White River Hydroelectric Project
FERC Project No. 2444

Final License Application

Volume 4
Documentation of Consultation

Prepared for

Northern States Power Company
a Wisconsin Corporation

Prepared by

Mead & Hunt
meadhunt.com

July 2023

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ATTACHMENTS

LIST OF ABBREVIATIONS AND TERMS

Applicant	Northern States Power Company, a Wisconsin Corporation
ATIS	Aquatic and Terrestrial Invasive Species
Bad River Tribe	Bad River Band of Lake Superior Chippewa Indians
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
DLA	Draft License Application
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
HPMP	Historic Properties Management Plan
JAM	Joint Agency Meeting
Licensee	Northern States Power Company, a Wisconsin Corporation
NGVD	National Geodetic Vertical Datum 1929
NPS	National Park Service
NOAA	National Oceanic and Atmospheric Administration
NSPW	Northern States Power Company, a Wisconsin Corporation
PAD	Pre-Application Document
Project	White River Hydroelectric Project
PSCW	Public Service Commission of Wisconsin
RAW	River Alliance of Wisconsin
TLP	Traditional Licensing Process
USACE	United States Army Corps of Engineers
EPA	United States Environmental Protection Agency
SHPO	Wisconsin State Historic Preservation Office
USFWS	United States Fish and Wildlife Service
UWSP WCFU	University of WI Stevens Point WI Cooperative Fisheries Unit
WCMP	Wisconsin Coastal Management Program
WDNR	Wisconsin Department of Natural Resources
WDOT	Wisconsin Department of Transportation

1. Listing of Stakeholder/Applicant Contacts

1.1 Listing of Stage 1 Contacts with Stakeholders

Table 1.1-1 presents contacts made between stakeholders and Northern States Power Company, a Wisconsin Corporation (Applicant, Licensee, or NSPW) the Applicant beginning with the Applicant's development and submittal of the Preliminary Application Document (PAD) to the stakeholders, continuing to include written study requests.

Contacts were made through meetings and written correspondence (including email). The following presents a summary of the various contacts.

Table 1.1-1 Listing of Stage 1 Contacts with Stakeholders

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Michael Wiggins Bad River Band of Lake Superior Tribe of the Chippewa (Bad River Tribe)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Edith Leoso Bad River Tribe	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Clinton Parish Bay Mills Indian Community of Michigan	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Marcus Ammesmaki Fond du Lac Band of the Minnesota Chippewa Tribe	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Karen Diver Fond du Lac Band of the Minnesota Chippewa Tribe	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
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Michael LaRonge Forest County Potawatomi Community of WI	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
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Wisconsin Cooperative Fisheries Research Unit University of WI Stevens Point (UWSP-WCFU)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Kathleen Angel Wisconsin Coastal Management Program (WCMP)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Tyler Howe State Historic Preservation Office (SHPO)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Michael David Scott Wisconsin Department of Natural Resources (WDNR)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
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Wisconsin Office of the Attorney General	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Wisconsin Office of the Governor	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
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Janet Bewley District 25 Senator	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Kimberly Bose Federal Energy Regulatory Commission (FERC)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Timothy Lapointe US Bureau of Indian Affairs (BIA)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Nannette Bischoff US Army Corps of Engineers (USACE)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
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Angela Tornes NPS	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Jen Tyler US Environmental Protection Agency (EPA)	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Glenn Grothman US Representative District 8	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
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Matthew Miller Xcel Energy	Darrin Johnson Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
James Zyduck Xcel Energy	Shawn Puzen Mead & Hunt	PAD Questionnaire	Letter	4/16/2020
Cheryl Laatsch WDNR	Shawn Puzen Mead & Hunt	Response to Questionnaire	Email	5/20/2020
Shawn Puzen Mead & Hunt	McCauley Haller WDNR	Response to Questionnaire	Email	5/29/2020
Shawn Puzen Mead & Hunt	McCauley Haller WDNR	Response to Questionnaire	Email	6/2/2020
Michael Wiggins Bad River Tribe	James Zyduck Xcel Energy	PAD, NOI, TLP Request	Letter	7/30/2020
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Tom Tiffany US Representative District 7	James Zyduck Xcel Energy	PAD, NOI, TLP Request	Letter	7/30/2020
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Cheryl Laatsch WDNR	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Michael Ostrenga WDOT	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Wisconsin Office of the Governor	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Beth Myers District 74 Representative	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Janet Bewley District 25 Senator	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Kimberly Bose FERC	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Timothy Lapointe BIA	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Nannette Bischoff USACE	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Mary Manydeeds BIA	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Nick Utrup USFWS	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Green Bay Field Office USFWS	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Tokey Boswell NPS	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Angela Tornes NPS	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Jen Tyler EPA	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Glenn Grothman US Representative District 6	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Senator Tammy Baldwin	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Senator Ron Johnson	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Heather Schutte Ashland County	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Brant Kucera City of Ashland	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Deb Lewis Ashland County	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Matthew Lehto Town of White River	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
James Fossum RAW	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Raj Shulka RAW	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Bob Stuber Michigan Hydro Relicensing Coalition	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Northwest Regional Planning Commission	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Mike Arrowood Walleye for Tomorrow	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Scott Crotty Xcel Energy	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Matthew Miller Xcel Energy	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
James Zyduck Xcel Energy	James Zyduck Xcel Energy	JAM Notification	Letter	10/7/2020
Eric Andrews, Bad River Tribe Edith Leoso, Bad River Tribe Jessica Strand, Bad River Tribe Nick Utrup, USFWS Connie Antonuk, WDNR Cheryl Laatsch, WDNR McCauley Haller, WDNR Michael Ostrenga, WDOT Tyler Howe, WSHPO Angela Tornes, NPS Matthew Miller, Xcel Energy Scott Crotty, Xcel Energy Randy Volbrecht, Xcel Energy James Zyduck, Xcel Energy Brauna Hartzell, Mead & Hunt Shawn Puzen, Mead & Hunt Arianna Schmidt, Mead & Hunt	Darrin Johnson Mead & Hunt	Invitation to JAM	Email	10/27/2020
Eric Andrews, Bad River Tribe Edith Leoso, Bad River Tribe Jessica Strand, Bad River Tribe Brauna Hartzell, Mead & Hunt Darrin Johnson, Mead & Hunt Shawn Puzen, Mead & Hunt Arianna Schmidt, Mead & Hunt Jen Schuetz, Mead & Hunt Angela Tornes, NPS Connie Antonuk, WDNR Macauley Haller, WDNR Michael Ostrenga, WDOT Tyler Howe, SHPO Scott Crotty, Xcel Energy Matthew Miller, Xcel Energy Randy Volbrecht, Xcel Energy	-	JAM Meeting	Virtual Meeting	10/29/2020
Kimberly Bose FERC	Scott Crotty Xcel Energy	JAM Proof of Publication	Letter	10/29/2020
Darrin Johnson Mead & Hunt	Tyler Howe SHPO	Comments on PAD	Email	9/4/2020
Paul Makowski FERC	Christine Gabriel NPS	Comments on PAD	Letter	10/8/2020
Matthew Miller Xcel Energy	Cheryl Laatsch WDNR	Comments on PAD/Study Requests	Letter	12/17/2020

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
FERC	Jessica Strand Bad River Tribe	Comments on PAD	Email	12/28/2020
FERC	Michael Wiggins Bad River Tribe	Comments on PAD	Letter	12/31/2020
Michael Wiggins Bad River Tribe	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Edith Leoso Bad River Tribe	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Brian Newland Bay Mills Indian Community of Michigan	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Kevin Dupuis, Sr. Fond du Lac Band of Lake Superior Chippewa	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Jill Hoppe Fond du Lac Band of Lake Superior Chippewa	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Ned Daniels, Jr. Forest County Potawatomi Community of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Michael LaRonge Forest County Potawatomi Community of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Andrew Werk, Jr. Fort Belknap Indian Community	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Michael Blackwolf Fort Belknap Indian Community	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Maryann Gagnon Grand Portage Band of the MN Chippewa Tribe	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Norman Des Champe Grand Portage Band of the MN Chippewa Tribe	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Marlin WhiteEagle Ho Chunk Nation of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
William Quackenbush Ho Chunk Nation of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Alden Connor Keweenaw Bay Indian Community	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Warren Swartz, Sr. Keweenaw Bay Indian Community	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Louis Taylor, Sr. Lac Courte Oreilles Band of Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Brian Bisonette Lac Courte Oreilles Band of Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
John Johnson Lac Du Flambeau Band of Lake Superior Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Melinda Young Lac Du Flambeau Band of Lake Superior Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Daisy McGeshick Lac Vieux Desert Band of Lake Superior Indians of MI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
James Williams Lac Vieux Desert Band of Lake Superior Indians of MI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Amy Burnette Leech Lake Band of Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Farron Jackson, Sr. Leech Lake Band of Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Regina Gasco-Bentley Little Traverse Bay Band of Odawa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Melissa Waitrolik Little Traverse Bay Band of Odawa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Joan Delabreau Menominee Indian Tribe of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
David Grignon Menominee Indian Tribe of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Douglas Lankford Miami Tribe of Oklahoma	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Diane Hunter Miami Tribe of Oklahoma	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Melanie Benjamin Mille Lacs Band of Ojibwe	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Natalie Weyaus Mille Lacs Band of Ojibwe	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Gary Frazer Minnesota Chippewa Tribe	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Stacy Cutbank Oneida Tribe of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Tehassi Hill Oneida Tribe of WI	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Chad Able Red Cliff Band of Lake Superior Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Rick Peterson Red Cliff Band of Lake Superior Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Marvin Defoe Red Cliff Band of Lake Superior Chippewa Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Chris McGeshick Sokaogon Chippewa Indian Community Mole Lake Band	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Adam Van Zile Sokaogon Chippewa Community Mole Lake Band	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Lewis Taylor St. Croix Band of Lake Superior Chippewa	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Wand McFaggen St. Croix Band of the Lake Superior Chippewa	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Shannon Holsey Stockbridge Munsee Tribe of Mohican Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Sherry White Stockbridge Munsee Tribe of Mohican Indians	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Nathan Allison Stockbridge Munsee Community	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Jamie Arsenault White Earth Band of the Minnesota Chippewa	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Michael Fairbanks White Earth Band of the Minnesota Chippewa	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
PSCW	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
UWSP-WCFU	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Kathleen Angel WCMP	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Tyler Howe SHPO	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Connie Antonuk WDNR	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Macaulay Haller WDNR	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Cheryl Laatsch WDNR	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Jeffery Schierer WDNR	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Wisconsin Office of the Governor	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Kimberly Bose FERC	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Tammy Poitra BIA	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Nannette Bischoff USACE	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Mary Manydeeds BIA	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Michael C. Connor US Department of Interior Comm. US Bureau Reclamation	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Nick Utrup USFWS	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Green Bay Field Office USFWS	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Christine Gabriel NPS	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Julie Galonska NPS	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Angela Tornes NPS	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Lisa Yager NPS	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Jen Tyler EPA	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Glenn Grothman US Representative District 6	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Tom Tiffany US Representative District 7	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Heather Schutte Ashland County	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Brant Kucera City of Ashland	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Deb Lewis Ashland County	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Dale Peters City of Eau Claire	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
City Manager City of La Crosse	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Marathon County	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Ronald Pete Town of Superior	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Town of Hayward	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Wes Huffer Town of Trego	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Brian Vosberg Town of Trego	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Barb Hinkfuss Town of Trego	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Lolita Olson Washburn County	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Matthew Lehto Town of White River	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
James Fossum RAW	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Raj Shulka RAW	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Bob Stuber Michigan Hydro Relicensing Coalition	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Northwest Regional Planning Commission	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Mike Arrowood Walleye for Tomorrow	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Thomas Frost Trego Lake District	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Charlie Peterson Trego Lake District	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Scott Crotty Xcel Energy	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Matthew Miller Xcel Energy	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
James Zyduck Xcel Energy	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Joan Harn NPS Consultant	James Zyduck Xcel Energy	Site Visit Notification	Letter	5/27/2021
Kimberly Bose FERC	James Zyduck Xcel Energy	Site Visit Proof of Publication	Letter	9/4/2020
Abi Fergus, Bad River Tribe Nathan Kilger, Bad River Tribe Jessica Strand, Bad River Tribe Shawn Puzen, Mead & Hunt Connie Antonuk, WDNR Cheryl Laatsch, WDNR Zach Lawson, WDNR Scott Crotty, Xcel Energy Tim Hudak, Xcel Energy Matthew Miller, Xcel Energy		On Site Visit	Meeting	6/17/2021
Kimberly Bose FERC	James Zyduck Xcel Energy	Site Visit Proof of Publication	Letter	6/24/2021

1.2 Listing of Stage 2 Contacts with Stakeholders

Table 1.2-1 presents contacts made between stakeholders and the Applicant, beginning after receipt of the written study requests, through consultation on the Draft License Application (DLA). Contacts were made through meetings and written correspondence. The following table presents a summary of the various contacts.

Table 1.2-1 Listing of Stage 2 Contacts with Stakeholders

Person/Agency Contacted	From	Item	Contact Type (Meeting or Letter/Email?)	Date
Eric Andrews, Bad River Tribe Edith Leoso, Bad River Tribe Jessica Strand, Bad River Tribe Connie Antonuk, WDNR Cheryl Laatsch, WDNR Tyler Howe, SHPO Nick Utrup, USFWS David Thomson, NPS Michael Ostrenga, WDOT Lilian Jonas, NPS Susan Rosebrough, NPS Scott Crotty, Xcel Energy Matthew Miller, Xcel Energy Shawn Puzen, Mead & Hunt	Darrin Johnson Mead & Hunt	Draft Study Summary	Email	8/2/2021
Matthew Miller Xcel Energy	Cheryl Laatsch WDNR	Comments on Draft Study Summary	Email	8/18/2021
Cheryl Laatsch WDNR	Shawn Puzen Mead & Hunt	Recreation Study Plan Consultation	Email	1/7/2022
Cheryl Laatsch, WDNR Eric Andrews, Bad River Tribe Jessica Strand, Bad River Tribe	Shawn Puzen Mead & Hunt	ATIS Study Plan Consultation	Email	1/27/2022
Shawn Puzen Mead & Hunt	Greg Malcom, WDNR	ATIS Study Plan Consultation	Email	1/27/2022
Shawn Puzen Mead & Hunt	Greg Malcom, WDNR	ATIS Study Plan Consultation	Email	2/1/2022
Cheryl Laatsch WDNR	Shawn Puzen Mead & Hunt	Mussel Study Plan Consultation	Email	2/2/2022
Shawn Puzen Mead & Hunt	Cheryl Laatsch WDNR	Mussel Study Plan Consultation	Email	2/16/2022
Cheryl Laatsch WDNR	Shawn Puzen Mead & Hunt	Fisheries Study Plan Consultation	Email	2/3/2022
Cheryl Laatsch WDNR	Shawn Puzen Mead & Hunt	Wood Turtle Study Plan Consultation	Email	2/3/2022

Person/Agency Contacted	From	Item	Contact Type (Meeting or Letter/Email?)	Date
Cheryl Laatsch WDNR	Shawn Puzen Mead & Hunt	Water Quality Study Plan Consultation	Email	2/3/2022
Kimberly Bose, FERC Cheryl Laatsch, WDNR Jessica Strand, Bad River Tribe	Scott Crotty Xcel Energy	Final Study Summary	Letter/Email	4/21/2022
Cheryl Laatsch WDNR	Shawn Puzen Mead & Hunt	Study Report Consultation	Email	12/6/2021
Shawn Puzen Mead & Hunt	Cheryl Laatsch WDNR	Study Report Consultation	Email	12/6/2022
Jessica Strand Bad River Tribe	Shawn Puzen Mead & Hunt	Study Report Consultation	Email	12/6/2022
Jessica Strand Bad River Tribe	Shawn Puzen	Study Report Consultation	Email	12/14/2022
Shawn Puzen Mead & Hunt	SHPO	Archaeological Survey Report Accepted	Email	1/20/2023
Shawn Puzen Mead & Hunt	Kimberly Cook SHPO	Archaeological Survey Report Concurrence	Email	2/15/2023
Kathleen Angel WCMP	Matthew Miller NSPW	CZMA Determination Request	Email/Letter	2/23/2023
Eric Andrews Bad River Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Abi Ferkus Bad River Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Edith Leoso Bad River Band of Lake Superior Tribe of the Chippewa	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Jessica Strand Bad River Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Michael Wiggins Bad River Band	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Whitney Gravelle Bay Mills Indian Community of Michigan	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Jill Hoppe Fond du Lac Band of the Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Kevin R Dupuis, Sr. Fond du Lac Band of the Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Ned Daniels, Jr. Forest County Potawatomi Community of WI	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting or Letter/Email?)	Date
Benjamin Rhodd Forest County Potawatomi Community of WI	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Jeffery Stiffarm Fort Belknap Indian Community of the Fort Belknap Reservation of MT	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Michael Blackwolf Fort Belknap Indian Community of the Fort Belknap Reservation of MT	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Maryann Gagnon Grand Portage Band of the MN Chippewa Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Norman Des Champe Grand Portage Band of the MN Chippewa Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
William Quackenbush Ho Chunk Nation of WI	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Gary Loonsfoot Keweenaw Bay Indian Community	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Warren Swartz Keweenaw Bay Indian Community	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Louis Taylor Lac Courte Oreilles Band of Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Brian Bisonette Lac Courte Oreilles Band of Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
John Johnson. Lac Du Flambeau Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Melinda Young Lac Du Flambeau Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Alina Shively Lac Vieux Desert Band of Lake Superior Indians of MI	Donald Hartinger Xcel Energy	DLA	Email	3/6/2023
James Williams Lac Vieux Desert Band of Lake Superior Indians of MI	Donald Hartinger Xcel Energy	DLA	Email	3/6/2023
Amy Burnette Leech Lake Band of Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Farron Jackson, Sr. Leech Lake Band of Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting or Letter/Email?)	Date
Regina Gasco-Bentley Little Traverse Bay Band of Odawa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Melissa Waitrolik Little Traverse Bay Band of Odawa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Ron Corn, Sr. Menominee Indian Tribe of WI	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
David Grignon Menominee Indian Tribe of WI	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Douglas Lankford Miami Tribe of Oklahoma	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Diane Hunter Miami Tribe of Oklahoma	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Melanie Benjamin Mille Lacs Band of Ojibwe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Natalie Weyaus Mille Lacs Band of Ojibwe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Gary Frazer Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Catherine Chavers Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Nicholas Metoxen Oneida Tribe of WI	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Tehassi Hill Oneida Tribe of WI	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Chad Able Red Cliff Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Christopher Boyd Red Cliff Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Marvin Defoe Red Cliff Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Robert Van Zile, Jr. Sokaogon Chippewa Indian Community Mole Lake Band	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Michael LaRonge Sokaogon Chippewa Community Mole Lake Band	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Lewis Taylor St. Croix Band of Lake Superior Chippewa	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Shannon Holsey Stockbridge Munsee Tribe of Mohican Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Sherry White Stockbridge Munsee Tribe of Mohican Indians	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting or Letter/Email?)	Date
Jamie Arsenault White Earth Band of the Minnesota Chippewa	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Michael Fairbanks White Earth Band of the Minnesota Chippewa	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
PSCW	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
UWSP-WCFU	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Kathleen Angel WCMP	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Tyler Howe SHPO	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Connie Antonuk WDNR	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Cheryl Laatsch WDNR	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Michael Ostrenga WDOT	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Wisconsin Office of the Governor	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Beth Myers District 74 Representative	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Janet Bewley District 25 Senator	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Kimberly Bose FERC	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Mic Isham Great Lakes Indian Fish and Wildlife Commission (GLIFWC)	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Tammy Poitra BIA	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Nannette Bischoff USACE	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Mary Manydeeds BIA	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Darrin Simpkins USFWS	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Green Bay Field Office USFWS	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Christine Gabriel NPS	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Jeff Duncan NPS	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Lillian Jonas NPS Consultant	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting or Letter/Email?)	Date
Susan Rosebrough NPS	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
David Thomson NPS	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Jen Tyler EPA	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Glenn Grothman US Representative District 6	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Senator Tammy Baldwin	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Senator Ron Johnson	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Heather Schutte Ashland County	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Brant Kucera City of Ashland	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Matthew Mackenzie City of Ashland	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Lynn Divine Bayfield County	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Matthew Erickson Town of Kelly	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Matthew Lehto Town of White River	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
James Fossum RAW	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Allison Werner RAW	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Bob Stuber Michigan Hydro Relicensing Coalition	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Northwest Regional Planning Commission	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Mike Arrowood Walleye for Tomorrow	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Brian C and Jamie Anderson Landowner	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Brian K and Linda Anderson Landowner	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
George and Dorota Bussey Landowner	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Fran Hagstrom Landowner	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Jacob and Torri Irbeck Landowner	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Northland College Landowner	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting or Letter/Email?)	Date
Scott Crotty Xcel Energy	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Matthew Miller Xcel Energy	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Donald Hartinger Xcel Energy	Donald Hartinger Xcel Energy	DLA	Letter	3/6/2023
Kimberly D. Bose FERC	Jacob Slattery Bad River Tribe	Comments on DLA	Letter	06/02/2023

1.3 Listing of Stage 3 Contacts with Stakeholders

Table 1.3-1 presents a list of correspondence from the Applicant to the stakeholders transmitting a letter with a link to an electronic copy of the Final License Application (FLA) as submitted to the Federal Energy Regulatory Commission.

Table 1.3-1 Listing of Stage 3 Contacts with Stakeholders

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Eric Andrews Bad River Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Abi Ferkus Bad River Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Lawrence Plucinski Bad River Band of Lake Superior Tribe of the Chippewa	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Jessica Strand Bad River Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Michael Wiggins Bad River Band	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Whitney Gravelle Bay Mills Indian Community of Michigan	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Jill Hoppe Fond du Lac Band of the Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Kevin R Dupuis, Sr. Fond du Lac Band of the Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Ned Daniels, Jr. Forest County Potawatomi Community of WI	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Benjamin Rhodd Forest County Potawatomi Community of WI	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Jeffery Stiffarm Fort Belknap Indian Community of the Fort Belknap Reservation of MT	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Michael Blackwolf Fort Belknap Indian Community of the Fort Belknap Reservation of MT	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Maryann Gagnon Grand Portage Band of the MN Chippewa Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Norman Des Champe Grand Portage Band of the MN Chippewa Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
William Quackenbush Ho Chunk Nation of WI	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Gary Loonsfoot Keweenaw Bay Indian Community	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Warren Swartz Keweenaw Bay Indian Community	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Louis Taylor Lac Courte Oreilles Band of Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Brian Bisonette Lac Courte Oreilles Band of Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
John Johnson. Lac Du Flambeau Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Melinda Young Lac Du Flambeau Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Alina Shively Lac Vieux Desert Band of Lake Superior Indians of MI	Donald Hartinger Xcel Energy	FLA	Email	07/21/2023
James Williams Lac Vieux Desert Band of Lake Superior Indians of MI	Donald Hartinger Xcel Energy	FLA	Email	07/21/2023
Amy Burnette Leech Lake Band of Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Farron Jackson, Sr. Leech Lake Band of Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Regina Gasco-Bentley Little Traverse Bay Band of Odawa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Melissa Waitrolik Little Traverse Bay Band of Odawa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Ron Corn, Sr. Menominee Indian Tribe of WI	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
David Grignon Menominee Indian Tribe of WI	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Douglas Lankford Miami Tribe of Oklahoma	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Diane Hunter Miami Tribe of Oklahoma	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Melanie Benjamin Mille Lacs Band of Ojibwe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Natalie Weyaus Mille Lacs Band of Ojibwe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Elizabeth Drost Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Catherine Chavers Minnesota Chippewa Tribe	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Nicholas Metoxen Oneida Tribe of WI	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Tehassi Hill Oneida Tribe of WI	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Chad Able Red Cliff Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Christopher Boyd Red Cliff Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Marvin Defoe Red Cliff Band of Lake Superior Chippewa Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Robert Van Zile, Jr. Sokaogon Chippewa Indian Community Mole Lake Band	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Michael LaRonge Sokaogon Chippewa Community Mole Lake Band	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Lewis Taylor St. Croix Band of Lake Superior Chippewa	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Shannon Holsey Stockbridge Munsee Tribe of Mohican Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Sherry White Stockbridge Munsee Tribe of Mohican Indians	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Jamie Arsenault White Earth Band of the Minnesota Chippewa	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Michael Fairbanks White Earth Band of the Minnesota Chippewa	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
PSCW	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
UWSP-WCFU	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Kathleen Angel WCMP	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Tyler Howe SHPO	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Connie Antonuk WDNR	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Cheryl Laatsch WDNR	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Michael Ostrenga WDOT	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Wisconsin Office of the Governor	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Beth Myers District 74 Representative	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Janet Bewley District 25 Senator	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Kimberly Bose FERC	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Executive Administrator GLIFWC	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Tammy Poitra BIA	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Nannette Bischoff USACE	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Mary Manydeeds BIA	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Darin Simpkins USFWS	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Green Bay Field Office USFWS	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Christine Gabriel NPS	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Alysa Walker NPS	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Lillian Jonas NPS Consultant	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Susan Rosebrough NPS	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
David Thomson NPS	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023

Person/Agency Contacted	From	Item	Contact Type (Meeting, Letter, Email?)	Date
Jen Tyler EPA	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Glenn Grothman US Representative District 6	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Senator Tammy Baldwin	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Senator Ron Johnson	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Heather Schutte Ashland County	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Brant Kucera City of Ashland	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Matthew Mackenzie City of Ashland	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Lynn Divine Bayfield County	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Matthew Erickson Town of Kelly	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Matthew Lehto Town of White River	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
James Fossum RAW	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Allison Werner RAW	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Bob Stuber Michigan Hydro Relicensing Coalition	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Northwest Regional Planning Commission	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
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Brian C and Jamie Anderson Landowner	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Brian K and Linda Anderson Landowner	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
George and Dorota Bussey Landowner	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Fran Hagstrom Landowner	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Jacob and Torri Irbeck Landowner	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Northland College Landowner	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Scott Crotty Xcel Energy	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023
Matthew Miller Xcel Energy	Donald Hartinger Xcel Energy	FLA	Letter	07/21/2023

2. Consultation Summary

The following sections present a summary of stakeholder comments, recommendations, and concerns and Applicant responses and positions relating to consultation following the submittal of the PAD to the stakeholders and ending in the filing of the FLA. A brief Project description is provided below for a basis for subsequent discussions. A detailed Project description is provided in Exhibit A in Volume 1 of this FLA.

White River Project Description

The Project is located on the White River, approximately 13 miles upstream of the river's confluence with the Bad River in Ashland and Bayfield Counties, Wisconsin.

The Project works consist of (1) a 46-foot high and 775-foot-long earth and concrete dam that includes a left earth embankment, an intake structure, a gated spillway section and a right earth embankment; (2) a reservoir with a maximum surface area of 39.9 acres and a maximum gross storage capacity of approximately 297 acre-feet at an elevation of 711.6 feet National Geodetic Vertical Datum 1929 (NGVD); (3) a 1,346-foot long conveyance system from the intake to the powerhouse consisting of a 7-foot diameter conduit, a 16-foot diameter surge tank, and two 5.5-foot diameter penstocks; (4) a concrete powerhouse that houses two generating units with a total authorized installed capacity of 1,200 kilowatts (kW); (5) a 2.4 kilovolt (kV), 220-foot long underground transmission line from the powerhouse to the non-project substation containing the 1,000 kVA, 69/2.4 kV 3-phase step-up transformer; and (6) appurtenant facilities.

The Project operates as a run-of-river facility for the purpose of generating hydroelectric power where the discharge measured immediately downstream of the Project approximates inflows into the Project reservoir. In order to minimize water level fluctuations, the reservoir is operated between elevations 710.4 and 711.6 feet NGVD. A minimum flow of 16 cubic feet per second or inflow, whichever is less, is released into the approximately ¼ mile long bypass reach at all times to protect aquatic resources.

Under the proposed operation, just prior to spring runoff and for emergency operations, NSPW may deviate from the maximum reservoir elevation by not more than 0.5 feet to remove ice from the spillway for dam safety purposes. The duration of the deviation shall be no longer than necessary, typically less than a few days, to remove the ice and will be conducted as a planned deviation under the requirements outlined in Section 5.8 of Exhibit E of this FLA.

2.1 Stage 1 Consultation Summary

Stage 1 Consultation Summary includes consultation beginning with pre-licensing questionnaires to obtain information to develop the PAD and ending with written comments and study requests from interested stakeholders. Formal comments and study requests were received from the following organizations/interested parties:

- Bad River Tribe
- National Park Service
- Wisconsin Department of Natural Resources
- Wisconsin State Historic Preservation Office

Comments and study requests received are located in Section 3.1 below.

2.2 Stage 2 Consultation Summary

The following presents a summary of stakeholder comments, recommendations, and concerns and Applicant responses and positions relating to consultation following the written study requests and ending with the stakeholder comments on the DLA. The summary is arranged by subject matter with stakeholder comments, recommendations, and concerns followed by Applicant positions being presented on a stakeholder-by-stakeholder basis.

Any additional narratives, letters, and other information provided within this application further delineate the present positions of the parties.

2.2.1 Study Summary

Based on the study requests submitted during the first stage of consultation, NSPW developed a draft study summary to identify study plans to be completed and the general study protocols.

In the study summary, NSPW proposed to complete the following activities:

- Aquatic and Terrestrial Invasive Species (ATIS)
- Fisheries Study and Riverine Habitat Assessment
- Mussel Study
- Phase 1 Archaeological Survey and Shoreline Monitoring
- Recreation Use Study
- Water Quality Study
- Wood Turtle Nesting Habitat Study

NSPW provided a draft study summary to the agencies/entities who requested studies on August 2, 2021 for comment. WDNR provided comments on August 18, 2021. Comments received and NSPW's responses are described in the sections below and are located in Section 3.2. A final study summary including copies of the final study plans that addressed stakeholder comments was submitted to FERC on April 21, 2022.

2.2.1.1 Aquatic and Terrestrial Invasive Species Study Plan

The ATIS Study Plan was distributed to the Bad River Tribe and WDNR for comment on January 13, 2022. The Bad River Tribe did not respond with comments. WDNR responded with comments on January 26, 2022, which were subsequently incorporated into the final study plan.

2.2.1.2 Fisheries Study and Riverine Aquatic Habitat Assessment Study Plan

The Fisheries Study and Riverine Aquatic Habitat Assessment Study Plan was submitted to WDNR on February 3, 2022 for comment. The WDNR did not respond with comments.

2.2.1.3 Mussel Study Plan

The Mussel Study Plan was submitted to WDNR on February 2, 2022 for comment. WDNR responded on February 16, 2022 indicating it did not have comments.

2.2.1.4 Phase 1 Archaeological Survey of Project Shoreline

NSPW conducted a Phase I Archaeological Survey of the Project shorelines. Since the procedures to conduct the studies are set forth in the existing Programmatic Agreement, no specific study plan was developed for consultation. The Archaeological Survey Report was filed with the SHPO on January 20, 2023 and the SHPO concurred with the recommendations in the report on February 15, 2023.

2.2.1.5 Recreation Use Study Plan

The Recreation Study Plan was submitted to WDNR on January 7, 2022 for comment. WDNR did not respond with comments. A subsequent telephone conversation with Cheryl Laatsch of WDNR indicated no comments would be provided.

2.2.1.6 Water Quality Study Plan

The Water Quality Study Plan was submitted to WDNR on February 3, 2022 for comment. WDNR did not respond with comments.

2.2.1.7 Wood Turtle Nesting Habitat Study Plan

The Wood Turtle Nesting Habitat Study Plan was submitted to the WDNR on February 3, 2022 for comment. The WDNR did not respond with any comments.

2.2.2 Study Reports

The studies were performed in 2022 per the final study plans. Draft study reports were provided to the Bad River Tribe and WDNR on December 6, 2022 for comment. No comments on any of the study reports were received.

2.2.3 Comments on DLA

NSPW sent a letter with a link to an electronic version of the DLA to all stakeholders on the distribution list. Comments were received from the Bad River Tribe on June 2, 2023. No other comments on the DLA were received. The comment letter is included in Attachment B. A summary of substantive comments and NSPW's responses are provided below.

<u>Comment 1:</u>

The Tribe, as a downstream nation with federally-approved Water Quality Standards (WQS), and regulatory authority under Clean Water Act Sections 303(c) and 401, should not be treated as every other stakeholder in the relicensing process, and should be involved in additional conversations regarding this project to ensure that federal permitting for the operation of the dam meets the Tribe's WQS.

<u>NSPW Response:</u>

The Bad River Tribe's water quality standards apply to water located within the boundaries of the Bad River Reservation, which is located several miles downstream of the Project. Waters within the Project boundary, however, are only subject to the State of Wisconsin's water quality standards. A discussion regarding the Project's compliance with state water quality standards applicable within the Project boundary is included in Section 5.4 of the FLA.

Comment 2:

LiDAR data used to determine updated contours for application materials was the 2014 LiDAR data for Ashland County, Wisconsin, which was collected prior to severe flooding that occurred in July 2016 that drastically changed the landscape of the watershed. Thus, we feel that the more accurate data to use in determining contours should be the more recent 2019 LiDAR data and thus the application materials and other information should be updated accordingly.

NSPW Response*:*

NSPW conducted the shoreline erosion, wood turtle, and terrestrial invasive species surveys along the entire shoreline of the Project reservoir; therefore, any significant changes in the shoreline topography caused by the 2016 flooding event would have been noted. No such changes in topography were identified in any of the survey reports.

The 2019 LiDAR data was reviewed by NSPW during the development of this application. NSPW found that the 2019 data could not be used to determine the contour of the shoreline at the proposed maximum reservoir elevation of 711.6 feet because, at the time of the 2019 flight, the reservoir elevation was greater than 711.6 feet and the corresponding contour was submerged and not visible.

For the aforementioned reasons, and for the purposes of this FLA, NSPW has determined that the 2014 LiDAR data is sufficient for determining elevation contours.

Comment 3:

The wetland data used for the PAD was the National Wetland Inventory, which upon last review by MNRD staff, uses the outdated version of the Wisconsin Wetland Inventory for mapped wetlands for Ashland County from 1991. The more recently updated Wisconsin Wetland Inventory from 2013 should be used to prepare application materials and determine possible impacts to wetlands, if the step of performing a true on-the-ground delineation is not completed.

NSPW Response:

The National Wetland Inventory Data provides sufficient background information and context on wetlands in the vicinity of the Project for the purposes of this relicensing. The Project operates in a run-of-river mode where the discharge measured immediately downstream of the Project tailrace approximates the sum of inflows into the Project reservoir. Reservoir fluctuations are limited by operating the reservoir between elevations 710.4 and 711.6 feet NGVD and a minimum flow of 16 cubic feet per second or inflow, whichever is less, is released into the bypass reach at all times to protect aquatic resources. As no substantive changes to Project operations are proposed, no adverse impacts to wetlands are anticipated.

While the proposed reduction of the Project boundary includes removal of some wetlands, these areas are not inundated by the impoundment at the maximum reservoir elevation of 711.6 feet NGVD and, therefore, are not necessary for the Project. Should these wetlands be removed from the Project boundary they will still be subject to local, state, and federal wetland protections.

<u>Comment #4:</u>

We believe that long-term prevention and management of aquatic invasive species (AIS) influenced by the White River Hydroelectric project were not addressed for the following reasons. Both aquatic and terrestrial invasive species studies were completed, profiling the White River Flowage for potential threats both upstream and downstream of the dam. We've also noted a commitment to allocating capital costs to develop a rapid response management plan, presumably to prevent and manage the introduction and spread of non-local beings. We think this settles short-term prevention and management, however we also raise concerns related to long-term prevention and management of aquatic invasive species (AIS) influenced by the White River Hydroelectric project.

<u>NSPW Response:</u>

In Section 6.4.1.1 of Exhibit E, NSPW proposes to develop a rapid response invasive species monitoring plan to monitor for the introduction of new “rapid response” invasive species. The plan would be developed in consultation with the WDNR and the Bad River Tribe prior to filing it with the Commission for approval. The plan would include a provision to conduct the surveys biennially.

<u>Comment #5:</u>

The White River flowage contains aquatic invasive plants like cattail which are a threat to downstream native floral and faunal communities and natural habitats for various fish and wildlife. Just like during dam drawdowns, it would be prudent to conduct AIS surveys and treatment in the reservoir and incorporate not just short-term but long-term monitoring and management of the reservoir. The license should include a botanical survey of the cattail clones, reed canary grass or other nonnative plant populations upstream of the White River dam to establish a baseline volume/extent of nonnative plant populations/density. This data could be shared with local AIS coordinators including Bad River and the Ashland County LWCD.

The goals would be to suppress aquatic invasive plants like cattails and reed canary grass. This will help MNRD meet its invasive species prevention and management plan, and those management plans of the Ashland County Land and Water Conservation Department.

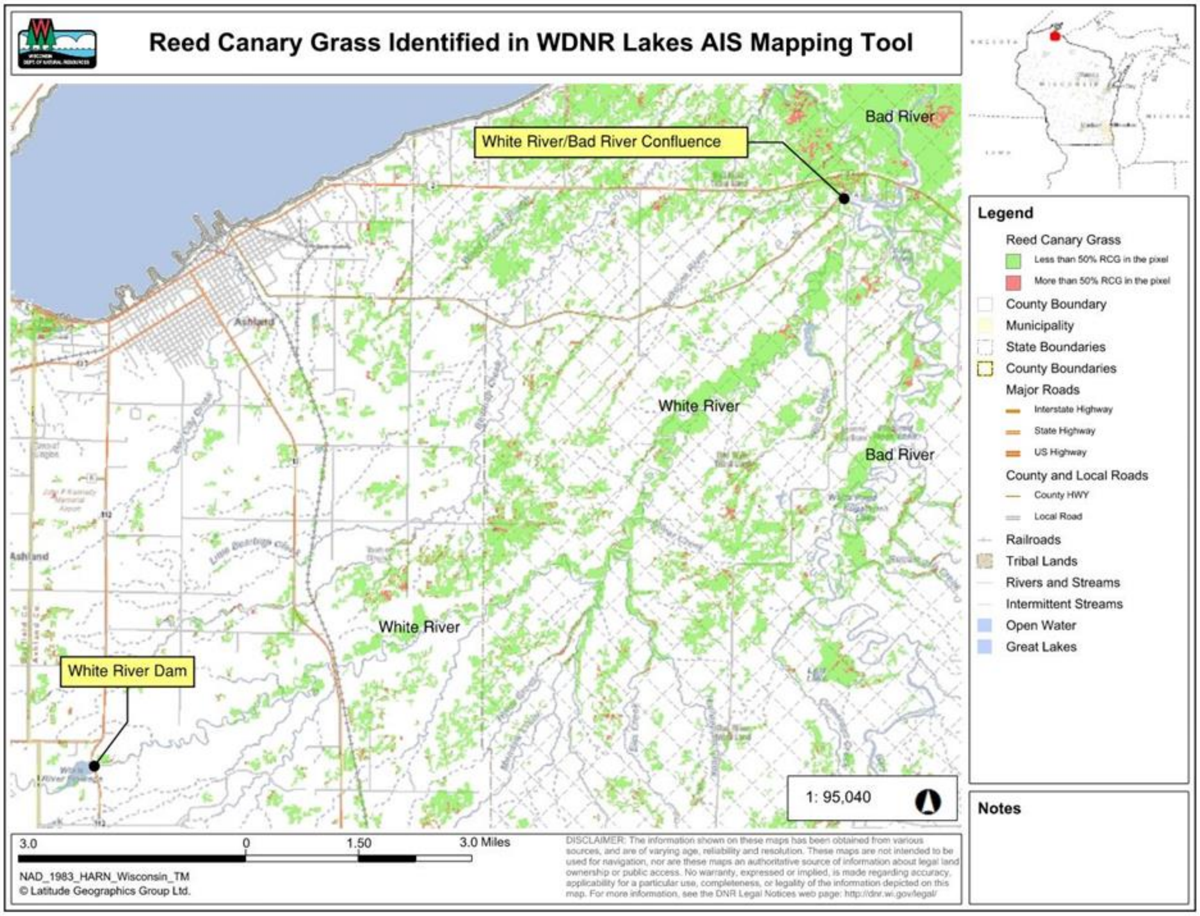
<u>NSPW Response:</u>

The Tribe's request for additional AIS surveys and treatment will be addressed in the final rapid response invasive species monitoring plan described in Section 6.4.1.1 of Exhibit E. NSPW proposes develop a plan within one year of license issuance to monitor for the introduction of new “rapid response” species and limit the dispersal of established species. The plan would be developed in consultation with the WDNR and the Bad River Tribe prior to filing it with the Commission for approval. The plan would include a provisions to conduct the surveys biennially.

Reed canary grass is commonly found in wetlands throughout Ashland County as well as statewide. **Figure 2.2.3-1** shows the existing mapped reed canary grass populations in the vicinity of the Project. While there are limited populations of reed canary grass adjacent to White River Flowage, the species is currently more prevalent in several other watersheds in the area. There are also existing widespread populations of reed canary grass along the White River where other tributaries contribute to the river, along the Bad River upstream of its confluence with the White River, and within the Kakagon Slough.

Since there are extensive widespread populations of reed canary grass already located in the vicinity, continued operation of the Project is unlikely to result in additional infestation of the species and no additional study is necessary. Additionally, as the species is not regulated by the State of Wisconsin under NR 40 as a prohibited or restricted species, NSPW is not proposing to monitor for it.

Figure 2.2.3-1 Mapped Reed Canary Grass in the Project Vicinity



Comment #6:

Resource: WDNR to Xcel PAD concerns (December 17, 2020 attached)--Concerns raised by the Wisconsin Department of Natural Resources over drawdown -- the non- local beings program with the MNRD shares the concerns of the DNR over the implementation of the drawdown. Compliance with the drawdown process also helps limit the mobility of invasive propagules spreading from the reservoir.

NSPW Response:

The Bad River Tribe shared the concerns of the WDNR as included in the WDNR's December 17, 2020 letter providing comments on the PAD and study requests. In the WDNR's letter, they indicated that they would request a drawdown plan as part of its water quality certification for the Project. Since routine drawdowns of the Project are not regularly conducted, the details (purpose, timing, depth of drawdown, length of drawdown, refill conditions, etc.) of future drawdowns cannot be determined at this time as each drawdown is unique and must be addressed on a case-by-case basis.

Additionally, any drawdown exceeding three weeks or longer would require NSPW to submit an application for a temporary license amendment to FERC for approval. Therefore, NSPW proposes to consult with the resource agencies and the Bad River Tribe when developing any temporary license amendment application prior to submittal to FERC. Resource agencies and Bad River Tribe concerns will be addressed in the final temporary license amendment request submitted to the FERC.

If a drawdown of less than three weeks in duration is necessary during the subsequent license term, it will be considered a planned deviation and follow the guidelines identified in Section 5.8 of Exhibit E. As part of the planned deviation process, NSPW must consult with the resource agencies and the Bad River Tribe for concurrence. This process allows the resource agencies and the Bad River Tribe to express any concerns they may have regarding drawdown conditions or invasive species prior to implementation.

Comment #7:

The licensee should conduct appropriate studies to investigate the delivery and passage of sediment upstream and downstream of the White River Hydroelectric Project during the new license period. These studies should adequately compare sediment transport models with empirical sediment yield to produce meaningful models, calibrate, and validate those models. Derived models could then be used to assess different land use, project management scenarios, and specifically model the White River with and without the hydroelectric dam. Additionally, the licensee should conduct thorough and comprehensive sediment and sampling program to access the entrainment of heavy and toxic metals, industrial chemicals, and non-point source agricultural and nutrient pollution entrained in the facies of trapped sediment within the impoundments inundated area.

Therefore, the licensee, at a minimum should be required to conduct the following studies (note: staff with MNRD would like these studies to be conducted every five years):

> *a. Define the mechanisms of sedimentation and fluvial response by assessing current conditions with historical photogrammetry and records. This should include bathymetric calculations with comparisons pre-construction and with current bathymetry and storage calculations.*
> *b. Analyze sediment particle distribution, channel storage, bedload flux and rate of entrapment by the White River Hydroelectric Dam.*
> *c. Conduct an investigation of suspended sediment load throughout the full range of flow for at least 2 years.*
> *d. Use Bathymetry mapping for pre and post drawdown to ensure the effectiveness of drawdown methods to determine if sediments are being resuspended and released.*
> *e. Conduct comprehensive bedload core and grab sampling and suspended sediment sampling to assess heavy and toxic metal, industrial and agricultural chemical pollution to include nonpoint source nutrient entrainment of facies deposition.*
> *f. Model future conditions of bedload and suspended sedimentation to predict effects upon project alternatives to include project decommissioning and river restoration.*

NSPW Response:

NSPW completed a shoreline erosion survey and determined that Project operations were not causing a noticeable contribution to the sediment in the reservoir. Therefore, the presence of the sediment does not have a nexus to the proposed operation of the Project. As previously noted, the Project operates in a run-of-river mode where the discharge measured immediately downstream of the Project tailrace approximates the sum of inflows into the Project reservoir. Reservoir fluctuations are limited by operating the reservoir between elevations 710.4 and 711.6 feet NGVD. This type of operation precludes any significant erosion from occurring along the reservoir.

No dredging activities are proposed within the reservoir and no construction is proposed that would be expected to disturb reservoir sediments. Routinely scheduled drawdowns of the reservoir are not necessary to operate the Project and no drawdowns have been proposed as part of this application. Additionally, FERC does not require applicants to study pre-project conditions. The environmental baseline for relicensing is the environment as it exists at the time of relicensing, not pre-project conditions and any studies modeling conditions without the dam in place are not warranted.

For the above-stated reasons, the requested sediment studies would not provide information that could be useful in developing potential license requirements and completing such a study is not appropriate in this relicensing proceeding.

Comment #8:

Climate change study -- the Northwoods is expected to see increases in ambient air and water temperatures, longer growing seasons, lower water levels, and an expected decline in ice cover and snow accumulation. These create long-term concerns over wetland habitat loss and wildlife occupancy and success, nutrient enrichment, erosion and sedimentation. A cumulative impacts study should capture the long-term effects that the dam has on floral and faunal communities, habitat quality, water quality, and water flow.

NSPW Response:

The FERC will consider the effects of climate change on the proposed action and its environmental impacts. Existing information and data sources are sufficient for this analysis. Therefore, there is no need for a specific climate change study.

Comment #9:

The release of flood waters from the dam during the 2016 flooding in the Bayfield, Ashland, and Iron Counties had impacts downstream that are not fully understood and the Bad River Community continues to have questions about possible future impacts from a similar or worse flood event in light of climate change and an increase in severe precipitation events. We request that a flood study be conducted concurrent with the re- licensing process so that possible impacts of a release of flood waters during different scenarios can be fully understood and flood forecasting can be completed with the National Weather Service to provide the best possible emergency response planning available to the Tribal community. This study would be necessary for MNRD to fully develop an emergency response plan for different dam release scenarios and could identify some operational requirements for the dam that would need to be included in the re-licensing. Methodology could be developed in coordination with the National Weather Service and the US Geological Survey, both of which have well-establishes protocols for this type of work and the expertise to tailor these protocols to the White River Subwatershed.

NSPW Response:

SENT TO XCEL FOR RESPONSE.

A flood study is not warranted based on the Project's operating requirements and available storage. The Project is operated as run-of-river and therefore has negligible impact on downstream flooding as inflow and outflow are essentially equal. The drainage area at the project is 301 square miles and the reservoir has a surface area of 39.9 acres, therefore, storage is insignificant relative to the watershed and the Project is not capable of providing any meaningful flood control nor significant flood releases. The river is flashy as evidenced during floods in 2016 and 2018. Any attempt to provide flood control would threaten the safety of the dam.

The 2016 flood was a flood of record on the Bad River and, until 2018, on the White River. The USGS gauge (04027000) on the Bad River just upstream of the confluence with the White River recorded a peak discharge of 40,000 cfs on July 12, 2016. The White River just downstream of the White River Hydro Project (USGS 04027500) recorded a peak discharge of 7,990 cfs on July 12, 2016. Clearly, the White River was far less a factor in the 2016 flood than the Bad River. On June 17, 2018, the White River recorded a peak discharge of 11,800 cfs. The peak discharge on the Bad River (USGS 04027000) was 14,300 cfs on June 18, 2018. NSPW is not aware of any significant flooding issues on the Bad River in 2018. The Bad River drainage area is nearly twice that of the White River and thus is the primary contributor to flooding on the Bad River downstream of the confluence with the White River.

If flood forecasting is desired, the National Weather Service is best equipped to provide it. There are existing gauges on both the Bad and White Rivers that should be sufficient for the NWS to develop models.

Comment #10:

Safe operation of the White River dam mitigates social and ecological risk associated with the downstream impacts. The appropriate channels of communication and notification to authorities should be followed. MNRD must also be an authority to notify and coordinate with in the event of sediment releases, an emergency or imminent risk of dam compromising events like floods, or any likelihood of dam failure. Emergency tabletop exercises are a helpful and effective tool to bring together staff and tribal members from Bad River to work through, and practice, scenarios and appropriate effective communication steps to manage a range of risks to the downstream area.

NSPW Response

The White River Dam is classified as a low-hazard dam and has an existing Emergency Action Plan (EAP). NSPW submitted its updated EAP for the Project to the Commission on December 22, 2022 (FERC Accession No. 20221222-5303). The EAP provides updated information regarding the coordination with stakeholders during emergency situations, including flooding. The EAP's notification flowcharts are tested annually.

Comment #11:

Additionally, we would like to ensure the proper lines of communication about unscheduled releases of the dam and communication about scheduled drawdowns happens in a timely manner to ensure that impacts to tribal waters and tribal events, like spring fishing, is minimized. In addition, MNRD would also *like to be notified - same as FERC, WDNR and USFWS — of any planned or unplanned deviations. Communication protocols and procedures should be properly addressed in the relicensing of the dam.*

NSPW Response:

NSPW has included the Bad River Tribe in the reporting requirements for planned and unplanned deviations in Section 5.8 of Exhibit E. The Bad River Tribe has also been added as one of the parties to be consulted if a temporary license amendment is required during the term of the subsequent license.

Comment #12:

Finally, we would like to add that cultural and historical considerations do not appear to be adequately addressed, and we will be communicating our concerns regarding these issues with the applicant and FERC in follow-up communications, as we continue to have an interest in this project under the National Historic Preservation Act and 36 CFR 800.

NSPW Response:

In Section 7.3.2 of the FLA, NSPW has proposed to develop a Historic Resources Management Plan (HPMP) in accordance with Stipulation II of the Programmatic Agreement. This plan will be developed within one year of license issuance in consultation with the SHPO, Bad River Tribe, and any other interested Native American Nations. NSPW looks forward to working with the Bad River Tribe and other stakeholders in the development of the HPMP.

3. Documentation of Consultation

The White River Project license was issued on August 29, 1995 for a term of 30 years with an effective date of August 1, 1995 and an expiration date of July 31, 2025. On July 29, 2020, NSPW filed a Notice of Intent (NOI) to relicense the Project, a PAD with information on the Project, and a request to use the TLP. The FERC granted NSPW's TLP request on September 16, 2020. Each stage of consultation is further discussed in the following sections.

3.1 Stage 1 Consultation

In accordance with the deadlines set by the FERC, NSPW held a virtual Joint Agency Meeting (JAM) on October 29, 2020 due to the COVID-19 Centers for Disease Control and corporate guidelines to avoid public gatherings and discretionary travel in place at the time. A public notice of the JAM was published in the Ashland Daily Press on October 16, 2020. The FERC was also notified of this meeting on October 7, 2020. The virtual JAM was attended by ten individuals from resource agencies and interested members of the public and eight individuals from NSPW and their relicensing consultant. A site visit to the Project was held on June 17, 2021. A public notice of the site visit was published on June 1, 2021 in the Ashland Daily Press. The FERC was also notified of the meeting on May 27, 2021.

Comments and study requests were received after the JAM by the following entities: The Bad River Tribe, National Park Service (NPS), Wisconsin State Historic Preservation Office (SHPO), and Wisconsin Department of Natural Resources (WDNR).

Copies of all Stage 1 correspondence between stakeholders and the Applicant, beginning with the submittal of the PAD Questionnaire by the Applicant to the Stakeholders and ending with the written study requests are included in **Attachment A**. The correspondence is presented in chronological order.

3.2 Stage 2 Consultation

Copies of all Stage 2 correspondence between stakeholders and the Applicant, following the written study requests through consultation on the DLA, and ending just before the filing of the FLA are included in **Attachment B**. The correspondence is presented on a stakeholder-by-stakeholder basis in chorological order.

3.3 Stage 3 Consultation

NSPW sent a copy of the cover letter of the FLA with a link to the Project's relicensing website to all relevant resource agencies, tribes, non-governmental organizations, and other potential interested parties included in the distribution list via certified mail (including owners of any property adjacent to or within the Project boundary). From this website (http://hydrorelicensing.com/) an electronic copy of the public portions of the FLA may be downloaded. Stakeholders that experience difficulty downloading the document may request an electronic version on a USB drive be sent via US Mail.

4. Evidence of Holding Public Meeting

4.1 Newspaper Notice

In accordance with the deadlines set by the FERC, NSPW held a virtual JAM on October 29, 2020 due to COVID-19 Centers for Disease Control and corporate guidelines to avoid public gatherings and discretionary travel at the time. A public notice of the JAM was published in the Ashland Daily Press on October 16, 2020. The FERC and stakeholders were also notified of this meeting on October 7, 2020. A site visit to the Project was held on June 17, 2021. A public notice of the site visit was published on June 1, 2021 in the Ashland Daily Press. The FERC and stakeholders were also notified of this meeting on May 27, 2021.

Xcel Energy®

1414 West Hamilton Avenue
P.O. Box 8
Eau Claire, Wisconsin 54702-0008
Telephone (800) 895-4999

October 29, 2020

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **<u>Proof of Publication of Notice of Joint Meeting</u>**
White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose:

Northern States Power Company-Wisconsin (NSPW), d/b/a Xcel Energy, published a notice in the Ashland Daily Press, a daily newspaper of general circulation in Ashland County, Wisconsin, announcing the October 29, 2020 Joint Meeting for the White River Hydroelectric Project (FERC Project No. 2444). The notice was published on October 16, 2020 and a copy of the Affidavit of Publication is enclosed.

Should you have any questions, please contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

Scott Crotty Digitally signed by Scott Crotty Date: 2020.10.29 07:21:35 -05'00'

For: James Zyduck
Director, Hydro Plants

Enclosure: Affidavit of Publication

cc: Shawn Puzen – Mead & Hunt, Inc. (via e-mail)
Project Files

ROP AFFIDAVIT

October 19, 2020

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WI/Ashland Daily Press (Ashland, WI)

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Sworn to and subscribed before me this_____day of 10.19.2020__, 2020.

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Notary Public

Page 1 of 1

Customized Newspaper Advertising 10/19/2020 #

Ashland, The Daily Press

Oct 16 2020
Page A009
Clip resized 27%

As virus breaks records, schools go back online

BY MADELINE FOX
Wisconsin Public Radio

Three days.

That's how long Julie Richardson's daughter, a freshman at Craig High School in Janesville, had in the school building before she had to switch to two weeks of all-remote learning due to a COVID-19 scare.

One of the other students in two of her classes had tested positive, so Richardson's daughter was also told to stay home as a precaution. The 14-year-old had opted for hybrid learning, with half her classes online and the other half in person, so after she was put on quarantine, she was told to make arrangements with her four in-person teachers to continue learning outside the classroom.

For her mother, communication from the district about how to handle these switches has come up a little short.

"Can you go down every rabbit hole when you're trying to figure out how you're going to do in-person school with a pandemic? I don't know," said Richardson. "But this seems to be the first rabbit hole that you would look, because I feel like what happened with my daughter was the most likely worst-case scenario."

Just over a week later, the rest of Craig High School and nearby Roosevelt Elementary followed after possible exposures hit a critical mass that prompted the district to temporarily move all learning online for two weeks. Virtual learning has since been extended through Oct. 4.

Since Wisconsin schools began reopening with in-person instruction, the reports of positive cases have popped up so quickly it's difficult to keep track.

Ashland school officials this week altered some of their class schedules as cases surged in the Bay Area.

The Oshkosh school district shuttered and reopened several school buildings in response to positive cases before deciding to go fully virtual for two weeks starting Thursday. Iowa-Grant School District's elementary and middle school closed last week. Brodhead High School credited its closure to a student party. Kenosha, the largest district in the state to offer in-person learning, has had seven students and three teachers test positive, which means more are quarantining or isolating based on their possible exposure.

Since the spring, school districts have been warning families that a decision to start the year in person was no guarantee that it would stay that way.

"We've had the same message, really, since school got out last year, that hey, when school starts in the fall, expect that we're probably going to have to transition, probably multiple times during the year, between various different platforms of instruction," said Joe Dawidziak, administrator for the Bonduel School District. "Just expect that that's going to happen."

His district decided to switch its youngest learners — pre-K through second grade — to virtual learning for a week after the district heard it had some positive tests late on a weekend. He said covering classes for staff members who would need to quarantine was one piece of the puzzle.

"The bigger story is we knew that we had to do contact tracing," he said. "It was 9:30 on a Sunday night, and we had no real good way of being able to do that at 9:30 and then notify parents their kids couldn't come into school before school started Monday morning."

Dr. Laura Cassidy, an epidemiologist with the Medical College of Wisconsin, noted that the immediate aftermath of a positive test or noticing symptoms consistent with COVID-19 is an essential period.

"Timing is very important because of the domino effect," she said. "Once one child gets sick, if you don't identify that early, and keep them from spreading it, then it spreads faster."

Dawidziak wouldn't say what the threshold was for Bonduel to switch to virtual learning, but said it's calculated based on availability of teachers, custodians and all other school staff, as well as how many kids have tested positive, and who they've been in contact with.

"That threshold, I believe, is going to continue to dwindle as (substitute teacher) pools dwindle, as the availability of coverage dwindles," he said. "Trying to get subs was a difficult thing prior to COVID, and it certainly hasn't gotten any easier."

Many substitute teachers are retired educators, who have, in many cases, decided to sit this school year out because their age puts them at higher risk for COVID-19 complications. At the same time, district teachers have been running into even more emergencies that could take them temporarily out of the classroom, whether it's possible exposure to someone who later tested positive, or having to stay home with a child who's quarantining.

In investigating why 276 of its nearly 1,700 teachers called in sick for Monday, the Kenosha Unified School District found that while 115 were out for pre-approved reasons like bereavement leave, approved family leave or jury duty, another 17 had COVID-like symptoms and 83 were out for other reasons, like a sick child or a doctor appointment.

Dawidziak, with the Bonduel district, said when they closed school for younger students, they similarly found that staff were out for a variety of reasons ranging from medical appointments to sick children — and they had those prearranged absences covered with substitutes and other teachers tagging in to help with classes.

"The issue that comes into play is when one staff member tests positive, and we already know they've been in close contact with other staff members, we started realizing this is going to be a bigger issue than we thought," he said, "because we're not just talking about getting a sub for the person who tested positive, we're also talking about trying to get a sub for other adults who work in the building that they came in close contact with."

With a staff of just over 100 people, he said it became clear pretty quickly that Bonduel couldn't staff a fully in-person school week with so many out quarantining.

Richardson, the Craig High School parent, said things did get easier for her daughter when the whole school went virtual. Now, instead of working out how to keep up virtually with each teacher, she was getting the same level of education as all her classmates.

Richardson is worried what another quarantine, separate from the whole school going virtual, could mean for her kids' education.

"If this were to happen to my daughter again, and she's out for another 14 days, that's a whole month of instruction," she said. "That's way too much to miss."

With Wisconsin reporting several single-day records in new COVID-19 cases last week and a "high level" of coronavirus activity in 71 of the state's 72 counties, it's likely more students will have to quarantine, and more districts could go virtual.

Cassidy, the epidemiologist, said as long as community spread is high, it's impossible to expect schools will be immune, since they're pulling from that same community pool of people.

"If the community spread is low, then the chance of a child, or a teacher or any staff member going into school — the chance of them having it and spreading it is lower," she said.

She added that while data from the spring didn't show a lot of younger people getting COVID-19, that was also being gathered while much of the state was sheltering in place, and children were less likely to be in spaces where they could pick up or spread the virus.

"I don't think we should dismiss children as not being at risk and not spreading it," she said. "When we closed down in March, and all the schools closed down and the kids went home, the rate of the flu went from like 30 percent to 1.8 percent in kids, so if we only looked at that snapshot in time, we might say that kids don't get the flu."

Health concerns loomed large for Richardson. Both her daughter, the freshman who quarantined early, and her son, a junior, opted for the hybrid learning model, given the choice of in-person, virtual or hybrid — he because some of the classes he wanted to take were only available in-person, and she because she wanted some semblance of a normal freshman year. Richardson said she'd have preferred to keep them both all-virtual, and healthy, but that the hybrid model was a compromise.

"Did we make the right choice going hybrid, did we make the wrong choice, is this the best thing for them? Who knows?" she said. "That's something my husband and I talk about, but that's the whole thing about parenting, right — you never know."

When students and teachers are going back into school buildings, Cassidy said it helps immensely to keep them in "pods" that keep classes or smaller groups all together with little contact outside their pod, so that if one person tests positive, they've had more limited interactions with other people who could contract COVID-19. Keeping close track of kids' and adults' movements can also make contact tracing easier, which in turn makes it easier to isolate people who may have come in contact with a positive COVID-19 case and keep them from potentially spreading it to more people.

"When you look at what professional sports teams are doing, they're living in bubbles," said Cassidy. "Don't our kids deserve that, too — don't they deserve the same protections?"

Enbridge completes 12-mile North Dakota stretch of Line 3

PEMBINA, N.D. (AP) — Enbridge Energy officials said Wednesday that they have completed a small section of its Line 3 crude oil pipeline replacement project in North Dakota, leaving only the Minnesota stretch that has been challenged by state officials and others.

Line 3 starts in Alberta and clips a corner of North Dakota before crossing northern Minnesota en route to Enbridge's terminal in Superior, Wisconsin. More than 400 construction workers started on the 12-mile North Dakota project in August, the company said in a release.

The Calgary, Alberta-based company has also completed the Canadian and Wisconsin portions of the pipeline. Plans to complete the 337-mile line in Minnesota have been approved by the the independent Public Utilities Commission but is facing its third appeal from the state Commerce Department.

An administrative law judge is due to issue a report Friday that will inform the Minnesota Pollution Control Agency as it decides on water quality permits for the project.

The new line is popular among Minnesota Republicans who control the Senate and construction unions that have previously backed Democratic Gov. Tim Walz. Environmental and tribal groups oppose the project, citing climate change and spill risks.

Enbridge is replacing the line that was built in the 1960s.

PUBLIC NOTICE

Northern States Power Company – Wisconsin (NSPW), d/b/a Xcel Energy, is holding a public meeting to discuss the relicensing process for its White River Hydroelectric Project located on the White River in the town of White River in Ashland County, Wisconsin. The Project operates under a license from the Federal Energy Regulatory Commission (FERC).

The meeting will take place on Thursday, October 29, 2020, 10 a.m. Due to current COVID-19 health-related concerns, the Centers for Disease Control (CDC) guidelines recommend that social gatherings and discretionary travel be avoided. In order to abide by CDC guidelines, the meeting will be held via a conference call rather than face-to-face. A site visit to the Project will be scheduled in the spring of 2021, assuming that the health and travel related concerns have abated by that time. A separate notice will be provided prior to the site visit.

Please RSVP by Friday, October 23, 2020 if you plan to participate in the meeting. NSPW will send out meeting information to those that RSVP to include a call-in number, meeting agenda, and PowerPoint presentation.

The purpose of the meeting is to outline NSPW's plan for relicensing and the continued operation of the Project. In addition, the meeting will provide a forum designed to hear your comments and to ask questions about the process to renew the license and the hydroelectric project itself.

The agenda for the October 29, 2020 meeting is as follows:

1. Welcome and Introductions
2. Overview of Meeting Logistics and Purpose
3. Overview of FERC Traditional Licensing Process
4. Overview of White River Project Features and Operations
5. Overview of Information Provided in Preliminary Application Document
6. Next Steps
7. Comments
8. Site Visit will be scheduled in Spring 2021

Information regarding the White River Hydroelectric Project is available for public review during normal business hours at the following Library:

- Vaughn Public Library – 502 Main Street W., Ashland, Wisconsin

Information is also available on the following website:

- White River at http://hydrorelicensing.com

If you have any questions regarding the meeting or this notice, or wish to RSVP for the meeting, please contact Mr. Matthew Miller, Hydro License Compliance Consultant at Matthew.J.Miller@XcelEnergy.com or by telephone at 715.737.1353.

Xcel Energy

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1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

June 24, 2021

FERC Docket Nos. 2444-036

VIA Electronic Filing

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Proof of Publication of Notice of Scheduled Site Visit**
White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose:

Northern States Power Company - Wisconsin (licensee), d/b/a Xcel Energy, published a notice in a newspaper of general circulation in Ashland County, Wisconsin announcing the June 17, 2021, site visit for the White River Hydroelectric Project (FERC Project No. 2444). The notice was published in the Ashland Daily Press on June 1, 2021. Copies of the public notice and Affidavit of Publication are enclosed.

Thank you for your time and consideration in this matter. If you have any questions, please contact Matthew Miller at (715) 737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

James M Zyduck Digitally signed by James M Zyduck
Date: 2021.06.28 13:53:17 -05'00'

James Zyduck
Director, Hydro Plants

Enclosures: Public Notice and Affidavit of Publication

cc: Shawn Puzen – Mead & Hunt, Inc. (via e-mail)
Project Files

Ashland, The Daily Press

Jun 01
2021
Page A008
Clip resized 28%

A8 | TUESDAY, JUNE 1, 2021 ASHLANDDAILYPRESS.NET

UW System returns summer youth programs

BY RICH KREMER
Wisconsin Public Radio

Students walking on East Campus Mall on the University of Wisconsin-Madison campus.

In this 2015 file photo, mourners attend a funeral for unclaimed people who died of extreme weather, in Karachi, Pakistan, after a devastating heat wave that struck southern Pakistan the previous weekend, with over 800 confirmed deaths according to a senior health official.

Study blames climate change for 37% of global heat deaths

BY SETH BORENSTEIN
AP Science Writer

PUBLIC NOTICE

Site Visit for the Relicensing of the White River Hydroelectric Project (FERC Project No. 2444)

Northern States Power Company – Wisconsin, d/b/a Xcel Energy (hereinafter NSPW), hereby notifies resource agencies, Indian tribes, and stakeholders, including interested members of the public, that it has scheduled a site visit regarding the Federal Energy Regulatory Commission (FERC or Commission) relicensing of the White River Hydroelectric Project (FERC Project No. 2444) (White River Project). The Project is located on the White River in the Town of White River in Ashland County, Wisconsin.

On July 29, 2020, NSPW filed with the Commission a Pre-Application Document, Notice of Intent, and Request to Use the Traditional Licensing Process (TLP) for the relicensing of the White River Project. The Commission, by letter dated Sept. 16, 2020, granted NSPW's request to use the TLP for the White River Project.

In accordance with the first stage of consultation requirements of the TLP, NSPW held a Joint Agency Meeting on Oct. 29, 2020. Due to COVID-19 health-related concerns, the meeting was held via conference call. No site visit to the White River Project was conducted at that time in order to abide by Centers for Disease Control and Corporate guidelines to avoid public gatherings and discretionary travel.

NSPW has scheduled a site visit to view the White River Project, in conjunction with a site visit to the Hayward (FERC Project No. 2417) and Trego (FERC Project No. 2711) hydroelectric projects, on Thursday, June 17, 2021. The site visit will begin at 9 a.m. at the White River Project located at 48720 State Hwy 112, Ashland, WI 54806. The group will then proceed to the Hayward Project for a site visit, followed by lunch on your own, and will finish the day with a site visit to the Trego Project.

An accurate number of attendees is necessary to allow NSPW to coordinate the site visit based on the most-recent Wisconsin COVID-19 mandate(s) and Corporate guidelines. In addition, based upon the number of attendees, participants may need to be separated into groups, if required by the mandate(s) and guidelines.

All interested parties, including members of the public, who plan to attend the site visit on Thursday, June 17, are asked to RSVP no later than Monday, June 14, to Matt Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Xcel Energy®

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Last utility truck made in Wisc. city hits auction block

BY NEIL JOHNSON
The Janesville Gazette

ROP AFFIDAVIT

June 04, 2021

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WI/Ashland Daily Press (Ashland, WI)

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Media Dept. 6.4.2021

Page 1 of 1

Customized Newspaper Advertising 06/04/2021 #

4.2 Recording of Public Meeting

A recording of the Joint Agency Meeting was filed with the FERC on April 27, 2021.

Attachment A Stage 1 Consultation

White River Questionnaire

White River Hydroelectric Project

FERC No. 2444: White River, Ashland County, WI
Licensee: Northern States Power Company - Wisconsin (d/b/a Xcel Energy)

Installed Capacity: 1.2 megawatt (MW)

- Unit #1: 0.7 MW
- Unit #2: 0.5 MW

License Expires: July 31, 2025

Notice of Intent to Relicense Due: July 31, 2020

Project Operation: Run-of-River

Minimum Flow Requirement: 16 cubic feet per second, or inflow, whichever is less

Reservoir Elevation Requirements:

- Minimum: 710.4 ft msl
- Maximum: 711.6 ft msl (temp. variance increased maximum to 712.6 ft msl until 2021)

Approximate Reservoir Surface Acreage: 56 acres

Northern States Power Company-Wisconsin (d/b/a Xcel Energy) ("NSPW") has retained Mead & Hunt, Inc. ("Mead & Hunt") to assist with the federal relicensing process for the White River Hydroelectric Project ("Project") located on the White River in northern Wisconsin. Under Federal Energy Regulatory Commission ("FERC") regulations, NSPW is preparing a Preliminary Application Document ("PAD") that provides the FERC and other entities with existing, relevant, and reasonably available information pertaining to the Project to help identify issues and related information needs, develop study requests and study plans, and prepare documents analyzing impacts. The PAD Information Questionnaire will be used to help identify sources of existing, relevant, and reasonably available information that is not in NSPW's possession.

1. Information about person completing this questionnaire:

   Name: ______________________ Title: ______________________

   Organization: ______________________

   Address: ______________________

   ____

   Phone: ______________________ Email: ______________________

2. Do you or your organization plan to participate in the 3 to 5 year-long licensing proceeding for the White River Hydroelectric Project?

   ☐ Yes ☐ No

3. Do you or your organization know of existing, relevant, and reasonably available information that describes the existing environment or known potential impacts of the Project?

   ☐ Yes ***(Please complete 3a thru 3f)*** ☐ No ***(Proceed to 4)***

   a. If yes, check box(es) to indicate the specific resource area(s) that the information relates to:

      ☐ Geology and soils
      ☐ Water resources
      ☐ Fish and aquatic resources
      ☐ Wildlife and botanical resources
      ☐ Wetlands, riparian, and littoral habitat
      ☐ Rare, threatened, and endangered species
      ☐ Recreational and land use
      ☐ Aesthetic resources
      ☐ Cultural resources
      ☐ Socio-economic resources
      ☐ Tribal resources
      ☐ Other resource information

Questions 3b – 3f are continued on the following pages

b. Briefly describe the information or list available documents:
(Additional information, if any, may be provided on page 4)

____

____

____

____

____

____

c. Where or how can NSPW obtain this information?

____

____

____

____

____

____

d. Please indicate whether there is a specific representative you wish to designate for potential follow-up contact by NSPW or NSPW's representative for the resource area(s) checked in 3a: ***(Additional information, if any, may be provided on page 4)***

<u>Representative Contact Information</u>

Name: ______________________________ Title: ______________________________

Address: ____

____

Phone: ______________________ Email: ______________________________

Name: ______________________________ Title: ______________________________

Address: ____

____

Phone: ______________________ Email: ______________________________

Questions 3e – 3f are continued on the following page

e. Are you aware of any particular issues pertaining to the specific resource area(s) identified in 3a? ***(Additional information, if any. may be provided on page 4)***

☐ Yes ***(Please list specific issues below)*** ☐ No

Resource Area	**Specific Issue**

f. Based on the issues identified in 3e, are you aware of any potential studies or information needs associated with the identified issues? ***(Additional information, if any, may be provided on page 4)***

☐ Yes ***(Please list below)*** ☐ No

Potential Studies or Information Needs

4. NSPW is investigating the use of the Traditional Licensing Process for the Hydroelectric Project. Do you have concerns with the use of the TLP? If so, please specify your concerns.

☐ Yes ***(Please describe concerns below)*** ☐ No

Traditional Licensing Process Concerns

5. NSPW is interested in any additional comments, questions, or information you have regarding the licensing of the Project. If the additional comments, questions, or information you provide below pertain to a particular question, please indicate the applicable question (such as 3b, 3d, 3e, 3f).

Additional comments, questions, or information

Please return this completed questionnaire to Mead & Hunt using the enclosed self-addressed, stamped envelope **within 30 days of receipt** to allow for follow-up by NSPW or NSPW's representative.

Not responding within 30 days will indicate you are not aware of any existing, relevant, and reasonably available information that describes the existing environment or known potential impacts of the Projects.

Comments and/or questions may also be sent via email to: Darrin.Johnson@meadhunt.com

Indian Tribes

Mr. Michael Wiggins, Chairman
Bad River Band of the Lake Superior Tribe of the Chippewa
P.O. Box 39
Odanah, WI 54861

Ms. Edith Leoso, THPO
Bad River Band of the Lake Superior Tribe of the Chippewa
P.O. Box 39
Odanah, WI 54861
THPO@badriver-nsn.gov

Mr. Clinton Parish, Chairman
Bay Mills Indian Community of Michigan
12140 W. Lakeshore Drive
Brimley, MI 49715

Mr. Marcus Ammesmake, THPO
Fond du Lac Band of the Minnesota Chippewa Tribe
1720 Big Lake Road
Cloquet, MN 55720

Ms. Karen Diver, Chairperson
Fond du Lac Band of the Minnesota Chippewa Tribe
1720 Big Lake Road
Cloquet, MN 55720
jillhoppe@fdlrez.com

Mr. Ned Daniels Jr., Chairman
Forest County Potawatomi Community of WI
3051 Sand Lake Road
Crandon, WI 54520

Mr. Michael LaRonge, THPO
Forest County Potawatomi Community of WI
5320 Wensaut Lane
P.O. Box 340
Crandon, WI 54520
Michael.LaRonge@FCPotawatomi-nsn.gov

Mr. Mark Azure, President
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
656 Agency Main Street
Harlem, MT 59526

Mr. Michael Blackwolf, THPO
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
656 Agency Main Street
Harlem, MT 59526

Ms. Mayann Gagnon, THPO
Grand Portage Band of the MN Chippewa Tribe
P.O. Box 428
Grand Portage, MN 55605

Mr. Norman Des Champe, Chairman
Grand Portage Band of the MN Chippewa Tribe
P.O. Box 428
Grand Portage, MN 55605

Mr. William Quackenbush, THPO
Ho Chunk Nation of WI
P.O. Box 667
Black River Falls, WI 54615
Bill.Quackenbush@Ho-Chunk.com

Mr. Gary Loonsfoot, THPO
Keweenaw Bay Indian Community
107 Bear Town Road
Baraga, MI 49908
gloonsfoot@kbic-nsn.gov

Mr. Warren Swartz, President
Keweenaw Bay Indian Community
17429 Beartown Road
Baraga, MI 44908

Mr. Mic Isham, Chairman
Lac Courte Oerilles Band of Chippewa Indians
13394 W Trepania Road
Bldg. No. 1
Hayward, WI 53843

Indian Tribes (continued)

Mr. Brian Bisonette, THPO
Lac Courte Oerilles Band of Chippewa Indians
13394 W Trepania Road
Bldg. No. 1
Hayward, WI 54543

Mr. Joseph Wildcat, Sr., President
Lac Du Flambeau Band of Lake Superior
Chippewa Indians
P.O. Box 67
Lac Du Flambeau, WI 54538

Ms. Melinda Young, THPO
Lac Du Flambeau Band of Lake Superior
Chippewa Indians
P.O. Box 67
Lac Du Flambeau, WI 54538
ldfthpo@ldftribe.com

Ms. Daisy McGeshick, THPO
Lac Vieux Desert Band of Lake Superior
Chippewa Indians of MI
P.O. Box 249
Watersmeet, MI 49969

Mr. James Williams, Chairman
Lac Vieux Desert Band of Lake Superior
Chippewa Indians of MI
E23968 Pow Wow Trail
Watersmeet, MI 49969

Ms. Amy Burnette, TPHO
Leech Lake Band of Chippewa Indians
190 Sailstar Drive NW
Cass Lake, MN 56633
amy.burnette@llojibwe.org

Ms. Carri Jones, Chairperson
Leech Lake Band of Chippewa Indians
6530 U.S. Hwy 2 NW
Cass Lake, MN 56633

Ms. Regina Gasco-Bentley, Chairperson
Little Traverse Bay Band of Odawa Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Ms. Melissa Waitrolik, SHPO
Little Traverse Bay Band of Odawa Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Ms. Joan Delabreau, Chairperson
Menominee Indian Tribe of Wisconsin
P.O. Box 910
Keshena, WI 54135

Mr. David Gignon, THPO
Menominee Indian Tribe of Wisconsin
W3426 Cty. VV W
P.O. Box 910
Keshena, WI 54135
dgrignon@mitw.org

Mr. Douglas Lankford, Chief
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

Ms. Diane Hunter, THPO
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

Ms. Melanie Benjamin, Chief Executive
Mille Lacs Band of Obibwe
43408 Oodena Drive
Onamia, MN 56359

Ms. Natalie Weyaus, THPO
Mille Lacs Band of Obibwe
43408 Oodena Drive
Onamia, MN 56359
natalie.weyaus@lillelacsband.com

Indian Tribes (continued)

Ms. Catherine Chavers, President
Minnesota Chippewa Tribe
P.O. Box 217
Cass Lake, MN 56633
cchavers@boisforte-nsn.gov

Stacy Cutbank, THPO
Oneida Tribe of Wisconsin
P.O. Box 365
Oneida, WI 54155
Sdanfor3@oneidanation.org

Ms. Tehassi Hill, Chairperson
Oneida Tribe of Wisconsin
P.O. Box 365
Oneida, WI 54155

Mr. Chad Able, Treaty Natural Resource Administrator
Red Cliff Band of Lake Superior Chippewa Indians
88385 Pike Road, Hwy 13
Bayfield, WI 54814

Mr. Brian Brainbridge, Chairperson
Red Cliff Band of Lake Superior Chippewa Indians
88385 Pike Road, Hwy. 13
Bayfield, WI 54814

Mr. Marvin Defoe, THPO
Red Cliff Band of Lake Superior Chippewa Indians
88385 Pike Road, Hwy. 13
Bayfield, WI 54814
marvin.defoe@redcliff-nsn.gov

Mr. Chris McGeschick, Chairman
Sokaogon Chippewa Community Mole Lake Band
3051 Sand Lake Road
Crandon, WI 54520

Mr. Adam Van Zile, THPO
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adam.VanZile@SCC-nsn.gov

Mr. Lewis Taylor, President
St. Croix Band of Lake Superior Chippewa
24663 Angeline Avenue
Webster, WI 54893

Ms. Shannon Holsey, President
Stockbridge Munsee Tribe of Mohican Indians
N8476 Mo He Con Nuck Road
Bowler, WI 54416

Ms. Sherry White, THPO
Stockbridge Munsee Tribe of Mohican Indians
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Bowler, WI 54416

Ms. Jaime Arsenault, TPO
White Earth Band of the Minnesota Chippewa
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jaime.arsenault@whiteearth.com

Ms. Erma Vizenor, Chairperson
White Earth Band of the Minnesota Chippewa
P.O. Box 418
White Earth, MN 56591

State

Public Service Commission of Wisconsin
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Madison, WI 53707

Wisconsin Cooperative Fishery Research Unit
UW Stevens Point
2100 Main Street
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Wisconsin Department of Administration
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Mr. Michael David Scott, Program Attorney
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Mr. Michael Ostrenga, NW Region Maintenance Supervisor
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michael.ostrenga@dot.wi.gov

Wisconsin Office of Attorney General
114 East State Capital
Madison, WI 53702

Wisconsin Office of the Governor
P.O. Box 7863
Madison, WI 53702

Mr. Tyler Howe, Office
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816 State Street
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tyler.howe@wisconsinhistory.org

Ms. Beth Meyers, District 74 Representative
Wisconsin State Assembly
P.O. Box 8952
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Ms. Janet Bewley, District 25 Senator
Wisconsin State Senate
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Federal

Ms. Kimberly Bose, Secretary
FERC Office of General Counsel
888 First Street NE
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Ms. Kimberly Bose, Secretary
FERC Office of Energy Projects
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Mr. Timothy Lapointe, Regional Director
U.S. Bureau of Indian Affairs Midwest Regional Office
5600 West American Boulevard
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Ms. Nannette Bischoff, FERC Coordinator, St. Paul District
U.S. Department of the Army Corps of Engineers
190 5th Street E
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Mr. Nick Utrup, Fisheries Biologist
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Field Supervisor
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Mr. Tokey Boswell, Regional Environmental Coordinator
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U.S. Department of the Interior - National Park Service
626 E Wisconsin Ave, Suite 100
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Ms. Jen Tyler, Mail Code: E-19J
U.S. Environmental Protection Agency – NEPA Implementation Section, Region V
77 W Jackson Boulevard, AR-18J
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Tyler.jennifer@epa.gov

Mr. Glenn Grothman, U.S. Representative
U.S. Representative from Wisconsin District 6
1427 Longworth H.O.B.
Washington, DC 20515

Ms. Tammy Baldwin, Senator
U.S. Senator from Wisconsin
709 Hart Senate Office Building
Washington, DC 2510

Mr. Ron Johnson, Senator
U.S. Senator from Wisconsin
328 Hart Senate Office Building
Washington, DC 20510

Local

Ms. Heather Schutte, Clerk
Ashland County
201 Main Street
Room 202
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heather.schutte@co.wi.us

Mr. Brant Kucera, City Administrator
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601 Main Street W
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bkucera@coawi.org

Ms. Deb Lewis, Mayor
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601 Main Street W
Ashland, WI 54806

Mr. Matthew Lehto, Chairman
Town of White River
65617 Charles Johnson Road
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Other

Mr. James Fossum
River Alliance of Wisconsin
199 Janet Marie Lane
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Northwest Regional Planning Commission
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Spooner, WI 54801

Mr. Mike Arrowood, Chairman
Walleye for Tomorrow
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Darrin Johnson

From:	Shawn Puzen
Sent:	Wednesday, May 20, 2020 12:25 PM
To:	Laatsch, Cheryl - DNR; Haller, Macaulay G - DNR
Cc:	Antonuk, Connie J - DNR; Miller, Matthew J; Darrin Johnson; Shawn Puzen
Subject:	RE: white river - questionnaire

Hi Cheryl,

It was mailed hard copy to your office on or about April 16th.

We look forward to receiving data from you in the near future.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
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120 YEARS OF SHAPING THE FUTURE

From: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Sent: Wednesday, May 20, 2020 12:18 PM
To: Shawn Puzen <Shawn.Puzen@meadhunt.com>; Haller, Macaulay G - DNR <macaulay.haller@wisconsin.gov>
Cc: Antonuk, Connie J - DNR <Connie.Antonuk@wisconsin.gov>
Subject: white river - questionnaire

Hi Shawn- - I didn't receive the White River questionnaire for White River yet. I will work with our internal staff to gather available data for you as soon as we can.

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Cheryl Laatsch
Statewide FERC Coordinator
Bureau of Environmental Analysis and Sustainability
Wisconsin Dept of Natural Resources
N7725 Hwy 28
Horicon WI 53032
(T) 920-387-7869 (Fax) 920-387-7888
Cheryl.laatsch@wisconsin.gov

dnr.wi.gov

Darrin Johnson

From: Shawn Puzen
Sent: Friday, May 29, 2020 2:42 PM
To: Darrin Johnson
Subject: FW: White River WDNR Materials for PAD
Attachments: White River_P-2444 WQ_AIS SWIMS Pull.xlsx; Endangered Resources Review for the Proposed White River Hydro Project Relicensing.pdf

FYI

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram
120 YEARS OF SHAPING THE FUTURE

From: Haller, Macaulay G - DNR <macaulay.haller@wisconsin.gov>
Sent: Friday, May 29, 2020 2:26 PM
To: Shawn Puzen <Shawn.Puzen@meadhunt.com>; Miller, Matthew J <Matthew.J.Miller@xcelenergy.com>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: White River WDNR Materials for PAD

Hi Shawn and Matt,

As part of the proposed White River P-2444 relicensing, I've attached some materials from WDNR, which includes an Endangered Resources review and SWIMS data:

- White River_P-2444 WQ_AIS SWIMS Pull: Results from SWIMS for monitoring stations within the project boundary. Only includes data from past 10 years of monitoring work. Pulled in May 2020.
    - Data includes start date, station ID, station name, project name, monitoring description, and result

- Endangered Resources Review for the Proposed White River Hydro Project Relicensing **(confidential)**
    - Wood turtles are the main concern

I will be sending additional materials as they come in from our technical staff team.

Please let me know if you have any questions.

Have a good weekend,

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Macaulay Haller
Water Resources Management Specialist- Senior
Water Regulations and Zoning Specialist- Senior
Wisconsin Department of Natural Resources

Start Date/Time	Project(s)	Station ID	Station Name	Station Type	WBIC	Waterbody Name	Description	Result	Units
6/29/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	3.912731588	FEET
6/29/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
7/15/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	1.110129544	FEET
7/15/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
9/1/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	0.684026215	FEET
9/1/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
9/10/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	1.399608786	FEET
9/10/2010 0:00	Satellite Lake Clarity Monitoring 2010	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	What type of access point was this?	Ramp	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Before you installed the new AIS sign (Prevent the Spread), were there other AIS signs at the access point? - Yellow "Exotic Species Advisory" sign	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Before you installed the new AIS sign (Prevent the Spread), were there other AIS signs at the access point? - Green and white "Help Prevent the Spread sign"	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Before you installed the new AIS sign (Prevent the Spread), were there other AIS signs at the access point? - Green, white and red stop sign "Please Stop and"	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Before you installed the new AIS sign (Prevent the Spread), were there other AIS signs at the access point? - County ordinance sign	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Before you installed the new AIS sign (Prevent the Spread), were there other AIS signs at the access point? - Lake Association sign	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Before you installed the new AIS sign (Prevent the Spread), were there other AIS signs at the access point? - Other	Hydro Dam Sign explaining lake, pushed over by bull dozer.	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you remove any of these signs during your visit, or do you have plans in the near future? - Yellow "Exotic Species Advisory" sign	NO	

6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you remove any of these signs during your visit, or do you have plans in the near future? - Green and white "Help..Prevent the Spread" sign	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you remove any of these signs during your visit, or do you have plans in the near future? - Green, white and red stop sign "Please Stop and..."	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you remove any of these signs during your visit, or do you have plans in the near future? - County ordinance sign	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you remove any of these signs during your visit, or do you have plans in the near future? - Lake Association Sign	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	When installing the sign, were you able to reuse the post from previous DNR signs?	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If the waterbody was known to contain invasive species, was the red sticker "This Waterbody Is Known to Contain Invasive Species" applied to the bottom of the sign?	NO	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Was the sign installed facing the water so people leaving the water could read it or facing the launching area so people could read it?	Land	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	The location that best represents where the sign is currently located	Next to access point, facing launch area	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Does the access point appear to be in proper working order?	YES	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	How many people assisted in the sign installation?	2	
6/28/2011 0:00	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	How would you describe yourself (affiliation)?	County employee	
7/3/2011 0:00	Satellite Lake Clarity Monitoring 2011	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	2.544055541	FEET
7/3/2011 0:00	Satellite Lake Clarity Monitoring 2011	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Number of Adult Loons on Lake	0	LOON /
7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Number of loon chicks on this territory today	0	LOON (
7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Wind/Water Conditions	Ripples	
7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Cloud Cover	Partly Cloudy	

7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Visibility	Excellent	
7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Method of Observation	From Shore	
7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Equipment Used	Binoculars	
7/16/2011 7:30	2011 Wisconsin Loon Population Survey	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Lake Access - Where did you get on the water or find access to view the lake?	Public Boat Landing	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Total Paid Hours Spent	2	HOURS
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Total Volunteer Hours Spent	0	HOURS
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did at least some data collectors monitor in May?	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did at least some data collectors monitor in June?	Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did at least some data collectors monitor in July?	Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did at least some data collectors monitor in August?	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you monitor all Beaches and Boat Landings?	Frequently/Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you monitor perimeter of Whole Lake?	Frequently/Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you monitor docks and piers?	Frequently/Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you monitor other locations?	Right on the White River Dam (Hwy 112)	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you walk along the shoreline?	Frequently/Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you observe entire shallow water area?	Frequently/Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you use rake to extract plant samples?	Frequently/Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Did you check underwater solid surfaces (boat hulls, dock legs, rocks)?	Frequently/Yes	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200 White River Flowage	Banded Mystery Snail	No	

7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Chinese Mystery Snail	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	CURLY-LEAF PONDWEED	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	EURASIAN WATERMILFOIL (MYRIOPHYLLUM SPICATUM L.)	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	FISHHOOK WATER FLEA	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Freshwater Jellyfish	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Hydrilla (Hydrilla verticillata)	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Purple loosestrife (Lythrum salicaria)	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Rusty Crayfish (Orconectes rusticus)	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	SPINY WATER FLEA	No	
7/29/2011 11:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	ZEBRA MUSSEL, ADULT	No	
8/28/2011 0:00	Satellite Lake Clarity Monitoring 2011	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	0.806448517	FEET
8/28/2011 0:00	Satellite Lake Clarity Monitoring 2011	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Waterbody Name	White River	
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Faucet Snails?	YES	
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Red Swamp Crayfish?	YES	
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for New Zealand Mudsnails?	YES	
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Quagga Mussels?	YES	

9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Zebra Mussels?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Didymo?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Yellow Floating Heart?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Curly-Leaf Pondweed?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Eurasian Water-Milfoil?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Brazilian waterweed?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Hydrilla?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Flowering Rush?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Japanese Hops?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Phragmites?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for purple loosestrife?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Did you look for Japanese Knotweed?	YES
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Description of End Location	White River at the Highway 13 overpass.

9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	End Longitude	90.84321
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	End Latitude	46.51644
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Description of Start Location	White River Flowage at the Highway 112 (Sanborn Avenue) overpass.
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Start Longitude	90.9033
9/9/2011 10:10	Project Riverine Early Detectors (Project RED)	10034358	White River Flowage - Flowage (Hwy 112) to White River (Hwy 13)	RIVER/STREAM	2892500	White River	Start Latitude	46.49847
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Waterbody Name	White River
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Start Latitude	46.4986
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Start Longitude	90.90998
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Description of Start Location	The Boat Launch/Canoe Portage at the White River Flowage, off Highway 112.
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	End Latitude	46.49437
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	End Longitude	90.93237
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Description of End Location	No obvious landmark: use listed GPS coordinates.
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Japanese Knotweed?	YES

9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for purple loosestrife?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Phragmites?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Japanese Hops?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Flowering Rush?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Hydrilla?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Brazilian waterweed?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Eurasian Water-Milfoil?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Curly-Leaf Pondweed?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Yellow Floating Heart?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Didymo?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Zebra Mussels?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Quagga Mussels?	YES
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for New Zealand Mudsnails?	YES

9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Red Swamp Crayfish?	YES		
9/15/2011 12:35	Project Riverine Early Detectors (Project RED)	10034360	White River Flowage - Flowage at Hwy 112 near Harley Hagstrom Rd	RIVER/STREAM	2892500	White River	Did you look for Faucet Snails?	YES		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Total Paid Hours Spent	6		HOURS
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Total Volunteer Hours Spent	0		HOURS
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did at least some data collectors monitor in May?	No		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did at least some data collectors monitor in June?	Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did at least some data collectors monitor in July?	No		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did at least some data collectors monitor in August?	No		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you monitor all Beaches and Boat Landings?	Frequently/Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you monitor perimeter of Whole Lake?	Frequently/Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you monitor docks and piers?	Frequently/Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you walk along the shoreline?	Frequently/Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you observe entire shallow water area?	Frequently/Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you use rake to extract plant samples?	Frequently/Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you check underwater solid surfaces (boat hulls, dock legs, rocks)?	Frequently/Yes		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Banded Mystery Snail	No		
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Chinese Mystery Snail	No		

6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	CURLY-LEAF PONDWEED	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	EURASIAN WATERMILFOIL (MYRIOPHYLLUM SPICATUM L.)	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	FISHHOOK WATER FLEA	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Freshwater Jellyfish	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Hydrilla (Hydrilla verticillata)	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Purple loosestrife (Lythrum salicaria)	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Rusty Crayfish (Orconectes rusticus)	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	SPINY WATER FLEA	No	
6/6/2012 0:00	AIS Monitoring - Ashland County (Staff)	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	ZEBRA MUSSEL, ADULT	No	
8/7/2012 0:00	Satellite Lake Clarity Monitoring 2012	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	11.15350486	FEET
8/7/2012 0:00	Satellite Lake Clarity Monitoring 2012	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
8/30/2012 0:00	Satellite Lake Clarity Monitoring 2012	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	1.230872204	FEET
8/30/2012 0:00	Satellite Lake Clarity Monitoring 2012	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
9/28/2014 0:00	Satellite Lake Clarity Monitoring 2014	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	0.814696	FEET
9/28/2014 0:00	Satellite Lake Clarity Monitoring 2014	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
9/7/2015 0:00	Satellite Lake Clarity Monitoring 2015	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	1.813085387	FEET
9/7/2015 0:00	Satellite Lake Clarity Monitoring 2015	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N	
9/17/2015 0:00	2018 CWA Impairment Assessments	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Assessment River Station Natural Community	LARGE RIVER	
9/17/2015 0:00	2018 CWA Impairment Assessments	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Non-Wadeable Stream 10 Year Mean mIBI Assessment Value	70	

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPHEMEROPTERA BAETIDAE BAETIS	2
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	TRICHOPTERA HYDROPSYCHIDAE CHEUMATOPSYCHE	9
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	TRICHOPTERA HYDROPSYCHIDAE CERATOPSYCHE	4
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	TRICHOPTERA HYDROPSYCHIDAE CERATOPSYCHE MOROSA MOROSA FORM SCHMUDE, HILSENHOFF 1986	11
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	TRICHOPTERA HYDROPTILIDAE HYDROPTILA	32
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	TRICHOPTERA POLYCENTROPODIDAE NEURECLIPSIS	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PLECOPTERA PERLIDAE ACRONEURIA	9
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	HILSENHOFF'S BIOTIC INDEX (HBI)	5.948
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	FAMILY-LEVEL BIOTIC INDEX (FBI)	6.006
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	HBI Max 10	5.304
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	SPECIES RICHNESS	40
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	GENERA RICHNESS	36
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PERCENT EPT INDIVIDUALS	16

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PERCENT EPT GENERA	22
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PERCENT CHIRONOMIDAE INDIVIDUALS	81
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	SHANNON'S DIVERSITY INDEX	4.078
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PERCENT SCRAPERS	2
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PERCENT FILTERER	35
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PERCENT SHREDDERS	6
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	PERCENT GATHERERS	28
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Family Rank 1	CHIRONOMIDAE
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Family Rank 2	HYDROPTILIDAE
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Family Rank 3	HYDROPSYCHIDAE
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Family Rank 4	LEPTOPHLEBIIDAE
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Family Rank 5	HEPTAGENIIDAE
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Genus Rank 1	RHEOTANYTARSUS

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Genus Rank 2	PARATANYTARSUS
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Genus Rank 3	CONCHAPELOPIA
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Genus Rank 4	HYDROPTILA
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Genus Rank 5	DICROTENDIPES
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPHEMEROPTERA HEPTAGENIIDAE	2
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPHEMEROPTERA LEPTOPHLEBIIDAE	23
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 ORTHOCLADIUS (ORTHOCLADIUS)	15
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 PARAKIEFFERIELLA -- PUPA	3
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 PARAMETRIOCNEMUS	11
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 ORTHOCLADIUS (SYMPOSIOCLADIUS) LIGNICOLA	2
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 THIENEMANNIELLA	2
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 THIENEMANNIELLA -- PUPA	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 TVETENIA BAVARICA GROUP BODE 1983	1

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4	13
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 PARATANYTARSUS	21
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 PARATANYTARSUS SPECIES A HILSENHOFF, UNPUBL.	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 PARATANYTARSUS SPECIES B HILSENHOFF, UNPUBL.	41
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 RHEOTANYTARSUS	150
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 RHEOTANYTARSUS -- PUPA	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 TANYTARSUS	3
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 CRYPTOCHIRONOMUS	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 POLYPEDILUM	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 POLYPEDILUM (POLYPEDILUM) FALLAX GROUP EPLER 2001	3
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA EMPIDIDAE HEMERODROMIA	3
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 DICROTENDIPES	32
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 MICROTENDIPES PEDELLUS GROUP PINDER, REISS 1983	7

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 MICROTENDIPES RYDALENSIS GROUP PINDER, REISS 1983	5
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 NILOTHAUMA	7
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	TROMBIDIFORMES HYGROBATIDAE HYGROBATES	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPHEMEROPTERA HEPTAGENIIDAE MACCAFFERTIUM VICARIUM/LUTEUM DIMICK, UNPUBL.	10
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA TIPULIDAE ANTOCHA	12
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 POLYPEDILUM (URESIPEDILUM) FLAVUM	19
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DEPO Percent Individuals (DEP_PC_CNT)	20.64
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DEPO Genera (DEPO_G)	13
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DEPO, percent genera (DEP_PC_GEN)	33.333
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPT Genera (EPT_GENERA)	8
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPT Individuals (EPT_COUNT)	103
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPT Percent Individuals (EPT_PC_CNT)	16.48
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Amph Percent Individuals (AMP_PC_CNT)	0

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPT Percent Genera (EPT_PC_GEN)	22.857
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Isop Percent Individuals (ISO_PC_CNT)	0
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Isop Genera (ISOP_G)	0
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Isop Percent Genera (ISO_PC_GEN)	0
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Dipt Percent Genera (DIP_PC_GEN)	77.143
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Dipt Percent Individuals (DIP_PC_CNT)	83.52
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Chir Percent Individuals (CHI_PC_CNT)	81.12
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Chir Percent Genera (CHI_PC_GEN)	71.429
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Gatherers Percent Individuals (GAT_PC_CNT)	28.015
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Gatherers Percent Genera (GAT_PC_GEN)	35.484
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Scrapers Percent Individuals (SCR_PC_CNT)	2.226
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Shredders Percent Individuals (SHR_PC_CNT)	5.937
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Insect Taxa (INSECT_T)	39

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Insect Percent Individuals (INSECT_PI)	99.84
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	EPT Taxa (EPT_T)	8
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Dominance 3 Percent Individuals (DOM3_PI)	38.978
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Intolerant EPT 2 Percent Individuals (INTOL_EPT2_PI)	4.792
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Tolerant Chir Percent Individuals (TOL_CHIR8_PI)	13.578
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Functional Trait Niches (ECOFTN)	8
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Amph Isop Percent Individuals (A_I_PC_CNT)	0
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Species Richness (Wadable IBI Intermediate)	40
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMIDAE	1
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA TANYPODINAE 0	21
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA TANYPODINAE 0 CONCHAPELOPIA	53
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA TANYPODINAE 0 MEROPELOPIA	15
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA TANYPODINAE 0 NILOTANYPUS	9

9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA TANYPODINAE 0 ZAVRELIMYIA	1	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1	6	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 PARAKIEFFERIELLA	15	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 CORYNONEURA	6	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 CRICOTOPUS (CRICOTOPUS) BICINCTUS GROUP CRANSTON ET AL. 1983	8	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 SUBLETTEA	3	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA TANYPODINAE 0 ABLABESMYIA (ABLABESMYIA)	10	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 CRICOTOPUS (CRICOTOPUS) TRIFASCIA GROUP CRANSTON ET AL. 1983	1	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 CRICOTOPUS - PUPA	3	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA ORTHOCLADIINAE 1 NANOCLADIUS	13	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Mean Pollution Tolerance Value	5.556	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	Macroinvertebrate Index of Biotic Integrity (IBI), Non-Wadable	70	
9/17/2015 0:00	Large River Macroinvertebrate Sampling	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	DIPTERA CHIRONOMINAE 4 PARATANYTARSUS LONGISTYLUS	10	
10/3/2016 0:00	Satellite Lake Clarity Monitoring 2016	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Water Clarity - Predicted Secchi Depth Derived from Satellite Imagery	0.51608118	FEET

10/3/2016 0:00	Satellite Lake Clarity Monitoring 2016	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Satellite derived water clarity greater than max depth of lake	N
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	FISHHOOK WATER FLEA	No
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	SPINY WATER FLEA	No
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	ZEBRA MUSSEL, VELIGER	No
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Didymo?	YES
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Yellow Floating Heart?	YES
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Quagga Mussels?	YES
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Phragmites?	YES
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Hydrilla?	YES

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Have you consolidated all of your samples into one composite bottle?	Yes	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Name of plankton sample analyst	Shelby Kail	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Name of plankton sample analyst	Shelby Kail	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Fanwort?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Secchi Depth	0.25	METER
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Japanese Knotweed?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for purple loosestrife?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Japanese Hops?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Flowering Rush?	YES	

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Brazilian waterweed?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Eurasian Water-Milfoil?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Curly-Leaf Pondweed?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Zebra Mussels?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for New Zealand Mudsnails?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Red Swamp Crayfish?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Faucet Snails?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Number of net tows	1	TOWS
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Number of net tows	1	TOWS

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Depth of tows	2	METER
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 2 - Latitude	46.29869	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 2 - Longitude	-90.54632	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 2 - Number of net tows	1	TOWS
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 3 - Latitude	46.29864	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 3 - Longitude	-90.54616	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you collect a specimen sample?	NO	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you collect a specimen sample?	NO	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you collect a specimen sample?	NO	

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you collect a specimen sample?	NO	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you collect a specimen sample?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 3 - Number of net tows	1	TOWS
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you take a photo?	NO	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you take a photo?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you take a photo?	NO	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you take a photo?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you take a photo?	NO	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Additional Comments about Aquatic Invasives Monitoring	Unknown species is same unkown snail as collected at search site 1	

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Additional Comments about Aquatic Invasives Monitoring	No AIS found
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Additional Comments about Aquatic Invasives Monitoring	No AIS found
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Additional Comments about Aquatic Invasives Monitoring	No AIS found
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Additional Comments about Aquatic Invasives Monitoring	No AIS found
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Additional Comments about Aquatic Invasives Monitoring	Unkown species is a kind of snail, Native iris (Iris versicolor) present at this site. No AIS found
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Species Name	Narrow-leaf cattail (Typha angustifolia)
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Species Name	Narrow-leaf cattail (Typha angustifolia)
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Species Name	Narrow-leaf cattail (Typha angustifolia)
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Species Name	Narrow-leaf cattail (Typha angustifolia)

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Species Name	Unknown Species
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Latitude	46.2986
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Latitude	46.2986
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Longitude	-90.54595
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site 1 - Longitude	-90.54595
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Banded mystery snails?	YES
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Boat Landing 1
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Search Site 5
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Search Site 4

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Search Site 3
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Meander Survey 3
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Meander Survey 2
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Meander Survey 1
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Search Site 2
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Site Number	Search Site 1
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Density of Aquatic Invasive Species (1)	3-many small beds or scattered plants or colonies of invertebrates
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Density of Aquatic Invasive Species (1)	5-dense plant, snail or mussel growth covering most shallow areas
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Density of Aquatic Invasive Species (1)	4-dense plant, snail or mussel growth in a while bay or portion of the lake

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Density of Aquatic Invasive Species (1)	4-dense plant, snail or mussel growth in a while bay or portion of the lake	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Density of Aquatic Invasive Species (1)	2-one or a few plant beds or colonies of invertebrates	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Density of Aquatic Invasive Species (2)	2-one or a few plant beds or colonies of invertebrates	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Species Name (2)	Unknown Species	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Chinese mystery snails?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Water Chestnut?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Spiny Waterfleas?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Volume of sample that was analyzed (ml)	50	ML
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Date sample was analyzed	12/18/2018	

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Date sample was analyzed	11/20/2018
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Total Volunteer Hours Spent	0
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Was the aquatic invasive species found live or dead?	Live
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Was the aquatic invasive species found live or dead?	Live
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Was the aquatic invasive species found live or dead?	Live
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Was the aquatic invasive species found live or dead?	Live
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Was the aquatic invasive species found live or dead?	Live
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Was the aquatic invasive species found live or dead? (2)	Live
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Rusty crayfish?	YES

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Fishhook Waterfleas?	YES
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	If you did not snorkel, why not?	Water clarity too poor	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Asiatic clam (Corbicula)?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Diameter of zooplankton net opening	50	CM
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you find what you suspect are Spiny Water Fleas in this waterbody?	No	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you find what you suspect are Fishhook Water Fleas in this waterbody?	No	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Parrot Feather?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Water Hyacinth?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Water Lettuce?	YES	
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Yellow Flag Iris?	YES	

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you snorkel the search sites?	NO

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you take a photo? (2)	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Total Paid Hours Spent	6
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for European frogbit	YES
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49842
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49752
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49583
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.4924
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49413
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49573

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49666
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49823
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Latitude of sample	46.49843
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.90997
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.90953
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.9121
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.92008
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.91626
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	90.91438

7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.91483
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.91395
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Longitude of sample	-90.91255
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you collect a specimen sample? (2)	NO
7/12/2018 0:00	Aquatic Invasive Species Early Detection 2018, AIS Occurrence Records - 'Other' Records Reviewed	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you look for Starry stonewort?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Additional Comments about Aquatic Invasives Monitoring	No AIS Detected!
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Waterbody Name	White River Flowage
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Start Latitude	46.498552
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Start Longitude	-90.910028

9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Description of Start Location	White River Flowage Boat Landing
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	End Latitude	46.496009
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	End Longitude	-90.931589
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Description of End Location	Use Lat/Long. Remote Area; No Distinct Landmarks.
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Japanese Knotweed?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for purple loosestrife?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Phragmites?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Japanese Hops?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Flowering Rush?	YES

WDNR COMMENT

9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Hydrilla?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Brazilian waterweed?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Eurasian Water-Milfoil?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Curly-Leaf Pondweed?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Yellow Floating Heart?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Didymo?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Zebra Mussels?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Quagga Mussels?	YES
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for New Zealand Mudsnails?	YES

9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Red Swamp Crayfish?	YES	
9/17/2019 9:58	ASHLAND COUNTY: Ashland County AIS Education, Prevention, & Planning - Project Red	10000622	White River Flowage	RIVERINE IMPOUNDMENT	2894200	White River Flowage	Did you look for Faucet Snails?	YES	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Observer Name (if not already recorded)	Scott Caven	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Organization	Ashland County LWCD	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Observer Email	scott.caven@co.ashland.wi.us	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	What type of access point was this?	Carry-in	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Waterbody Type	River/Stream	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Did you take a photo?	Yes	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Purpose of AIS Sign Visit?	Inspection	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	AIS Sign Type	Prevent the Spread boat launch sign	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	AIS Sign Condition	Adequate	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	The location that best represents where the sign is currently located	On a post at pier/dock	
11/5/2019 14:27	Signage Installation - Ashland County	10019547	White River Flowage -- Access - STH 112	LAKE-BOAT LANDING	2894200	White River Flowage	Which direction is the sign facing?	Facing Launch Area (Upland) - Sign seen as boater is launching	
<no data>	AIS Incident Reports - Bayfield County	023127	White River Downstream Hwy 112 Near Ashland WI	RIVER/STREAM	2892500	White River	<no data>	<no data>	<no da

Darrin Johnson

From:	Shawn Puzen
Sent:	Thursday, June 4, 2020 3:59 PM
To:	Darrin Johnson
Subject:	FW: White River WDNR Materials for PAD
Attachments:	White River P-2444 Relicensing WDNR Fish Data.zip

Found it….

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram
120 YEARS OF SHAPING THE FUTURE

From: Haller, Macaulay G - DNR <macaulay.haller@wisconsin.gov>
Sent: Wednesday, June 3, 2020 5:12 PM
To: Shawn Puzen <Shawn.Puzen@meadhunt.com>; Miller, Matthew J <Matthew.J.Miller@xcelenergy.com>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: RE: White River WDNR Materials for PAD

Hi Shawn,

I have included information from fisheries staff regarding White River.

I've also included a statement from one of our ecologists: "I was on the flowage several years ago when they were drawing it down, tossing common floaters (freshwater mussel species) into deeper water to prevent at least some of them from desiccating. I also picked up a dead loon from the shoreline at that time and sent it in for necropsy."

Thanks,
Macaulay

From: Haller, Macaulay G - DNR
Sent: Tuesday, June 2, 2020 8:08 AM
To: 'shawn.puzen@meadhunt.com' <shawn.puzen@meadhunt.com>; 'Miller, Matthew J' <Matthew.J.Miller@xcelenergy.com>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: RE: White River WDNR Materials for PAD

Hi Shawn,

I have included information from wildlife and conservation staff regarding White River. I will be sending additional materials as they come in from our technical staff.

Wildlife:

Staff wildlife biologist not aware of any wildlife surveys or data collected within the project boundary, recommended *White River Property Group Master Plan (attached).*

Mussels:

At this time, conservation staff have no mussel records in the Mussel Database for the White River in Ashland County. The only records for the White or its tributaries are from the West Fork of the White in Bayfield Co. Eastern Elliptio is the only listed species. It is Special Concern, and would likely occur in the White River, as well as the other species listed. These are old records, but would still expect this mussel assemblage to still be present.

Mussels from West Fork White River Bayfield Co,
Creek Heelsplitter - Lasmigona compressa (1994)
Cylindrical Papershell - Anodontoides ferussacianus (1994)
Eastern Elliptio - Elliptio complanata (1994)
Fluted-shell - Lasmigona costata (1994)
Giant Floater - Pyganodon grandis (1994)

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Macaulay Haller
Water Resources Management Specialist- Senior
Water Regulations and Zoning Specialist- Senior
Wisconsin Department of Natural Resources
Macaulay.Haller@wisconsin.gov

dnr.wi.gov

From: Haller, Macaulay G - DNR
Sent: Friday, May 29, 2020 2:26 PM
To: 'shawn.puzen@meadhunt.com' <shawn.puzen@meadhunt.com>; 'Miller, Matthew J' <Matthew.J.Miller@xcelenergy.com>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: White River WDNR Materials for PAD

Hi Shawn and Matt,

As part of the proposed White River P-2444 relicensing, I've attached some materials from WDNR, which includes an Endangered Resources review and SWIMS data:

- White River_P-2444 WQ_AIS SWIMS Pull: Results from SWIMS for monitoring stations within the project boundary. Only includes data from past 10 years of monitoring work. Pulled in May 2020.
    - Data includes start date, station ID, station name, project name, monitoring description, and result

- Endangered Resources Review for the Proposed White River Hydro Project Relicensing **(confidential)**
    - Wood turtles are the main concern

I will be sending additional materials as they come in from our technical staff team.

Please let me know if you have any questions.

Have a good weekend,

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Macaulay Haller
Water Resources Management Specialist- Senior
Water Regulations and Zoning Specialist- Senior
Wisconsin Department of Natural Resources
Macaulay.Haller@wisconsin.gov

dnr.wi.gov

White River P-2444

Fish:

Email Attachment Descriptions:

1) Biological and Social Dynamics of White River Brown Trout Fishery 2014-2015: The 2014-2015 White River study was initiated to update trout population, trout catch, and harvest and angler attitudes. This report compares recent with historic data and update management recommendations based on what was learned from 2005 to 2015. Pages 34-39 provide direction for future fisheries management efforts on the White River.
2) FERC_White_River_relicense_data_nonwadable_trend.xlsx: Fisheries data for White River upstream from White River Flowage (WRF)
3) Nonwadable trend station map.doc: Map showing location of email attachment 2 (White River upstream from WRF)
4) White_River_Flowage_Sea_Lamprey_Weir_Catch_1956_1960_SN1.pdf: Fish survey data for WRF
5) White_River_Flowage_6_1966_General_Survey_Report.pdf: Fish survey data for WRF
6) White_River_Flowage_6_1966_Original_Data_SN3.pdf: Fish survey data for WRF
7) White_River_Flowage_Aging_Data_6_1966.pdf: Fish survey data for WRF
8) White_River_Flowage_5_1983_SN3.pdf: Fish survey data for WRF
9) White_River_Flowage_4_1990_SN1.pdf: Fish survey data for WRF
10) White_River_Flowage_4_2015_SN1.pdf: Fish survey data for WRF

Fisheries Data

1) Downstream of Dam: DNR Fisheries database was reviewed and Fisheries staff did not find any data for the project area. Older data (various years from 1963-1981) exist for a station nearly 15 miles downstream.

2) Upstream of Dam:

    a. White River Flowage (WRF, Ashland County): See attached survey data (attachments 4-10).

    b. White River upstream of the WRF (Bayfield County): There is an extensive survey history. While much of this data is located a considerable distance upstream (on some of the ‘upper-white’ and its headwater tributaries), there are a few surveys that might reflect or relate to the fishery in the WRF directly. More specifically:
        i. Non-wadable trend survey (located @ Sutherland Road). This is planned to be conducted every-other year, flows allowing.
        ii. Lower-white River non-wadable survey (Mason – WRF), using inflatable zodiac not conducted often, but provides the best picture of the fishery

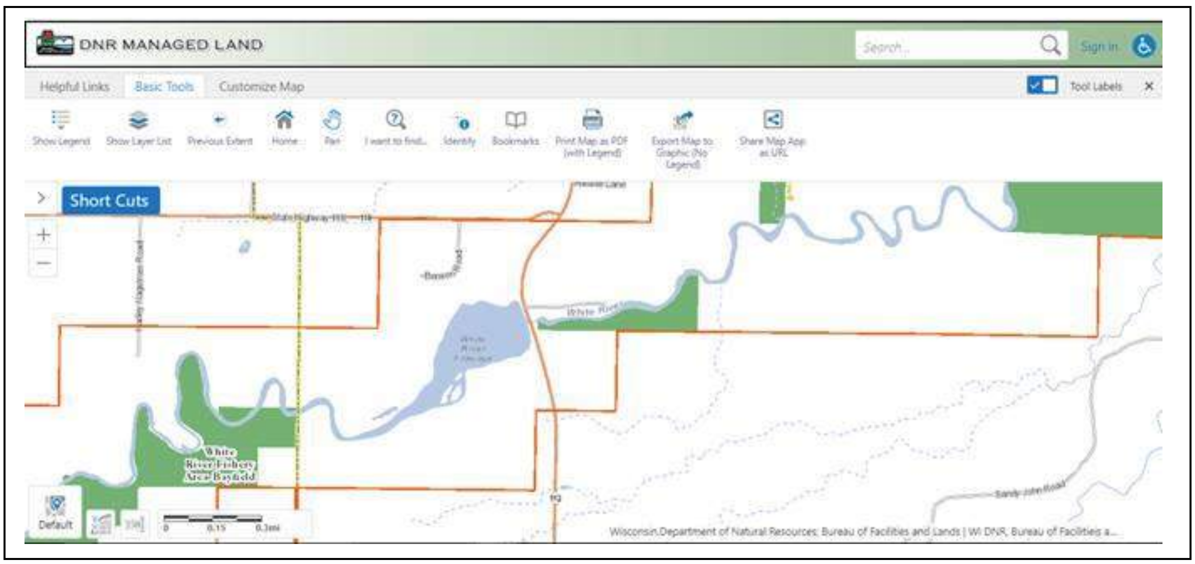
immediately upstream of the WRF. The most recent datapoint we have is 2005.

iii. Creel Survey of the White River (conducted every 10 years). See email attachment 1.

Fisheries, Lands Management Plans

1) The White River within the project area is within the Superior Coastal Plain Master Plan geographic area: https://embed.widencdn.net/pdf/plus/widnr/3rv49zubit/SCP_RegionalMasterPlan.pdf?u=umm5nf&showinbrowser=true

2) The Master Plan only refers to the White River Fishery Area and White River Wildlife Area; no specific management instructions. Instead, these areas are administered through the White River Property Group Master Plan (https://dnr.wi.gov/files/PDF/pubs/lf/LF0072.pdf). The plan includes that part of the White River Fishery Area on the south side of the river, downstream from the dam (green shade polygon in middle of map, below).



3) The Lake Superior Fisheries Management Plan (https://dnr.wi.gov/topic/fishing/lakesuperior/LakeSuperiorFishManagementPlan.html) also has a minor role in the project area, as it includes Lake Superior tributaries upstream to the first impassable barrier (i.e., White River Dam). Currently, the draft plan is being reviewed by the NRB and is anticipated to be finalized later this year.

Surface Water Data Viewer Fish Management Layer

- Class II trout stream upstream and downstream of WRF
- Sturgeon waters downstream of WRF

Biological and Social Dynamics of the White River Brown Trout Fishery, 2014-2015 WBIC – 2892500

Chris Coffin, WDNR fisheries technician, displays a White River brown trout caught during sampling in 2015. Photo: Scott Toshner

Scott Toshner, Kirk Olson and Chris Coffin
Wisconsin Department of Natural Resources
Northern District - Brule
March, 2016

Executive Summary

The White River is one of only eight trout streams in Wisconsin containing more than 40 miles of Class I or II trout water. The river is known for its top quality brown trout *Salmo trutta* fishery that is relatively inaccessible by roads. The 2014-2015 White River study was initiated to update trout population, trout catch and harvest and angler attitudes, based on the recommendations of Toshner and Manz (2008). In this report we compare recent with historic data and update management recommendations based on what was learned from 2005 to 2015. This study utilized many of the same methodologies that were developed in historic surveys on the White River.

Brown trout density from 2014 to 2015 has declined below the management recommendation of 300 -550 fish/mile (Toshner and Manz, 2008), which was the density thought to be adequate to maintain natural recruitment. These lower densities were likely the result of one or more small year classes of brown trout in the system. Densities of brown trout ≥ 6 inches have declined to 125 fish/mile in 2014-2015, compared to the consecutive year average of 523 fish/mile from 1984 to 2005. Additionally, we observed a substantial decline in age-I brown trout in 2013 and 2014 at all six trend stations located on tributaries and upper reaches of the White River, likely leading to weak year classes on the lower White. The cause of low year class strength may be related to several factors. Two of which may be severe winters in 2012/2013 and 2013/2014 and a large rain event in July of 2013 which caused a fish kill.

Our results indicate the brown trout decline in density is likely not from angler over-harvest. The average exploitation of brown trout ≥ 6 in was the lowest ever observed in 2014-2015 (11%) and exploitation did not exceed 20% in the two most recent creel surveys in 1992-1993 and 2004-2005. Exploitation of large brown trout (≥ 15 in) was 10 % in the current survey, declining from1992-1993 and 2003-2004 exploitation rates of 22% and 25%, respectively.

Regulation changes may have been partly responsible for the higher proportion of brown trout ≥ 15 in observed in surveys post regulation change. A more restrictive regulation was implemented in 2016. The genesis of this regulation was the rule simplification process for trout fishing regulations that began in 2013. In light of the 2014 and 2015 survey information, decreasing angler harvest is warranted even though angler exploitation is currently at a low level. Since the density of brown trout is now well below management recommendations, we feel that all management tools should be used to limit exploitation of adult fish. Future surveys will document changes in brown trout density and if densities rise to within or above management goals, a less restrictive regulation should be considered.

Annual trend monitoring on both wadable and non-wadable stations on the White River has provided useful information. Wadable trend station data has shown the possible link between recruitment in the tributaries of the White River and density of brown trout in lower sections of the White River. Wadable trend monitoring stations indicated that age-I brown trout abundance in the tributaries to the White River has the most potential for estimating year class strength. Stable isotope analysis revealed upstream spawning movements of brown trout from lower reaches to the headwaters of the South Fork of the White River.

One hundred and forty seven anglers responded to the angler questionnaire. Angler opinion corroborated population estimate data in regard to lower abundance of brown trout in the White River. In 2014 and 2015, 78% of respondents said they were either very satisfied or somewhat satisfied with their fishing experiences on the White River. There was nearly an even split of bait choices among anglers. The more conservative regulation starting in 2016 on the White River was viewed as having a positive impact on the fishery by the majority of anglers (61%), though live bait anglers preferred it less than fly anglers. However, when asked whether they favor or oppose the regulation, anglers were evenly split, with bait anglers more strongly opposing the regulation (70%) than fly anglers (20%). The lack of angler recruitment on the White River may be a cause for concern. The percent of anglers 50 years of age or older increased from 48% in 2006 to 68% in 2015. Increasing angler recruitment on the White River will be critical for maintaining public interest in the watershed and justifying continued fisheries management activities.

Management recommendations for the White River include: (1) Maintain 300-550 brown trout/mile ≥ 6 inches; (2) retain current regulations at this time and consider more liberal harvest regulations if the brown trout population increases to levels within management goals; (3) discern, through the use of expanded stable isotope studies, coarse-scale movement patterns of adult brown trout to identify spawning areas and summer and winter home ranges; (4) continue an active monitoring program with population estimates, angler questionnaires and creel surveys every 10 years and bi-annual non-wadable and annual wadable index stations. (5) work with interested parties to assist in accomplishing management recommendations and support the many groups that are preserving the White River and its watershed.

Table of Contents

Introduction

The White River is one of only eight trout streams in Wisconsin containing more than 40 miles of Class I or II trout water and has been known as a top quality brown trout fishery with limited road access. The 2014-2015 White River study was initiated to gather additional trout population, trout catch and harvest and angler attitudes regarding the fishery, following the management recommendations in Toshner and Manz (2008). In this report we compare recent to historic data and update management recommendations based on what we learned between 2005 and 2015.

The White River watershed is located in northwestern Wisconsin. The river originates in the Chequamegon National Forest in central Bayfield County and is the largest river in the county. The river flows east from its origin near Delta, 32 miles and enters Ashland County. A forty-nine foot power dam, located just inside Ashland County, creates the 56-acre White River Flowage and prevents upstream movement of fish from Lake Superior. Below the power dam, the river flows northeast 14 miles to its junction with the Bad River near Odanah and then another 4 miles into Lake Superior (Avery 1990). Numerous tributaries enter the White River, the largest of which is the Long Lake Branch that originates from Lake Owen in Bayfield County and joins the White River near the downstream end of the Bibon Swamp Natural Area. Eighteen Mile and Twenty Mile Creeks are the second and third largest tributaries to the White River and join the Long Lake Branch north of Grandview in the southern edge of the Bibon Swamp (Figure 1).

The average daily discharge of the White River (1949 to 2005) near the power dam is 273 cubic feet per second (cfs) (USGS, station number: 04027500, waterdata.usgs.gov). April has the highest monthly average discharge (572 cfs) and January has the lowest monthly average discharge (182 cfs). Peak streamflow from 1949 to 2014 was 6,720 cfs recorded on July 24, 2005.

In the late 1800s the White River and its tributaries were used extensively to transport and process timber logged in the watershed. Many of the dams found throughout the watershed had their origins from the logging period. These dams were used either for power production for mills or as storage devices that could be opened or blown out in spring to float the logs to downstream locations. Logging activity from the turn of the 20th century still impacts water quality and channel morphology.

Citizens, local politicians and resource managers have worked to protect the White River watershed since the 1950s. Motor boats have been prohibited on the White River above State Highway 63 since 1967 when the Delta and Mason town boards adopted such action to secure the future of the unique recreational opportunities offered by the river. In addition, there are four major land protection areas on the White River that now encompass the headwaters to where the White River enters Tribal lands. The four protection areas include two fisheries areas (White River Fishery Area and the White River Fisheries - Expansion), a natural area (Bibon Swamp Natural Area) and a wildlife area (White River Wildlife Area). The White River Fisheries Area was established first in 1961 and the expansion was established in 2004.

The White River and its tributaries have a diverse fishery with nearly 40 species of fish identified (Appendix I, Table 1). Historic fish management of the White River and its watershed has included fisheries surveys, stocking, various length and bag regulations, installation of instream habitat improvement structures, headwater spring pond dredging and beaver *castor canedensis* control activities. Trout population surveys in the Bibon Swamp section of the White River occurred in 1984, 1985, 1986, 1988, 1989, 1992, 1993, 2003, 2004 and 2005. Creel surveys occurred in 1984, 1985, 1992, 1993, 2004 and 2005. Various other surveys have occurred on upper sections of the White River and its tributaries. These surveys mainly utilized backpack and towable electrofishing units. Objectives of these surveys were to assess fish passage and instream habitat improvement, or as part of the statewide wadable baseline monitoring program.

The White River has a long stocking history and has been stocked predominately with brook trout, brown trout and rainbow trout since at least 1920 according to records from the Wisconsin Fish Commission, and 1933 according to records from the Brule DNR office file (Appendix I, Table 2). The exception was one stocking of black bass (unknown species) in 1935. From 1933 to 1948 a combination of brook trout, brown trout, and rainbow trout were stocked primarily as fingerlings. Stocking from 1949 to 1969 consisted mostly of brown trout and brook trout; however the age of fish stocked during this period was mostly yearlings. Brown trout were stocked from 1949 to 1981 as predominately yearlings. Since 1981 no stocking has occurred and the fishery has been maintained by natural reproduction. Historic hatchery records indicate that the strain of brown trout stocked into the White River originally came from Europe in the early 1900s. The strain was started in the Nevin Hatchery and transferred to the Wild Rose Hatchery in 1946 where it was crossed with a strain from Cortland, New York.

The fishing season on the White River opens the first Saturday in May and ends October 15th. Trout fishing regulations have changed over time on the White River. Prior to 1990, bag and length restrictions on the White River included a 6 in minimum length limit, a daily bag limit of 10 trout in May (only 5 browns and rainbows), and a daily bag of 10 trout of any species from June through September. In 1990, from downstream of Pikes River Road bridge to the White River dam was changed to a Category 5 (3 trout over 9 in, only 1 brown trout over 15 in; Figure 1). Upstream from Pikes River Road Bridge the fishing regulation was changed to a Category 2

(7 in minimum length and 5 trout daily bag limit). The 1990 change in regulations was in response to excessive angler exploitation of brown trout ≥ 15 in (Avery 1990).

Several changes to angling regulations have been made in 2016 as a result of the statewide push toward trout regulation simplification. Beginning in 2016, all of the White River and its tributaries are open to catch and release fishing (first Saturday in January to the first Friday in May) upstream of the power dam. Additionally, the White River upstream of Pike River Road, unnamed tributaries to the White River and East, West and South Forks of the White River have been changed to a 8 in minimum length and 3 trout daily bag limit in 2016. The White River downstream of Pike River Road and the Long Lake Branch of the White River changed to a18 in minimum length and 1 trout daily bag limit. Tributaries to the Long Lake Branch of the White River changed to a no minimum length limit and 5 trout daily bag limit. These regulation changes resulted from a statewide trout regulation simplification effort, which removed the historic regulations categories on the White River system from which managers could choose. Data presented in this report had not been collected when these regulation changes were made.

Recent management efforts have focused on fisheries surveys, beaver control, land acquisition and habitat improvement and protection. Land acquisition has been occurring in all of the various management areas as funding has been available and where landowners have been willing to sell or provide easements. Over 1,000 acres have been purchased by the State of Wisconsin since 2006 within the property boundaries. Stream habitat projects have mainly been focused on stretches of stream near the headwaters area. Controlling glossy buckthorn infestations and maintaining instream habitat improvements have been the main activities involving stream habitat since 2006.

The primary objectives of this report were to: (1) determine brown trout abundance, size structure, growth, movement patterns, (2) estimate angler pressure, harvest and attitudes on the White River and (3) compare these estimates to previous surveys on the White River. In addition, we describe the size structure and relative abundance of northern pike in the White River and results from water temperature monitoring in the White River and its tributaries.

Methods

<u>Trout Populations</u>

A 21.3 mile reach of the White River, beginning at Pikes River Road Bridge and continuing downstream to Bibon Road Bridge was selected for the study and was the same reach studied in historic fishery surveys (Avery 1990, Avery 1999; Fig. 1). Two, 4-mile long electrofishing stations were surveyed in 2014 and 2015 and encompassed two thirds of the historic survey stations per recommendations from Toshner and Manz 2008. Station start positions were located at the confluence of Bolon Creek and the White River and the Sutherland Bridge crossing (Figure 1). Data collected in 2014-2015 was compared to data collected in 1984-1986, 1988-1989, 1992-1993 and 2003-2004.

Mark-recapture electrofishing surveys using two mini-boomshocker boats, one following the other a short distance behind, were conducted from 2014-2015. Both mini-boomshocker units utilized two-booms. All electrofishing surveys progressed downstream during daylight using DC electricity (240 volts, 6.0 amps, on average). One pass was completed for each station for both the mark and recapture portions of the survey. Both brown and brook trout captured on the marking run were measured to the nearest 0.1 in total length, weighed, given a temporary fin clip and released within the station at least ½ mile from either the start or end of the station sampled. Both brown and brook trout captured on the recapture run were examined for marks, measured and released. Mark and recapture electrofishing runs were separated by one day to allow fish to redistribute between runs. Although some 3.0 - 5.9 in brown trout were captured each spring, the efficiency of their capture was poor, thus this discussion refers only to brown trout ≥ 6 in.

Brown trout population abundance was estimated with the Bailey modification of the Petersen estimator for trout ≥ 6 in (Ricker 1975). Population estimates for each station were divided into inch groups based upon the proportion of unmarked trout captured in each inch group on both the mark and recapture runs. Estimates and their variances were combined to determine total population parameters. Confidence intervals for mean brown trout density during each time period (combination of consecutive years) was estimated using population estimates from each sampling reach (n = 2-3 for each time series) as replicates. Trends in population abundance were evaluated using linear regression. Average lengths of trout were determined based on measurements from all stations and trends evaluated using linear regression. Population estimates were not calculated for brook trout due to their low abundance.

Scale samples were taken from 5 brown trout per 0.5 in group during electrofishing surveys and scales and otoliths were taken from angler harvested fish (as available) for age and growth analysis. Scale age was estimated by viewing scales under a 30X microfilm projector. Sagittal otolith age was determined by cross section and magnification under a compound microscope at 4X magnification. Age at length was back calculated using scale annulus measurements in 2003 and 2005 due to growth observed after annulus formation. Back calculation of lengths from scales relies on recognition of annual growth markings (annuli) on scales to calculate an estimated body length associated with each annulus. Body lengths estimated in this way make up a growth history, from which growth rate can be inferred (Pierce et al. 1996). The Fraser-Lee proportional method was used in back calculation of scales (Fraser

1916, Lee 1920). In 2004 and 2015, age at length was not back calculated because annulus formation was occurring at the time of the capture. Von Bertalanffy growth curves were modeled to estimate length at infinity for the scale samples collected during electrofishing and for scale and otolith samples from angler harvested fish.

Sport Fishery

In 2014 and 2015, a partial creel survey was conducted in the White River Study area from Pike River Road to Bibon Road (Figure 1). The creel occurred between the first Saturday in May and the end of the Hex (*Hexagenia limbata*) Hatch in mid-July. Though previous creel surveys occurred throughout the open fishing season (first Saturday in May to the end of September), Toshner and Manz (2008) recommended this shortened creel period given the limited pressure that occurs after the hex hatch and the consistency of seasonal trends in angler pressure. Otherwise, we followed the design described by Toshner and Manz (2008).

A stratified, random design was used to quantify angler effort and harvest (e.g. Avery 1990, Avery 1999, Toshner and Manz 2008). Creel clerks worked at randomly assigned 8 hour AM (6:00-14:00) or PM (14:00 – 22:00) shifts during three randomly selected weekdays and on both weekend days. Creel clerks followed this schedule throughout the creel period except during opening weekend (16 hour shifts were worked between 6:00 – 22:00) and the hex hatch (shifts were adjusted two hours later to improve coverage). During their shift, creel clerks conducted instantaneous car counts at 2-hour intervals, visiting all access points in the study area. Between instantaneous car counts, anglers completing fishing trips were interviewed to allow an estimate of mean angler hours per vehicle, catch rates and harvest rates.

Pressure was estimated separately for weekend and weekdays within seven strata (opening weekend, remainder of May, June before the hex hatch, hex hatch, July after the hex hatch, August and September). Catch and harvest rates were also estimated separately within each of the seven strata. We used the following equation to estimate pressure within each:

$$\left[\sum_{i=1}^{n}(C_i T_i)\right](A_{wd})(WD) + \left[\sum_{i=1}^{n}(C_i T_i)\right](A_{wed})(WED)$$

where, n is the number of car counts possible in a day, C_i is the mean number of cars present at each car count period i, T_i is the time interval represented by each car count, A_{wd} is the mean number of anglers per car on weekend days and holidays, A_{wed} is the mean number of anglers per car on weekend days and holidays, WD is number of weekdays in the month, and WED is the number of weekend days in the month. Fishing pressure for opening weekend was estimated separately following a similar (same?) equation.

Total harvest for each stratum was estimated by multiplying harvest rate from creel clerk interviews and angler pressure within each stratum. Though previous studies incorporated information from voluntary angler catch cards (Avery 1990, 1999), we only used information from creel clerk interviews. Because our creel survey ended in Mid-July (end of the hex hatch), we expanded angler pressure for the remainder of the trout season based on angler pressure estimates from 2004 and 2005. We also used the mean harvest rate from surveyed strata to estimate total harvest for the entire trout season, excluding opening weekend in 2014 because of unprecedented weather conditions. Harvest within each size class was estimated by taking the proportion of creeled fish in a size class (using creel clerk interviews) and multiplying the result by the total harvest. Exploitation was estimated by dividing harvest by abundance.

Annual electrofishing survey

Annual single-pass electrofishing surveys were conducted on six wadable sites in the White River Watershed between 2007 and 2015 and at one non-wadable station in the lower

White River between 2006 and 2015. Wadable sampling took place during the month of August when water levels were within 0.2 m of the normal water level. Non-wadable sampling generally took place in late March after ice out. The non-wadable station encompassed the area from Sutherland Road to the primitive campsite for all survey years except 2015 when the station end was one half mile upstream of the primitive campsite. A comparable survey on the non-wadable station was not completed in 2013 due to high water and late ice. In 2014, an error resulted in the catches of the leading and trailing boats being combined. In order to make 2014 catch per unit effort comparable, we corrected the total catch per unit effort to that of a single boat, based on previous data from two boat surveys on the river. All fish collected were identified, enumerated and measured to the nearest 0.1 inch. Fish were classified into three age categories (age-0, age-I and older than age-I) based on a visual evaluation of length frequency histograms and length at age information from a previous scale analysis (Toshner and Manz 2008). A Ricker stock-recruitment curve (assuming log-normal error) was fit to the data to examine the relationship between age-0 relative abundance and age-I abundance the following year (e.g. Maceina and Pereira 2007).

We examined trends in catch per effort (CPE) and the influence of temperature and flow on relative abundance of age-0 and age-I brown trout within each site. Flow data were collected from the USGS gauge on the lower White River (USGS, waterdata.usgs.gov, station: 04027500) and temperature data were collected from a weather Station in Brule, WI . We summarized flow data by taking the mean daily flow for each season during open water (spring, summer and fall) and temperature by estimating winter degree days (base 20°F) and summer degree days (base 75°F) for each season. Simple linear regression and multiple linear regression (backward variable selection) were used to evaluate relationships between relative abundance and environmental conditions. Residuals plots were examined for normality and homoscedasticity. Summer degree days was excluded from our analysis as it was highly correlated to winter degree days and winter degree days were more often strongly correlated to relative abundance.

Stable Isotope Analysis

Samples for C and N stable isotope analysis were collected during the 2015 field season on the White and the South Fork of the White River (Figure. 2). Adipose fins were collected in place of muscle samples to limit sampling mortality. Several studies have identified adipose fins as a suitable proxy for brown trout and other Salmonids (Jardine et al. 2005, Hanisch et al. 2010, Graham et al. 2013). Samples were collected haphazardly except for a portion of the fall sample, when larger (>9 in) spawning fish were targeted. Adipose fin clips were collected from brown trout in the main stem of the White River during late March (n = 20) and early August (n = 6). Brown trout in the south fork of the White River were sampled during early August (n = 13) and early November (n = 23; when active spawning was observed).

Samples were dried, homogenized and placed in tin capsules after collection. Sample processing was contracted through UC Davis Stable Isotope Facility (cost: $8 per sample, 2016 USD) and results were reported in the delta (δ) notation, using Peedee Belemite carbonate and atmospheric nitrogen as standards:

$$\delta(\%_0) = \left[\left(\frac{R_{Sample}}{R_{Reference}}\right) - 1\right] * 1000$$

where R_{Sample} is the ratio of heavy isotope to light isotope ($^{13}C/^{12}C$ or $^{15}N/^{14}N$) of the sample and $R_{Reference}$ is the ratio of heavy isotope to light isotope of the standard. Samples were adjusted for lipid content using C:N as a proxy for lipid content and following the correction equation of Hoffman and Sutton (2010).

Relationships between length and stable isotope signatures were examined across all brown trout using simple linear regression. Because $\delta^{15}N$ was linearly correlated to length across all brown trout sampled, a length adjustment (e.g. Fraser et al. 1998) was applied following the equation:

$$Y_i' = Y_i - b(L_i - L)$$

Where L_i is the total length for fish i, L is the mean total length of all fish sampled, Y_i' is the size-corrected $\delta^{15}N$ value for fish i, Y_i is the uncorrected $\delta^{15}N$ value for fish i and b is the slope of the linear regression line for total length vs. $\delta^{15}N$. This adjustment allowed the examination of $\delta^{15}N$ signatures independent of length. We compared length adjusted $\delta^{15}N$ and lipid adjusted $\delta^{13}C$ among fish from sites sampled prior to spawning using one-way ANOVA.

Angler Questionnaire

The methods for the angler questionnaire were similar to those used by Toshner and Manz (2008). The questionnaire, with cover letter describing the survey, was delivered in October following the closure of the inland fishing season. To increase response rate, one additional mailing was made to non-respondents and “reminder” post-cards were sent on another occasion. In all, anglers were given approximately two months to respond. A return envelope, with postage was included with each questionnaire. .

The questionnaire was designed to gauge angler motivation, satisfaction, participation, and years of experience. The questionnaire included questions on where and how anglers fished, each angler's history on the White River, and angler opinions on regulations and the fish they catch. In order to evaluate differences in attitudes between user groups, anglers were also asked what type of angling method they preferred (i.e. worms/live bait, artificial lures or fly fishing). Almost all of the questions included in the survey were close-ended questions where the answer choices were provided (see Appendix II for the complete questionnaire and answers by percentage). Close ended questions are preferable when more quantitative data is desired on participation rates and the intensity of feelings pertaining to issues regarding the fishery (Dillman 1978; Fenske 1983).

Northern pike

Northern pike sampled in all stations during 2014-2015 were processed much like the trout captured. Abundance could not be determined for northern pike due to low catch rate.

Temperature Monitoring

Onset© Computer Corporation Hobo® Water Temp Pro continuous temperature monitoring devices were installed at 7 sites in the White River Watershed to record water temperatures during 2002-2015. Water temperatures were recorded at ½ to 1 hour increments. The Wild Rivers Chapter of Trout Unlimited deployed, maintained and downloaded water temperature data using Box Car Pro 4.3 software from 2002 to 2005. WDNR deployed, maintained and downloaded water temperature data using Hoboware software from 2010 to 2015. Maximum daily mean temperatures from June through August (summer) were used for site and historic comparison purposes and to determine whether the stream was cold (< 20.7 C), cool (20.7 C to 24.6 C) or warm (> 24.6 C; Lyons et al. 1996).

Results

Trout populations

Brown trout (N = 1,316) and brook trout (N = 32) were captured during spring electrofishing surveys of the White River in 2014-2015 (N excludes recaptured fish). Brown trout comprised more than 98% of the trout captured and therefore is the primary species referred to in this report. The low frequency of brook trout is similar to historic surveys (Avery 1990, Toshner and Manz 2008).

Brown trout density declined between 1984 and 2015 ($R^2 = 0.72$, $p < 0.0001$, Figure 4). Brown trout density reached its highest level in 1988-1989 at 656 fish/mile and declined to its lowest level in 2014-2015 at 125 fish/mile (Figure 3; Appendix I, Table 3). Yearly and within station variation of brown trout density was often considerable. Annual brown trout density averaged 448 (N= 12, 1 SD = 200) fish/mile from 1984 to 2015 but ranged from 93 fish/mile (2015) to 757 fish/mile (1988; Figure 4; Appendix I, Table 4). The lowest annual brown trout densities of 139 and 93 fish/mile occurred in 2014 and 2015, respectively. Individual station brown trout density also differed but generally showed a decline with time. Between 1984 and 2015, density of brown trout (≥ 6 in) ranged from 77 fish/mile to 964 fish/mile in the various stations sampled (Appendix I, Table 4).

Compared to previous surveys, fewer fish were present in the 7.0 to 15.0 inch length groups in 2014 and 2015 (Figure 5). Density of 6 to 8.9 inch brown trout ranged from 31 fish/mile in 2014-2015 to 196 fish/mile in 1984-1986 (Appendix I, Table 3). Brown trout densities between 9 and 14.9 inches ranged from 34 fish/mile in 2014-2015 to 409 fish/mile in 1988-1989. Density of brown trout ≥15 inches ranged from 27 fish/mile in 1984-1986 to 64 fish/mile in 1992-1993 (Figure 6). The second highest density of brown trout ≥15 inches by sampling period occurred in 2014-2015 (60 fish/mile). Mean length of brown trout has increased significantly over time (R^2 = 0.5, P = 0.030; Figure 7).

Brown trout sampled during the 2015 population estimate ranged in age from II to VII based on scale samples (Figure 8). Age-II brown trout accounted for 8% of the population in 2015 versus an average of 40% from 2003-2005. Age-II and age-III brown trout accounted for 27% of the population in 2015 versus an average of 69% from 2003-2005. Brown trout growth was similar among survey years (Figure 9). Age-II and age-IV brown trout averaged 7.7 and 13.7 inches, respectively, for all survey years. The oldest brown trout, age-VIII using scales as an aging structure, were represented in 2005 and 2015 but not in 2003 and 2004.

Agreement among age estimates determined from paired samples of scales and otoliths taken from individual angler harvested fish was 36% (Figure 10). When age estimates from structures differed, 83% and 13% were within 1 and 2 years of age, respectively. The maximum age difference of three years was a 14.9 inch brown trout which had a scale age of five and an otolith age of two. Relative to otoliths, scales appear to underage fish with a scale age of three but overage fish with a scale age of four and older. When age estimates from age structures differed, otoliths suggest fish with scale age of four and older were overaged by one to two years 77% of the time. The oldest brown trout aged by use of an otolith was age-X and was 20.5 inches in length. Length at infinity of brown trout derived from von Bertalanffy modeling was variable amongst aging structure and sampling method. Scale samples taken during electrofishing sampling produced a length at infinity of 39.1 inches. Length at infinity from samples of otoliths and scales taken from angler harvested brown trout were 43.0 and 25.0 inches, respectively.

Brook trout represented 2.5% of all trout captured in the White River from 2014-2015, similar to the 2003-2005 survey (1.6%). Relative abundance of brook trout for 2014-2015 was

0.9 fish/mile in the population estimate stations (Figure 1). In comparison, relative abundance of brook trout was 3.7 fish/mile in 2003 and 2005. Brook trout relative abundance was not available from surveys prior to 2003 on the White River.

Sport Fishery

Angler pressure in 2014 and 2015 was lower than previous years when a creel had occurred (Figure 11). Estimated angler hours declined by 3,766 hours (on average) since the 2004 and 2005 comprehensive survey. Total harvest, catch rate, harvest rate and exploitation also declined on average, when compared to previous surveys (Figure 12, 14 and 15). Though all these values decreased on average in 2014 and 2015, there were large differences in estimates between 2014 and 2015.

Estimates for catch and harvest rates, angler pressure, total harvest and exploitation all increased from 2014 to 2015. Total angler pressure increased by 927 hours between 2014 and 2015, with the greatest increases occurring in month of May (Figure 15). Catch rates in 2015 also increased to levels observed in previous years (Figure 13). Exploitation of brown trout ≥ 6 in. increased 12% between 2014 and 2015, and was similar to exploitation estimates after 1985. Exploitation of brown trout ≥ 15 in. increased slightly between 2014 and 2015 (2%) but remained lower than all other previous estimates of exploitation (Figure 14).

Annual electrofishing surveys

Catch per unit effort (catch/mile. CPUE) of brown trout was highly variable on the non-wadable station from 2006 to 2015 (Figure 16). Mean CPUE for brown trout surveyed in the non- wadable station was 76 fish/mile (1 SD = 25.7, N = 8) and ranged from 115 fish/mile in 2012 to 29.5 fish/mile in 2015. Correlation between mean CPUE of age-I brown trout from the wadable trend monitoring stations and the CPUE of brown trout 10.0 to 14.9 inches in length (representing age-III + brown trout) from the non-wadable trend monitoring station in the Bibon

Swamp showed a non-significant correlation (R^2 = 0.6, P = 0.13; Figure 17). However, the lowest and highest mean CPUE of age-I brown trout from wadable trend stations produced the lowest and highest CPUE of age-III brown trout two years later in the non-wadable trend station, respectively.

Catch per unit effort (catch/mile) of age-I and older brown trout was highly variable on Twenty Mile Creek (CV = 77 %) and moderately variable within the remaining trend sites (CV = 25% - 47%, mean CV = 42%). Catch per unit effort of age-I and older brown trout were highly correlated among the Long Lake Branch, Twenty-mile Creek, Eighteen-mile Creek, the upper White River and the lower White River (r = 0.78- 0.92) but not the South Fork of the White and the East Fork of the White (r = -0.02 – 0.50, Figure 18). Generally, catch per unit effort was highest on the South fork (mean CPE = 1270), lowest on the lower white river (mean CPE = 69) and variable among the remaining sites (mean CPE = 389-897, Figure 19). Relative abundance of both age-I and age-I and older brown trout dropped sharply at nearly every site in 2013 and relative abundances were the lowest observed in 2013 or 2014 at every trend station (Figure 18 and 19).

Age-0 brown trout catches were highly variable at wadable trend stations (CV = 57% - 96%, mean CV = 76%) except the South Fork of the White River (CV = 38%). Age-0 catch per unit effort was not as strongly correlated among sites as age-I and older catches. Age-0 catch per unit effort was highly correlated among the East Fork, Twenty Mile Creek and the upper White River (r = 0.79 – 0.857) and correlations were lower among other sites (r = -0.12 – 0.68). Age-0 CPE was highest on the South Fork (mean CPE = 4,579), lowest on Twenty Mile Creek (mean CPE = 167 trout/mile) and variable among remaining sties (mean CPE = 236 – 1,160, Figure 20 and 21). In 2013 and 2014 we did not capture any age-0 brown trout on Eighteen Mile Creek and Twenty Mile Creek, respectively.

Only the upper White River had a significant Ricker stock-recruitment relationship between age-0 CPE and age-I CPE the following year (observed vs. predicted, $R^2 = 0.598$, $P = 0.025$). The Ricker model did not fit the relationships between age-0 CPE and age-I CPE at the remaining sites well (observed vs. predicted, $R^2 = 0.03 – 0.26$, $P = 0.16 – 0.73$). Winter degree days (base 25ºF) had a significant negative correlation to relative abundance of age-I and older fish at three sites (upper White River, lower White River and the South Fork of the White River, $R^2 = 0.45 – 0.47$, $P <0.05$). A multiple regression model, including winter degree days and summer mean flow fit relative abundance of age-I and older fish in Eighteen Mile Creek ($P = 0.0261$). Age-0 relative abundance was positively correlated to fall flows on the Long Lake Branch (R^2 =, $P = 0.044$), and summer flows were positively correlated to age-0 CPE on Twenty Mile Creek ($R^2 = 0.633$, $P = 0.0104$).

Stable Isotope Analysis

Brown trout sampled in the summer on the upper South Fork of the White River had a significantly enriched $\delta\delta^{13}C$ signature relative to brown trout sampled in the summer on the lower South Fork, near the confluence with the West Fork, and the main stem of the White in both spring and summer (Tukey's HSD, p<0.001, Figure 22). $\delta\delta^{13}C$ signatures of brown trout sampled during the summer on the South Fork decreased with distance from Lake Two (Figure 23). Length adjusted $\delta^{15}N$ signatures for brown trout sampled in the summer on the South Fork of the White River overlapped with fish sampled in the spring on the upper White River, but were significantly depleted relative to fish sampled in the summer on the upper White River and fish sampled in the spring on the lower White River (Figure 23).

Three of the 23 fish we sampled during the fall on the upper South Fork had signatures within the range of fish sampled during spring and summer lower in the watershed (near the mouth of the South Fork and in the White River, Figure 23). These fish ranged in size from 10.1-

19.7 in. in total length. Of the remaining twenty, twelve had signatures within the range of fish sampled in the upper South Fork during the summer, seven had signatures more enriched than any fish we had previously sampled and one fish had a signature in the area of overlap between lower river sites and the upper South Fork (Figure 24).

Angler Questionnaire

Questionnaire return rates were 77.0% (147 out of 191) in 2015 and 72.8% (233 out of 320) in 2006. These are above average response rates considering that full-participation percentages are between (43-64%) as stated by (Sztramko et al. 1991). Respondents comprised a broad spectrum of ages and experience, and traveled from near and far to fish the White River. Ninety Three percent of respondents in the 2015 survey were male, which was similar to the 2006 survey (94%). The age composition of anglers that responded to the survey has increased. The 2015 survey showed that 68% of anglers were 50 years or older compared to 48% in the 2006 survey. The average age of anglers also increased from 48 in 2006 to 53 in 2015. Over three quarters of all anglers had fished the White River for more than 11 years. Just under half (48%) of respondents were local anglers, traveling less than 50 miles one way to reach their fishing location, while 39% traveled between 50 and 200 miles, and 14% traveled over 200 miles. The longest distance an angler traveled was 1,850 miles one way.

Fishing experience satisfaction among anglers was high but has decreased slightly over time. In 2014 and 2015, 78% of respondents said they were either very satisfied or somewhat satisfied with their fishing experiences on the White River which compares to 84% of anglers who answered similarly in 2006. However, the percentage of anglers who were "very satisfied" with their fishing experience declined from 37% in 2006 to 26% in 2015 and the percent of anglers "not at all satisfied" increased from 2% in 2006 to 8% in 2015. The average number of days anglers fished the White River ranged between 6 and 8 days for 2014 and 2015 survey periods. Fishing the White River ranks as one of the most important fishing destinations for 68% of respondents. Over half (53%) of respondents in the 2015 survey thought that fishing on the White River has probably or definitely worsened compared to 49% in 2006.

Anglers were passionate with regard to how they fish the White River. Popular angling methods include fly fishing, use of live bait (worms), and artificial lures. A total of 50% of respondents answered that they never use live bait and 37% answered that they would never fly fish. Fifty six percent of respondents answered that they would never use artificial lures.

The average length of brown trout considered a trophy by anglers increased from 20 inches in 2006 to 25 inches in 2015. A total of 55% of respondents said the largest brown trout that they have caught in the White River was over 20 in. Many White River anglers practice live release of legal length trout. The majority (82%) of respondents in 2015 said they released some legal trout and kept others, with 30% releasing all legal trout. Only 6% of respondents said they kept all legal trout. Most anglers (90%) felt that the practice of live release of legal length trout has either increased or remained the same since they have been fishing the White River.

The more conservative regulation starting in 2016 on the White River, with an 18-inch length and a bag limit of one trout, was viewed as having a positive impact on the fishery by 61% of respondents, while 14% viewed it as neither positive nor negative, and 25% viewed it as probably or definitely negative. Eighty percent of anglers that never use live bait viewed the regulation change as having a positive effect on the White River. Anglers that never fly fish also believe that the regulation change will have a positive effect on the White River brown trout fishery but they were fewer (50% positive). Thirty three percent of anglers that would never fly fish viewed the more restrictive regulation as having a negative impact on the brown trout population.

When it came to the question of whether or not respondents favor or oppose trout regulations with an 18-inch minimum length and a bag limit of one trout, (47%) of respondents would definitely or probably oppose, and 44% of respondents would definitely or probably favor, and 9% were not sure. Seventy three percent of anglers that never use live bait favor the more conservative regulation. On the other hand, 70% of anglers that never fly fish oppose the more conservative regulation.

Northern Pike

A total of 13 northern pike were captured in White River surveys from 2014-2015, compared to 49 captured from 2003-2005. Mean length of northern pike from 2014-2015 was 26.4 inches (SD = 3.5, N = 13) and ranged from 18.0 to 30.2 inches. Mean length of northern pike from 2003-2005 was 21.0 inches (SD = 6.3, N = 49) and ranged from 7.2 to 35.8 inches.

Temperature Monitoring

Water temperatures during summer months in the White River system were colder in 2010-2012 and 2015 than 2002-2004, with the exception of the East Fork of the White River which had higher temperatures in 2010-2012 and 2015 than the 2002-2004 (Figure 26). Maximum summer daily mean temperatures (MSDMT) on Eighteen Mile Creek and the South Fork of the White River indicated cold water conditions throughout the survey period. MSDMT changed from cool to cold between survey periods on the White River at Pike River Road and Sutherland Bridge, the Long Lake Branch of the White River at Taylor Lane and Twenty Mile Creek at North Sweden Road. In contrast, mean, maximum and minimum air temperatures increased from 2002-2004 to 2010-2012, 2015 (WI State Climatological Survey).

Summary and Discussion

The White River was surveyed in 2014-2015 to determine the status of the fishery, add to the information collected in previous surveys and report on additional data collected per management recommendations made by Toshner and Manz (2008). More specifically, we analyzed brown trout population parameters, creel survey metrics, wadable and non-wadable trend station data, brown trout movement via stable isotope analysis and changes in angler perceptions/ dynamics and angler opinions on regulations.

Brown trout density in the White River has been variable from year to year and station to station from 1984 to 2015. When consecutive years and stations within years are combined, however, the trend indicates a decrease in the brown trout abundance ≥ 6 inches. Densities of brown trout ≥ 6 inches have declined to 125 fish/mile in 2014-2015, compared to the consecutive year average of 523 fish/mile from 1984 to 2005. Brown trout density from 2014 to 2015 has fallen below the management recommendation of 300 to 550 fish/mile (Toshner and Manz, 2008), which was the density thought to be adequate to maintain natural recruitment. These lower densities were likely the result of one or more small year classes of fish in the system. Relative abundance of age-I brown trout at our long term trend stations declined sharply in 2013 and was the lowest observed at every station in 2013 or 2014, indicating weak year class strength in those years. Severe winters may have had an effect on age-I year class strength in the tributaries in 2012/2013 and 2013/2014. Winter degree days had a significant negative correlation on several tributaries to the White River that are thought to strongly contribute to recruitment. Overwinter mortality has been shown to regulate abundance in other populations of stream dwelling salmonids (Hunt 1969, Meyer and Griffith 1997). In addition, an extreme rain event in the late July of 2013, when approximately 7 inches of rain fell in a 24 hour period at Sutherland Bridge, caused a fish kill event. The fish kill was likely caused by the flushing of wetlands surrounding the White River which had low levels of dissolved oxygen at a time when water temperatures where warm, thus reducing available oxygen to trout. Quantifying the extent of the 2013 fish kill is difficult due to the remote nature and turbid water of the Bibon Swamp, but anglers reported seeing in excess of 80 dead brown trout between Sutherland Bridge and Goldbergs Landing in the days following the rain event. The severity of the 2013 fish kill may have been high based on results from the non-wadable trend station data that indicated relative abundance of brown trout was the highest in 2012 from the time period from 2006 to 2012. The high relative abundance from the non-wadable trend station in 2012 would have been expected to carry over to the 2014 and 2015 population estimates, but this did not occur.

There has been a shift in the brown trout population size structure since the late 1980s toward larger fish. A shift in size structure toward larger fish seems desirable but may warrant concern. Reduction of new recruits into a population will shift a population size structure to larger, older fish if recruitment is low (Toshner 2004, Margenau et al. 2008, Zale et al. 2012). Length frequencies of brown trout in 2014 and 2015 exhibited low numbers of fish in the 7.0 to 8.9 inch and 9.0 to 15.0 inch length groups when compared to historic surveys (Figure 5). Furthermore, age-II and age-III brown trout accounted for 27% of the population in 2015 versus an average of 69% from 2003-2005. Both length frequency and age distribution of brown trout indicate low recruitment may be a likely cause for lower brown trout densities in the White River in 2014 and 2015.

Our results indicate the brown trout decline in density is likely not from angler over-harvest. The average exploitation of brown trout ≥ 6 inches has steadily declined from 35% in 1984-1985 to the all-time low of 11% in 2014-2015. Exploitation of large brown trout (≥ 15 inches) was 10 % in the current survey and also declined compared to the 1992-1993 and 2003-2004 exploitation rates of 22% and 25%, respectively. An 11% exploitation rate is generally considered sustainable, even for slow growing or sporadically recruiting salmonids (Hansen 1996, Ebner et al. 2008). However, even 11% exploitation could negatively impact the population if recruitment remains low.

A more restrictive regulation will be implemented beginning in 2016. The genesis of this regulation was the rule simplification process for trout fishing regulations that began in 2013. The former regulation was no longer available for use; the choice involved either a more liberal regulation or a more conservative regulation. At the time of the decision data present in this report had yet to be collected, but erring on the conservative side was thought to be prudent. In light of the 2014 and 2015 survey information decreasing angler harvest is warranted even though angler exploitation is currently low. Since the density of brown trout is now below management recommendations, using all available management tools to limit exploitation becomes reasonable. Future surveys will document changes in brown trout density and if recruitment increases and densities rise to within or above management goals, consideration of a less restrictive regulation should be considered.

Potential outcomes of a more restrictive regulation may include a decreased abundance of brown trout if intra-specific competition (i.e. predation of large brown trout on small brown trout) is affecting recruitment (Dong and DeAngelis 1998). However, historical data suggests that this is unlikely given the number of brown trout ≥ 15 inches has remained consistent between 1993 and 2015 while the number of brown trout from 6 to 14.9 inches has been widely variable.Anderson and Nehring (1984) found that a catch-and-release regulation in a wild trout population in Colorado had catch rates that average 48% greater than in the standard regulation of the same stream that had the additional benefit of catchable-size trout stocking. They also found that catch rate of trophy sized trout (≥ 15 inches) was 28 times greater in the catch and release section than in the harvest section. Carline et al. (1991) similarly found that catch rates of brown trout increased from 0.2 to 1.3/h after the implementation of a catch and release only regulation on a Pennsylvanian trout stream, they also found that abundance of age-I and older brown trout increased by 165%.

We did not detect a significant relationship between age-I brown trout abundance in headwater reaches (wadable trend stations) and age-III abundance on the lower White two years later. However, our sample size was small (N = 5) and there are initial indications that a positive relationship may exist between the two. Therefore, we recommend continuing annual sampling on the wadable trend stations and annual sampling on the non-wadable trend station.

Relative abundance of age-0 brown trout in our annual trend stations was highly variable. Age-0 abundances fluctuated widely and patterns were not always consistent across sites or years. It appears that synchronicity in age-0 relative abundance occurred in some years but not others (e.g. in 2012 vs. 2007; Figure 20 and 21). It may be that stream specific conditions (e.g. differences in flow and temperature regimes) are causing this variability. Age-0 relative abundance was not usually related to age-I abundance in the following year, except on the upper White River, where we documented a significant stock recruitment relationship.

Interestingly, age-I and older relative abundance was highly synchronous among four of the six trend stations. This suggests that stream conditions experienced across the watershed influence the relative abundance of age-1 and older brown trout at these sites. Winter intensity (winter degree days) was the stream variable most frequently correlated to age-I and older abundance (four sites, negative correlations). Over winter mortality of stream trout can be substantial (Hunt 1968, Meyer and Griffith 1997) and has largely been attributed to depletion of energy reserves (Cunjak 1988, Hutchings et al. 1999). However, our results should be interpreted with caution given the correlations among measured stream conditions (e.g. negative relationship between summer degree days and winter degree days) and the possibility of correlations with unmeasured stream conditions.

Brown trout $\delta^{13}C$ signatures decreased from the upper South Fork to the main stem of the White River which is inconsistent with patterns described in other watersheds (Doucett et al. 1996, Finlay 2001). We expected fish $\delta^{13}C$ signatures to increase in a downstream direction due to a combination of increased in-stream productivity and decreased proportional contribution from terrestrial sources (Doucett et al. 1996, Finlay 2001). The headwaters of the South Fork begin in a large, productive spring pond complex, including Lake Two (16 acres, 7 ft. max. depth). Primary producers within these spring complexes may be enriched in $\delta^{13}C$ (relative to downstream river reaches) due to high productivity coupled with low water velocities (Finlay et al. 1999, Finlay 2004, Ishikawa 2012) and this carbon may be contributing to fish production downstream from Lake Two, resulting in the pattern we observed. Regardless, the high degree of separation between brown trout sampled in the upper South Fork and those sampled in the lower South Fork and White River allowed us to distinguish between fish originating from each location. Though some overlap between South Fork and White River $\delta^{13}C$ signatures occurred, only one brown trout sampled during the fall spawning on the upper South Fork had a value within the range of overlap (Figure 23).

Based on $\delta^{13}C$ signatures, three of the 23 brown trout sampled during spawning on the South Fork originated from the lower South Fork or the White River. One of these brown trout was larger than any that had been captured in previous surveys on the South Fork (19.7 in. total length, WDNR unpublished data, 21 surveys, 1978-2015), while fish over 19 in. are relatively common in the White River (Toshner and Manz 2008). Twelve brown trout had signatures within the range of fish sampled during the summer on the South Fork and one fish had a signature that fell within the range of overlap between upstream and downstream reaches on the lower South Fork and White River. The remaining fish (n = 7) were more enriched than any fish we sampled earlier in the season and likely originated upstream of our summer sampling sites (Figure 23).

This is one of a few studies that have applied naturally occurring carbon and nitrogen stable isotopes to describe movements of fish within a river system (Cunjak et al. 2005, Sepuvelda et al. 2009, Ramsay et al. 2012) and the only study, that we are aware of, which has documented the utility of carbon stable isotopes to discriminate between fish occupying stream reaches < 2.5 mi. apart. Given the small spatial scale, we observed an extremely wide range of carbon isotope signatures in fish sampled during summer (-21.3 to -30.3 $\delta^{13}C$) on the South Fork. Doucett et al. (1996) documented a similar range of $\delta^{13}C$ signatures in resident trout from sites separated by 11.2 mi. The gradient we described may be present in other tributaries that begin as productive lakes or springs in the watershed (e.g. West Fork, East Fork). Carbon isotopes may be used to track spawning movements at these sites.

Without samples from each nearby tributary, it is possible that the $\delta^{13}C$ depleted brown trout we sampled during the fall attained their signature in another tributary of the White that was not sampled (e.g. West Fork). It is also possible that some of the brown trout we sampled during the spring and summer may have been migrants from other reaches. This would be unlikely for brown trout sampled in the summer since movements of stream dwelling brown trout are generally low during summer (Clapp et al. 1990, Meyers et al. 1992, Ovidio et al. 1998, Burrell et al. 2000). Future work should compare $\delta^{13}C$ samples from invertebrates or more sedentary fish species (e.g. sculpin, Cunjak et al. 2005) from each major tributary in the upper White River to validate our current $\delta^{13}C$ baselines and interpretation of these data.

Our results highlight the connectivity of brown trout in the White River, and are consistent with the extensive literature on brown trout spawning movements via telemetry (Clapp et al. 1990, Meyers et a. 1992, Ovidio et al. 1998, Burrell et al. 2000, Davis et al. 2015). The WDNR has invested extensive resources into protecting the watershed of the South Fork and enhancing in-stream fish habitat. Our results indicate that this work is not only supporting the local brown trout population but likely downstream populations as well.

Continuous temperature monitoring in the White River watershed from 2010 to 2015 was compared to results from 2002 to 2004. The maximum summer daily mean temperature was lower or stable at all monitoring locations with the exception of the East Fork of the White River, which had increased temperatures. In contrast, mean, maximum and minimum air temperatures increased from 2002-2004 to 2010-2012, 2015 (WI State Climatological Survey). In stream temperature dynamics are complex and influenced by a range of other variables (Poole and Berman, 2001). The contradiction between decreasing water temperature and increasing air temperature during survey periods may be partially explained by increased groundwater discharge into the White River during the 2010 to 2015 survey period. The drought of the mid-2000's and subsequent end of the drought in the late 2000's could have provided a mechanism for increased ground water discharge that buffered higher air temperatures from 2010 to 2015. Changing flow and temperature regimes due to climate change have the potential to substantially impact abundances of stream dwelling salmonids (Dunham et al. 2015). Modeled changes in stream temperature due to climate change (FishVis data viewer, http://ccviewer.wim.usgs.gov/FishVis/#) indicate that increased water temperatures in the mid to late 21st century may reduce thermal habitat for cold water species such as brown and brook trout. Due to these concerns, summer water temperature monitoring should be continued to monitor water temperature regimes in the White River and its tributaries.

The social component of anglers on the White River is complex. Replication of many aspects of the angler questionnaire from 2006 allowed comparison to responses from the angler questionnaire from 2015. Angler opinion corroborated population estimate data in regard to lower abundance of trout in the White River. When asked if fishing has improved or worsened those who indicated “worsened” cited fewer trout as the reason in 2006 (14%) increased to 40% in 2015. There remained a nearly even split of bait type choices among anglers however, anglers who answered they would “never” fly fish decreased by 7% and those who answered they would never use live bait increased by 11% from 2006 to 2015. The more conservative regulation starting in 2016 on the White River, with an 18-inch length and a bag limit of one trout was viewed as having a positive impact on the fishery by the majority of anglers (61%), although anglers who fished with live bait preferred it less than those who fly fish. However, when asked whether they favor or oppose the new regulation anglers were evenly split. Anglers who fished with bait strongly opposed the new regulation (70%) whereas anglers who fly fish strongly favored the new regulation (73%). Fortunately for bait anglers, sections of the White River, the Long Lake Branch of the White River and their tributaries still allow harvest opportunity and have an 8 inch minimum length restriction and a daily bag limit of 3 trout. If brown trout densities increase in future surveys, consideration should be given to liberalization of the regulations to allow anglers increased harvest opportunity. A lack of angler recruitment may be cause for concern on the White River. The average age of anglers who completed the questionnaire increased from 48 years in 2006 to 53 years in 2015. The percent of anglers 50 years of age or older increased from 48% in 2006 to 68% in 2015. Increasing angler recruitment on the White River will be critical for maintaining public interest in the watershed and justifying continued fisheries management activities.

Evaluation of previous management objectives (Toshner and Manz 2008, Italics) and future Recommendations

1. Population goals. *Proposed a management goal of 300-550 brown trout/mile ≥ 6 inches. At that density recruitment should be adequate to support the fishery.*

Brown trout densities from the 2014 and 2015 surveys for brown trout ≥ 6 inches have declined to 125 fish/mile and have decreased below the goal. Reasons for this are likely linked to low recruitment caused by harsh winters in 2012/2013 and 2013/2014 and the summer of 2013 fish kill caused by a large rain event. If recruitment increases in the future we expect brown trout densities to increase.

2. Regulations. *Implementation of regulation changes were not advised because harvest in the 2004 and 2005 creel surveys on the White River indicated angler exploitation was not limiting abundance of brown trout.*

The regulations on the White River have been changed as a result of the statewide trout regulation simplification process which began in 2013. In light of the decline of the brown trout population in the most recent survey the more restrictive regulation may be appropriate if only to provide a small degree of protection to the population. If future surveys show an increase in brown trout densities to within or above population management goals, consideration should be given to liberalizing regulations to allow anglers to harvest more brown trout.

3. Monitor recruitment. *Counting redds in the fall in tributaries that are known recruitment sources for the White River and comparing those to year class strength was proposed to provide information on the importance of the specific habitat types in the watershed.*

Redd counts were attempted in 2008 with the aid of volunteers. Results were difficult to discern and few redds were identified. This may have been due to timing of the investigation. In any case, the effort required and the usefulness of these data encouraged us to explore other routes to investigate recruitment and these are explored in this report.

Recommended continuous temperature monitoring data collection.

Continuous temperature monitoring data has been collected and results are included in this report.

4. <u>Trout movement/passage</u>. *Recommended studying movement patterns of brown trout.*

A grant proposal for radio tagging brown trout was submitted in 2009 to the Great Lakes Fish and Wildlife Restoration Initiative and was not chosen for funding. The cost of the radio tagging study was estimated to be $89,000. Due to the advancement of stable isotope technology and the low cost associated with this technique (~$1,000 for study described in this report) we used the method to demonstrate brown trout movement within the White River watershed. The results of which are included in this report along with management recommendations for further use of this technique.

Recommended completion of relative abundance surveys on the area of the White River from State Highway 63 downstream to the dam.

This section of the White River was sampled for the first time in 2005. Results showed low abundance of brown trout in the area which correlated to the high water temperatures observed in the section of river. While the lower section of the White River may be seasonally important to brown trout, completion of surveys in this logistically challenging section of river were considered lower priorities when compared to the annual trend monitoring and period population estimates, creel surveys and angler questionnaires.

Recommended exploring the condition of fish passage from Eighteen Mile Creek to the Long Lake Branch.

A fish passage survey evaluation was completed in 2009. Results of the survey indicated brown and brook trout could pass the area from the Long Lake Branch of the White River into Eighteen Mile Creek. We also found that all sizes of both brown and brook trout could navigate this heavily braided stream segment (Toshner 2009).

Proposed continued funding of beaver control activities for the White River system as a whole both for fish passage and water temperature concerns from dams.

Beaver control in the White River watershed is ongoing and is contracted by WDNR through the United States Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS). APHIS removed over 250 beaver and over 270 beaver dams from 2007 to 2016 in the White River watershed.

5. Northern pike. *Proposed continued monitoring of northern pike in the White River.*

Northern pike continued to be sampled during monitoring activities on the White River. The numbers of northern pike capture declined from 49 in the 2003 to 2005 survey to 13 in the 2104 to 2015 survey.

6. Age validation. *Recommended the use of otoliths from angler harvested brown trout for comparison to scales to generate aging data and to discern differences in brown trout longevity.*

Otoliths were collected from angler harvested brown trout in 2014 and 2015 and results are presented in this report. Prior to the use of otoliths for age interpretation the oldest scale age for a brown trout was 8 years. Otoliths helped identify a 10 year old brown trout that was 20.5 inches in length. We found that interpretation of both scales and otoliths present challenges when trying to accurately determine the age of brown trout. We propose an age validation study using coded wire tags on age-I brown trout sampled in the wadable trend monitoring stations. This method would provide a “known” age fish sample that we could use to correlate with aging data in the future. We also recommend collection of both otoliths and scales from the tagged brown trout when encountered during surveys. Until results from an age validation study are analyzed, population estimate surveys should continue to collect a subsample of scales which can be used to provide comparative data to historic surveys. Accurate age assessment is important to determine year class strength in the White River.

7. Future surveys. *Proposed future population, creel, angler questionairre and continuous temperature monitoring surveys on the White River should be conducted every 10 years.*

The 2014-2015 survey accomplished this recommendation. We propose to continue this frequency with the next comprehensive survey to be scheduled for 2024-2025.

Proposed utilizing stations longer in length due to movement out of the one mile stations and considerable differences found between the alternate stations surveyed in 2005 and the historic locations along with the advantage of including a larger portion of the study area. The proposal called for three stations, each four miles in length.

The 2014-2015 survey utilized two stations that were each four miles in length, the upper and middle stations. Logistically the sampling of the lower station would require an extra two electrofishing days and is in a location that is difficult to access, therefore we recommend future surveys utilize the upper and middle stations only. We feel that these stations adequately represent the study area, especially in terms of where angler effort is concentrated and will adequately reflect population trends in the White River as a whole. In addition, these stations require only one week to survey which is important since the timing of the survey conflicts with lake survey efforts the Brule Fishery office conducts annually.

Recommended annual electrofishing survey be completed on the middle station utilizing one mini-boomshocker with one pass to provide relative abundance, length frequency and year class strength information on brown trout.

This recommendation has been completed with the exception of 2013, which was due to unconducive weather conditions. The results of this survey are presented in this report. We recommend the annual frequency of this survey to continue. In correlation with the non-wadable trend station monitoring we recommend annual wadable trend monitoring to continue. We propose sampling the wadable trend stations of Twenty Mile Creek, Eighteen Mile Creek, Long

Lake Branch of the White River, South Fork of the White River and East Fork of the White River. The list of stations eliminates the wadable station on the White River due to the inability to efficiently sample this location. The continuation of wadable stream trend monitoring enables the quantification of year class strength through the use of age-I brown trout abundance.

Proposed several recommendations for future creel surveys.

Due to our desire to maintain the comparability of creel surveys the protocol remained similar in 2014-2015. Shortening the creel survey to reduce the cost of gathering data was the only creel recommendation acted upon in 2014-2015.

8. Partners. *Recommended working with interested parties to assist in accomplishing management recommendations, the completion of which will help further our understanding of the unique fishery that the White River* supports.

Partners worked with include, Bayfield Regional Conservancy, Bibon Swamp Advisory Committee, Friends of the White River, United States Forest Service, United States Fish and Wildlife Service, West Wisconsin Land Trust and The Wild Rivers Chapter of Trout Unlimited. Further protection of the White River watershed has occurred since the prior report. Hundreds of acres have been acquired and protected and numerous public education events held. Continuing and possibly expanding these efforts are encouraged in the future.

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Table 1. Description of the seven strata used in the 2014 and 2015 creel survey.

Strata	Time period
1	Opening Weekend
2	Remainder of May
3	June before the Hex hatch
4	Hex hatch
5	Remainder of July
6	August
7	September

Table 2. Angler pressure estimates for 1984-2015. Estimates prior to 2014 included information from angler questionnaires, only angler interviews were used after 2005. Pressure by strata were only available for 2004-2015.

Fishing pressure (angler hours)

Year	Strata 1	Strata 2	Strata 3	Strata 4	Strata 5	Strata 6	Strata 7	Total
1984								**9760**
1985								**12087**
1992								**12676**
1993								**13377**
2004	786	1841	792	1987	284	575	747	**7013**
2005	595	2862	665	1567	315	459	598	**7061**
2014	138	673	356	1051	120	204	266	**2807**
2015	510	858	538	1045	159	272	353	**3734**

Table 3. Catch and harvest rates of trout from the White River study area. Estimates for July after the hex hatch through September in 2014 and 2015 were based on mean catch rates for surveyed period, excluding opening weekend 2014.

Creel Strata	Trout Species	2004 Catch/Hr	2004 Harvest/Hr	2005 Catch/Hr	2005 Harvest/Hr	2014 Catch/Hr	2014 Harvest/Hr	2015 Catch/Hr	2015 Harvest/Hr
Strata 1	Brown	0.42	0.22	0.51	0.34	0.03	0.01	0.19	0.12
	Brook	0.03	0.01	0.02	0.01	0.00	0.00	0.04	0.03
	Total	0.45	0.23	0.53	0.35	0.03	0.01	0.23	0.14
Strata 2	Brown	0.75	0.30	0.72	0.25	0.14	0.05	0.50	0.12
	Brook	0.07	0.03	0.05	0.01	0.02	0.00	0.08	0.03
	Total	0.82	0.33	0.77	0.26	0.17	0.05	0.58	0.15
Strata 3	Brown	1.09	0.18	0.81	0.21	0.22	0.08	0.56	0.12
	Brook	0.04	0.00	0.09	0.00	0.02	0.01	0.16	0.01
	Total	1.13	0.18	0.90	0.21	0.24	0.09	0.72	0.13
Strata 4	Brown	0.52	0.12	0.23	0.07	0.34	0.05	0.34	0.05
	Brook	0.00	0.00	0.02	0.00	0.03	0.00	0.06	0.00
	Total	0.52	0.12	0.25	0.07	0.37	0.05	0.40	0.05
Strata 5	Brown	1.16	0.10	0.55	0.11		0.06		0.10
	Brook	0.30	0.00	0.11	0.05		0.00		0.02
	Total	1.46	0.10	0.66	0.16				
Strata 6	Brown	1.16	0.10	0.41	0.03		0.06		0.10
	Brook	0.30	0.00	0.19	0.06		0.00		0.02
	Total	1.33	0.09	0.60	0.09				
Strata 7	Brown	0.43	0.15	0.49	0.14		0.06		0.10
	Brook	0.25	0.00	0.05	0.00		0.00		0.02
	Total	0.68	0.15	0.54	0.14				
Season Average	Brown	0.79	0.17	0.53	0.16				
	Brook	0.14	0.01	0.08	0.02				
	Total	0.93	0.17	0.61	0.18	0.20	0.05	0.48	0.12

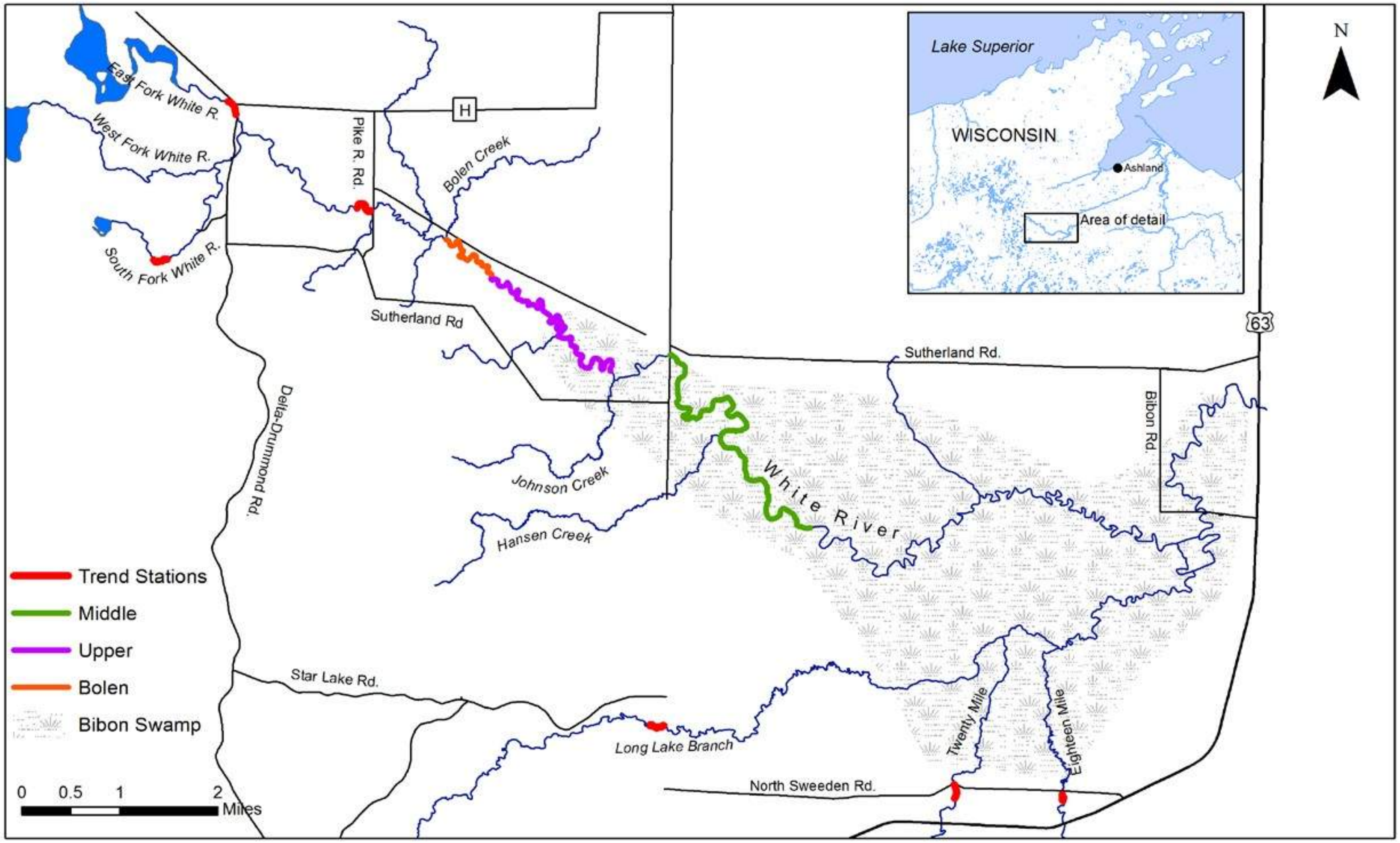


Figure 1. Map of the White River Watershed, 2014 and 2015 population estimate reaches and long term trend stations, Bayfield County, Wisconsin.

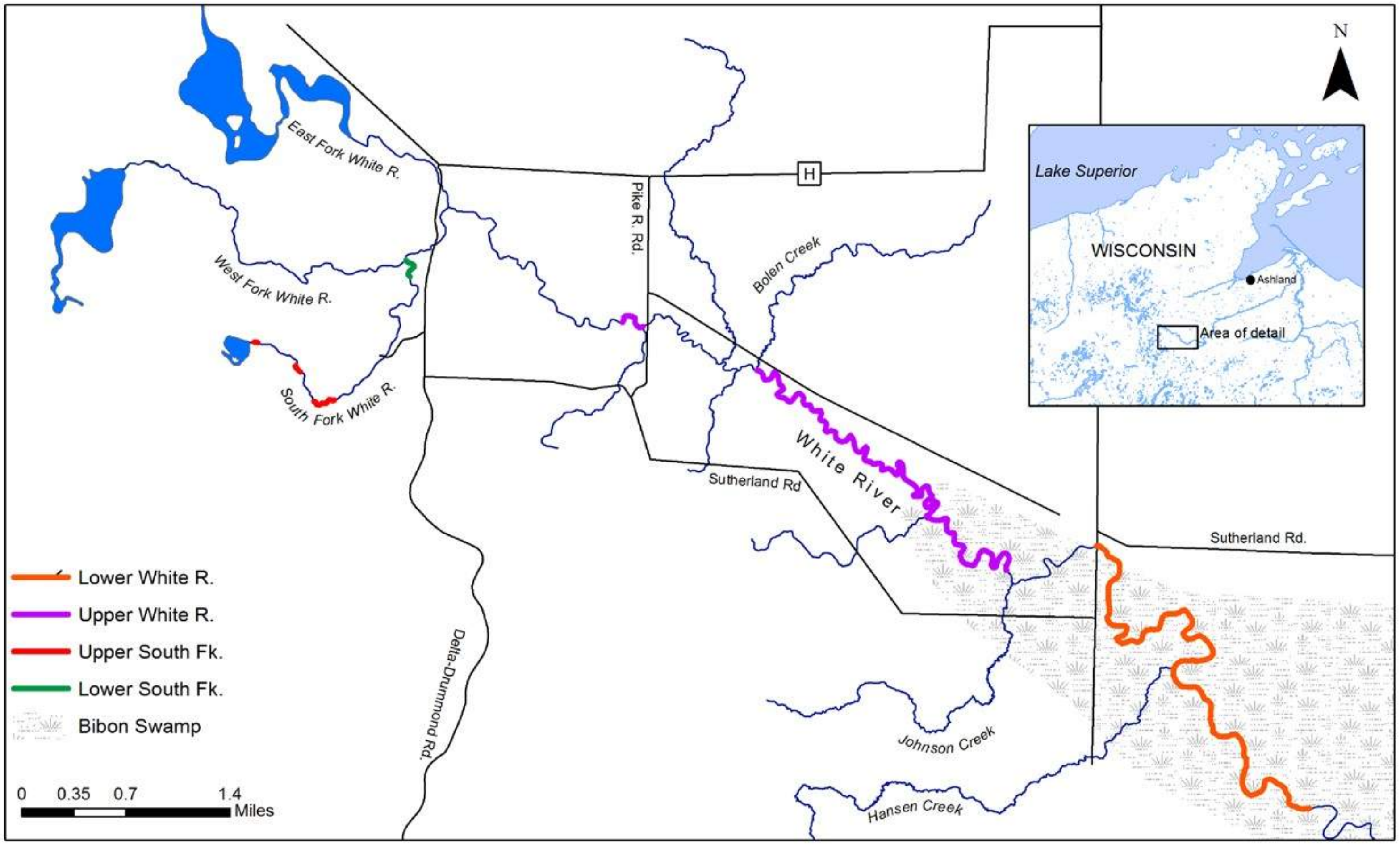


Figure 2. Location of sampling reaches for brown trout stable isotope analysis.

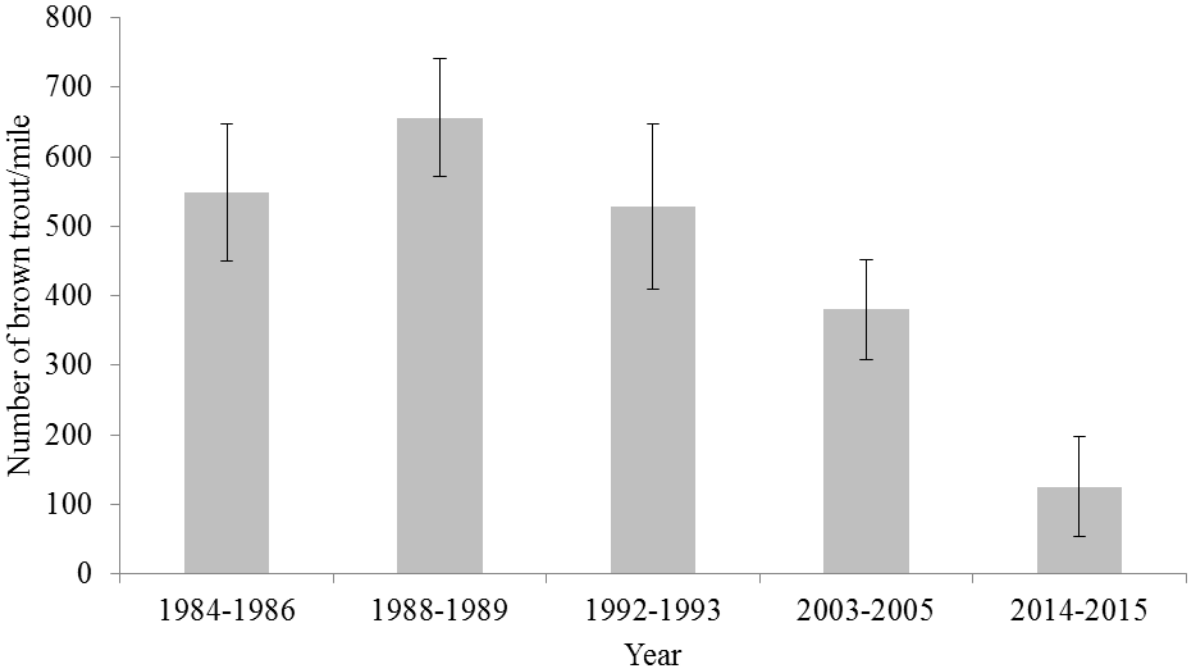


Figure 3. Density of brown trout ≥ 6 inches (fish/mile ± 95% confidence intervals) by consecutive years combined and all stations combined in White River, Bayfield County, Wisconsin.

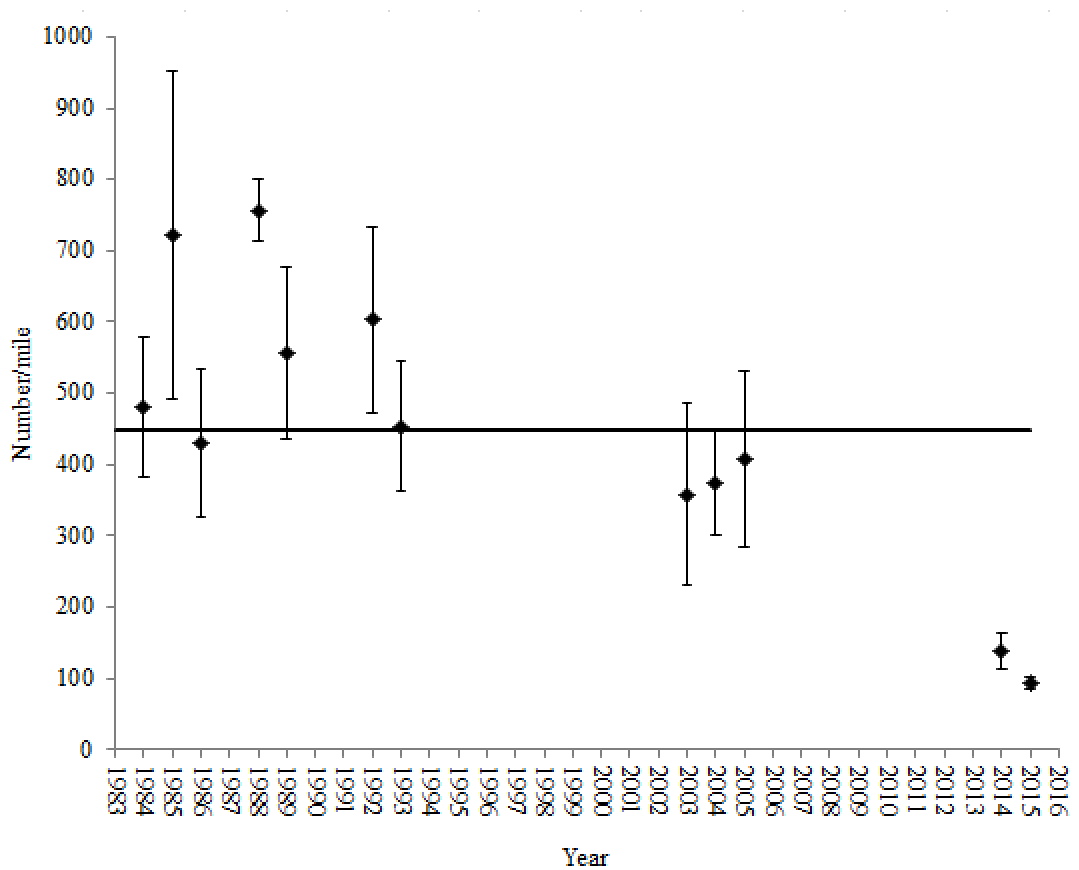


Figure 4. Number of brown trout ≥ 6 inches (fish/mile ± 95% confidence intervals) by year with all stations combined in White River, Bayfield County, Wisconsin. Horizontal line represents average brown trout density (448 fish/mile).

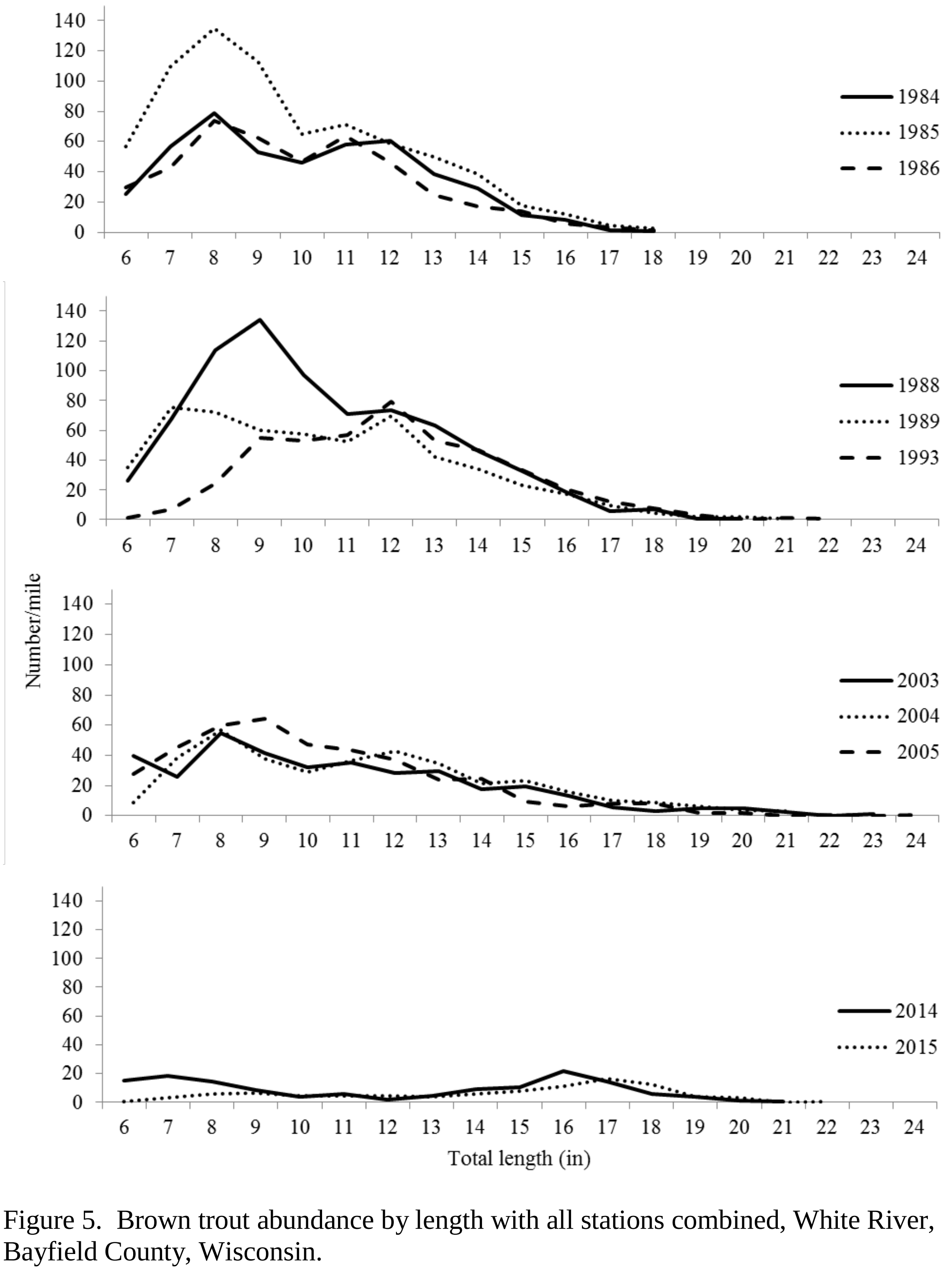


Figure 5. Brown trout abundance by length with all stations combined, White River, Bayfield County, Wisconsin.

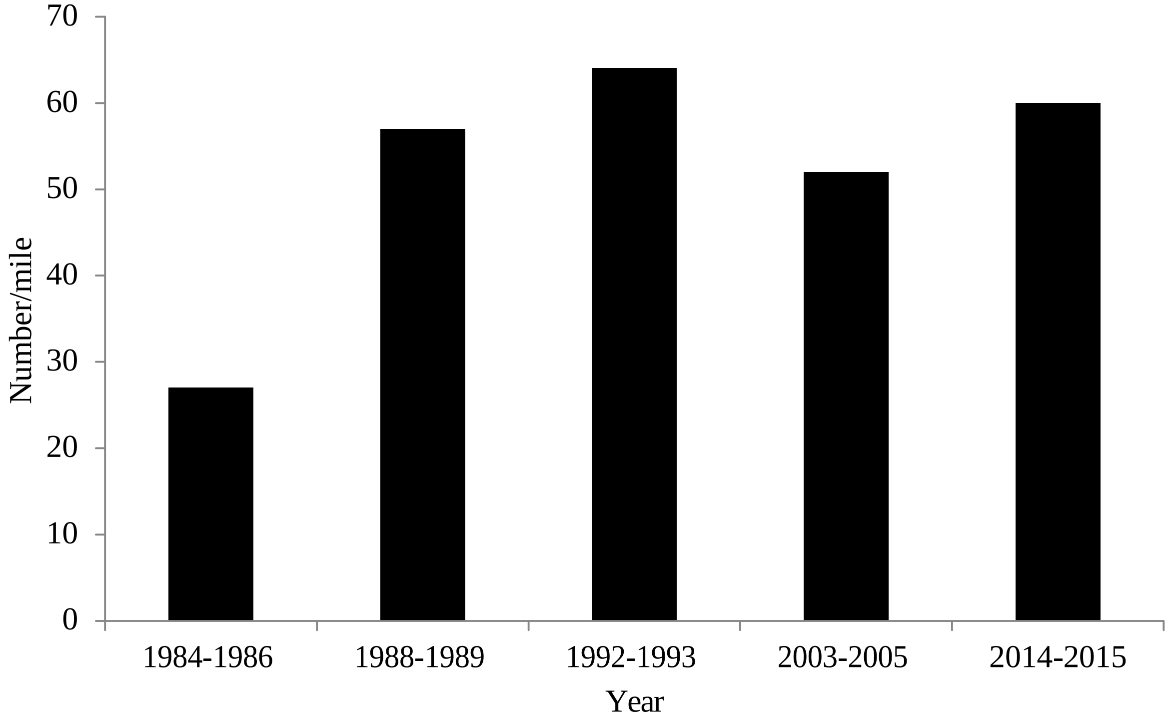


Figure 6. Density of brown trout ≥ 15 inches consecutive years combined and all stations combined in White River, Bayfield County, Wisconsin.

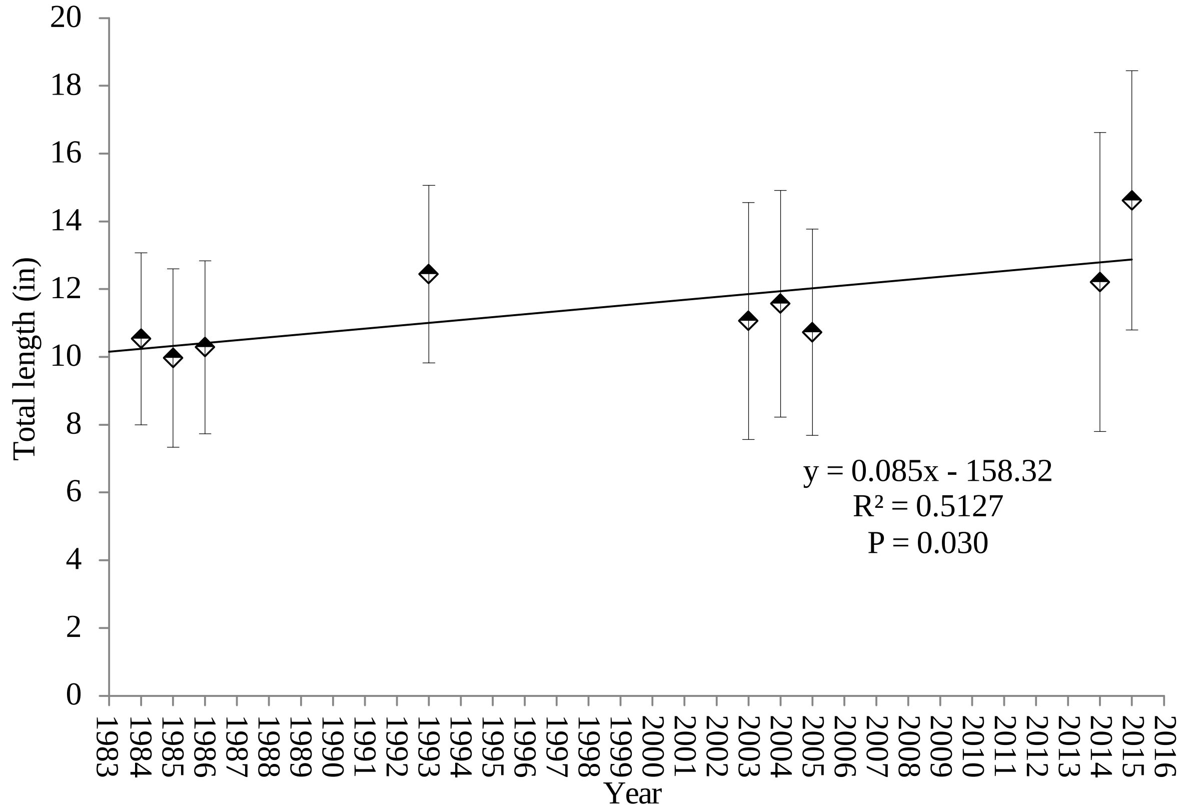


Figure 7. Mean length of brown trout by year with all stations combined in White River, Bayfield County, Wisconsin. Errors bars represent ± 1 SD. Solid line represents linear trend.

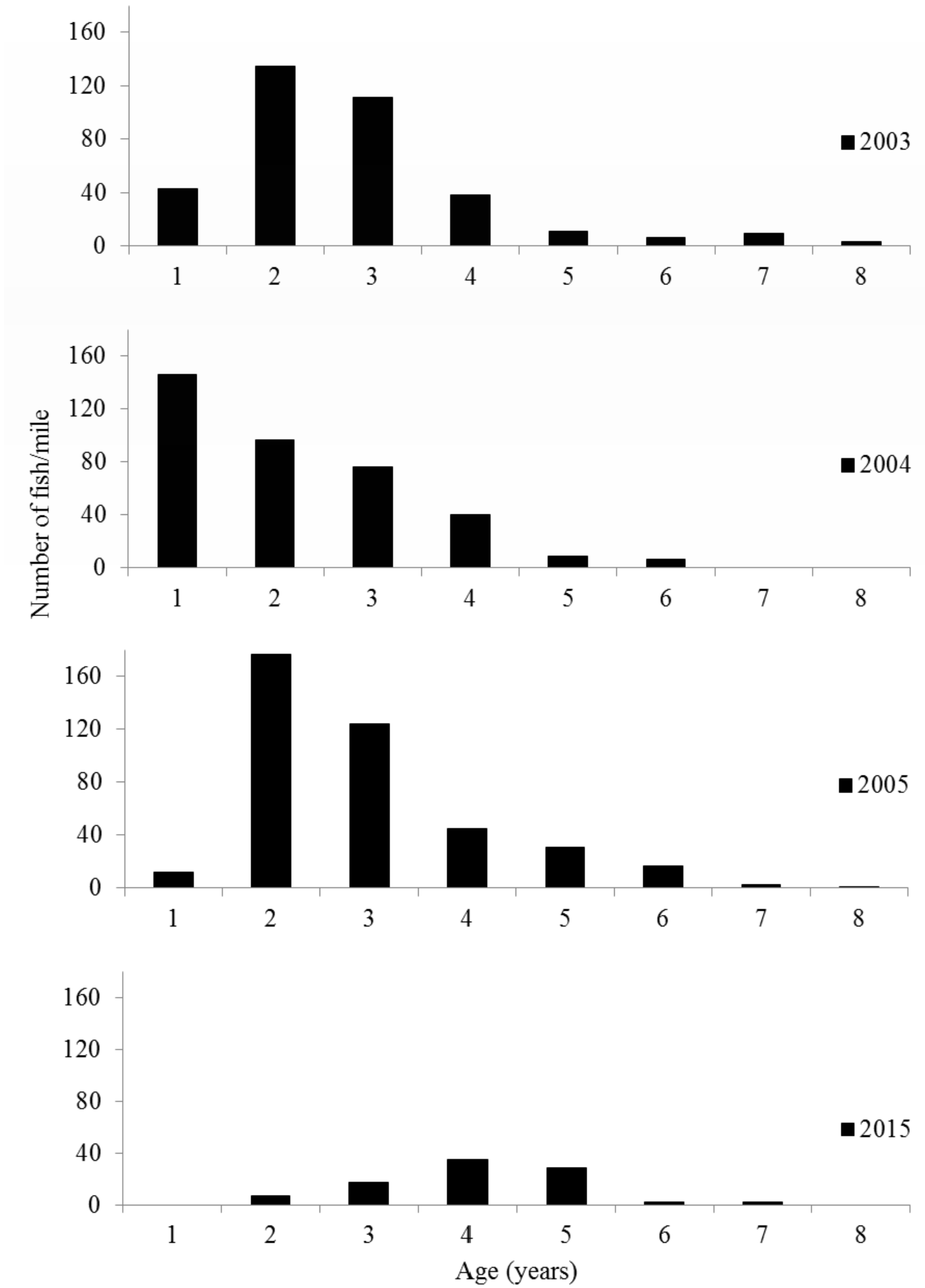


Figure 8. Density of brown trout by age and year, White River, Bayfield County, Wisconsin.

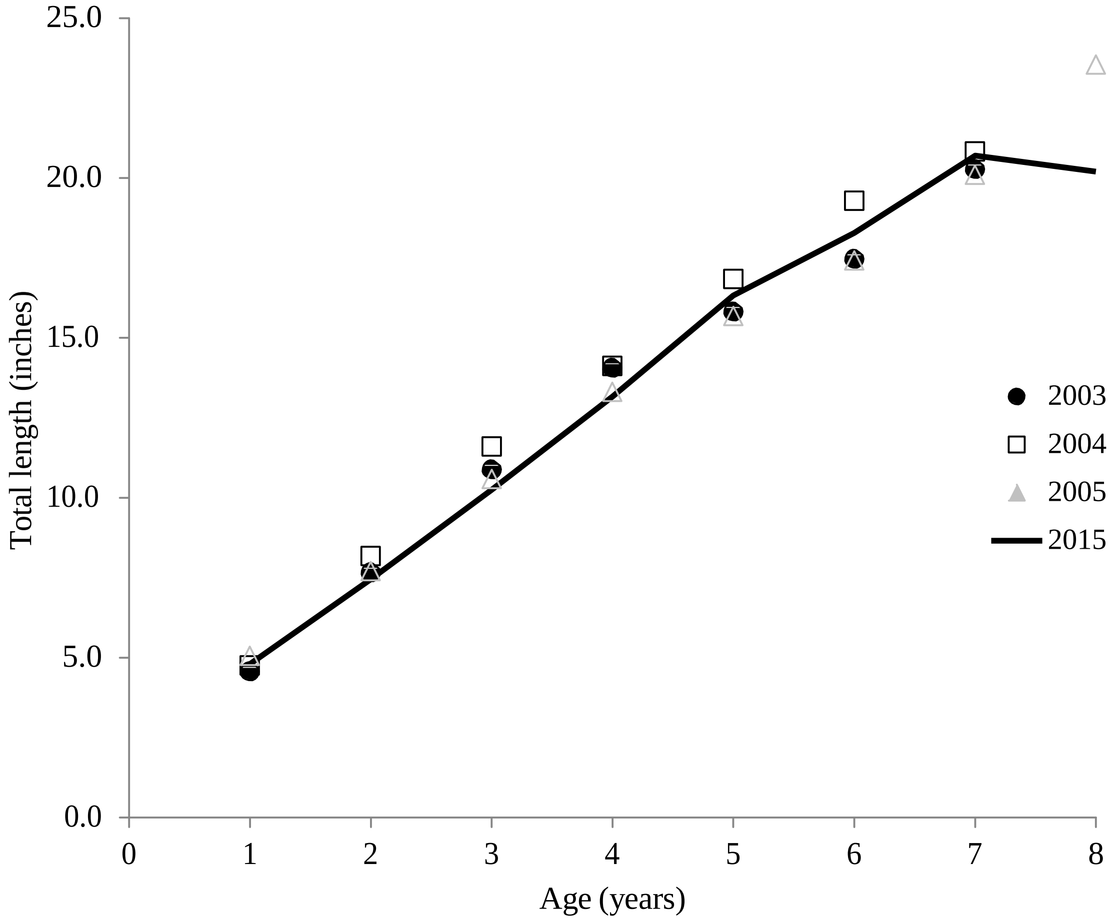


Figure 9. Brown trout length at age, White River, Bayfield County, Wisconsin, 2003-2015. Mean length at age in 2003 and 2005 determined from Frazier-Lee back calculations.

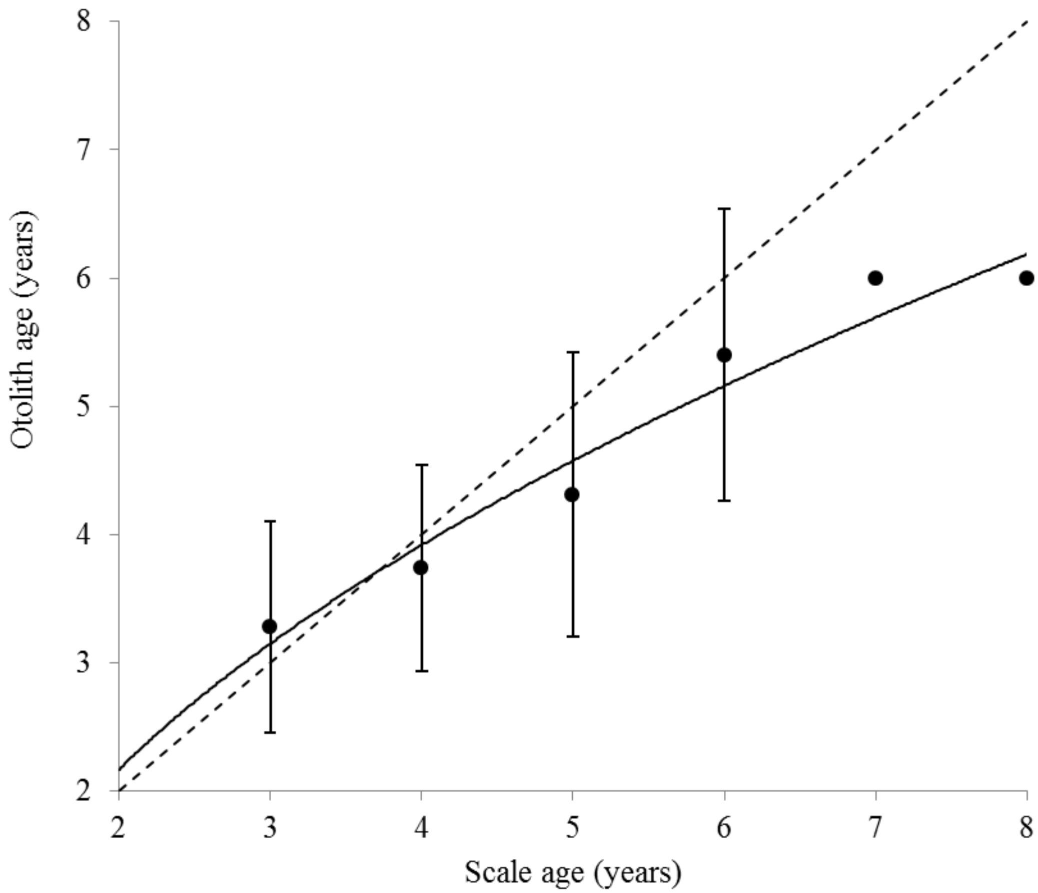


Figure 10. Mean otolith age (circles) compared to the estimated scale age for angler harvested brown trout during the 2014 and 2015 fishing seasons, White River, Bayfield County, Wisconsin. Errors bars represent ± 1 SD. Solid and dashed lines represent the age bias curve and theoretical 1:1 agreement, respectively.

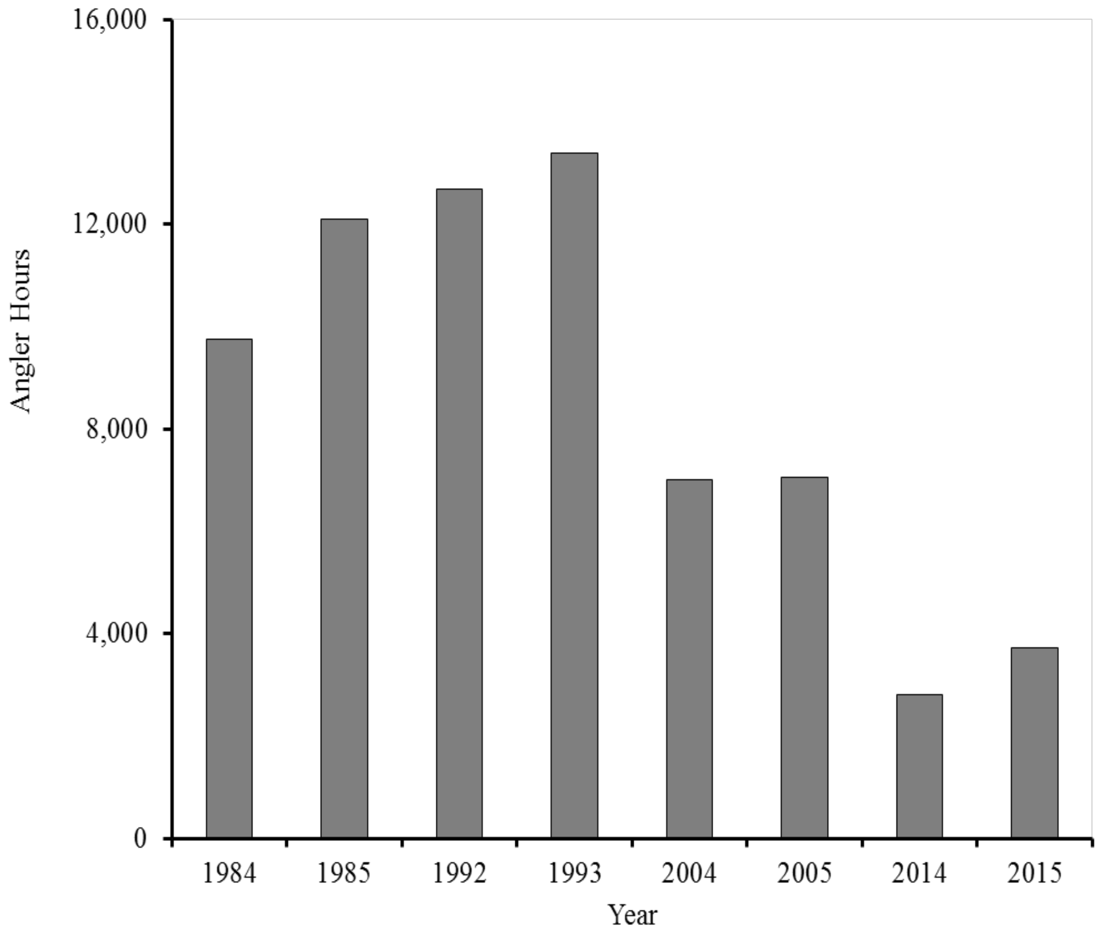


Figure 11. Total angler hours expended between 1984 and 2015 on the White River, Bayfield County, Wisconsin.

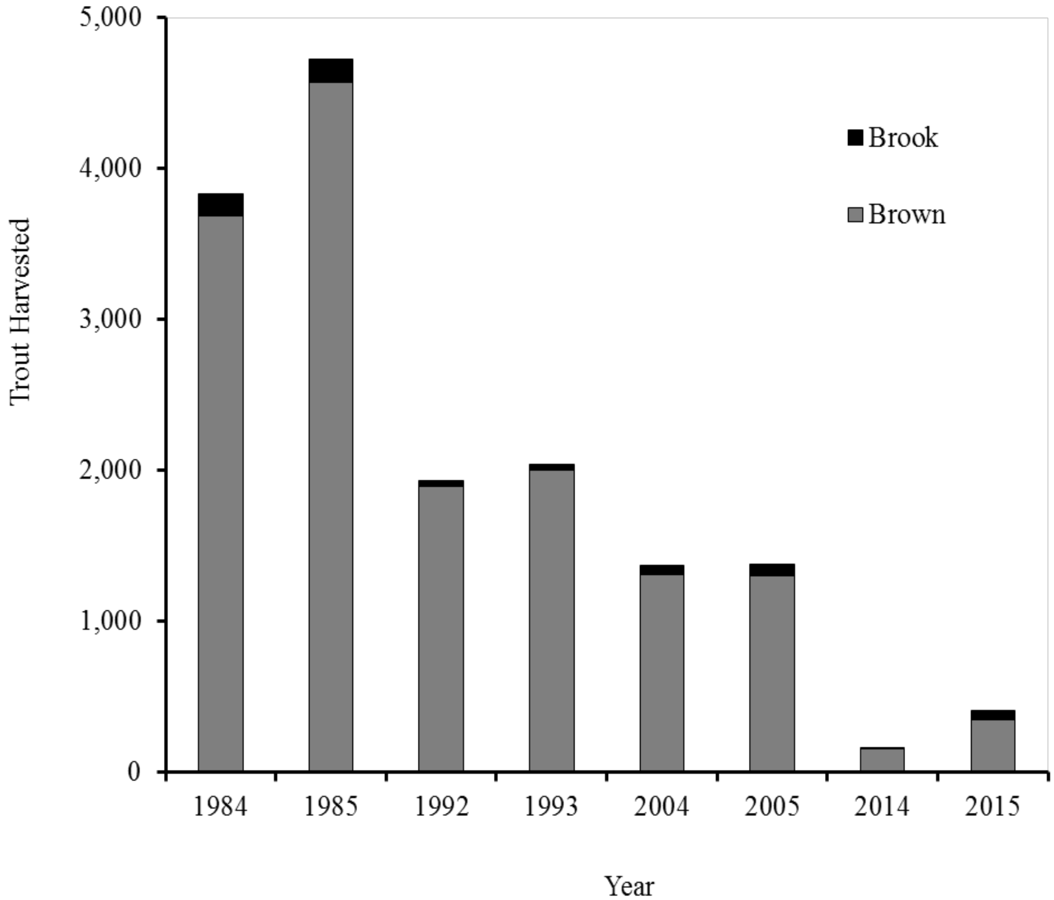


Figure 12. Total harvest of brook and brown trout between 1984 and 2015 on the White River, Bayfield County, Wisconsin.

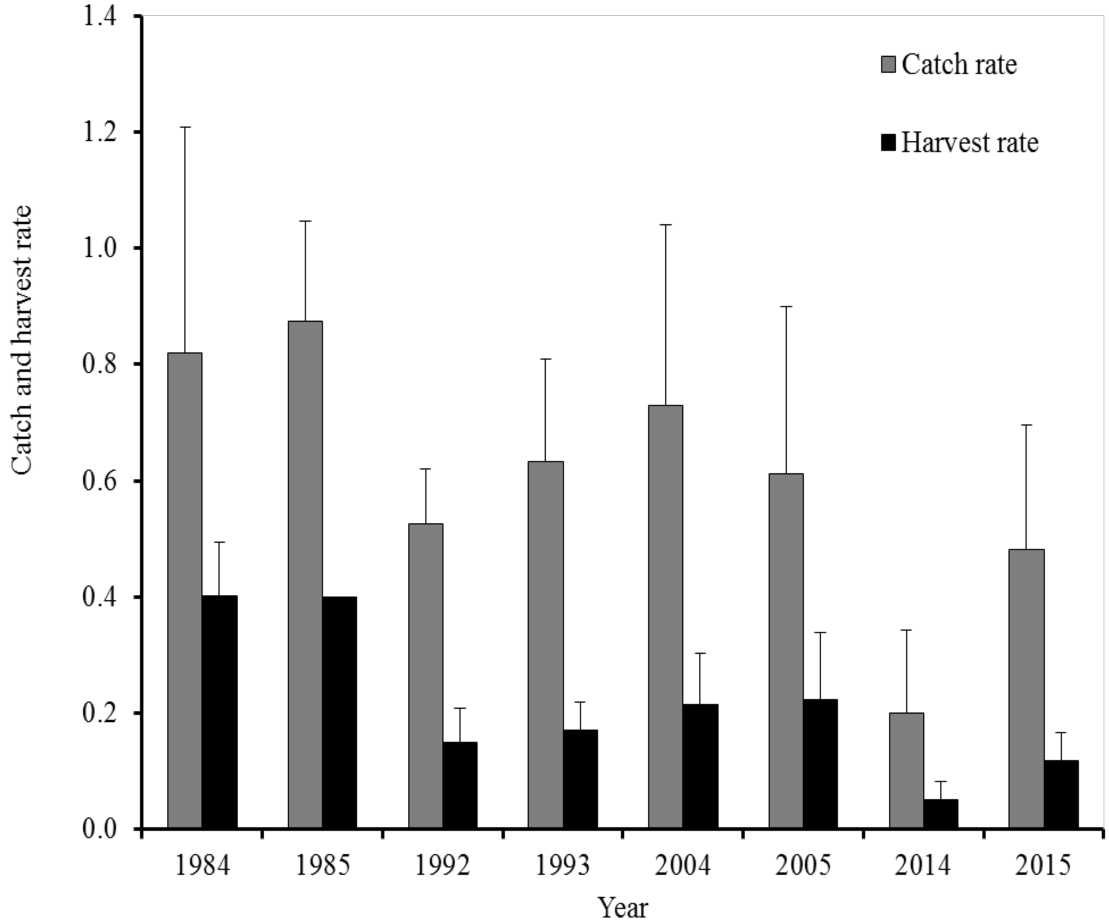


Figure 13. Mean catch and harvest rates (± 1 SD) for creel surveys conducted between 1984 and 2015 on the White River, Bayfield County, Wisconsin. Between 1984 and 1993, harvest and catch rates were estimated by incorporating both creel clerk interviews and voluntary reporting by anglers. After 1993, only creel clerk interviews were used for catch and harvest calculations.

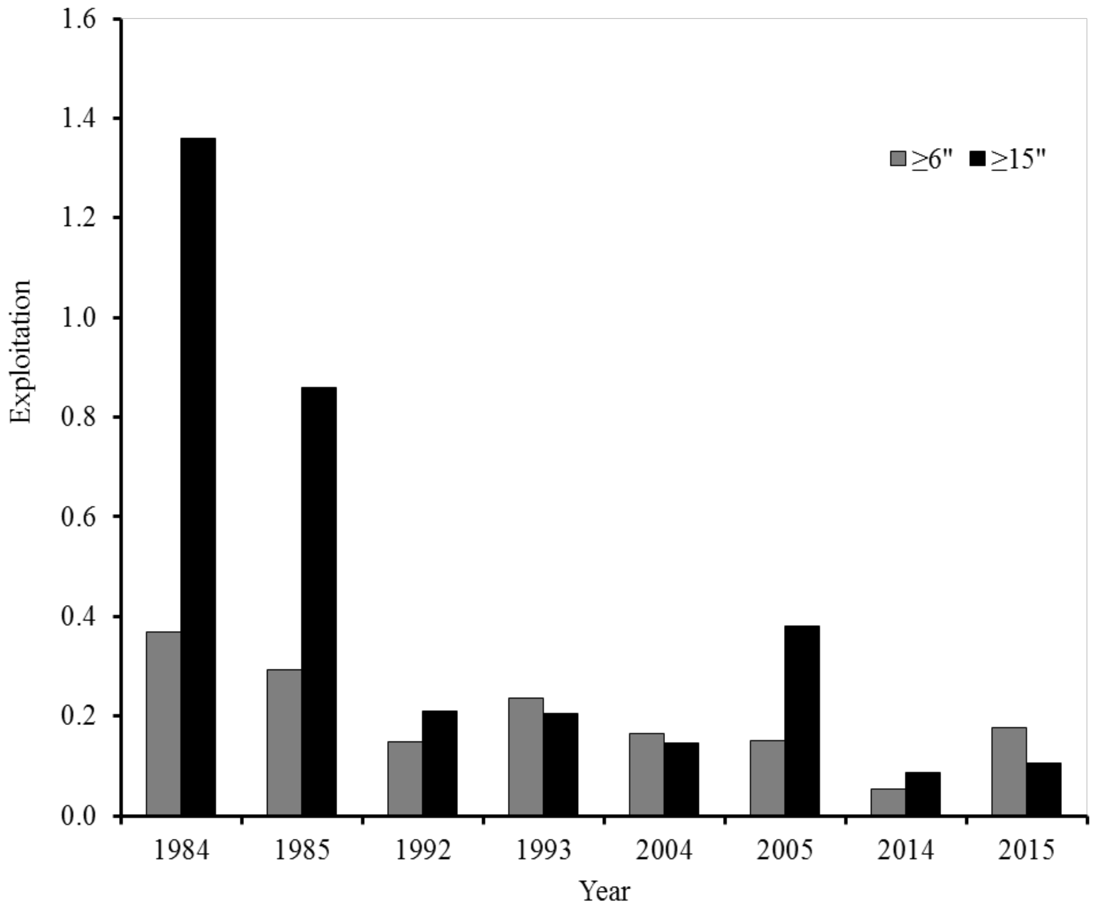


Figure 14. Exploitation of brown trout ≥ 6 inches and ≥ 15 inches on the White River, Bayfield County, Wisconsin.

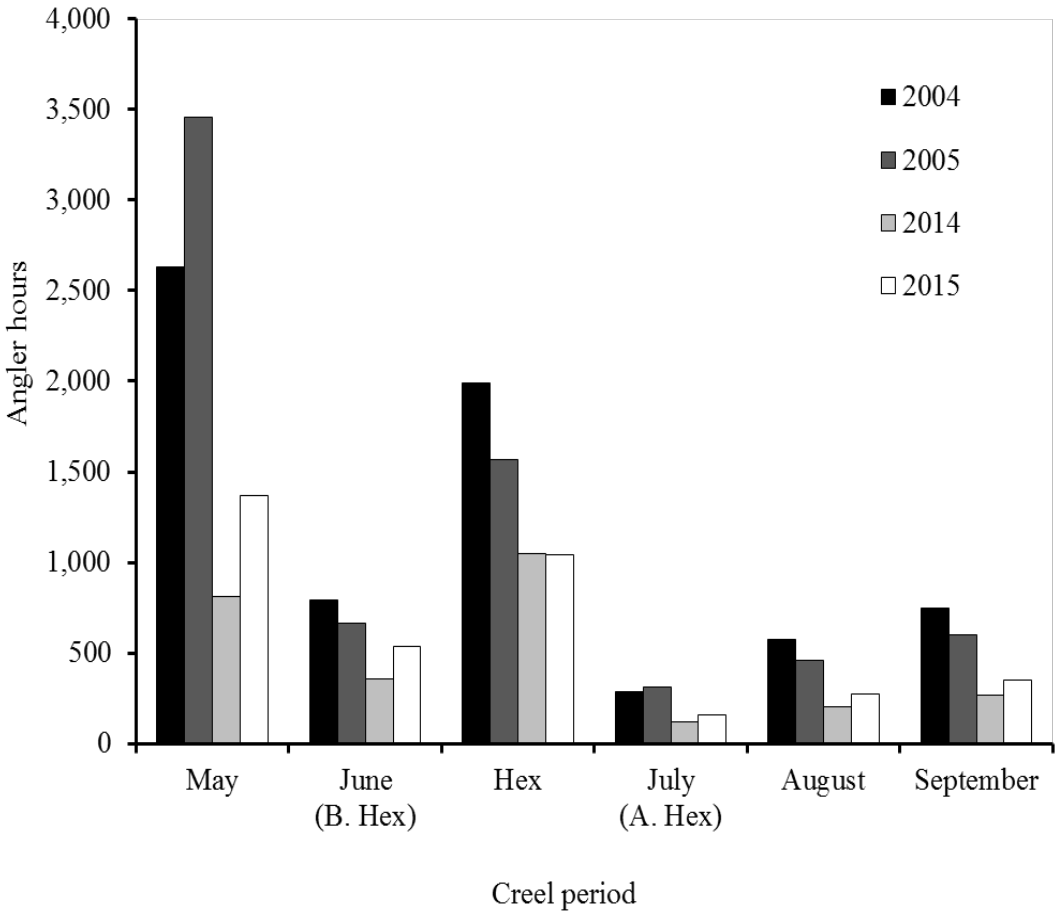


Figure 15. Total angler hours separated by creel period for the White River, Bayfield County, Wisconsin. June (B. Hex) = June prior to the hex hatch, Hex = during the hex hatch in late June and early July, July (A. Hex) = July after the hex hatch.

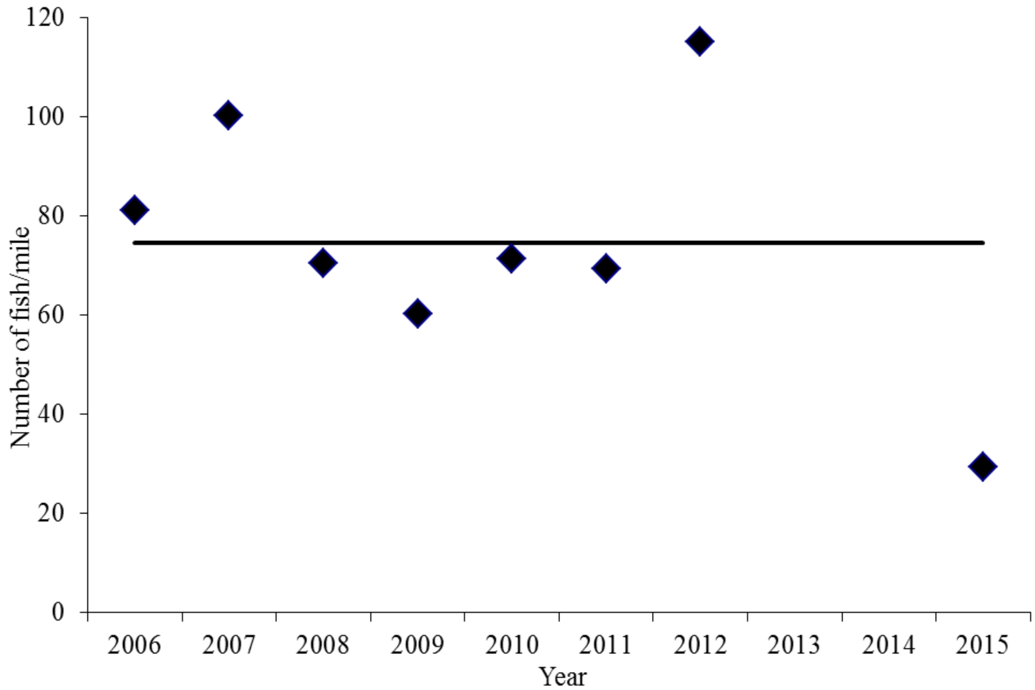


Figure 16. Relative abundance of brown trout at non-wadable long term trend station on the White River, Bayfield County, WI. Solid black line represents the mean relative abundance (75 fish/mile).

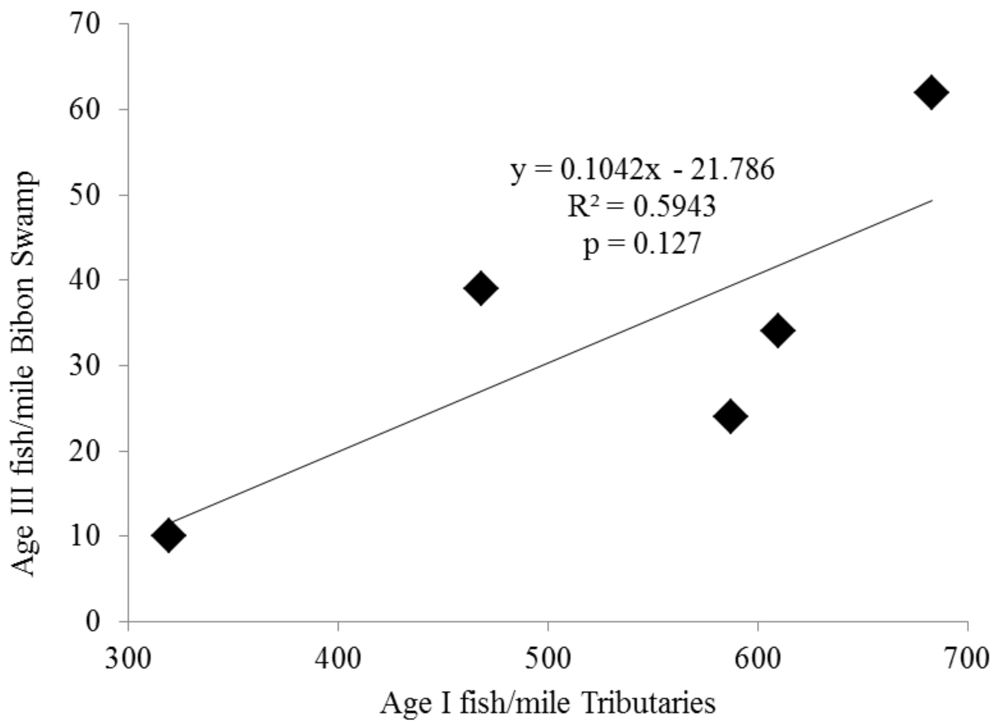


Figure 17. Relation of age-I brown trout sampled in wadable tributary trend stations to age-III brown trout found two years later in the non-wadable trend station in the Bibon Swamp, White River, Bayfield County, Wisconsin. Solid line represents linear trend.

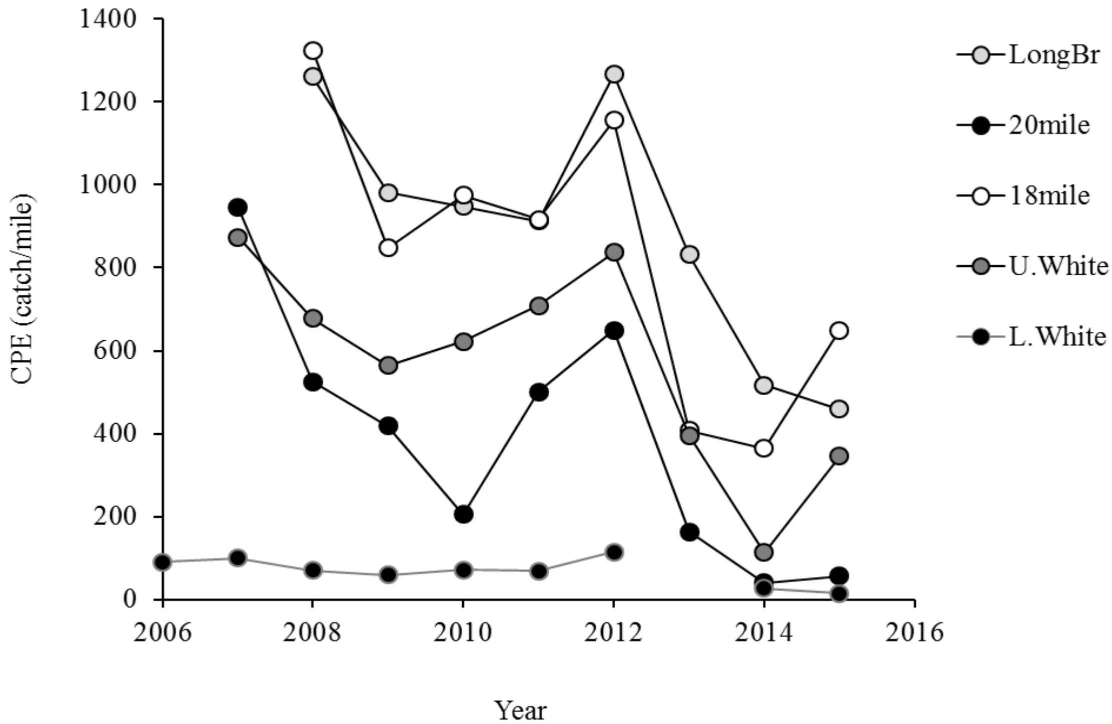


Figure 18. Relative abundance of age-I and older brown trout at long term trend station in the White River Watershed, Bayfield County, WI.

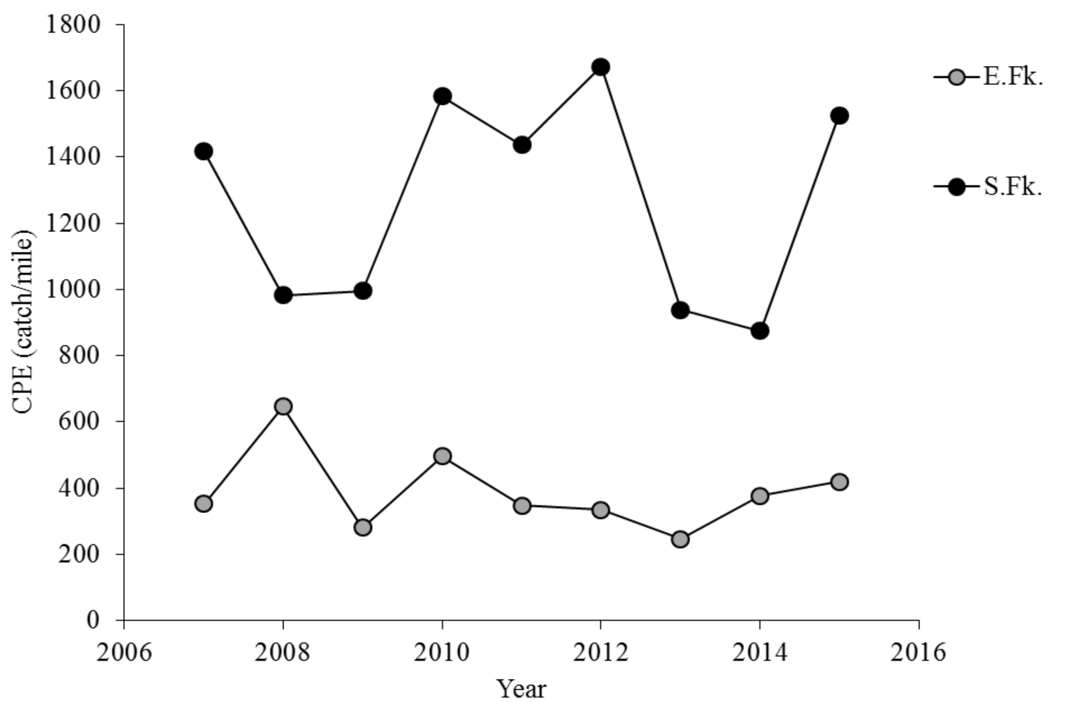


Figure 19. Relative abundance of age-I and older brown trout at long term trend station in the White River Watershed, Bayfield County, Wisconsin.

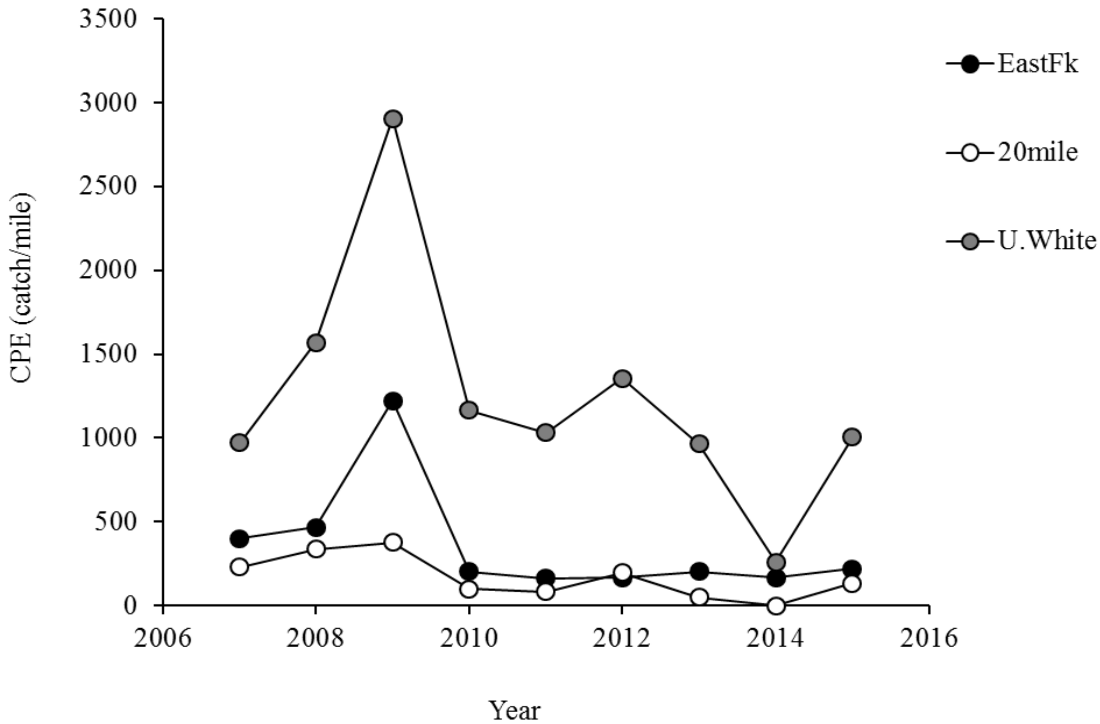


Figure 20. Relative abundance of age-0 brown trout at long term trend station in the White River Watershed, Bayfield County, Wisconsin.

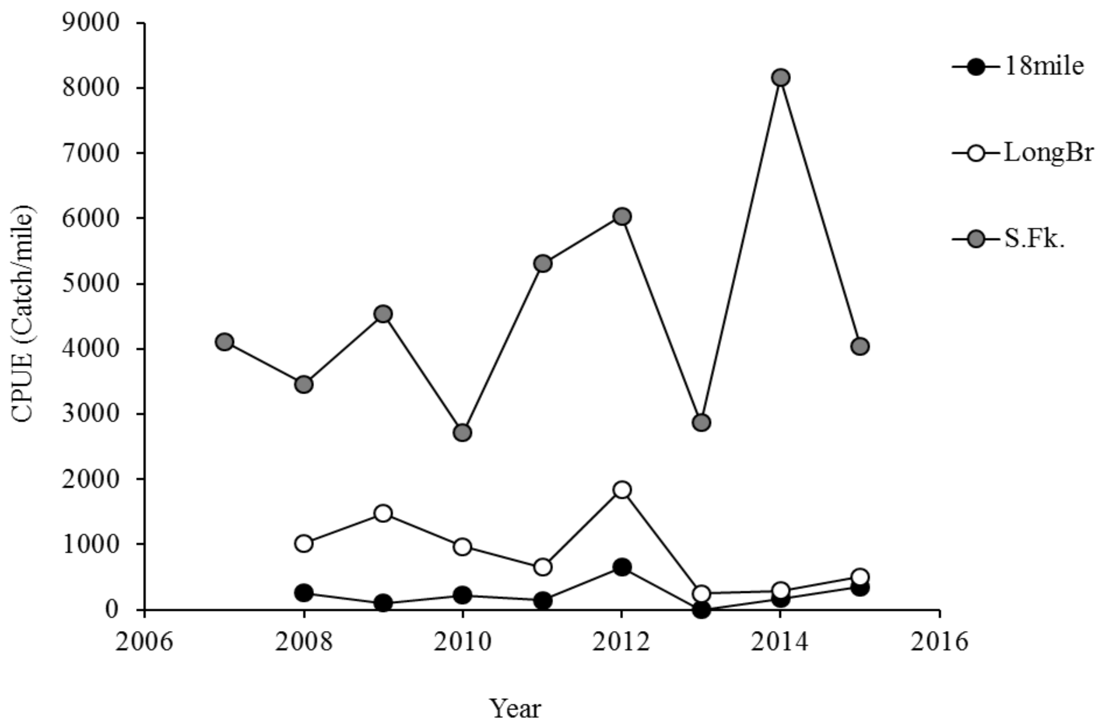


Figure 21. Relative abundance of age-0 brown trout at long term trend station in the White River Watershed, Bayfield County, Wisconsin.

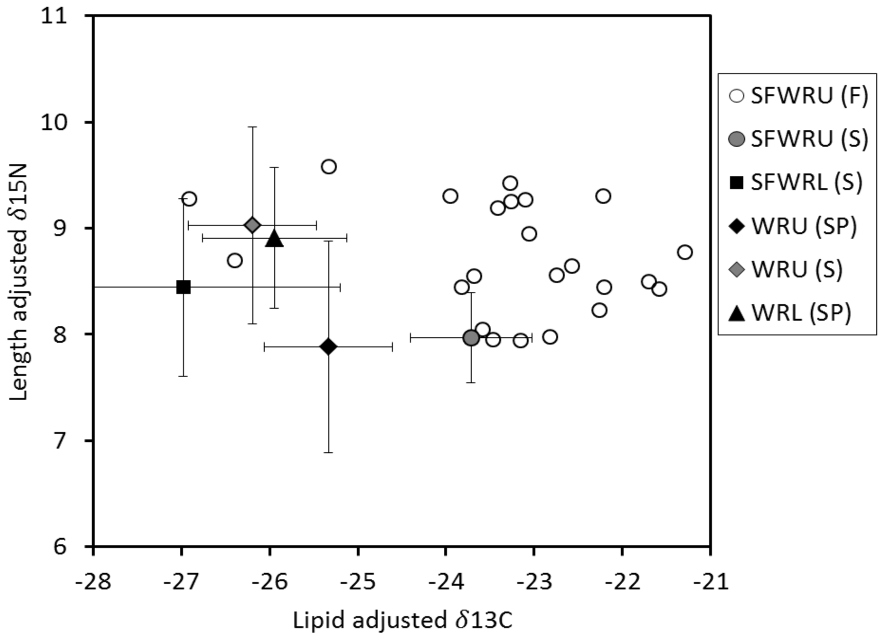


Figure 22. Lipid adjusted $\delta\delta^{13}$C and length adjusted $\delta\delta^{15}$N values for brown trout sampled on the lower White River during March (black triangle), upper White River during March (black diamond) and August (grey diamond), South Fork of the White River in August (grey circle) and November (open circles).

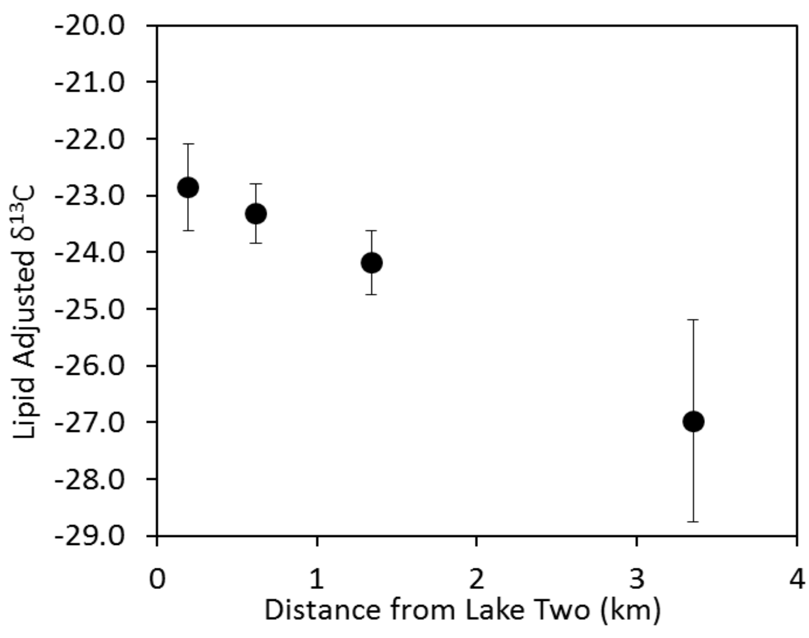


Figure 23. Closest point sampled in fall and does not include three outliers which had d13C signatures similar to lower river brown trout (see figure 24).

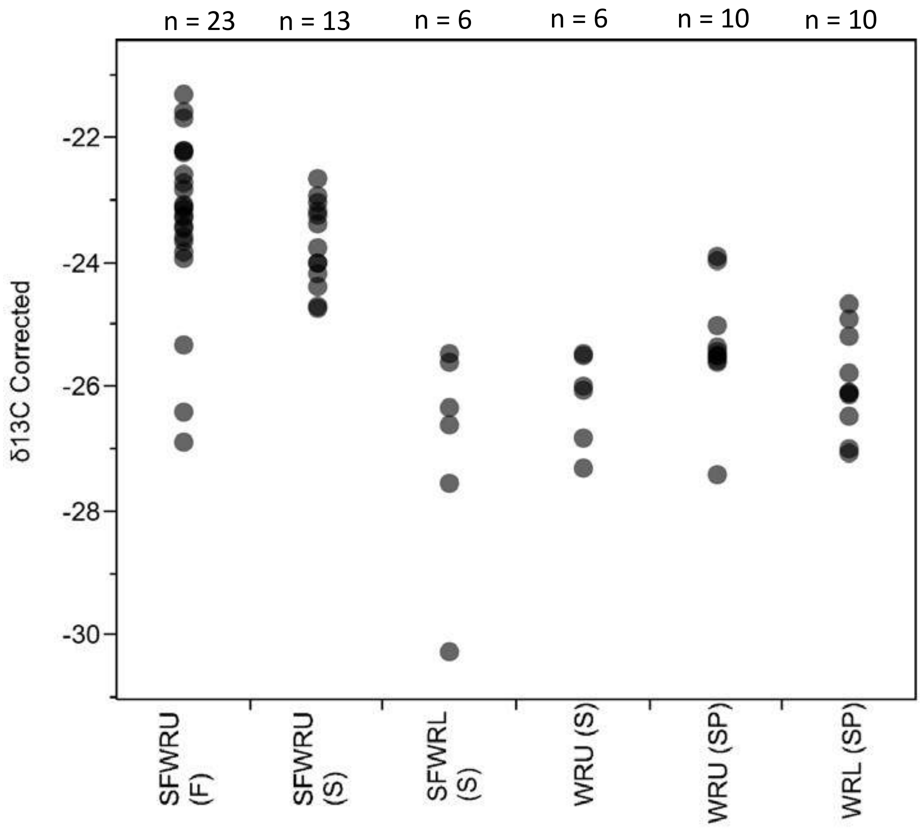


Figure 24. Lipid corrected $\delta^{13}C$ signatures for brown trout sampled in the White River and the South Fork of the White River. SFWRU (F) = brown trout sampled during the fall on the upper South Fork of the White River, SFWRU (S) = brown trout sampled during the summer on the upper South Fork of the White River, WRL (SP) = brown trout sampled during the spring on the lower White River, WRU (S) = brown trout sampled during the summer on the upper White River, WRU (SP) = brown trout sampled during the spring on the upper White River.

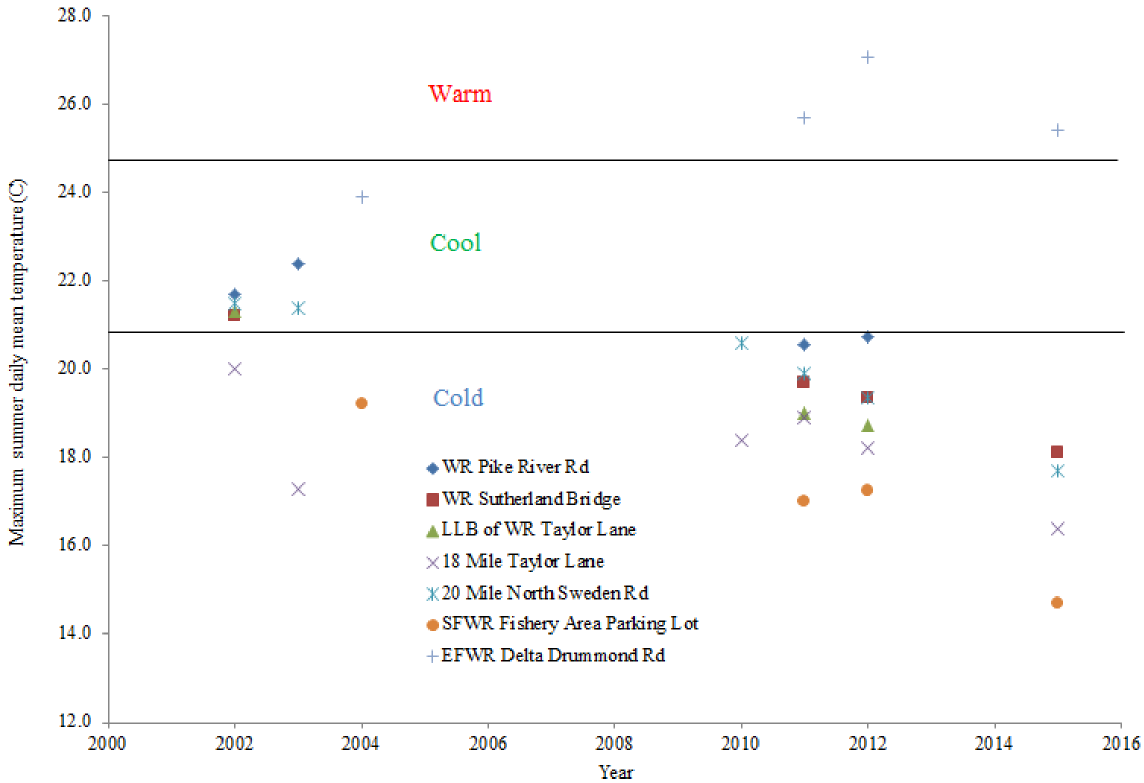


Figure 26. Maximum summer daily mean temperature (MSDMT) at seven locations in the White River Watershed, Bayfield County, Wisconsin, 2002-2015. Warm, cool and cold clasifications as defined by Lyons et al. 1996.

Appendix I, Table 1. Common and scientific names of fish species found in the White River, Bayfield County, Wisconsin.

Common Name	Scientific Name
chestnut lamprey	*Ichthyomyzon castaneus*
northern brook lamprey	*Ichthyomyzon fossor*
brook trout	*Salvelinus fontilalis*
brown trout	*Salmo trutta*
rainbow trout	*Oncorhynchus mykiss*
tiger trout	*Salvelinus fontilalis X Salmo trutta*
central mudminnow	*Umbra limi*
northern pike	*Esox lucius*
blackchin shiner	*Notropis heterodon*
blacknose dace	*Rhinichthys atratulus*
blacknose shiner	*Notropis heterolepis*
bluntnose minnow	*Pimephales notatus*
brassy minnow	*Hybognathus hankinsoni*
common shiner	*Luxilus cornutus*
creek chub	*Semotilus atromaculatus*
fathead minnow	*Pimephales promelas*
finescale dace	*Phoxinus neogaeus*
golden shiner	*Notemigonus crysoleucas*
hornyhead chub	*Nocomis biguttatus*
longnose dace	*Rhinichthys cataractae*
mimic shiner	*Notropis volucellus*
northern redbelly dace	*Phoxinus eos*
pearl dace	*Margariscus margarita*
white sucker	*Catostomus commersoni*
shorthead redhorse	*Moxostoma macrolepidotum*
black bullhead	*Ameiurus melas*
tadpole madtom	*Noturus gyrinus*
troutperch	*Percopsis omiscomaycus*
brook stickleback	*Culaea inconstans*
largemouth bass	*Micropterus salmoides*
smallmouth bass	*Micropterus dolomieu*
bluegill	*Lepomis macrochirus*
pumpkinseed	*Lepomis gibbosus*
rock bass	*Ambloplites rupestris*
Iowa darter	*Etheostoma exile*
johnny darter	*Etheostoma nigrum*
yellow perch	*Perca flavescens*
mottled sculpin	*Cottus bairdi*
slimy sculpin	*Cottus cognatus*

Appendix I, Table 2. Fish stocking history of White River, Bayfield County, Wisconsin.

Year	Species	Number Stocked	Size
1933	Brook Trout	4,800	
1934	Brook Trout	4,776	
1935	Brown Trout	18,000	Fingerling
	Bass	480	
1936	Brook Trout	9,990	Fingerling
1937	Brook Trout	24,000	Fingerling
1939	Rainbow Trout	25,000	Fingerling
	Brown Trout	4,000	Fingerling
1940	Rainbow Trout	40,026	Fingerling
	Brown Trout	2,000	Fingerling
1941	Brown Trout	15,000	Fingerling
	Rainbow Trout	32,000	Fingerling
	Rainbow Trout	225	Adult
1942	Brown Trout	48,812	Fingerling
	Rainbow Trout	25,500	Fingerling
1943	Rainbow Trout	12,000	Fingerling
	Brown Trout	34,600	Fingerling
1944	Rainbow Trout	9,000	Fingerling
	Brown Trout	19,000	Fingerling
1946	Brown Trout	23,500	Fingerling
1947	Brown Trout	40,000	Fingerling
	Rainbow Trout	30,000	Fingerling
1948	Brown Trout	52,200	Fingerling
1949	Brown Trout	1,600	Yearling
	Brown Trout	28,100	Fingerling
1950	Brown Trout	2,100	Yearling
	Brown Trout	26,100	Yearling
1951	Brown Trout	850	Yearling
	Brown Trout	6,000	Fingerling
1952	Brown Trout	6,000	Yearling
1953	Brown Trout	4,800	Yearling
1954	Brown Trout	2,000	Yearling
1955	Brook Trout	1,000	Yearling
	Brown Trout	500	Yearling
	Rainbow Trout	1,000	Yearling
1956	Brown Trout	3,386	Yearling
1957	Brown Trout	2,850	Yearling
1958	Brown Trout	2,000	Yearling
1959	Brown Trout	1,500	Yearling
	Rainbow Trout	1,000	Yearling
1963	Brown Trout	6,750	Yearling
	Brown Trout	3,876	Fingerling
	Rainbow Trout	5,467	Yearling
1964	Brown Trout	7,250	Yearling
1965	Brown Trout	4,750	Yearling
	Brown Trout	5,000	Fingerling
1966	Brown Trout	5,750	Yearling

Appendix I, Table 2 (continued). Fish stocking history of White River, Bayfield County, Wisconsin.

Year	Species	Number Stocked	Size
1967	Brook Trout	4,500	Yearling
1967	Brown Trout	5,000	Yearling
1968	Brook Trout	2,500	Yearling
	Brown Trout	5,000	Yearling
1969	Brook Trout	15,000	Fingerling
	Brown Trout	7,000	Yearling
1970	Brown Trout	4,200	Yearling
1971	Brown Trout	6,250	Yearling
1972	Brown Trout	4,250	Yearling
1973	Brown Trout	4,250	Yearling
1974	Brown Trout	4,250	Yearling
1975	Brown Trout	4,250	Yearling
1976	Brown Trout	4,250	Yearling
1977	Brown Trout	6,250	Yearling
1978	Brown Trout	3,000	Yearling
1979	Brown Trout	2,000	Yearling
1980	Brown Trout	2,000	Yearling
1981	Brown Trout	2,000	Yearling

Appendix I, Table 3. Average spring brown trout density (fish/mile) by length intervals and station in the White River, Bayfield County, Wisconsin. Includes only trout ≥ 6 in. 95% confidence intervals are in parenthesis.

	1984-86 Stations				1988-89 Stations			
Length Group (in)	Sutherland	Goldberg	Primitive	Avg.	Sutherland	Goldberg	Primitive	Avg.
6.0 - 8.9	133	211	245	196	134	176	260	190
9.0 - 14.9	256	383	279	306	409	461	357	409
≥ 15.0	19	21	40	27	28	60	84	57
Total	408 (115)	615 (314)	564 (147)	529 (98)	571 (103)	697 (50)	701 (57)	656 (85)

	1992-93 Stations				2003-05 Stations			
Length Group (in)	Sutherland	Goldberg	Primitive	Avg.	Sutherland	Goldberg	Primitive	Avg.
6.0 - 8.9	75	42	51	56	117	94	150	120
9.0 - 14.9	514	328	383	408	257	160	207	208
≥ 15.0	35	49	109	64	62	59	34	52
Total	624 (115)	419 (41)	543 (60)	528 (119)	437 (58)	313 (53)	391 (146)	380 (72)

	2014-15 Stations		
Length Group (in)	Bolen	Sutherland	Avg.
6.0 - 8.9	43	20	31
9.0 - 14.9	42	27	34
≥ 15.0	77	43	60
Total	161 (52)	90 (13)	125 (72)

Appendix I, Table 4. Spring brown trout density (fish/mile) by length intervals and station in the White River, Bayfield County, Wisconsin. Includes only brown trout ≥ 6 in. 95% confidence intervals are in parenthesis.

	1984 Stations				1985 Stations			
Length Group (in)	Sutherland	Goldberg	Primitive	Avg.	Sutherland	Goldberg	Primitive	Avg.
6.0 - 8.9	138	109	229	158	198	361	338	299
9.0 - 14.9	401	229	267	299	282	582	329	398
≥ 15.0	34	17	20	24	25	21	62	36
Total	573 (244)	355 (72)	516 (139)	481 (98)	505 (92)	964 (214)	729 (180)	733 (230)

	1986 Stations				1988 Stations			
Length Group (in)	Sutherland	Goldberg	Primitive	Avg.	Sutherland	Goldberg	Primitive	Avg.
6.0 - 8.9	108	163	168	146	154	196	245	198
9.0 - 14.9	203	337	240	260	536	536	427	500
≥ 15.0	9	26	39	25	30	72	74	59
Total	320 (48)	526 (80)	447 (78)	431 (104)	720 (156)	804 (74)	746 (68)	757 (43)

	1989 Stations				1992 Stations			
Length Group (in)	Sutherland	Goldberg	Primitive	Avg.	Sutherland	Goldberg	Primitive	Avg.
6.0 - 8.9	114	155	275	181	101	57	80	79
9.0 - 14.9	282	386	287	318	551	356	504	470
≥ 15.0	26	48	94	56	12	42	108	53
Total	422 (70)	589 (67)	656 (94)	556 (121)	664 (86)	454 (54)	692 (93)	603 (130)

	1993 Stations				2003 Stations			
Length Group (in)	Sutherland	Goldberg	Primitive	Avg.	Sutherland	Goldberg	Primitive	Avg.
6.0 - 8.9	49	27	22	33	166	141	52	120
9.0 - 14.9	477	300	262	346	250	174	130	185
≥ 15.0	58	56	110	75	63	56	41	54
Total	584 (75)	384 (58)	394 (72)	454 (113)	479 (91)	371 (60)	224 (56)	358 (128)

	2004 Stations				2005 Stations			
Length Group (in)	Sutherland	Goldberg	Primitive	Avg.	Bolen Creek	Johnson Creek	Lower Bibon	Avg.
6.0 - 8.9	63	67	200	110	123	74	198	132
9.0 - 14.9	226	164	206	199	296	142	285	241
≥ 15.0	82	71	46	67	41	50	13	35
Total	371 (68)	302 (63)	452 (120)	375 (75)	460 (70)	267 (37)	496 (58)	408 (123)

	2014 Stations			2015 Stations		
Length Group (in)	Bolen	Sutherland	Avg.	Bolen	Sutherland	Avg.
6.0 - 8.9	69	36	48	16	4	10
9.0 - 14.9	57	23	34	26	31	29
≥ 15.0	87	43	58	67	42	54
Total	213 (76)	102 (21)	139 (26)	109 (14)	77 (11)	93 (9)

Appendix II

White River Angler Questionnaire

Final Results 2004-2005 compared to 2014-2015

SECTION I: FISHING THE WHITE RIVER IN 2004 & 2005 - 2014 & 2015

1. What area of the White River did you fish most often in? **(check one)**

Years 04-05	14-15	
13%	11.5	From Pikes Road Bridge upstream, including headwater areas
48	40.8	From Pikes Road Bridge downstream to Sutherland Bridge
30	40.0	From Sutherland Bridge downstream to Bibon Road Bridge
9	7.7	Downstream of Bibon Road Bridge

2. About how many days did you spend at least part of the day fishing the White River?

Days	2004 Percent	2005 Percent	2014 Percent	2015 Percent
0	7%	11%	11%	5%
1 – 2	23	24	18	24
3 – 4	28	27	19	28
5 – 10	21	24	36	30
> 10	20	16	16	14
Ave. days	8	7	7	6
Max	200	150	60	40

3. How did you typically fish the White River – did you fly fish, use live bait, or artificial lures? **(circle one number for each type of fishing)**

2004-2005

	Live bait	Artificial	Fly fishing
Never	39%	36%	44%
Sometimes	8	23	12
Often	24	23	9
Always	29	18	35

2014-2015

	Live bait	Artificial	Fly fishing
Never	50%	56%	37%
Rarely	3	8	7
Sometimes	10	11	5
Often	14	14	7
Always	22	12	43

4. How many miles one-way did you typically travel to reach your fishing location on the White River during?

1-way miles	04-05 Percent	14-15 Percent
1 – 10	24%	26
11 – 20	14	13
21 – 50	14	9
51 – 100	17	16
101 – 200	20	23
> 200	11	14
Ave. miles	87	109
Max	650	1850

5. Overall, how satisfied were you with your fishing experiences on the White River? **(check one)**

04-05 Percent	14-15 Percent	
37%	26	Very satisfied
47	52	Somewhat satisfied
14	15	Not too satisfied
2	8	Not at all satisfied

6. Your satisfaction with White River fishing may have been influenced by some of the following. To what extent do you disagree or agree that each of the following statements affected your satisfaction with fishing the White River. **(circle one number for each item)**

(Percent responding read across →)

	2004-2005				
	Strongly disagree	Slightly disagree	Neither	Slightly agree	Strongly agree
Water quality on the river is poor	54%	19	14	11	2
There are too many anglers	26%	33	17	20	5
I don't catch many fish	22%	28	14	27	9
I catch too many small fish	25%	22	31	16	6
I don't catch enough trophy fish	15%	19	27	27	12
The daily bag limit is too low	51%	13	20	13	3
The regulations are complicated	42%	15	19	15	10
The regulations are restrictive	43%	15	24	13	5

	2014-2015				
	Strongly disagree	Slightly disagree	Neither	Slightly agree	Strongly agree
Water quality on the river is poor	52%	20	20	6	3
There are too many anglers	44%	21	17	15	3
I don't catch many fish	17%	16	15	38	14
I catch too many small fish	28%	27	25	14	6
I don't catch enough trophy fish	21%	17	27	21	14
The daily bag limit is too low	53%	11	23	8	5
The regulations are complicated	50%	18	12	16	5
The regulations are restrictive	50%	15	17	13	5

SECTION II: YOUR HISTORY ON THE WHITE RIVER

1. For about how many years have you fished the White River in Bayfield County in the Bibon Swamp area, anywhere between Pikes Road Bridge and Bibon Road Bridge?

	04-05	14-15
Years	Percent	Percent
1 – 2	11%(7% 1year)	10% (3% 1 year)
3 – 5	14	6
6 – 10	18	8
11 – 20	19	23
21 – 30	19	20
> 30	19	33
Ave. yrs	18	24
Max	58	60

2. In what year did you first fish the White River?

2004-2005		2014-2015	
Year(s)	Percent	Years	Percent
2005	4%	2015	3
2004	5	2014	4
2000-03	15	2010 – 13	9
1990-99	26	2000 – 09	14
1980-89	14	1990 – 99	22
1970-79	21	1980 – 89	16
Before 1970	14	1970 –79	20
		Before 1970	12
Mean	1986	Mean	1989
Min	1940	Min	1955

3. In the past ten years how many years have you fished the White River? **(check one)**

1996-2005 Percent	2006-2015 Percent	
14%	13%	Less than 3 years
13	7	3 – 4 years
10	6	5 – 6 years
10	11	7 – 8 years
53	63	9 – 10 years

4. During the 10 year period in general, would you say the number of days in a year you fish the White River has been increasing, decreasing or staying about the same? **(check one)**

1996-2005 Percent	2006-2015 Percent	
9%	9	Increasing
29	26	Decreasing
61	65	Staying about the same

5. How important is fishing the White River to you in comparison to all of your other fishing destinations? Would you say that fishing the White River is… **(check one)**

04-05 Percent	14-15 Percent	
5%	18	My most important fishing destination
66	68	One of the most important fishing destinations
21	12	No more important than any other of my fishing destinations
8	1	Less important than most of my other fishing destinations
1	2	Not at all important to me as a fishing destination
	1	I do not fish any other waters

6. In the past three years have you fished other rivers or streams for trout in Wisconsin? **(check one) (If No please go to question 8)**

04-05 Percent	14-15 Percent	
84%	83	Yes
16	17	No

7. Compared to other trout rivers or streams in Wisconsin would you say the fishing quality on the White River is…**(check one)**

04-05 Percent	14-15 Percent	
17%	19	Much better
40	32	Somewhat better
25	21	About the same
14	23	Somewhat worse
4	5	Much worse

8. In the years that you've fished the White River, how would you say each of the following has changed?
(check one for each item)

(Percent responding read across →)

2004-2005

Number of fish I catch	Increasing	Remained stable	Decreasing
	4%	40	56
Average size of fish I catch	Larger	Remained stable	Smaller
	9%	53	38
Water quality	Better	Remained stable	Worse
	2%	86	12
Crowding from other anglers	More crowded	Remained stable	Less crowded
	32%	53	15
Overall management of the river	Better	Remained stable	Worse
	23%	65	13

2014-2015

Number of fish I catch	Increasing	Remained stable	Decreasing
	4%	36	59
Average size of fish I catch	Larger	Remained stable	Smaller
	19%	51	29
Water quality	Better	Remained stable	Worse
	7%	85	8
Crowding from other anglers	More crowded	Remained stable	Less crowded
	21%	47	32
Overall management of the river	Better	Remained stable	Worse
	18%	70	12

9. In general, would you say that fishing the White River has improved or worsened in the years you've been fishing? **(check one)**

04-05 Percent	14-15 Percent	
2%	4	Definitely improved
15	11	Probably improved
33	33	Remained about the same
33	31	Probably worsened
16	22	Definitely worsened

10. Your answer to the previous question may have been influenced by various factors. **If you checked worsened in question 9, please check 2 boxes in the Worsened column, if you checked improved in question 9, please check 2 boxes in the Improved column.**

2004-2005

Worsened Percent		Improved Percent	
17%	Too much fishing pressure	3%	Reduced fishing pressure
14	Other anglers keeping too many fish	8	More catch and release being practiced
12	Ineffective or detrimental regulations	5	Improved fishing regulations
9	Loss of trout habitat	2	Improved trout habitat
2	Water quality becoming worse	0	Improved water quality
14	Lower trout population levels	2	Higher trout populations
2	Higher water temperatures	0	Cooler water temperatures
4	Fewer large brown trout	1	More large brown trout
5	Too many northern pike	4	Fewer northern pike
0	Poor fish management (excluding regs)	6	Improved fish management (excl. regs)
0	Increase in other predators (such as otter and herons)	1	Decrease in other predators (such as otter and herons)

2014-2015

Worsened Percent		Improved Percent	
8%	Too much fishing pressure	15%	Reduced fishing pressure
2	Other anglers keeping too many fish	15	More catch and release being practiced
3	Ineffective or detrimental regulations	3	Improved fishing regulations
5	Loss of trout habitat	12	Improved trout habitat
5	Water quality becoming worse	0	Improved water quality
40	Lower trout population levels	9	Higher trout populations
9	Higher water temperatures	6	Cooler water temperatures
15	Fewer large brown trout	18	More large brown trout
6	Too many northern pike	12	Fewer northern pike
1	Poor fish management (excluding regs)	6	Improved fish management (excl. regs)
5	Increase in other predators (such as otter and herons)	3	Decrease in other predators (such as otter and herons)

SECTION III: REGULATIONS AND THE FISH YOU CATCH

1. How many inches long was the largest brown trout that you caught from 2006 to 2015 from the White River? (Previous creel did not specify a ten year period)

	04-05	06-15
Inches	Percent	Percent
0	3%	4
< 11	3	4
11 – 17.9	24	18
18 – 19.9	24	20
20 – 21.9	16	17
22 – 23.9	18	18
24 or longer	12	20
Ave.	19	19
Max	28	32

2. How many inches long would a brown trout from the White River need to be for you to consider it a "trophy" fish?

	04-05	14-15
Inches	Percent	Percent
12	0%	3
14 – 17	11	10
18 – 19	17	10
20	34	38
21 – 22	14	11
23 or longer	24	28
Ave.	20	25
Max	28	36

3. Think about the legal sized trout you caught from the White River. Would you say that you released all legal trout, released some and kept others, or kept all legal trout from the White River? **(check one)**

04-05	14-15	
Percent	Percent	
3%	12	I did not catch a legal-sized trout
28	30	Released all legal trout
62	52	Released some legal trout and kept others
7	6	Kept all legal trout

4. In the years that you've been fishing the White River, would you say that your catch-and-release fishing of legal sized trout has… **(check one)**

04-05 Percent	14-15 Percent	
30%	22	Definitely increased
16	16	Probably increased
43	52	Remained about the same
9	7	Probably decreased
3	3	Definitely decreased

5. Starting in 2016, the White River will have a regulation with an 18-inch minimum length and a bag limit of one trout. This is a change from regulations implemented in 1990 which allowed a bag limit of three trout with a 9-inch minimum length with one trout of 15-inches or greater allowed. Do you feel this change in the trout regulations will have a positive or negative impact on the White River fishery? **(check one)**

Percent	
32%	Definitely positive
29	Probably positive
14	Neither positive nor negative
8	Probably negative
17	Definitely negative

6. Do you favor or oppose trout regulations with an 18-inch minimum length limit and a bag limit of 1 trout, that will go into effect in 2016? **(check one)**

Percent	
33%	Definitely favor
10	Probably favor
7	Probably oppose
40	Definitely oppose
9	I'm not sure

These last two questions will help us compare your answers to those of other White River anglers.

7. Are you:

04-05 Percent	14-15 Percent	
94%	93	Male
6	7	Female

8. How old are you?___________years old

Age	04-05 Percent	14-15 Percent
Less than 20	5%	7
20 – 29	12	3
30 – 39	14	12
40 – 49	21	10
50 – 59	21	31
60 and older	27	37
Ave. age	48	53
Max	98	85

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE. PLEASE RETURN IT IN THE POSTAGE-PAID ENVELOPE AT YOUR EARLIEST CONVENIENCE.

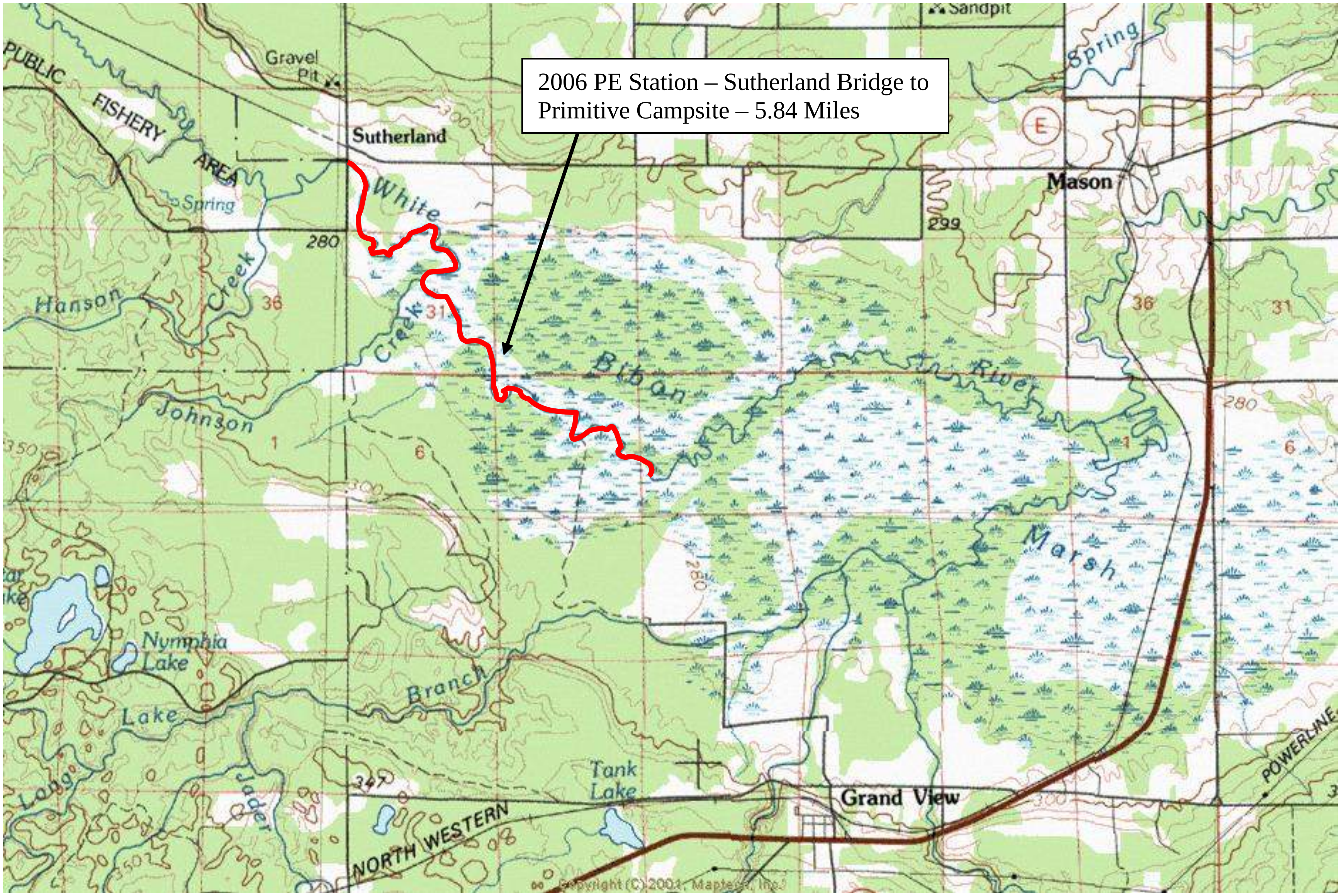
Federal Aid Project funded by your purchase of hunting and fishing equipment and motor boat fuels

Bureau of Integrated Science Services
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921

Printed on Recycled Paper

This study was funded in part through Sport Fish and Wildlife Restoration dollars.

PUB-SS-1025-2006


2006 PE Station – Sutherland Bridge to Primitive Campsite – 5.84 Miles
PUBLIC FISHERY AREA
Gravel Pit
Sutherland
Sandpit
Spring
Mason
White
Spring
Creek
Hanson
Creek
Bibon
River
Marsh
Johnson
Nymphia Lake
Lake
Branch
Long
Jader
Tank Lake
Grand View
NORTH WESTERN
POWERLINE
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Waterbody	Survey Type	Date	Common species name	Scientific species name	Count of individuals		
WHITE RIVER	Mini-boom electrofishing	05/17/06	BROOK TROUT	Salvelinus fontinalis	12		
WHITE RIVER	Mini-boom electrofishing	04/17/07	BROOK TROUT	Salvelinus fontinalis	1		
WHITE RIVER	Mini-boom electrofishing	05/09/08	BROOK TROUT	Salvelinus fontinalis	2		
WHITE RIVER	Mini-boom electrofishing	04/13/09	BROOK TROUT	Salvelinus fontinalis	1		
WHITE RIVER	Mini-boom electrofishing	03/30/11	BROOK TROUT	Salvelinus fontinalis	5		
WHITE RIVER	Mini-boom electrofishing	04/12/12	BROOK TROUT	Salvelinus fontinalis	4		
WHITE RIVER	Mini-boom electrofishing	03/28/17	BROOK TROUT	Salvelinus fontinalis	5		
WHITE RIVER	Mini-boom electrofishing	04/04/19	BROOK TROUT	Salvelinus fontinalis	1	31	0.70%
WHITE RIVER	Mini-boom electrofishing	05/17/06	BROWN TROUT	Salmo trutta	974		
WHITE RIVER	Mini-boom electrofishing	04/17/07	BROWN TROUT	Salmo trutta	541		
WHITE RIVER	Mini-boom electrofishing	05/09/08	BROWN TROUT	Salmo trutta	381		
WHITE RIVER	Mini-boom electrofishing	04/13/09	BROWN TROUT	Salmo trutta	325		
WHITE RIVER	Mini-boom electrofishing	03/28/10	BROWN TROUT	Salmo trutta	385		
WHITE RIVER	Mini-boom electrofishing	03/30/11	BROWN TROUT	Salmo trutta	374		
WHITE RIVER	Mini-boom electrofishing	04/12/12	BROWN TROUT	Salmo trutta	622		
WHITE RIVER	Mini-boom electrofishing	03/28/17	BROWN TROUT	Salmo trutta	227		
WHITE RIVER	Mini-boom electrofishing	04/04/19	BROWN TROUT	Salmo trutta	202	4031	93.20%
WHITE RIVER	Mini-boom electrofishing	04/12/12	CREEK CHUB	Semotilus atromaculatus	1	1	0.02%
WHITE RIVER	Mini-boom electrofishing	05/17/06	NORTHERN PIKE	Esox lucious	2		
WHITE RIVER	Mini-boom electrofishing	04/17/07	NORTHERN PIKE	Esox lucious	1	3	0.07%
WHITE RIVER	Mini-boom electrofishing	03/30/11	TIGER TROUT	Salmo trutta × Salvelinus fontinali	1		
WHITE RIVER	Mini-boom electrofishing	04/12/12	TIGER TROUT	Salmo trutta × Salvelinus fontinali	1	2	0.05%
WHITE RIVER	Mini-boom electrofishing	04/17/07	WHITE SUCKER	Semotilus atromaculatus	44		
WHITE RIVER	Mini-boom electrofishing	05/09/08	WHITE SUCKER	Semotilus atromaculatus	38		
WHITE RIVER	Mini-boom electrofishing	04/13/09	WHITE SUCKER	Semotilus atromaculatus	43		
WHITE RIVER	Mini-boom electrofishing	03/28/10	WHITE SUCKER	Semotilus atromaculatus	1		
WHITE RIVER	Mini-boom electrofishing	03/30/11	WHITE SUCKER	Semotilus atromaculatus	3		
WHITE RIVER	Mini-boom electrofishing	04/12/12	WHITE SUCKER	Semotilus atromaculatus	91		
WHITE RIVER	Mini-boom electrofishing	03/28/17	WHITE SUCKER	Semotilus atromaculatus	26		
WHITE RIVER	Mini-boom electrofishing	04/04/19	WHITE SUCKER	Semotilus atromaculatus	9	255	5.90%
						4323	

WDNR COMMENT
State of Wisconsin
Department of Natural Resources

GAME FISH LENGTH FREQUENCY

FORM 3600-65 REV. 3-80

INCHES

COUNTY	WATER	DATE	GEAR
Ashland COUNTY CODE __ __	White River Flowage WATER CODE __ __ __ __	April 13-16, 1990	Fyke Nets

SIZE RANGE INCHES	Northern pike	White sucker	Shorthead redhorse	LM bass	SIZE RANGE INCHES	Northern pike		
<3.0					27.0-27.4	4		
3.0- 3.4					27.5-27.9	3		
3.5- 3.9					28.0-28.4	3		
4.0- 4.4					28.5-28.9	3		
4.5- 4.9					29.0-29.4	3		
5.0- 5.4					29.5-29.9	2		
5.5- 5.9					30.0-30.4	1		
6.0- 6.4					30.5-30.9			
6.5- 6.9					31.0-31.4	1		
7.0- 7.4					31.5-31.9	5		
7.5- 7.9					32.0-32.4	1		
8.0- 8.4					32.5-32.9	1		
8.5- 8.9					33.0-33.4	2		
9.0- 9.4		1			33.5-33.9			
9.5- 9.9					34.0-34.4			
10.0-10.4		2			34.5-34.9			
10.5-10.9					35.0-35.4			
11.0-11.4		1			35.5-35.9			
11.5-11.9					36.0-36.4			
12.0-12.4		2	9		36.5-36.9	1		
12.5-12.9		3	22		37.0-37.4			
13.0-13.4		3	23		37.5-37.9			
13.5-13.9	2	4	12		38.0-38.4			
14.0-14.4		5	9		38.5-38.9			
14.5-14.9	1	4	4	1	39.0-39.4			
15.0-15.4	4	4	3		39.5-39.9			
15.5-15.9		8			40.0-40.9			
16.0-16.4	3	9	4		41.0-41.9			
16.5-16.9	1	5	1		42.0-42.9			
17.0-17.4	7	2	1		43.0-43.9			
17.5-17.9	10	1	2		44.0-44.9			
18.0-18.4	8	3	2		45.0-45.9			
18.5-18.9	15	3			46.0-46.9			
19.0-19.4	20	1	2		47.0-47.9			
19.5-19.9	13		1		48.0-48.9			
20.0-20.4	13				49.0-49.9			
20.5-20.9	16				50.0-50.9			
21.0-21.4	11				51.0-51.9			
21.5-21.9	16				52.0-52.9			
22.0-22.4	17				53.0-53.9			
22.5-22.9	9				54.0-54.9			
23.0-23.4	13				55.0-55.9			
23.5-23.9	20				56.0-56.9			
24.0-24.4	14				57.0-57.9			
24.5-24.9	7				58.0-58.9			
25.0-25.4	2				59.0-59.9			
25.5-25.9	5				60.0+			
26.0-26.4	4							
26.5-26.9	5							
TOTAL	266	61	95	1	TOTAL			

WISCONSIN CONSERVATION DEPARTMENT

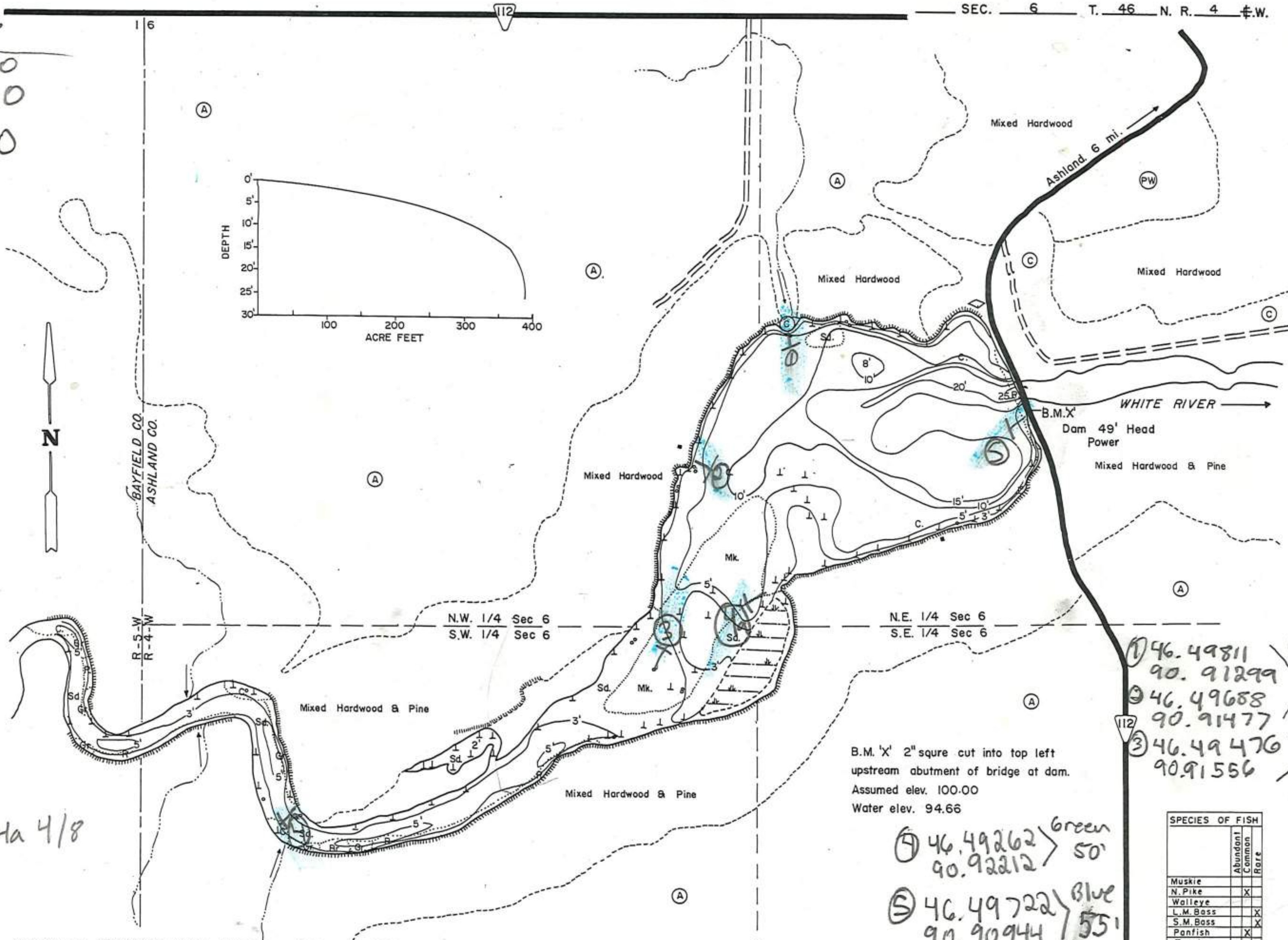
LAKE SURVEY MAP

WHITE RIVER LAKE — ASHLAND COUNTY

SEC. 6 T. 46 N. R. 4 ~~E~~W.

SWI

	T°
4/7	40.0
4/8	39.0
4/10	43.0



B.M. 'X' 2" squre cut into top left upstream abutment of bridge at dam.
Assumed elev. 100.00
Water elev. 94.66

(1) 46.49811 90.91299 } white 50'
(2) 46.49688 90.91477
(3) 46.49476 90.91556 } Blue 75'

(4) 46.49262 90.92212 } Green 50'

(5) 46.49722 90.90944 } Blue 55'

(4a) 46.49838 90.91014

Set 4/7
moved 4 -> 4a 4/8

SPECIES OF FISH	Abundant	Common	Rare
Muskie			
N. Pike		X	
Walleye			
L.M. Bass			X
S.M. Bass			X
Panfish		X	
Trout			

AREA 56.1 ACRES
UNDER 3FT. 28.2 %
OVER 20FT. 1.4 %
VOLUME 390.7 ACRE FT.
TOTAL ALK. 99 P.P.M.
SHORELINE 2.7 MILES
MAX. DEPTH 26 FEET

EQUIPMENT RECORDING SONAR MAPPED SEPT (MO.) 1966 (YR.)

WATER ELEV. 94.66

TOPOGRAPHIC SYMBOLS
- (B) Brush
- (PW) Partially wooded
- (W) Wooded
- (C) Cleared
- (P) Pastured
- (A) Agricultural
- B.M. Bench Mark
- Dwelling
- Resort
- Steep slope
- Indefinite shoreline
- Marsh
- Spring
- Intermittent stream
- Permanent inlet
- Permanent outlet
- Dam

LAKE BOTTOM SYMBOLS
- P. Peat
- Mk. Muck
- C. Clay
- M. Marl
- Sd. Sand
- St. Silt
- Gr. Gravel
- R. Rubble
- Br. Bedrock
- Stumps & Snags
- T Submergent vegetation
- Emergent vegetation
- Floating vegetation

SCALE: 300' 0' 300' 600' 900' 1200 1500

◇ Access ◈ Access with Parking ◆ Boat Livery

Field work by: C.Busch, L.Sather, N.Porkorny Drawn by: C. Holt

Sheet ____ of ____ WDNR COMMENT

Survey ID = 515077684 Station ID = 123718

WALLEYE NETTING DATA COLLECTION SHEET (3600-186-W/N) **WALLEYE** **Wisconsin Department of Natural Resources**

Waterbody Name:	White River Flowage	Target Fish:	~~Walleye~~ Northern Pike	Number of Nets:	5
MWB Code/WBIC:		Mark Given:		Number of Nights:	3
Waterbody Type:		Survey Type:	Population Estimate	Net Frame Height:	
County:		Gear Type:	Fyke Net	Net Frame Width:	
Date (MM/DD/YY):	4/7/15 – 4/10/15	Weather:	Cloudy	Lead Length:	
Station:		Adverse Conditions:		Largest Bar Mesh Size:	
Start Time:		Water Temperature:	39.0	Smallest Bar Mesh Size:	
End Time:		Water Level: [HI] [NORM] [LOW]		Mesh Color:	
Collectors:	Falstad, Lawson, Hulio	Water Clarity:		Mesh Material:	

15 net nights

inches	MALE (NP) Unclipped 4/8	MALE (NP) Unclipped 4/10	MALE Clipped	inches	FEMALE (NP) Unclipped 4/8	FEMALE (NP) Unclipped 4/10	FEMALE Clipped	inches	UNKNOWN (NP) Unclipped 4/8	UNKNOWN (NP) Unclipped 4/10	UNKNOWN Clipped
<3.0				<3.0				<3.0			NO CLIP
3.0-3.4				3.0-3.4				3.0-3.4			
3.5-3.9				3.5-3.9				3.5-3.9			
4.0-4.4				4.0-4.4				4.0-4.4			
4.5-4.9				4.5-4.9				4.5-4.9			
5.0-5.4				5.0-5.4				5.0-5.4			
5.5-5.9				5.5-5.9				5.5-5.9			
6.0-6.4				6.0-6.4				6.0-6.4			
6.5-6.9				6.5-6.9				6.5-6.9			
7.0-7.4				7.0-7.4				7.0-7.4			
7.5-7.9				7.5-7.9				7.5-7.9			
8.0-8.4				8.0-8.4				8.0-8.4			
8.5-8.9				8.5-8.9				8.5-8.9		I	
9.0-9.4				9.0-9.4				9.0-9.4			
9.5-9.9				9.5-9.9				9.5-9.9		II	
10.0-10.4				10.0-10.4				10.0-10.4	I	I In Pod	
10.5-10.9				10.5-10.9				10.5-10.9		I	
11.0-11.4				11.0-11.4				11.0-11.4			
11.5-11.9				11.5-11.9				11.5-11.9	I		
12.0-12.4				12.0-12.4				12.0-12.4			
12.5-12.9				12.5-12.9				12.5-12.9			
13.0-13.4		I		13.0-13.4				13.0-13.4			
13.5-13.9				13.5-13.9				13.5-13.9			
14.0-14.4				14.0-14.4				14.0-14.4			
14.5-14.9		I		14.5-14.9	I			14.5-14.9			
15.0-15.4				15.0-15.4				15.0-15.4			
15.5-15.9	I			15.5-15.9		I		15.5-15.9			
16.0-16.4		I		16.0-16.4				16.0-16.4			
16.5-16.9	I			16.5-16.9	I			16.5-16.9			
17.0-17.4				17.0-17.4				17.0-17.4			
17.5-17.9	I	I		17.5-17.9				17.5-17.9			
18.0-18.4				18.0-18.4				18.0-18.4			
18.5-18.9				18.5-18.9				18.5-18.9			
19.0-19.4		II		19.0-19.4				19.0-19.4			
19.5-19.9				19.5-19.9				19.5-19.9			
20.0-20.4				20.0-20.4				20.0-20.4			
20.5-20.9	I	I		20.5-20.9				20.5-20.9			
21.0-21.4				21.0-21.4				21.0-21.4			
21.5-21.9				21.5-21.9				21.5-21.9			
22.0-22.4				22.0-22.4				22.0-22.4			
22.5-22.9		I		22.5-22.9				22.5-22.9			
23.0-23.4				23.0-23.4				23.0-23.4			
23.5-23.9				23.5-23.9				23.5-23.9			
24.0-24.4				24.0-24.4				24.0-24.4			
24.5-24.9	I	I		24.5-24.9				24.5-24.9			
25.0-25.4				25.0-25.4		I		25.0-25.4			
25.5-25.9				25.5-25.9				25.5-25.9			
26.0-26.4				26.0-26.4				26.0-26.4			
26.5-26.9				26.5-26.9				26.5-26.9			
27.0-27.4				27.0-27.4				27.0-27.4			
27.5-27.9				27.5-27.9				27.5-27.9			
28.0-28.4				28.0-28.4	I			28.0-28.4			
28.5-28.9				28.5-28.9				28.5-28.9			
29.0-29.4				29.0-29.4				29.0-29.4			
29.5-29.9				29.5-29.9				29.5-29.9			
30.0 +				30.0 +				30.0 +			
TOTALS:				TOTALS:		5		TOTALS:	2	5	

14

WALLEYE / NETTING

21 total

Wisconsin
Department of Natural Resources
WDNR COMMENT

NETTING DATA COLLECTION SHEET (4.0 in. - 40+ in.)
Form 3600-188 Rev. 4-94

Lake WRF MWB Code: ________ Date: 4 / 8 / 15 County: ________ Collector: ________

Target Fish: ________ Survey Type: ________ Mark Given: ________ H_2O Temp: ________ Time ____ : ____

Adverse Conditions: ________ Station: ________

Net Type: ________ Length/Frame: ________ Bar Mesh: ________

Color: ________ Mesh Type: ________ Net Nights: ________

Inches	BLG	BKC	PSD	BKT	Inches			NET 1		
4.0 - 4.4	6.8	6.7	4.5	8.6	30.0 - 30.4			Species		
4.5 - 4.9	6.3	5.9			30.5 - 30.9			Count		
5.0 - 5.4	6.3	8.0			31.0 - 31.4					
5.5 - 5.9	7.2	6.0		BRT	31.5 - 31.9			Species		
6.0 - 6.4	7.3			21.8	32.0 - 32.4			Count		
6.5 - 6.9	6.8	5.7	5.5		32.5 - 32.9					
7.0 - 7.9	6.6		5.4		33.0 - 33.4			Species		
7.5 - 7.9	6.2		5.3		33.5 - 33.9			Count		
8.0 - 8.4	5.6		4.7		34.0 - 34.4					
8.5 - 8.9	6.7		4.4		34.5 - 34.9			NET 2		
9.0 - 9.4	6.3				35.0 - 35.4			Species		
9.5 - 9.9	6.5				35.5 - 35.9			Count		
10.0-10.4	6.5				36.0 - 36.4					
10.5-10.9					36.5 - 36.9			Species		
11.0-11.4	7.6				37.0 - 37.4			Count		
11.5-11.9	4.9				37.5 - 37.9					
12.0-12.4	6.3				38.0 - 38.4			Species		
12.5-12.9	7.3				38.5 - 39.9			Count		
13.0-13.4	6.9				39.0 - 39.4					
13.5-13.9	7.5				39.5 - 39.9			NET 3		
14.0-14.4	7.3				40 +			Species		
14.5-14.9	6.2							Count		
15.0-15.4	6.3									
15.5-15.9	6.7							Species		
16.0-16.4								Count		
16.5-16.9										
17.0-17.4								Species		
17.5-17.9								Count		
18.0-18.4										
18.5-18.9								NET 4		
19.0-19.4								Species		
19.5-19.9								Count		
20.0-20.4										
20.5-20-9								Species		
21.0-21.4								Count		
21.5-21.9										
22.0-22.4								Species		
22.5-22.9								Count		
23.0-23.4										
23.5-23.9								NET 5		
24.0-24.4								Species		
24.5-24.9								Count		
25.0-25.4										
25.5-25.9								Species		
26.0-26.4								Count		
26.5-26.9										
27.0-27.4								Species		
27.5-27.9								Count		
28.0-28.4										
28.5-28.9										
29.0-29.4										
29.5-29.9										

NETTING CPE DATA COLLECTION SHEET (3600-186-CPE/N)

CPE

Wisconsin Department of Natural Resources

Waterbody Name: White River Flowage
MWB Code/WBIC:
Waterbody Type:
County:
Date (MM/DD/YY): 4/8/15
Station:
Start Time:
End Time:
Collectors: Folstad, Larson, Holi[illegible]

Target Fish: Pike
Mark Given:
Survey Type: Population Estimate
Gear Type: Fyke Net
Weather:
Adverse Conditions:
Water Temperature: 39
Water Level: [HI] [NORM] [LOW]
Water Clarity:

Number of Nets: 5
Number of Nights: 1
5 net nights
Net Frame Height:
Net Frame Width:
Lead Length:
Largest Bar Mesh Size:
Smallest Bar Mesh Size:
Mesh Color:
Mesh Material:

SPECIES	Net # 1	Net # 2	Net # 3	Net # 4	Net # 5	Net #	Net #	Net #	Net #	Net #	Net #	Net #	TOTALS
WP	3	3	3	–	1								10
Redhorse	20	–	–	6	20								46
White Sucker	10	6	10	–	5								31
Black Crappie	1	2	–	–	1								4
Bluegill	2	5	4	–	2								13
Brown Bullhead	3	1	–	–	3								7
PKSD	–	1	–	–	–								1

CPE / NETTING

WDNR COMMENT

Sheet_____of_____

NETTING CPE DATA COLLECTION SHEET (3600-186-CPE/N)

CPE

Wisconsin Department of Natural Resources

Waterbody Name: White River Flowage
MWB Code/WBIC:
Waterbody Type:
County:
Date (MM/DD/YY): 4/10/15
Station:
Start Time:
End Time:
Collectors: Folstad, Lawson, Hulio

Target Fish:
Mark Given:
Survey Type: Population Estimate
Gear Type: Fyke Net
Weather: Sunny, 52°
Adverse Conditions:
Water Temperature: 43
Water Level: [HI] [NORM] [LOW]
Water Clarity:

Number of Nets: 5
Number of Nights: 2
10 net nights
Net Frame Height:
Net Frame Width:
Lead Length:
Largest Bar Mesh Size:
Smallest Bar Mesh Size:
Mesh Color:
Mesh Material:

SPECIES	Net # 1	Net # 2	Net # 3	Net # 4a	Net # 5	Net # 6	Net #	Net #	Net #	Net #	Net #	Net #	TOTALS
NP	2	2	5	—	2								11
BLG	3	3	1	—	3								10
BC	—	1	—	—	—								1
Redhorse	37	3	6	14	17								77
White Sucker	19	4	8	13	5								49
PKSD	1	1	—	—	3								5
Brown bull	—	3	3	—	—								6
BRT	—	—	—	—	1								1
BKT	—	—	1	—	—								1

CPE / NETTING

WDNR COMMENT

SUMMARY FISHING RECORD
FORM 3600-63

DEPARTMENT OF NATURAL RESOURCES

COUNTY: Ashland	WATERS: White River Flowage
SAMPLING OBJECTIVE: Basic Inventory	NUMBER AND LOCATION OF STATIONS (HABITAT): 5 nets set at various Locations run for 2 days totaling 10 lifts
PERIOD FISHED (DATES): 5/19-20/83	

GEAR

BOOM SHOCKER (HOURS)	TIME ______ NIGHT ______ DAY

VISUAL HOURS	TIME OF DAY	HAUL SEINE (LENGTH)	MESH	AREA COVERED
ANGLING (HOURS)	TIME OF DAY	TRAP NET (NO. OF NET LIFTS) 8 / 2	MESH 1.0 in bar / .5 in bar	DEPTH 4.5 ft / 4 ft
MINNOW SEINE (NO. HAULS)	AREA COVERED	GILL NET (NO. OF FEET X NO. OF LIFTS)	MESH SIZE	DEPTH

OTHER (HOURS OR LIFTS)	CHARACTERISTICS

FISHING RESULTS

SPECIES	NO.	MODAL SIZE(S)	SIZE RANGE	CATCH/UNIT
Northern Pike	51		13.5 - 39.9	5.1/net day
Largemouth Bass	1		13.5	.1/net day
Northern Redhorse	22		10.5 - 14.9	2.2/net day
White Sucker	7		15.5 - 16.9	.7/net day
Black Crappie	54		5.2 - 13.0	5.4/net day
Bluegill	24		5.2 - 7.4	2.4/net day
Pumpkinseed	13		5.0 - 6.3	1.3/net day
Black Bullhead } Yellow Bullhead }	506		5.8 - 11.4	50.6/net day

OBSERVATIONS
Golden shiner, 3.5", present

SIGNED (COMPILER): T. Cawrst	DATE: 9/30/83

REV. 10-70

- WDNR COMMENT

State of Wisconsin
Department of Natural Resources

GAME FISH LENGTH FREQUENCY

FORM 3600-65 REV. 3-80

INCHES

COUNTY	WATER	DATE	GEAR
ASHLAND COUNTY CODE __ __	WHITE RIVER FLOWAGE WATER CODE __ __ __ __	5/19-20/83	5 FYKE NETS

<table>
<tr><th>SIZE RANGE INCHES</th><th colspan="4">SPECIES</th><th>SIZE RANGE INCHES</th><th colspan="3">SPECIES</th></tr>
<tr><th></th><th>NORTHERN PIKE</th><th>LARGEMOUTH BASS</th><th>NORTHERN REDHORSE</th><th>WHITE SUCKER</th><th></th><th>N. PIKE</th><th></th><th></th></tr>
<tr><td><3.0</td><td></td><td></td><td></td><td></td><td>27.0-27.4</td><td></td><td></td><td></td></tr>
<tr><td>3.0- 3.4</td><td></td><td></td><td></td><td></td><td>27.5-27.9</td><td>卌 |</td><td></td><td></td></tr>
<tr><td>3.5- 3.9</td><td></td><td></td><td></td><td></td><td>28.0-28.4</td><td>卌</td><td></td><td></td></tr>
<tr><td>4.0- 4.4</td><td></td><td></td><td></td><td></td><td>28.5-28.9</td><td>|||</td><td></td><td></td></tr>
<tr><td>4.5- 4.9</td><td></td><td></td><td></td><td></td><td>29.0-29.4</td><td>|</td><td></td><td></td></tr>
<tr><td>5.0- 5.4</td><td></td><td></td><td></td><td></td><td>29.5-29.9</td><td>||||</td><td></td><td></td></tr>
<tr><td>5.5- 5.9</td><td></td><td></td><td></td><td></td><td>30.0-30.4</td><td>|</td><td></td><td></td></tr>
<tr><td>6.0- 6.4</td><td></td><td></td><td></td><td></td><td>30.5-30.9</td><td></td><td></td><td></td></tr>
<tr><td>6.5- 6.9</td><td></td><td></td><td></td><td></td><td>31.0-31.4</td><td>||</td><td></td><td></td></tr>
<tr><td>7.0- 7.4</td><td></td><td></td><td></td><td></td><td>31.5-31.9</td><td>|</td><td></td><td></td></tr>
<tr><td>7.5- 7.9</td><td></td><td></td><td></td><td></td><td>32.0-32.4</td><td>|</td><td></td><td></td></tr>
<tr><td>8.0- 8.4</td><td></td><td></td><td></td><td></td><td>32.5-32.9</td><td>||</td><td></td><td></td></tr>
<tr><td>8.5- 8.9</td><td></td><td></td><td></td><td></td><td>33.0-33.4</td><td>|</td><td></td><td></td></tr>
<tr><td>9.0- 9.4</td><td></td><td></td><td></td><td></td><td>33.5-33.9</td><td></td><td></td><td></td></tr>
<tr><td>9.5- 9.9</td><td></td><td></td><td></td><td></td><td>34.0-34.4</td><td>|</td><td></td><td></td></tr>
<tr><td>10.0-10.4</td><td></td><td></td><td></td><td></td><td>34.5-34.9</td><td>||</td><td></td><td></td></tr>
<tr><td>10.5-10.9</td><td></td><td></td><td>|</td><td></td><td>35.0-35.4</td><td>||</td><td></td><td></td></tr>
<tr><td>11.0-11.4</td><td></td><td></td><td>|</td><td></td><td>35.5-35.9</td><td></td><td></td><td></td></tr>
<tr><td>11.5-11.9</td><td></td><td></td><td>|</td><td></td><td>36.0-36.4</td><td></td><td></td><td></td></tr>
<tr><td>12.0-12.4</td><td></td><td></td><td>||</td><td></td><td>36.5-36.9</td><td>|</td><td></td><td></td></tr>
<tr><td>12.5-12.9</td><td></td><td></td><td></td><td></td><td>37.0-37.4</td><td>||</td><td></td><td></td></tr>
<tr><td>13.0-13.4</td><td></td><td></td><td>||</td><td></td><td>37.5-37.9</td><td></td><td></td><td></td></tr>
<tr><td>13.5-13.9</td><td>|</td><td>|</td><td>||</td><td></td><td>38.0-38.4</td><td></td><td></td><td></td></tr>
<tr><td>14.0-14.4</td><td></td><td></td><td></td><td></td><td>38.5-38.9</td><td>|</td><td></td><td></td></tr>
<tr><td>14.5-14.9</td><td></td><td></td><td>||</td><td></td><td>39.0-39.4</td><td>|</td><td></td><td></td></tr>
<tr><td>15.0-15.4</td><td>||</td><td></td><td></td><td></td><td>39.5-39.9</td><td></td><td></td><td></td></tr>
<tr><td>15.5-15.9</td><td></td><td></td><td>+11 COUNT</td><td>|</td><td>40.0-40.9</td><td></td><td></td><td></td></tr>
<tr><td>16.0-16.4</td><td></td><td></td><td></td><td>||</td><td>41.0-41.9</td><td></td><td></td><td></td></tr>
<tr><td>16.5-16.9</td><td>|</td><td></td><td></td><td>|</td><td>42.0-42.9</td><td></td><td></td><td></td></tr>
<tr><td>17.0-17.4</td><td></td><td></td><td></td><td>+3 COUNT</td><td>43.0-43.9</td><td></td><td></td><td></td></tr>
<tr><td>17.5-17.9</td><td></td><td></td><td></td><td></td><td>44.0-44.9</td><td></td><td></td><td></td></tr>
<tr><td>18.0-18.4</td><td></td><td></td><td></td><td></td><td>45.0-45.9</td><td></td><td></td><td></td></tr>
<tr><td>18.5-18.9</td><td></td><td></td><td></td><td></td><td>46.0-46.9</td><td></td><td></td><td></td></tr>
<tr><td>19.0-19.4</td><td></td><td></td><td></td><td></td><td>47.0-47.9</td><td></td><td></td><td></td></tr>
<tr><td>19.5-19.9</td><td></td><td></td><td></td><td></td><td>48.0-48.9</td><td></td><td></td><td></td></tr>
<tr><td>20.0-20.4</td><td></td><td></td><td></td><td></td><td>49.0-49.9</td><td></td><td></td><td></td></tr>
<tr><td>20.5-20.9</td><td></td><td></td><td></td><td></td><td>50.0-50.9</td><td></td><td></td><td></td></tr>
<tr><td>21.0-21.4</td><td>|</td><td></td><td></td><td></td><td>51.0-51.9</td><td></td><td></td><td></td></tr>
<tr><td>21.5-21.9</td><td></td><td></td><td></td><td></td><td>52.0-52.9</td><td></td><td></td><td></td></tr>
<tr><td>22.0-22.4</td><td></td><td></td><td></td><td></td><td>53.0-53.9</td><td></td><td></td><td></td></tr>
<tr><td>22.5-22.9</td><td></td><td></td><td></td><td></td><td>54.0-54.9</td><td></td><td></td><td></td></tr>
<tr><td>23.0-23.4</td><td>||</td><td></td><td></td><td></td><td>55.0-55.9</td><td></td><td></td><td></td></tr>
<tr><td>23.5-23.9</td><td></td><td></td><td></td><td></td><td>56.0-56.9</td><td></td><td></td><td></td></tr>
<tr><td>24.0-24.4</td><td></td><td></td><td></td><td></td><td>57.0-57.9</td><td></td><td></td><td></td></tr>
<tr><td>24.5-24.9</td><td>||</td><td></td><td></td><td></td><td>58.0-58.9</td><td></td><td></td><td></td></tr>
<tr><td>25.0-25.4</td><td></td><td></td><td></td><td></td><td>59.0-59.9</td><td></td><td></td><td></td></tr>
<tr><td>25.5-25.9</td><td>|</td><td></td><td></td><td></td><td>60.0+</td><td></td><td></td><td></td></tr>
<tr><td>26.0-26.4</td><td>||</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>26.5-26.9</td><td>||</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>TOTAL</td><td></td><td>1</td><td>22</td><td>7</td><td>TOTAL</td><td>51</td><td></td><td></td></tr>
</table>

WDNR COMMENT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PANFISH LENGTH FREQUENCY

FORM 3600-64 REV. 3-81

INCHES

COUNTY ASHLAND COUNTY CODE — —	WATER WHITE R. FLOWAGE WATER CODE — — — —	DATE 5/19-20/83	GEAR 5 FYKE NETS

SIZE RANGE INCHES	BLACK CRAPPIE	BLUEGILL	PUMPKINSEED	BLACK BULLHEAD
1.0-1.4				
1.5-2.0				
2.1				
2.2				
2.3				
2.4				
2.5				
2.6				
2.7				
2.8				
2.9				
3.0				
3.1				
3.2				
3.3				
3.4				
3.5				
3.6				
3.7				
3.8				
3.9				
4.0				
4.1				
4.2				
4.3				
4.4				
4.5				
4.6				
4.7				
4.8				
4.9				
5.0			ǀ	
5.1				
5.2	ǀǀ	ǀ		
5.3			ǀ	
5.4				
5.5	ǀ			
5.6	ǀǀ		ǀ	
5.7	ǀǀǀ	ǀǀ	ǀǀǀ	
5.8	ǀ		ǀ	ǀ
5.9	ǀǀ		ǀ	ǀǀ
6.0		ǀ	ǀ	ǀǀ
6.1		ǀ	ǀǀ	ǀǀǀ
6.2		ǀ	ǀ	ǀǀǀǀ
6.3		ǀ	ǀ	ǀ
6.4				ǀǀǀ
6.5		ǀǀ		ǀ
6.6		ǀǀ		ǀǀǀ
6.7		ǀǀǀǀ		ǀǀ
6.8				
6.9		ǀǀ		
TOTALS				

SIZE RANGE INCHES	CRAPPIE	BLUEGILL	BLACK BULLHEAD	YELLOW BULLHEAD
7.0				
7.1		𝍸		
7.2		ǀ	ǀ	
7.3			ǀ	
7.4	ǀ	ǀ		
7.5				
7.6				ǀ
7.7				
7.8			ǀ	
7.9				
8.0				
8.1	ǀǀ		ǀ	
8.2	ǀǀ			
8.3				
8.4	ǀ			
8.5	ǀǀ			
8.6	ǀǀ		ǀ	
8.7	𝍸			
8.8	ǀ			
8.9	𝍸			
9.0	ǀǀ			
9.1	ǀǀǀ			
9.2				
9.3				
9.4				
9.5				
9.6	ǀ		ǀǀ	
9.7	ǀ		ǀ	
9.8	ǀ		ǀ	
9.9				
10.0	ǀ			
10.2	ǀǀ			ǀ
10.4	ǀǀ		ǀ	
10.6	ǀǀǀǀ		ǀǀ	ǀ
10.8	ǀǀǀ			ǀ
11.0				
11.2				
11.4			ǀ	
11.6				
11.8				
12.0				
12.2				
12.4				
12.6				
12.8				
13.0	ǀǀ			
13.2				
13.4				
13.6				
13.8				
14.0+				
TOTALS				

GOLDEN SHINER 3.3 + 471 COUNT BLACK AND YELLOW BULLHEADS

WDNR COMMENT

WISCONSIN CONSERVATION DEPARTMENT
Madison, Wisconsin 53701

FI-323

SUMMARY FISHING RECORD

County Ashland Waters White River Flowage

Sampling Objective General Survey

Period Fished (dates) Boom shocker 7-28-66, Fyke net 6-21, 23-66

Number and Location of Stations (habitat) 10 stations, scattered along entire shoreline

Gear:

Boom Shocker (hours) 3 Time: Night .... Day X

Visual Hours .... Time of Day .... Haul Seine (length) .... Mesh .... Area Covered ....

Angling (hours) .... Time of Day .... Trap Net (no. of net lifts) 9 Mesh 1" Depth 5'

Minnow Seine (no. hauls) .... Area Covered .... Gill Net (no. of feet x no. of lifts) .... Mesh Size .... Depth ....

Other (hours or lifts) .... Characteristics ....

Fishing Results:

Species	No.	Modal Size(s)	Size Range	Catch/Unit
Northern Pike	17	23.3	12.2 - 32.2	
L.M. Bass	1	12.7	12.7	
S.M. Bass	1	8.2	8.2	
Black Crappie	25	9.5	5.6 - 14.1	
Bluegill	33	5.9	5.0 - 7.5	
Rockbass	16	6.1	3.8 - 8.8	
Yellow Perch	3	8.2	6.9 - 10.5	
Black bullhead	369	7.8	5.0 - 10.8	
Brown bullhead	10	8.3	5.2 - 10.8	
Common sucker	96	8.8	1.8 - 19.9	
Pumpkinseed	3	5.7	4.8 - 6.3	
Northern Redhorse	18	12.2	4.8 - 19.3	

Observations: No recommended management program, survey data was mixed, making it impossible to analyze catch per unit.

...ed Randolph Steuck (Compiler) Date January 11, 1967

WDNR COMMENT

Wisconsin Conservation Department

INTRA-DEPARTMENT

MEMORANDUM

Park Falls
Station

Date February 16, 1967

TO: Clarence A. Wistrom

FROM: Randolph Steuck

SUBJECT: White River Flowage, Ashland County

The White River Flowage is formed by a high dam controlled by the Lake Superior Power Company. This dam has been in existence since 1907 and its purpose is to create electric power. This dam has blocked fish migration from Lake Superior since its creation. With the absense of natural barriers, the excellent upstream water quality and flow, the White River without the dam could conceivably be another Brule River.

About eighty percent of the year, the flowage water is turbid. This turbidity is caused by tributary drainage over red clay soil in the upstream watershed. Because of the turbid water condition, it was difficult to collect a good fish sample with electrofishing gear. The greater percent of the fish survey sample was collected with fyke nets. A fair population of northern pike and a good panfish population exists here. Black bullheads are the dominent fish species. An occasional brown and brook trout is caught, however, no trout were captured or observed during the survey. No active management program is recommended at this time. No fish have been stocked in this flowage area since 1953.

The public access is located on State Highway 112 right of way and partially on power company land. This access has two car parking and is adequate for the light fishing pressure on this water. The Lake Superior Power Company agreed to enlarge this access if the need arises. The power company does not object to portages across their property to downstream water.

Apparently the turbid water condition does not affect the feeding habits of the fish. The four species crappies, rockbass, northern pike and bluegills have normal growth rates.

Randolph Steuck
Randolph Steuck

RS/cb
NOTED:

______________ ______________
Date

WDNR COMMENT

WISCONSIN CONSERVATION DEPARTMENT
Madison, Wisconsin 53701

Fi-320

LIMNOLOGY

County: Ashland — Waters: White River Flowage

Location: Section 6 Township 46 Range 4W

Area (acres): 47.4

Type of Water: Lake .... Stream .... Impoundment x

Dimensions: Length (miles and tenths) 0.6 Width 0.2

Depth: Mean 14 feet Maximum (feet) 26
> 20 feet (percent) 5
< 3 feet (percent) 18

Shore Length (miles and tenths): 1.8

Littoral Bottom Types (percent): Sand 10% Clay 90%
Gravel .... Hardpan ....
Bedrock .... Boulder ....
Silt .... Marl .... Rubble .... Detritus ....

Direct Drainage Area (square miles): 0.2

Watershed Land Cover (percent): Agriculture ....
Wetland .... Wild 100

Watershed: Area (square miles) 172.0

Inlets: Number 1 Width (feet) 80 Navigability yes Volume

Outlet: Width (feet) 80 Navigability yes Volume

Landlocked: ....

Water Control Structure:
Owner Lake Superior Power Co. Height (feet) 49' Type Tainter Gate Purpose Power plant

Water Source: Drainage x Seepage .... Spring .... Drained ....

Flow of Outlet (cfs): 213 CFS (estimated)

Water Chemistry:
Date 9-12-66 MPA Alkalinity (ppm) 76

pH: 7.5

Phosphates: Total .... Dissolved ....

Conductance: C_t .... C_{177} 144

Watercolor: Lt. Brown .... Med. Brown .... Drk. Brown .... Clear .... Turbid x

Secchi Disk (depth in feet): 2'
Conditions Turbid (clay in solution) 75% of the year

Upper Thermocline Depth (feet): 0 Chloride (ppm) ....

Comments: Drainage from clay soils tend to cause almost a continuous turbid water condition.

Leo Stecker (Compiler) Date 9-12-66

WDNR COMMENT

OXYGEN, TEMPERATURE, VOLUME PROFILE

O_2 (ppm)	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Temp. (F.°)	30		40		50		60	65	70		80		90	

DEPTH (FEET)

O_2	Depth	Temp.
7.2 ppm		64
		64
	2	
		64
		63
	4	
7.0 ppm		63
	6	62
		62
	8	62
		62
6.6 ppm	10	62
		62
	12	62
		62
	14	62
6.0 ppm		62
	16	62
		61
	18	61
		61
5.4 ppm	20	61
		61
	22	61
		61
	24	61
4.7 ppm		61
	26	61

VOLUME (ACRE FEET)

Date of Collection Sept 12, 1966

WDNR COMMENT

WISCONSIN CONSERVATION DEPARTMENT
Madison, Wisconsin 53701

Fi-325

GAME FISH LENGTH FREQUENCY

COUNTY	WATERS	DATE	GEAR
Ashland	White River Flowage	6-21-66	Fyke net (4) 230 V-A.C. Shocker

Size Range	SPECIES				
	Northern Pike				
3.0- 3.4					
3.5- 3.9					
4.0- 4.4					
4.5- 4.9					
5.0- 5.4					
5.5- 5.9					
6.0- 6.4					
6.5- 6.9					
7.0- 7.4					
7.5- 7.9					
8.0- 8.4					
8.5- 8.9					
9.0- 9.4					
9.5- 9.9					
10.0-10.4					
10.5-10.9					
11.0-11.4					
11.5-11.9					
12.0-12.4	1				
12.5-12.9					
13.0-13.4					
13.5-13.9	1				
14.0-14.4					
14.5-14.9					
15.0-15.4					
15.5-15.9					
16.0-16.4					
16.5-16.9					
17.0-17.4					
17.5-17.9					
18.0-18.4					
18.5-18.9					
19.0-19.4	2				
19.5-19.9	2				
20.0-20.4					
20.5-20.9	1				
21.0-21.4					
21.5-21.9					
22.0-22.4	1				
22.5-22.9					
23.0-23.4					
23.5-23.9	1				
24.0-24.4	1				
24.5-24.9					
25.0-25.4					
25.5-25.9					
26.0-26.4					
26.5-26.9	1				
Total					

Size Range	SPECIES	
27.0-27.4		
27.5-27.9		
28.0-28.4	2	
28.5-28.9	1	
29.0-29.4	1	
29.5-29.9	1	
30.0-30.4		
30.5-30.9		
31.0-31.4		
31.5-31.9		
32.0-32.4	1	
32.5-32.9		
33.0-33.4		
33.5-33.9		
34.0-34.4		
34.5-34.9		
35.0-35.4		
35.5-35.9		
36.0-36.4		
36.5-36.9		
37.0-37.4		
37.5-37.9		
38.0-38.4		
38.5-38.9		
39.0-39.4		
39.5-39.9		
40.0-40.4		
40.5-40.9		
41.0-41.4		
41.5-41.9		
42.0-42.4		
42.5-42.9		
43.0-43.4		
43.5-43.9		
44.0-44.4		
44.5-44.9		
45.0-45.4		
45.5-45.9		
46.0-46.4		
46.5-46.9		
47.0-47.4		
47.5-47.9		
48.0-48.4		
48.5-48.9		
49.0-49.4		
49.5-49.9		
17		

WDNR COMMENT

WISCONSIN CONSERVATION DEPARTMENT
Madison, Wisconsin 53701

Fi-324

PANFISH LENGTH FREQUENCY

COUNTY	WATERS	DATE	GEAR
Ashland	White River Flowage	6-21-66	Fyke net (4) 230 V-A.C. shocker

Size Range	Bluegill	Crappie	Rockbass
<1			
1-1.4			
1.5-1.9			
2.0			
2.1			
2.2			
2.3			
2.4			
2.5			
2.6			
2.7			
2.8			
2.9			
3.0			
3.1			
3.2			
3.3			
3.4			
3.5			
3.6			
3.7			
3.8			2
3.9			
4.0			
4.1			
4.2			
4.3			
4.4			
4.5			
4.6			
4.7			
4.8			1
4.9			1
5.0	1		
5.1			
5.2			
5.3	1		2
5.4	3		
5.5	4		
5.6	4	1	1
5.7	4	1	
5.8		1	
5.9	2	2	1
6.0			
6.1	3		
6.2		3	1
6.3	1	1	
6.4	1	1	
6.5	1	1	1
6.6	3		
6.7	1		
6.8			
6.9	1		

Size Range	Bluegill	Crappie	Rockbass
7.0			3
7.1			
7.2			
7.3	1		
7.4			
7.5	2		
7.6			1
7.7			
7.8			
7.9			
8.0			
8.1			
8.2			
8.3			
8.4			
8.5			1
8.6			
8.7			
8.8			1
8.9			
9.0			
9.1		12.3 2	
9.2		12.4 1	
9.3		12.6 1	
9.4		12.8 1	
9.5		12.9 1	
9.6		13.1 1	
9.7		13.2 1	
9.8		13.4 1	
9.9		13.6 1	
10.0		13.8 1	
10.1		14.1 1	
10.2			
10.3			
10.4			
10.5			
10.6			
10.7			
10.8			
10.9			
11.0			
11.1			
11.2			
11.3		1	
11.4			
11.5			
11.6			
11.7			
11.8		1	
11.9			
>12			
Total	32	25	16

Park Falls

April 16, 1964

TO: John Klingbiel

FROM: Randolph Steuck

SUBJECT: Application for a Federal Power Commission license for the White River Dam, Ashland County.

A field inspection was made of the White River Dam flowage area to determine public use, public access, and conservation interest.

The only possible boat access to the flowage is from the county highway which crosses on the control structure for the flowage. The Lake Superior District Power Company and the Ashland County Highway Department have provided a boat launching ramp with parking for two cars. Boat launching is difficult because of shallow water at the end of ramp.

Future consideration should be given to improving the launching ramp and enlarging the parking area for five cars. This would provide adequate access to the flowage and also provide a take out point for canoes.

Fishing pressure is light on the impoundment, however, the White River is used as a water trail by girl scouts from camps located upstream. It is necessary to portage canoes one fourth mile from the dam site to lower river. Portaging can only be accomplished by crossing power company property. Future consideration should be given to a public portage route to the lower river.

This power dam has been in operation for fifty years, and during this period no major problems have been encountered. No recommendations are being offered at this time to modify operating procedures. The portion of the White River from the White River Dam downstream, is included in the special trout season for migratory trout, but seems to be only marginal trout water with little fishing pressure.

Recommendations for future consideration would include improvement of the existing launching ramp and a portage route around the dam.

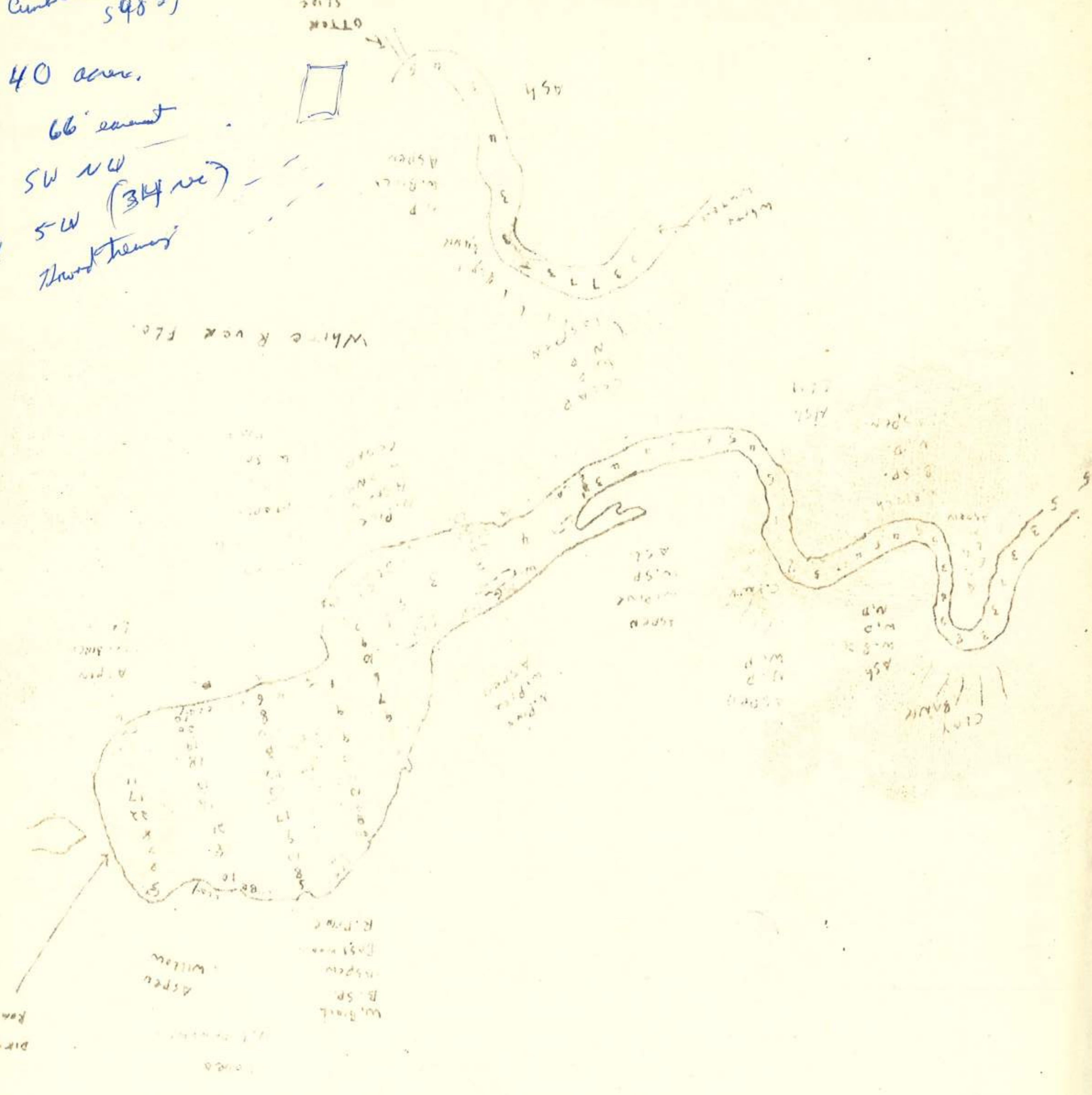
The District Game Manager, Clifford Wiita, stated that wildlife values on the flowage area are insignificant. The local warden, Robert Markle concurred in the above recommendations.

Randolph Steuck

RS/cb

Gerry E Johnson
Cumberland, Wis
54829

40 acres.
66' easement
SW NW
49 5W (34 acre)
Hardwood trees



WDNR COMMENT

WISCONSIN CONSERVATION DEPARTMENT
Madison 1, Wisconsin

Fi-278

WHITE RIVER FLOWAGE ASHLAND CO.
4 Fyke nets 6-21-66

Sucker		Black Bullhead	Black Bullhead	Red-horse ✓		Brown Bullhead			STONE ROLLER	
12.2		8.3	6.1	14.6		9.6			4.4	
14.2		6.5	6.5	15.5		9.3				
15.7		6.5	6.9	19.3		9.3				
14.6		8.7	6.3	17.3		9.0				
12.5		9.0	6.6	16.4		9.3				
17.5		6.9	9.4	11.7		8.7				
9.8		6.6	5.6	10.0		7.3				
18.1		10.1	8.6	11.7		6.8				
16.7		11.3	6.8			5.2				
16.1		5.7	9.8			10.8				
14.7		5.9	6.2							
14.8		9.6	6.5							
11.1		7.1	6.9							
10.8		7.0	5.7							
10.6		7.0	10.0							
13.5		8.3	7.7							
17.8		9.8	10.7							
10.4		9.3	9.8							
13.5		10.3	10.2							
17.1		6.5	9.8							
12.7		7.1	9.8							
10.6		9.2	10.6							
19.9		7.2	9.7							
18.6		5.6	9.5							
13.2		6.9	7.4							
15.7		6.4	9.0							
16.4		8.5	9.2							
9.9		9.0	5.0							
17.3		9.2	7.5							
9.4		8.7	79							
11.7		6.9								
16.9		7.4	count							
16.4		6.3	98							
13.7		8.5	24							
19.4		8.6	32							
18.4		9.4	7							
19.4		9.8	5							
15.1		6.8	42							
		6.5	22							
		9.4	34							
		6.3	12							
		9.7	13							
		9.7								
		9.2								
		9.8								
		8.7								
		10.8								
		10.2								
		6.7								
		9.5								
38		x	x							

REV. 2/60

WISCONSIN CONSERVATION DEPARTMENT
Madison 1, Wisconsin

Shocker

Red Horse	Sucker	Common Shiners	Trout Perch	Bull Head
18.1	15.5 4.7	2.7	2.9	73
12.0	9.3 13.7	2.7	2.9	
11.5	14.9 8.4	2.8	3.1	
10.4	13.6 5.4	2.1	2.4	
15.4	9.6 5.1	2.1	2.7	
13.7	11.2 5.6	3.2	1.2	
10.7	7.8 3.6	1.3	2.5	
7.5	10.2 5.4		3.2	
4.8+	5.3		2.7	
6.1	4.8		2.6	
	14.7		2.7	
	6.5		2.3	
	7.8		2.8	
	9.6		1.8	
	7.1		1.7	
	9.4		2.7	
	5.4		3.1	
	6.5			
	11.5			
	4.9			
	9.2			
	10.9			
	+3.3			
	3.4			
	7.5			
	7.6			
	4.8			
	8.8			
	3.5			
	6.5			
	8.7			
	3.8			
	4.1			
	11.6			
	13.1			
	11.3			
	7.3			
	5.2			
	6.6			
	6.9			
	6.4			
	7.4			
	5.4			
	4.5			
	+1.8			
	8.8			
	3.1			
	12.3			
	5.1			
	3.2			
	59			

REV. 2/60

Growth Data

White River Flowage - Ashland County

June, 1966

Year Class	No.	Size Range	Mean Size
Northern Pike			
II	2	12.2 - 13.8	13.0
III	7	19.2 - 23.7	21.4
IV	3	24.2 - 28.0	26.1
V	3	28.2 - 29.1	28.6
VI	1	29.6	29.6
VII	1	32.2	32.2
Rock Bass			
III	2	3.8	3.8
IV	9	4.8 - 7.0	5.9
V	2	7.0	7.0
VI	2	7.6 - 8.5	8.0
VII	1	8.8	8.8
Bluegill			
IV	1	5.0	5.0
V	6	5.3 - 5.5	5.4
VI	22	5.5 - 7.5	7.0
VII	3	6.7 - 7.5	7.1
Crappie			
III	11	5.6 - 6.5	6.0
V	2	11.3 - 11.8	11.5
VI	1	12.3	12.3
VII	10	12.4 - 14.1	13.2
VIII	1	13.8	13.8

White River
Sea Lamprey Weir Catch
April 10, 1960 to August 1, 1960

	43° April	56° May	68° June	72° July	August
Sea Lamprey		39	189	1	
Silver Lamprey					
Brook Lamprey			6		
Rainbow Trout	1				
Brook Trout					
Brown Trout		3	2		
W. Sucker	5	89	72	10	
L.N. Sucker		5			
Red Horse		48	20	1	
Walleye					
N. Pike		1	1	1	
S.M. Bass		1	1		
Yellow Perch					
Trout Perch		23	16		
Log Perch		1	5		
Com. Shiner		52	69	27	
Chub		8	12	14	
Bullhead		219	94	7	
Rock Bass		8	5		
Pumpkinseed		1	5		
Crappie		7	2		
L.N. Dace		1			
Ammocetes			1		
Smelt				1	

April 3 to August 14, 1959

	44° April	60° May	76° June	70° July	73° August
Sea Lamprey	25	495	95	17	
Rainbow Trout	1	2	1		
Sucker	123	320	118	137	3
L.N. Sucker		33			
Red Horse		10	36		22
Native Lamprey	1	3			
Brook Trout					
Br. Trout	2	6	2		
Walleye	1				
N. Pike		2		2	
S.M. Bass		1			
Yell. Perch	15	12	2	4	
Trout Perch	75	108	2	1	
Log Perch			1		
Bullhead		1030	941	150	35
Co. Shiner	103	316	181	74	26
Chub	18	125	48	21	3
Smelt	3588				
Rock Bass		5	15	11	
Bluegill					
Crappie		2	5		
L.N. Dace	1			3	

Burbot	1		1		
Brook Lamprey		15			
Pumpkinseed		18		1	
Mud Minnow				3	
Ammocetes					6

April - August 25, 1958

	47° April	56° May	58° June	70° July	74° August
Sea Lamprey	55	136	47	1	1
Rainbow Trout	1	1			
Sucker	485	131	211	655	84
L.N. Sucker	14	5	7		
Red Horse	7	4	207	236	169
Native Lamprey	8	24	7		
Brook Trout					
Br. Trout					2
Walleye		5			2
N. Pike	1				
S.M. Bass		1			1
Yell. Perch	19	25		15	
Trout Perch	226	483	63	24	17
Log Perch	2		17	9	8
Bullhead	19	179	107	429	145
Co. Shiner	453	410	257	415	51
Chub		49	33	56	26
Smelt	22167	411			
Rock Bass		1	2	12	5
Bluegill				26	5
Crappie			3		
L.N. Dace		8	1		
Burbot			3	1	14
Brook Lamprey		1			
Sauger				1	
Mud Minnow				1	

April 5, 1957 - August 5, 1957

	45° April	54° May	63° June	68° July	72° August
Sea Lamprey	87	253	46	8	
Rainbow Trout	1	3	1	1	
W. Sucker	938	407	132	164	8
L.N. Sucker	253	59		4	5
Redhorse	6	79	472	311	12
Native Lamprey		14			
Brook Trout	1	3			
Brown Trout	1	5		2	
Walleye	9	6	11	14	
N. Pike	1	1	1	4	
S.M. Bass		1	1	1	
Y. Perch		3	9	10	
Trout Perch	333	301	61	5	
Log Perch	2	4	1		
Bullhead	172	736	480	328	1
Co. Shiner	53	445	142	33	5
Ck. Chub	142	90	37	17	

Smelt	111	1			
Rock Bass		13	7	5	
Pumpkinseed				10	2
Bluegill					
Crappie				5	
L.N. Dace	1	8		4	
Silver Lamprey	8	2			
Burbot	2	1	1	3	

April 7 - July 4, 1956

	39° April	53° May	66° June	68° July	August
Sea Lamprey	4	191	21	3	
Rainbow Trout		1			
W. Sucker	272	2949	43	6	
L.N. Sucker	21	1306	2		
Redhorese	3	141	79	18	
Native Lamprey	1	2	8		
Brook Trout					
Brown Trout		1	2		
Walleye	1	34	28	4	
N. Pike		4	1		
S.M. Bass		2	9		
Y. Perch					
Trout Perch		133	9		
Log Perch		16			
Bullhead		250	192	4	
Go. Shiner		70	49		
Ck. Chub		19	52		
Smelt	8680	5130			
Rock Bass		16	7		
Pumpkinseed			8		
Bluegill		5			
Crappie		7	1		
L.N. Dace		18	2		
Silver Lamprey		61			
Burbot			1		

White River

NOI, PAD and Request to Use TLP

XcelEnergy®
RESPONSIBLE BY NATURE®

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

July 30, 2020

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Preliminary Application Document, Notice of Intent, Request to Use Traditional Licensing Process and Request for Designation of Non-Federal Representative**
White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose:

In accordance with 18 CFR § 16.6 and Section 15 of the Federal Power Act, Northern States Power Company-Wisconsin (NSPW or Licensee), d/b/a Xcel Energy, is hereby electronically filing a Notice of Intent to File a License Application (NOI) and a Pre-Application Document (PAD) for the relicensing of the White River Hydroelectric Project (FERC Project No. 2444). The current license for the Project expires on July 31, 2025.

In accordance with the Commission's regulations, NSPW hereby declares its unequivocal intent to relicense the White River Hydroelectric Project by filing the enclosed NOI and PAD. In accordance with 18 CFR § 5.5(c), the Licensee will also provide a copy of the NOI and PAD in electronic format to appropriate federal, state, and interstate resource agencies as well as Indian Tribes, local governments, and members of the public likely to be interested in the relicensing process. A distribution list of all known potential stakeholders receiving copies of the NOI and PAD is attached. Licensee will also provide two paper courtesy copies of the NOI and PAD to Commission Staff in the Office of Energy Projects and the Office of General Counsel-Energy Projects as outlined in the Commission's filing guidelines.

Under 18 CFR § 5.3, the Licensee hereby requests Commission approval to use the Traditional Licensing Process (TLP). The TLP should provide cost and time savings to both the Licensee and stakeholders due to the limited areal extent of the project boundary, the limited number of anticipated stakeholders, and the lack of controversial issues brought forward in the questionnaire responses. Experience also indicates that the TLP is less costly than the Integrated Licensing Process (ILP).

Due to the limited number of responses to the questionnaire provided to the stakeholders, and the lack of any expressed opposition, there does not appear to be any objection to the use of the TLP. There also does not appear to be any complex resource issues or anticipated controversy. Therefore, the Licensee anticipates the Commission will be able to complete the timely issuance of a subsequent license for the Project.

Under 18 CFR § 5.3(d)(1), comments concerning Licensee's request to use the TLP must be filed with the Commission within 30 days of the filing date of this request and must include either the FERC Project No. 2444 or the name and address of the Licensee as included in the PAD.

To assist in open communication with the stakeholders, the Licensee plans to use electronic communication, where feasible, as the primary source of communication. If electronic communication is not feasible, hard copy communication will be utilized as a secondary form of communication throughout the licensing process. Documents filed with the Commission and provided to the stakeholders will also be posted on a website at http://hydrorelicensing.com/.

Under 18 CFR § 5.3(d)(2), the Licensee shall file no later than the date of this filing a notice in a daily or weekly newspaper of general circulation in Ashland County, Wisconsin. The notice shall include the date of the PAD and the request to use the TLP. The notice shall also summarize the documents filed, justification for requesting to use the TLP, Licensee's name, address and telephone number, and indicate that comments are due within 30 days of the public notice filing date. Comments filed in response to the public notice must include the project number and/or the Licensee's name and address, and state that respondents must submit Comments to the Secretary of the Commission in accordance with filing procedures outlined in the Commission's website at http://FERC.gov.

The public notice shall also state that comments regarding Licensee's request to use the TLP should address as appropriate the likelihood of timely license issuance, complexity of resource issues, level of anticipated controversy, relative cost of the TLP compared to the ILP, the amount of available information and potential for significant disputes over studies and other factors believed to be pertinent.

A public scoping meeting and site visit will be held between 30 and 60 days of the Commission's decision regarding the use of the TLP. Written comments on the PAD must be filed with the Commission, and a copy sent to NSPW, within 60 days of the public scoping meeting.

Under 18 CFR § 5.5(e), the Licensee hereby further requests to be designated as the Commission's non-federal representative in the relicensing of the White River Hydroelectric Project (FERC Project No. 2444) for the purposes of consultation under Section 7 of the Endangered Species Act and the joint regulations under 50 CFR Part 402, and National Oceanic and Atmospheric Administration under Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations at 50 CFR § 600.920, and Section 106 of the National Historic Preservation Act and the implementing regulations under 36 CFR Part 800.

Thank you for your time and consideration in this matter. Should you have any questions, please contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Respectfully Submitted,

James M Zyduck Digitally signed by James M Zyduck
Date: 2020.07.28 12:14:55 -05'00'

James M. Zyduck
Director, Hydro Plants

cc: Distribution List

Certificate of Service

I hereby certify that I, on behalf of NSPW, a Wisconsin corporation, have this day served by First Class Mail the foregoing documents in electronic format upon each person designated on the attached distribution list.

Dated this ____30th___ day of ____July________ 2020.

Darrin Johnson

Darrin M. Johnson
Mead & Hunt, Inc.

White River Hydroelectric Project Licensing

FERC Project No. 2444

Notice of Intent to Relicense
Request to Use the Traditional Licensing Process
Pre-Application Document
Distribution List

<u>TRIBES</u>

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Bay Mills Indian Community of MI
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Mr. James Williams, Chairman
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Ms. Melinda Young, THPO
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LdFthpo@LdfTribe.com

FEDERAL

Honorable Tammy Baldwin, Senator
U.S. Senator from Wisconsin
709 Hart Senate Office Building
Washington, DC 2510

Ms. Nannette Bischoff, FERC Coordinator, St. Paul District
U.S. Department of the Army Corps of Engineers
180 5th Street E
Suite 700
St. Paul, MN 55101
nannette.m.bischoff@usace.army.mil

Ms. Kimberly Bose, Secretary
FERC Office of General Counsel
888 First Street NE
Washington, DC 20426

Ms. Kimberly Bose, Secretary
FERC Office of Energy Projects
888 First Street NE
Washington, DC 20426

Ms. Tokey Boswell, Regional Environmental Coordinator
U.S. Department of the Interior – National Park Service
601 Riverfront Drive
Omaha, NE 68102
tokey_boswell@nps.gov

Honorable Glenn Grothman, U.S. Representative
U.S. Representative from Wisconsin District 6
1427 Longworth H.O.B.
Washington, DC 20515

Honorable Ron Johnson, Senator
U.S. Senator from Wisconsin
328 Hart Senate Office Building
Washington, DC 20510

Mr. Timothy Lapointe, Regional Director
U.S. Bureau of Indian Affairs Midwest Regional Office
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Ms. Angela Tornes, Midwest Hydropower Coordinator
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626 E Wisconsin Ave, Suite 100
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angela_tornes@nps.gov

Honorable Tom Tiffany, U.S. Representative
U.S. Representative from Wisconsin District 7
1714 Longworth H.O.B.
Washington, DC 20515

Ms. Jen Tyler, Mail Code: E-19J
U.S. Environmental Protection Agency – NEPA Implementation Section, Region V
77 W Jackson Boulevard, AR-18J
Chicago, IL 60604
Tyler.jennifer@epa.gov

U.S. Department of the Interior – Fish & Wildlife Service – Green Bay Field Office
Field Supervisor
2661 Scott Tower Drive
New Franken, WI 54229
greenbay@fws.gov

Mr. Nick Utrup, Fisheries Biologist
U.S. Department of the Interior – Fish & Wildlife Service
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Public Service Commission of Wisconsin
P.O. Box 7894
Madison, WI 53707

Wisconsin Cooperative Fishery Research Unit
UW Stevens Point
2100 Main Street
Stevens Point, WI 54481

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Madison, WI 53702

Wisconsin Office of the Governor
P.O. Box 7863
Madison, WI 53702

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Ms. Janet Bewley, District 25 Senator
Wisconsin State Senate
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LOCAL

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Ashland, WI 54806
bkucera@coawi.org

Ms. Deb Lewis, Mayor
City of Ashland
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Ashland, WI 54806

Mr. Matthew Lehto, Chairman
Town of White River
65617 Charles Johnson Road
Ashland, WI 54806
14ledo81@gmail.com

Ms. Heather Schutte, Clerk
Ashland County
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heather.schutte@co.wi.us

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Chairman
Walleye for Tomorrow
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Northwest Regional Planning Committee
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Spooner, WI 54801-8692

Mr. Raj Shukla or Ms. Allison Werner
River Alliance of Wisconsin
147 S. Butler St., Suite 2
Madison, WI 53703
Tshukla@wisconsinrivers.org

Mr. James Zyduck
Director of Hydro Plants
Xcel Energy
1414 W Hamilton Ave
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James.Zyduck@XcelEnergy.com

NOTICE OF INTENT
BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION
TO FILE AN APPLICATION
FOR SUBSEQUENT LICENSE
WHITE RIVER HYDROELECTRIC PROJECT
FERC PROJECT NO. 2444
NORTHERN STATES POWER COMPANY-WISCONSIN, d/b/a Xcel Energy

In accordance with 18 C.F.R. Section 5.5, Northern States Power Company-Wisconsin, d/b/a Xcel Energy, hereby declares its intent to file an application for a subsequent license for an existing minor hydroelectric development at the White River Hydroelectric Project as described below.

Information Required Pursuant to 18 C.F.R. §§ 5.5 and 16.6(b)

1. Potential License Applicant's Name and Address

The licensee's name and address are:

Northern States Power Company-Wisconsin
Attn: James Zyduck
Director of Hydro Plants
1414 W Hamilton Ave
PO Box 8
Eau Claire, WI 54702
James.Zyduck@XcelEnergy.com

2. Project Number

The FERC project number is 2444.

3. License Expiration Date

The license expiration date is July 31, 2025.

4. Statement of Intent

Northern States Power Company-Wisconsin, d/b/a Xcel Energy, unequivocally intends to file an application for a subsequent license for the White River Hydroelectric Project (FERC No. 2444) and has requested permission to use the Commission's Traditional Licensing Process.

5. Principal Project Works and Project Description

The principal project works consist of a 775-foot long, 46-foot high dam consisting of four sections, a 7-foot diameter reinforced concrete conduit that extends 1,345 feet from the dam to the surge tank, a 16-foot diameter by 62-foot high surge tank, two 5.5-foot diameter steel penstocks extending 30 feet from the surge tank to the power house, a 39 foot long by 69 foot wide by 25-foot high powerhouse, and a 2.4 kV/69 kV step up transformer in the adjacent non-project substation.

The dam consists of four sections: 1) a 37-foot high, 400-foot long left earthen embankment section which extends to the left abutment of the headworks structure with a crest elevation at or above 720.4

feet NGVD, 2) a 20-foot wide intake section with 14.25-foot wide by 20-foot high trashracks with a 1.25 inch clear spacing between bars, 3) a 55-foot wide by 35-foot high by 70-foot long gated spillway section with two gates each 25 feet wide and 19.75 feet high with sill crest elevations of 685.2 feet NGVD, and 4) a 37-foot high, 300-foot long right earthen embankment section which extends to the right abutment of the gated spillway section with a crest elevation of at or above 720.4 feet NGVD.

The powerhouse contains two horizontal type units. Unit 1 has double Francis runners with 15 blades manufactured by Kiser and is rated at 940 hp. Unit 2 has double Francis runners with 16 blades manufactured by S. Morgan Smith Company and is rated at 667 hp.

The powerhouse also contains two generators with a total rated capacity of 1,200 kW. Unit 1 is a GE, 2300-volt, 450 rpm, 1.0 power factor AC generator with a nameplate capacity of 700 kW. Unit 2 is a Westinghouse, 2300-volt, 450 rpm, 1.0 power factor AC generator with a nameplate capacity of 500 kW.

6. Location of the Project

The location of the project is as follows:

State:	Wisconsin
County:	Ashland County
Stream:	White River approximately 13 miles upstream of its confluence with the Bad River
Nearby Communities:	City of Ashland, Wisconsin; Town of White River, Wisconsin
Other:	Located in northwestern Ashland County; approximately 5 miles from the city of Ashland, WI; and approximately 113 miles northeast of the City of Eau Claire, WI.

7. Installed Plant Capacity

The plant has an installed capacity of 1.2 MW.

Unit 1: 700 kW
Unit 2: 500 kW

8. Names and Mailing Addresses

- *Every county in which any part of the project is located, and in which any Federal facility that is used or to be used by the project is located:*

County:	Ashland
Contact name:	Heather Schutte, County Clerk
Mailing Address:	201 Main St, Room 202, Ashland, WI 54806 Heather.schutte@clerk@co.wi.us

The Project uses no federal facilities and occupies no federal lands.

- *Every city, town, or similar local political subdivision*

(A) *in which any part of the project is or is to be located and any Federal facility that is or is to be used by the project is located:*

Brant Kucera
City Administrator
City of Ashland
601 Main St. W.
Ashland, WI 54806
bkucera@coawi.org

Matthew Lehto
Chairman
Town of White River
65617 Charles Johnson Rd.
Ashland, WI 54806
14ledo81@gmail.com

The Project uses no federal facilities and occupies no federal lands.

(B) *that has a population of 5,000 or more people and is located within 15 miles of the existing proposed project dam:*

Brant Kucera
City Administrator
City of Ashland
601 Main St. W.
Ashland, WI 54806
bkucera@coawi.org

- *Every irrigation district, drainage district, or similar special purpose political subdivision*

(A) *in which any part of the project is or is proposed to be located and any Federal facility that is or is proposed to be used by the project is located;*

Northwest Regional Planning Commission
1400 S. River St.
Spooner, WI 54801-8692

The Project uses no federal facilities and occupies no federal lands.

(B) *that owns, operates, maintains, or uses any project facility or any Federal facility that is or is proposed to be used by the project:*

None.

- *Every other political subdivision in the general area of the project or proposed project that there is reason to believe would likely be interested in, or affected by, the notification:*

None.

- *Indian tribes:*

Mr. Chad Able, Treaty Natural Resource Administrator
Red Cliff Band of Lake Superior Chippewa
88385 Pike Rd., Hwy 13
Bayfield, WI 54814

Mr. Marcus Ammesmaki, THPO
Fond du Lac Band of Lake Superior Chippewa
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Mille Lacs Band of Ojibwe
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Lac Du Flambeau, WI 54538-0067

Mr. James Williams, Chairman
Lac Vieux Desert Band of Lake Superior Chippewa Indians of MI
E23968 Pow Wow Trail
Watersmeet, MI 49969

Ms. Melinda Young, THPO
Lac du Flambeau Band of Lake Superior Chippewa Indians of WI
P.O. Box 67
Lac du Flambeau, WI 54538
LdFthpo@LdfTribe.com

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

July 30, 2020

Vaughn Public Library
502 Main Street West
Ashland, WI 54806

Subject: Request to Display Public Copy

To Whom it may concern:

Northern States Power Company-Wisconsin, d/b/a Xcel Energy, is entering the Federal Energy Regulatory Commission's relicensing process for its White River Hydroelectric Project (FERC Project No. 2444). Therefore, we respectfully request that you display the enclosed hard copy of the Notice of Intent and Pre-Application Document in a location that is reasonably accessible to the public for inspection during regular business hours. Please retain this copy for public inspection until July 31, 2025.

Thank you for your time and consideration in this matter. If you have any questions, please contact me at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Respectfully Submitted,

Matthew J. Miller

Digitally signed by Matthew J. Miller
DN: cn=Matthew J. Miller, o=Xcel Energy, ou=Energy Supply, email=matthew.j.miller@xcelenergy.com, c=US
Date: 2020.07.14 15:46:15 -05'00'

Matthew J. Miller
Hydro License Compliance Consultant

Enc. NOI, PAD, and TLP Request-One Copy

Xcel Energy®
RESPONSIBLE BY NATURE®

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

August 26, 2020

FERC Docket No. 2444-036

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Proof of Publication of NOI, PAD and Request to Use TLP**
White River Project (FERC Project No. 2444)

Dear Secretary Bose:

Pursuant to 18 CFR § 5.3(d)(2), Northern States Power Company – Wisconsin, d/b/a Xcel Energy, licensee for the White River Project (P-2444), published a notice in a daily newspaper of general circulation in Ashland County, Wisconsin regarding our filing of the Notice of Intent (NOI), Pre-Application Document (PAD), and request to use the Traditional Licensing Process (TLP) for said Project. The notice was published on July 29, 2020. Copies of both the notice and Affidavit of Publication are enclosed.

Should you have any questions, please contact Matt Miller at 715-737-1353 or at matthew.j.miller@xcelenergy.com.

Sincerely,

James M Zyduck Digitally signed by James M Zyduck
Date: 2020.08.27 13:00:10 -05'00'

James M. Zyduck
Director, Hydro Plants

Enclosures

c: Shawn Puzen, Darrin Johnson – Mead & Hunt, Inc. (via e-mail)
Project Files

PUBLIC NOTICE

WHITE RIVER HYDROELECTRIC PROJECT

On or before July 30, 2020, Northern States Power Company-Wisconsin, d/b/a Xcel Energy (hereinafter "NSPW"), 1414 West Hamilton Ave., P.O. Box 8, Eau Claire, Wisconsin 54702-0008, 715-737-1353, will file a Notice of Intent to File a License Application (NOI) and a Pre-Application Document (PAD) for a Subsequent License for a Minor Waterpower Project for the White River Hydroelectric Project (FERC Project No. 2444) with the Federal Energy Regulatory Commission (FERC).

The NOI and PAD provide details of the White River Hydroelectric Project as well as NSPW's intent to seek a subsequent license for its continued operation. The Project is located on the White River in the town of White River in Ashland County, Wisconsin. NSPW will be requesting permission from the FERC to use the Traditional Licensing Process (TLP).

The NOI, PAD and request to use the TLP will be available for public review and reproduction at the Vaughn Public Library (502 Main Street W. in Ashland) during normal business hours. The documents will also be available for public review on the Xcel Energy Hydroelectric Project website at www.hydrorelicensing.com and upon appointment at the Xcel Energy office at 1414 West Hamilton Ave in Eau Claire.

Comments can be filed with the FERC within 30 days of the filing date and respondents must submit comments to the Secretary of the Commission in accordance with filing procedures outlined in the Commission's website at http://FERC.gov. Comments on the request to use the TLP should address as appropriate the likelihood of timely license issuance, complexity of resource issues, level of anticipated controversy, relative cost of the TLP compared to the integrated process, the amount of available information and potential for significant disputes over studies, and other factors believed to be pertinent.

Xcel Energy®

ROP AFFIDAVIT

July 29, 2020

Customized Newspaper Advertising
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WI/Ashland Daily Press
122 Third Street W
Ashland, Wisconsin 54806
V: 715-682-2313 F: Email: bnorth@ashlanddailypress.net

WI/Ashland Daily Press (Ashland, WI)

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Janice P. Nelson EXP. 6-5-24
Notary Public

White River

Joint Agency Meeting

Xcel Energy®
RESPONSIBLE BY NATURE®

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

October 7, 2020

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **<u>Notification of Joint Meeting</u>**
White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose:

In accordance with 18 CFR, Part 16, Section 16.8 (b)(3) and (b)(4), Northern States Power Company – Wisconsin (NSPW), d/b/a Xcel Energy, hereby invites resource agencies, Indian tribes, and members of the public to attend a joint meeting to discuss the relicensing process for the White River Hydroelectric Project. The meeting will allow for a review of information previously provided by NSPW in its Preliminary Application Document (PAD), as well as to discuss information to be provided as a part of the relicensing process. The Federal Energy Regulatory Commission (FERC) approved NSPW's request to use the Traditional Licensing Process (TLP) for the Project on September 16, 2020.

The meeting will take place on Thursday, October 29, 2020, at 10:00 a.m. Due to current COVID-19 health-related concerns, the Centers for Disease Control (CDC) guidelines recommend that social gatherings and discretionary travel be avoided. In order to abide by CDC guidelines, the meeting will be held via conference call rather than face-to-face. A site visit to the Project will be scheduled in the spring of 2021, assuming that the health and travel related concerns have abated by that time. A separate notice will be provided at least 15 days prior to the site visit.

<u>Please RSVP by Friday, October 23, 2020 if you plan to participate in the meeting</u>. NSPW will send out meeting information to those that RSVP to include a call-in number, meeting agenda, and PowerPoint presentation.

The agenda for the meeting is as follows:

1. **Welcome and Introductions**
2. **Overview of Meeting Logistics and Purpose**
3. **Overview of FERC Traditional Licensing Process**
4. **Overview of White River Project Features and Operations**
5. **Overview of Information Provided in Preliminary Application Document**
6. **Next Steps**
7. **Comments**
8. **Site Visit will be scheduled in Spring 2021**

According to 18 CFR, Part 16, Section 16.8 (b)(4), the meeting will be audio recorded. Interested resource agencies and Indian tribes may request a copy of the recording.

Information regarding the White River Hydroelectric Project is available for public review during normal business hours at the following public library:

- Vaugh Public Library – 502 Main Street W., Ashland, WI

Information is also available on the following website:

- White River at http://hydrorelicensing.com

As required by FERC regulation 18 CFR, Part 16, Section 16.8 (b)(5), written comments regarding the PAD shall be submitted to NSPW no later than December 28, 2020 (60 days after the October 29, 2020 meeting). Any comments received from resource agencies, Indian tribes, and/or interested members of the public should:

- Identify its determination of necessary studies to be performed or the information to be provided by the potential applicant.
- Identify the basis for its determination.
- Discuss its understanding of the resource issues and its goals and objectives for these resources.
- Explain why each study methodology recommended by it is more appropriate than any other available methodology alternatives, including those identified by the potential applicant.
- Document that the use of each study methodology recommended by it is a generally accepted practice.
- Explain how the studies and information requested will be useful to the agency, Indian tribe, or member of the public in furthering its resource goals and objectives that are affected by the proposed project.

This notice of the joint meeting is being sent to those resource agencies, Indian tribes, and interested members of the public included in the enclosed distribution list.

Should you have any questions, please contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

James M Zyduck Digitally signed by James M Zyduck
Date: 2020.10.07 15:40:19 -05'00'

James M. Zyduck
Director, Hydro Plants

Enclosure: Certificate of Service
White River Project Distribution List

cc: List of addresses (attached)
Shawn Puzen – Mead & Hunt, Inc. (via e-mail)
Project Files

Certificate of Service

I hereby certify that I, on behalf of Xcel Energy, have this day served (via first class mail) the foregoing documents upon each person designated on the attached Master Address Distribution List.

Dated this 7th day of October 2020.

Darrin Johnson

Darrin Johnson
MEAD & HUNT, Inc.

White River Hydroelectric Project Licensing
Distribution List
FERC Project No. P-2444

Indian Tribes

Mr. Michael Wiggins, Chairman
Bad River Band of the Lake Superior Tribe of the Chippewa
P.O. Box 39
Odanah, WI 54861

Ms. Edith Leoso, THPO
Bad River Band of the Lake Superior Tribe of the Chippewa
P.O. Box 39
Odanah, WI 54861

Mr. Clinton Parish, Chairman
Bay Mills Indian Community of Michigan
12140 W. Lakeshore Drive
Brimley, MI 49715

Mr. Marcus Ammesmake, THPO
Fond du Lac Band of the Minnesota Chippewa Tribe
1720 Big Lake Road
Cloquet, MN 55720

Ms. Karen Diver, Chairperson
Fond du Lac Band of the Minnesota Chippewa Tribe
1720 Big Lake Road
Cloquet, MN 55720

Mr. Ned Daniels Jr., Chairman
Forest County Potawatomi Community of WI
3051 Sand Lake Road
Crandon, WI 54520

Mr. Michael LaRonge, THPO
Forest County Potawatomi Community of WI
5320 Wensaut Lane
P.O. Box 340
Crandon, WI 54520

Mr. Mark Azure, President
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
656 Agency Main Street
Harlem, MT 59526

Mr. Michael Blackwolf, THPO
Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
656 Agency Main Street
Harlem, MT 59526

Ms. Mayann Gagnon, THPO
Grand Portage Band of the MN Chippewa Tribe
P.O. Box 428
Grand Portage, MN 55605

Mr. Norman Des Champe, Chairman
Grand Portage Band of the MN Chippewa Tribe
P.O. Box 428
Grand Portage, MN 55605

Mr. William Quackenbush, THPO
Ho Chunk Nation of WI
P.O. Box 667
Black River Falls, WI 54615

Mr. Gary Loonsfoot, THPO
Keweenaw Bay Indian Community
107 Bear Town Road
Baraga, MI 49908

Mr. Warren Swartz, President
Keweenaw Bay Indian Community
17429 Beartown Road
Baraga, MI 44908

Mr. Louis Taylor, Chairman
Lac Courte Oerilles Band of Chippewa Indians
13394 W Trepania Road
Bldg. No. 1
Hayward, WI 53843

Indian Tribes (continued)

Mr. Brian Bisonette, THPO
Lac Courte Oerilles Band of Chippewa Indians
13394 W Trepania Road
Bldg. No. 1
Hayward, WI 54543

Mr. Joseph Wildcat, Sr., President
Lac Du Flambeau Band of Lake Superior
Chippewa Indians
P.O. Box 67
Lac Du Flambeau, WI 54538

Ms. Melinda Young, THPO
Lac Du Flambeau Band of Lake Superior
Chippewa Indians
P.O. Box 67
Lac Du Flambeau, WI 54538

Ms. Daisy McGeshick, THPO
Lac Vieux Desert Band of Lake Superior
Chippewa Indians of MI
P.O. Box 249
Watersmeet, MI 49969

Mr. James Williams, Chairman
Lac Vieux Desert Band of Lake Superior
Chippewa Indians of MI
E23968 Pow Wow Trail
Watersmeet, MI 49969

Ms. Amy Burnette, TPHO
Leech Lake Band of Chippewa Indians
190 Sailstar Drive NW
Cass Lake, MN 56633

Ms. Carri Jones, Chairperson
Leech Lake Band of Chippewa Indians
6530 U.S. Hwy. 2 NW
Cass Lake, MN 56633

Ms. Regina Gasco-Bentley, Chairperson
Little Traverse Bay Band of Odawa Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Ms. Melissa Waitrolik, SHPO
Little Traverse Bay Band of Odawa Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Ms. Joan Delabreau, Chairperson
Menominee Indian Tribe of Wisconsin
P.O. Box 910
Keshena, WI 54135

Mr. David Gignon, THPO
Menominee Indian Tribe of Wisconsin
W3426 Cty. VV W
P.O. Box 910
Keshena, WI 54135

Mr. Douglas Lankford, Chief
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

Ms. Diane Hunter, THPO
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

Ms. Melanie Benjamin, Chief Executive
Mille Lacs Band of Ojibwe
43408 Oodena Drive
Onamia, MN 56359

Ms. Natalie Weyaus, THPO
Mille Lacs Band of Ojibwe
43408 Oodena Drive
Onamia, MN 56359

Ms. Catherine Chavers, President
Minnesota Chippewa Tribe
P.O. Box 217
Cass Lake, MN 56633

Indian Tribes (continued)

Ms. Stacie Cutbank, THPO
Oneida Tribe of Wisconsin
P.O. Box 365
Oneida, WI 54155

Mr. Tehassi Hill, Chairperson
Oneida Tribe of Wisconsin
P.O. Box 365
Oneida, WI 54155

Mr. Chad Able, Treaty Natural Resource Administrator
Red Cliff Band of Lake Superior Chippewa Indians
88385 Pike Road, Hwy 13
Bayfield, WI 54814

Mr. Brian Brainbridge, Chairperson
Red Cliff Band of Lake Superior Chippewa Indians
88385 Pike Road, Hwy. 13
Bayfield, WI 54814

Mr. Marvin Defoe, THPO
Red Cliff Band of Lake Superior Chippewa Indians
88385 Pike Road, Hwy. 13
Bayfield, WI 54814

Mr. Chris McGeshick, Chairman
Sokaogon Chippewa Community Mole Lake Band
3051 Sand Lake Road
Crandon, WI 54520

Mr. Adam Van Zile, THPO
Sokaogon Chippewa Community Mole Lake Band
3051 Sand Lake Road
Crandon, WI 54520

Mr. Lewis Taylor, President
St. Croix Band of Lake Superior Chippewa
24663 Angeline Avenue
Webster, WI 54893

Ms. Shannon Holsey, President
Stockbridge Munsee Tribe of Mohican Indians
N8476 Mo He Con Nuck Road
Bowler, WI 54416

Ms. Sherry White, THPO
Stockbridge Munsee Tribe of Mohican Indians
P.O. Box 70
Bowler, WI 54416

Ms. Jaime Arsenault, TPO
White Earth Band of the Minnesota Chippewa
P.O. Box 418
White Earth, MN 56591

Ms. Erma Vizenor, Chairperson
White Earth Band of the Minnesota Chippewa
P.O. Box 418
White Earth, MN 56591

<u>State</u>

Public Service Commission of Wisconsin
P.O. Box 7894
Madison, WI 53707

WI Cooperative Fishery Research Unit
UW Stevens Point
2100 Main Street
Stevens Point, WI 54481

Ms. Kathleen Angel, Wisconsin Coastal Management Program
Wisconsin Department of Administration
101 E. Wilson Street, 10th Floor
Madison, WI 53703

Ms. Cheryl Laatsch, FERC Coordinator
Wisconsin Department of Natural Resources
502 E. Mill Street
Beaver Dam, WI 54880

Mr. Michael Ostrenga, NW Region Maintenance Supervisor
Wisconsin Department of Transportation
1701 N. Fourth Street
Superior, WI 54880

Wisconsin Office of the Governor
P.O. Box 7863
Madison, WI 53702

Mr. Tyler Howe, SHPO
Wisconsin State Historical Society
816 State Street
Madison, WI 53706

Ms. Beth Meyers, District 74 Representative
Wisconsin State Assembly
P.O. Box 8952
Madison, WI 53708

Ms. Janet Bewley, District 25 Senator
Wisconsin State Senate
P.O. Box 7882
Madison, WI 53707

<u>Federal</u>

Ms. Kimberly Bose, Secretary
FERC Office of General Counsel
888 First Street NE
Washington, DC 20426

Ms. Kimberly Bose, Secretary
FERC Office of Energy Projects
888 First Street NE
Washington, DC 20426

Mr. Timothy Lapointe, Regional Director
U.S. Bureau of Indian Affairs Midwest Regional Office
5600 West American Boulevard
Suite 500
Bloomington, MN 55437

Ms. Nannette Bischoff, FERC Coordinator, St. Paul District
U.S. Department of the Army Corps of Engineers
180 5th Street E
Suite 700
St. Paul, MN 55101

Ms. Mary Manydeeds, Environmental Specialist
U.S. Department of the Interior – Bureau of Indian Affairs, Norman Pointe II Building
5600 American Boulevard W
Suite 500
Bloomington, MN 55437

Mr. Nick Utrup, Fisheries Biologist
U.S. Department of the Interior – Fish & Wildlife Service
4101 American Boulevard E
Bloomington, MN 55425

U.S. Department of the Interior – Fish & Wildlife Service – Green Bay Field Office
Field Supervisor
2661 Scott Tower Drive
New Franken, WI 54229

Federal (continued)

Mr. Tokey Boswell, Regional Environmental Coordinator
U.S. Dept. of the Interior–National Park Service
601 Riverfront Drive
Omaha, NE 68102

Ms. Angela Tornes, Midwest Hydropower Coordinator
U.S. Dept. of the Interior - National Park Service
626 E Wisconsin Ave, Suite 100
Milwaukee, WI 53202

Ms. Jen Tyler, Mail Code: E-19J
U.S. Environmental Protection Agency – NEPA Implementation Section, Region V
77 W Jackson Boulevard, AR-18J
Chicago, IL 60604

Mr. Glenn Grothman, U.S. Representative
U.S. Representative from Wisconsin District 6
1427 Longworth House Office Building
Washington, DC 20515

Ms. Tammy Baldwin, Senator
U.S. Senator from Wisconsin
709 Hart Senate Office Building
Washington, DC 2510

Mr. Ron Johnson, Senator
U.S. Senator from Wisconsin
328 Hart Senate Office Building
Washington, DC 20510

Mr. Tom Tiffany, U.S. Representative
U.S. Representative from District 7
1714 Longworth House Office Building
Washington, DC 20515

Local

Ms. Heather Schutte, Clerk
Ashland County
201 Main Street, Room 202
Ashland, WI 54806

Mr. Brant Kucera, City Administrator
City of Ashland
601 Main Street W
Ashland, WI 54806

Ms. Deb Lewis, Mayor
City of Ashland
601 Main Street W
Ashland, WI 54806

Mr. Matthew Lehto, Chairman
Town of White River
65617 Charles Johnson Road
Ashland, WI 54806

Other

Mr. James Fossum
River Alliance of Wisconsin
199 Janet Marie Lane
Winona, MN 55987

Mr. Raj Shulka
River Alliance of Wisconsin
147 S Sutler Street
Suite 2
Madison, WI 53703

Bob Stuber, Executive Director
Michigan Hydro Relicensing Coalition
1620 High St.
Traverse City, MI 49684

Northwest Regional Planning Commission
1400 S River Street
Spooner, WI 54801

Mr. Mike Arrowood, Chairman
Walleye for Tomorrow
2240 Auburn Street
Fond du Lac, WI

NSPW

Mr. Scott Crotty, Sr. Operations Managers
Xcel Energy
1414 W. Hamilton Avenue
P.O. Box 8
Eau Claire, WI 54702-0008

Mr. Matthew Miller, Hydro License Compliance Consultant
Xcel Energy
1414 W. Hamilton Avenue
P.O. Box 8
Eau Claire, WI 54702-0008

Mr. James Zyduck, Director, Hydro Plants
Xcel Energy
1414 W. Hamilton Avenue
P.O. Box 8
Eau Claire, WI 54702-0008

FW: White River Virtual Joint Agency Meeting

DJ Darrin Johnson

Accept | Tentative | Decline | Propose New Time | ...

Required Laatsch, Cheryl - DNR; Edith Leoso (THPO@badriver-nsn.gov); Crotty, Scott A; tyler.howe@wisconsinhistory.org; Miller, Matthew J; Tornes, Angela; Shawn Puzen; Nick Utrup, USDOI-FWS; Jen Schuetz; michael.ostrenga@dot.wi.gov; Arianna Schmidt; Climate@badriver-nsn.gov; Wildlife@badriver-nsn.gov

Wed 10/21/2020 10:22 AM

Optional jim.zyduck@xcelenergy.com; Volbrecht, Randy A

Filed by Newforma

Thursday, October 29, 2020 10:00 AM-1:00 PM   Conference Call/Teams meeting

-----Original Appointment-----
From: Darrin Johnson
Sent: Monday, October 19, 2020 12:07 PM
To: Darrin Johnson; Crotty, Scott A; Miller, Matthew J; Shawn Puzen; Jen Schuetz; Arianna Schmidt
Cc: jim.zyduck@xcelenergy.com; Volbrecht, Randy A
Subject: White River Virtual Joint Agency Meeting
When: Thursday, October 29, 2020 10:00 AM-1:00 PM (UTC-06:00) Central Time (US & Canada).
Where: Conference Call/Teams meeting

We will be holding a virtual Joint Agency Meeting for the White River Project relicensing on Thursday, October 29 from 10 am to 1 pm (we will likely be done by noon).

Please RSVP if you plan to attend so we can keep track of the number of participants. We will be sending out an agenda and pdf copy of the PowerPoint presentation prior to the meeting to everyone who RSVPs so they can follow along during the meeting.

Join Microsoft Teams Meeting

+1 872-240-1286 United States, Chicago (Toll)

Conference ID: 237 381 420#

Local numbers | Reset PIN | Learn more about Teams | Meeting options

---

Darrin Johnson

From: Darrin Johnson
Sent: Tuesday, October 27, 2020 4:52 PM
To: Volbrecht, Randy A; Crotty, Scott A; jim.zyduck@xcelenergy.com; Miller, Matthew J; Edith Leoso (THPO@badriver-nsn.gov); Climate@badriver-nsn.gov; Laatsch, Cheryl - DNR; connie.antonuk@wisconsin.gov; Haller, Macaulay G - DNR; Nick Utrup, USDOI-FWS; tyler.howe@wisconsinhistory.org; Tornes, Angela
Cc: Shawn Puzen; Jen Schuetz; Brauna Hartzell; Arianna Schmidt
Subject: White River Virtual Joint Agency Meeting Documents
Attachments: 20201020 Final White River JAM Presentation.pdf; 20201020 Final White River JAM agenda and Conf Call Info.pdf

Categories: Filed by Newforma

Good afternoon,

Thank you for RSVPing for the White River Hydroelectric Project Virtual Joint Agency Meeting. The meeting is being held to develop a common understanding of the Project, resource issues, and information needs as we begin the relicensing process. The meeting will begin at 10:00 am on Thursday October 29. We will be hosting the meeting in Microsoft Teams. You just have to click on the Join Microsoft Teams Meeting link in the meeting invite. If that is not working for some reason, you can also call into the meeting. The call in information is included in the attached White River JAM Agenda and Conf. Call Info document. We have also included a pdf version of the presentation that we will be going through during the meeting if you would prefer to follow along on a paper copy. If you have any questions regarding the meeting, feel free to contact me.

DARRIN JOHNSON
FERC COMPLIANCE AND LICENSING, WATER
Mead & Hunt
Direct: 608-443-0313 | Cell: 715-697-3130 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

White River Hydroelectric Project
Joint Agency Meeting

Meeting Date / Time:	Thursday, October 29, 2020 10:00 a.m. to 1:00 p.m. CDT

Meeting Location:	**Via Conference Call** Call-In Number 1-872-240-1286 Conference ID 237 381 420#

A. Welcome and Introductions

B. Overview of Meeting Logistics and Purpose

C. Overview of FERC Traditional Licensing Process

D. Overview of White River Project Features and Operations

E. Overview of Information Provided in the Pre-Application Document (PAD) and Other Sources

F. Next Steps

G. Comments

H. Site Visit will be scheduled in Spring of 2021

File Comments and Study Requests with FERC by December 28, 2020 and please copy:

Shawn Puzen
FERC Licensing & Compliance Mgr.
Mead & Hunt, Inc
1720 Lawrence Drive
De Pere, WI 54155-3901
Shawn.puzen@meadhunt.com

Matthew Miller
Xcel Energy
1414 W. Hamilton Ave.
PO Box 8
Eau Claire, WI 54702-0008
Matthew.j.miller@xcelenergy.com


Xcel Energy®
RESPONSIBLE BY NATURE®
White River
Hydroelectric Project
FERC Project No. 2444
Joint Agency Meeting
October 29, 2020

Agenda

1. Welcome and Introductions
2. Review of FERC Traditional Licensing Process (TLP) and schedule
3. Overview of the Project features and operations
4. Overview of information provided in the Pre-Application Document (PAD) and other sources
5. Next steps
6. Comments
7. Site visit – to be determined

Review of Traditional Licensing Process (TLP) and Schedule "Three Stage Process"

❖ **TLP First Stage**

- Applicant issues NOI, PAD, request to use TLP, newspaper notice
- Commission approves use of the TLP within 60 days of filing NOI
- Applicant conducts joint agency/public meeting and site visit within 30 to 60 days of TLP Approval/Notice of Commencement
- Resource agencies, tribes, and other relicensing participants provide written comments and study requests no later than 60 days following the meeting

Review of TLP and Schedule "Three Stage Process"

❖ TLP Second Stage

- Applicant completes reasonable and necessary studies
- Applicant provides draft license application (DLA) and study results to resource agencies, tribes, and other relicensing participants
- Resource agencies, tribes, relicensing participants comment on DLA
- Applicant conducts a Joint Agency Meeting (JAM) if substantive disagreements exist

❖ TLP Third Stage

- Applicant files FLA with Commission and sends copies to resource agencies, tribes, and relicensing participants

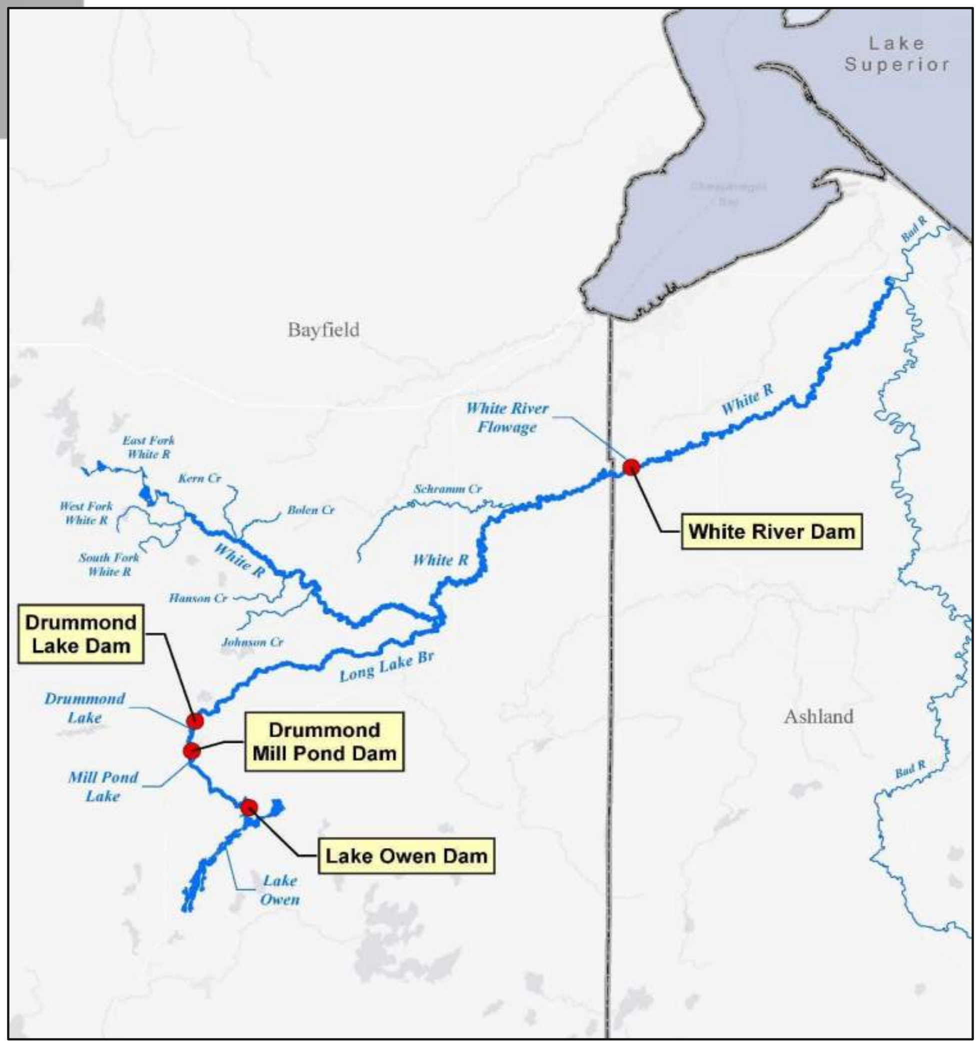
TLP Schedule

TLP Steps	Timelines	Due Date*
Initial Activities		
Licensee submits NOI, PAD, and TLP requests	5 years before the license expiration date	07/30/2020
Stakeholders provide comments regarding TLP	30 days after the request	08/31/2020
FERC approval of TLP	30-60 days after the request	09/16/2020
Stage 1 Consultation		
Licensee conducts JAM with potential stakeholders	30 to 60 days after the TLP approval	10/29/2020
Stakeholders submit comments on PAD/study requests	Comments and study requests due 60 days after JAM	12/28/2020
Stage 2 Consultation		
Licensee's Study, Year 1	Begins after receipt of study requests	2021
Licensee's Study, Year 2, if necessary	Begins after completion of Study Year 1	2022
Licensee submits DLA to FERC and stakeholders for comment	Begins after completion of Study Year 2 (soft deadline)	03/03/2023
Stakeholders and FERC provide comments on the DLA	Within 90-days after receipt of DLA	06/02/2023
Stage 3 Consultation		
Licensee Files Final Application	At least two years prior to license expiration	07/31/2023
FERC Issues Public Notice of Application	Within 14 days of FLA Submittal	8/14/2023
FERC License Expires	FERC goal is to issue the new license before the current license expires	7/31/2025

5

5

Dams in White River Watershed

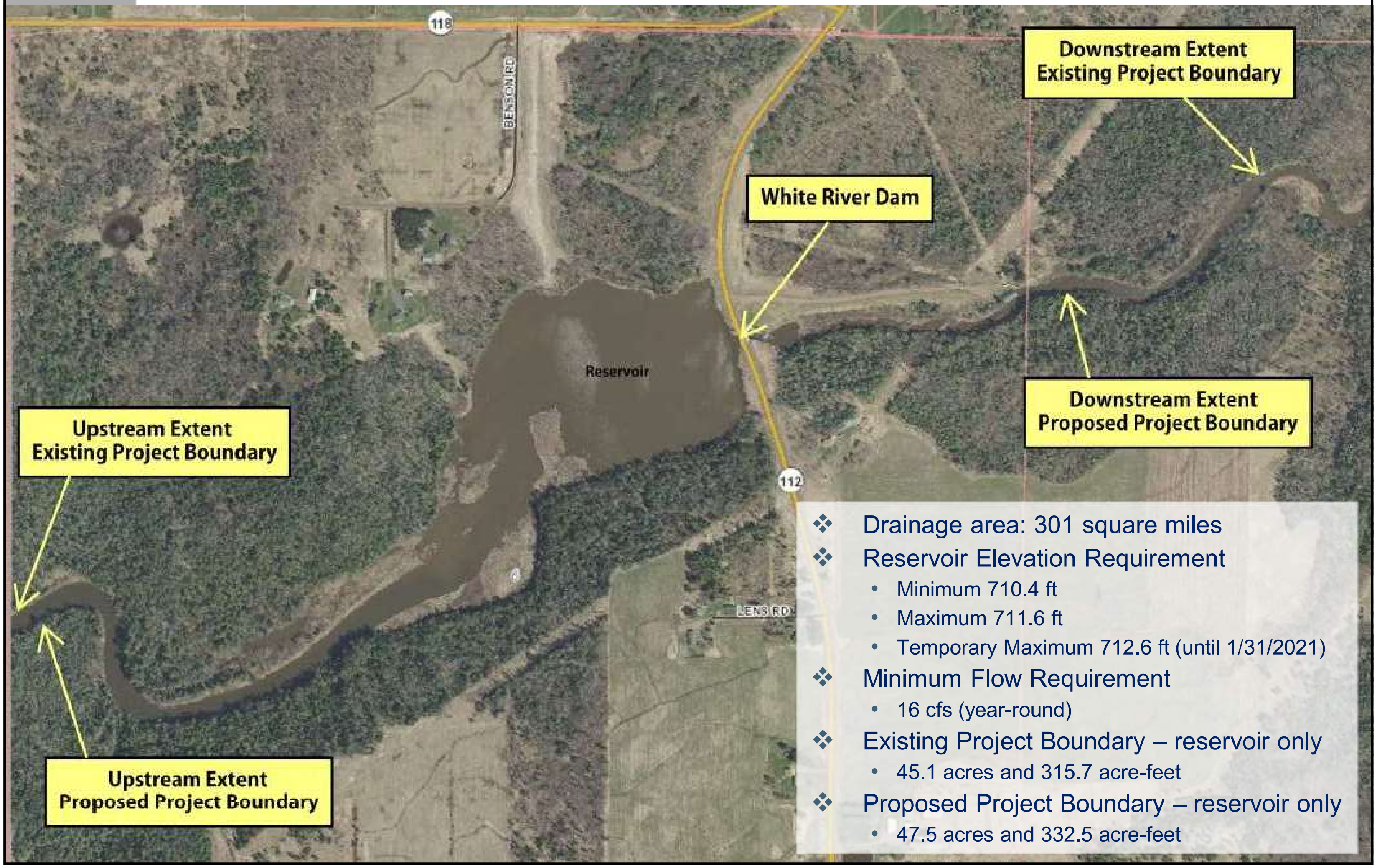


- 3 State Regulated
  - Drummond Lake Dam
  - Drummond Mill Pond Dam
  - Lake Owen Dam
- 1 FERC Licensed
  - White River Dam

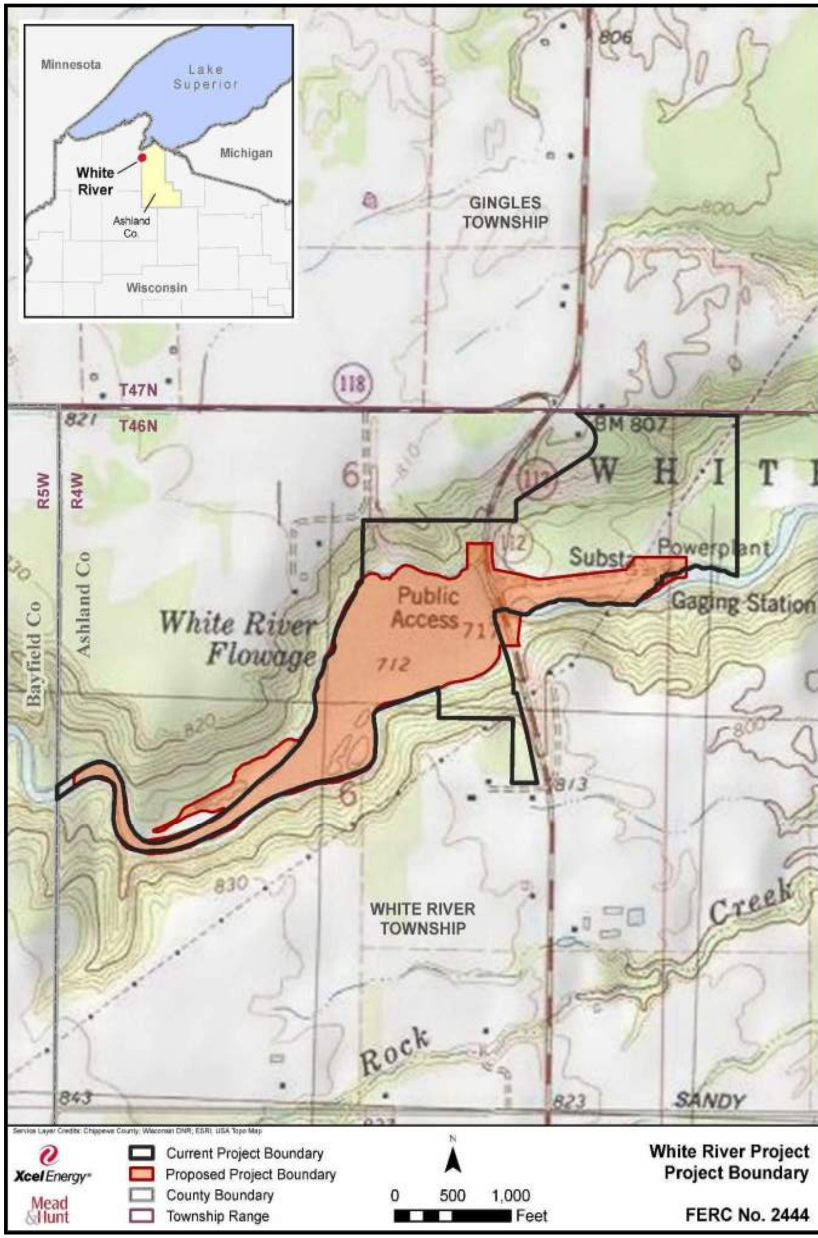
White River Project Location

- Town of White River Ashland County, Wisconsin
- 13 miles upstream of confluence with Bad River
- 18 miles upstream of Lake Superior
- First & only dam on main stem of White River

White River Project Reservoir



- Drainage area: 301 square miles
- Reservoir Elevation Requirement
  - Minimum 710.4 ft
  - Maximum 711.6 ft
  - Temporary Maximum 712.6 ft (until 1/31/2021)
- Minimum Flow Requirement
  - 16 cfs (year-round)
- Existing Project Boundary – reservoir only
  - 45.1 acres and 315.7 acre-feet
- Proposed Project Boundary – reservoir only
  - 47.5 acres and 332.5 acre-feet



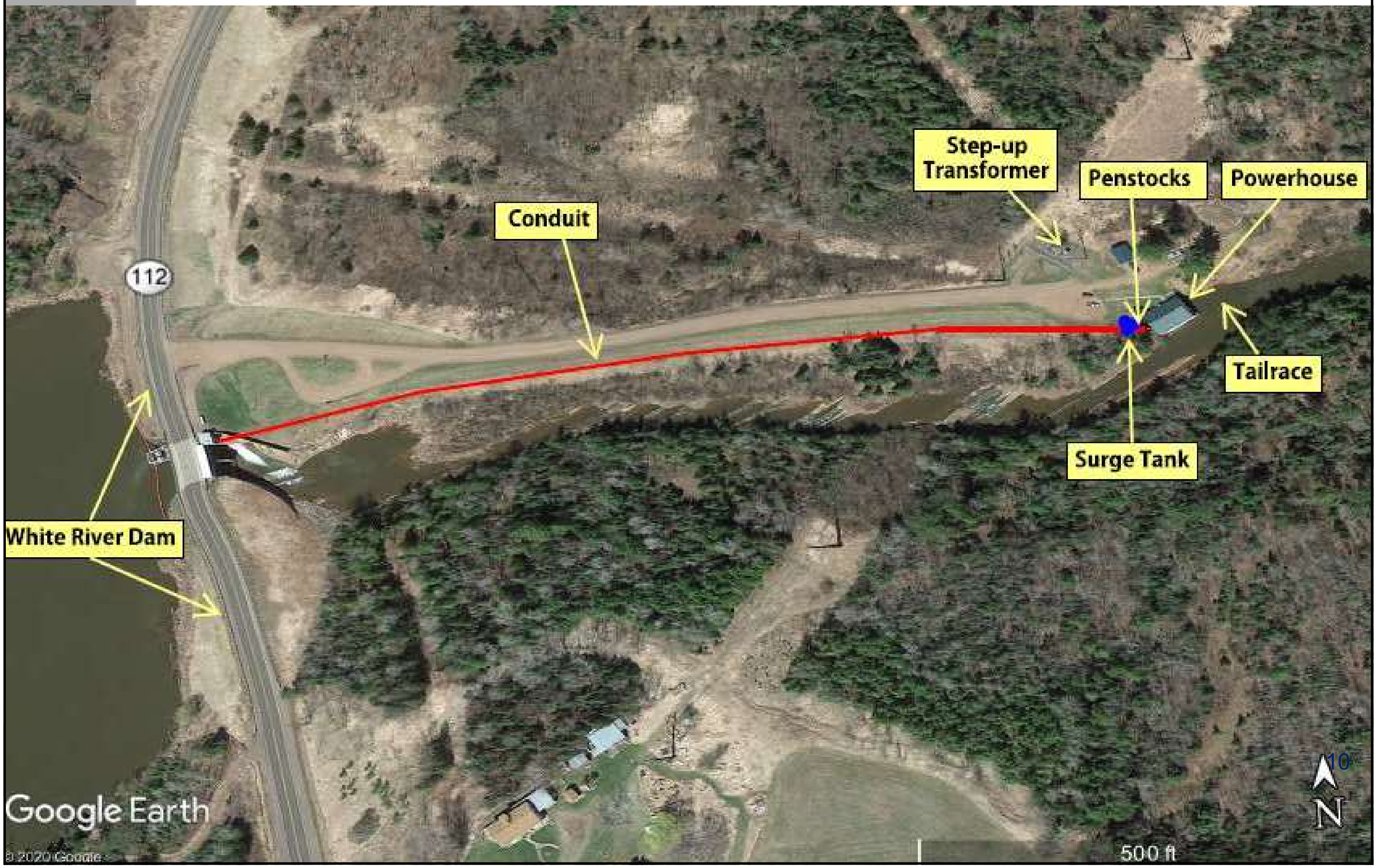
Proposed White River Project Boundary

- Proposed Boundary
  - Lands needed for Project operations
    - Penstock
    - Surge Tank
    - Powerhouse
    - Recreation Sites
  - Lands upstream of dam to El. 712.6 feet
- Exceptions and Changes
  - Removal of lands above El. 712.6 feet upstream of Hwy 112, except boat landing
  - Removal of lands on north side of river downstream of dam not needed for Project operations
  - Addition of lands on the south side of river downstream of Hwy 112 needed for Project operations
  - Addition of waters up to El. 712.6 feet

9

9

White River Project Primary Features



10

White River Dam Sections

White River Project Overview

- Average annual calendar year flow: 281 cfs
- Monthly average river flow range: 61 to 6,390 cfs
- Minimum hydraulic capacity: 50 cfs
- Maximum hydraulic capacity of each turbine: Unit 1 – 200 cfs
  Unit 2 – 150 cfs

White River Electrical Equipment

- Unit 1 – 700 kW
- Unit 2 – 500 kW
- Total Plant Capacity 1,200 kW
- Step up transformer


White River Project Operations
Run of River
Minimum elevation: 710.4 feet
Maximum elevation: 711.6 feet
Temporary variance: maximum elevation 712.6 feet
Minimum flow of 16 cfs into bypassed reach
14

RESOURCE INFORMATION

Photo Credit: Wisconsin Department of Tourism

Fish Entrainment and Mortality

- Trashracks
  - Height: 20 feet
  - Width: 14.25 feet
  - Clear spacing: 1.25 inches
  - Intake approach velocity:
    ~ 2.0 ft/sec at max. flow

Mussels

- No recent surveys completed within reservoir or main stem of White River
- One native species identified downstream of Project in White River

Botanical Species

- Common Tree Species
  - Hardwood tree species include maple (sugar and red), aspen, birch (paper and yellow), black ash, black cherry, red oak, basswood
  - Evergreen tree species include red pine, eastern white pine, balsam fir, white spruce, eastern hemlock, white cedar
- Common Wetland Species
  - Cattails, sedges, grasses, rushes

Wildlife Species

❖ Common Mammal Species

- Black bear, coyote, deer mouse, meadow vole, muskrat, porcupine, raccoon, red squirrel, showshoe hare, white-tailed deer

❖ Common Bird Species

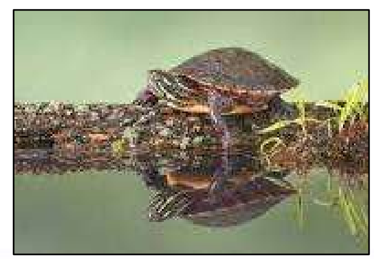
- Bald eagle, black-capped chickadee, great blue heron, mallard, pileated woodpecker, red-winged blackbird, ruffed grouse, wood duck

❖ Common Reptile Species

- Eastern gartersnake, leopard frog, painted turtle, wood frog, wood turtle





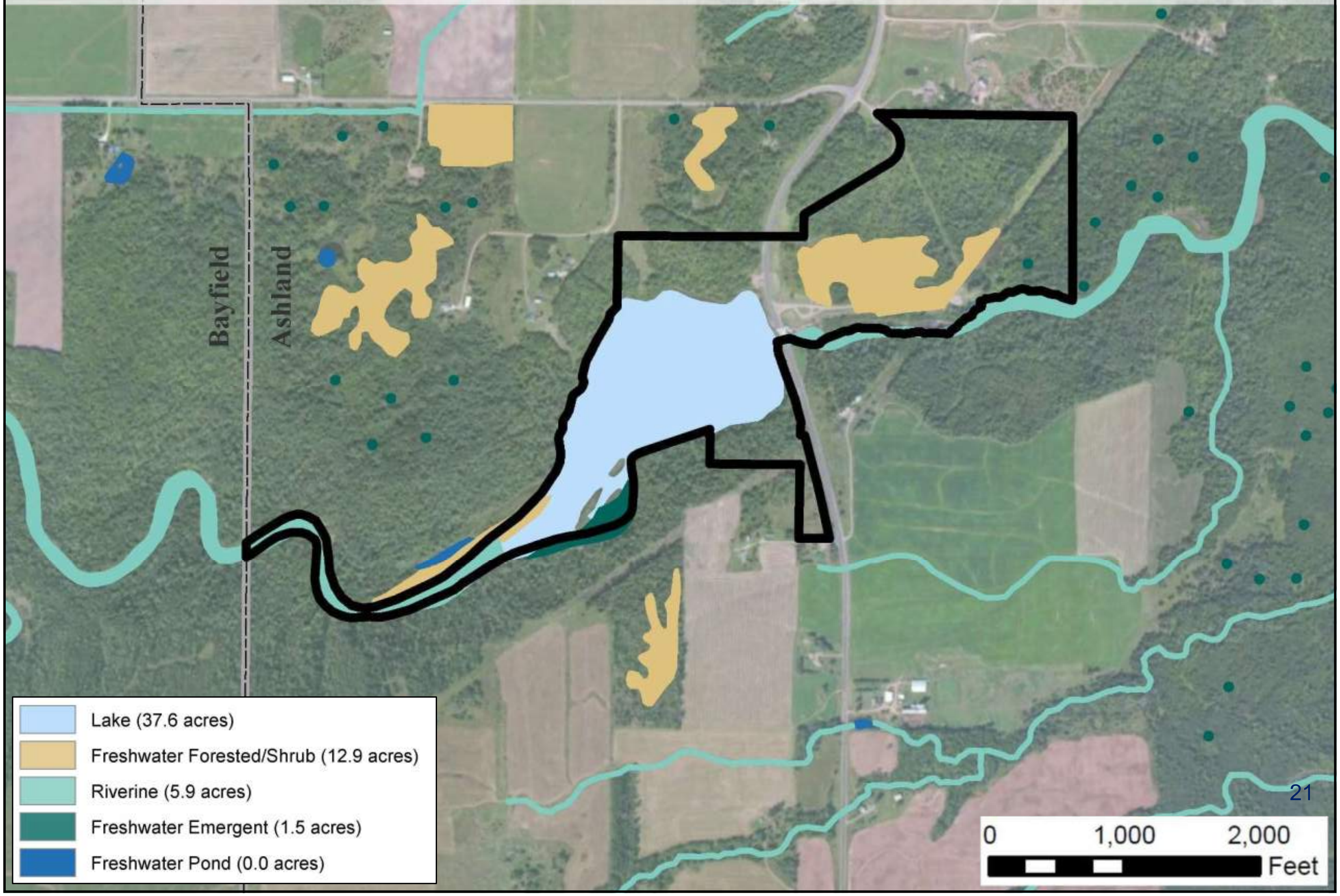
Invasive Species

- AIS Mapping Tool
  - Reed Canary Grass
- 2019 Ashland County Land & Water Conservation Department survey
  - Narrowleaf Cattail

Reed Canary Grass

Narrowleaf Cattail

Wetlands within Current Project Boundary



21

Threatened and Endangered Species

- Information Planning and Conservation (IPaC) Resource List
- Federally Protected animal species likely to occur in Project vicinity


Bald Eagle


Canada Lynx


Gray Wolf


Northern Long-eared Bat


Piping Plover

Threatened and Endangered Species

- ❖ Natural Heritage Inventory (NHI)
- ❖ State Protected animal species likely to occur in Project vicinity
  - Bald Eagle
  - Flat-headed Mayfly
  - Upland Sandpiper
  - Wood Turtle



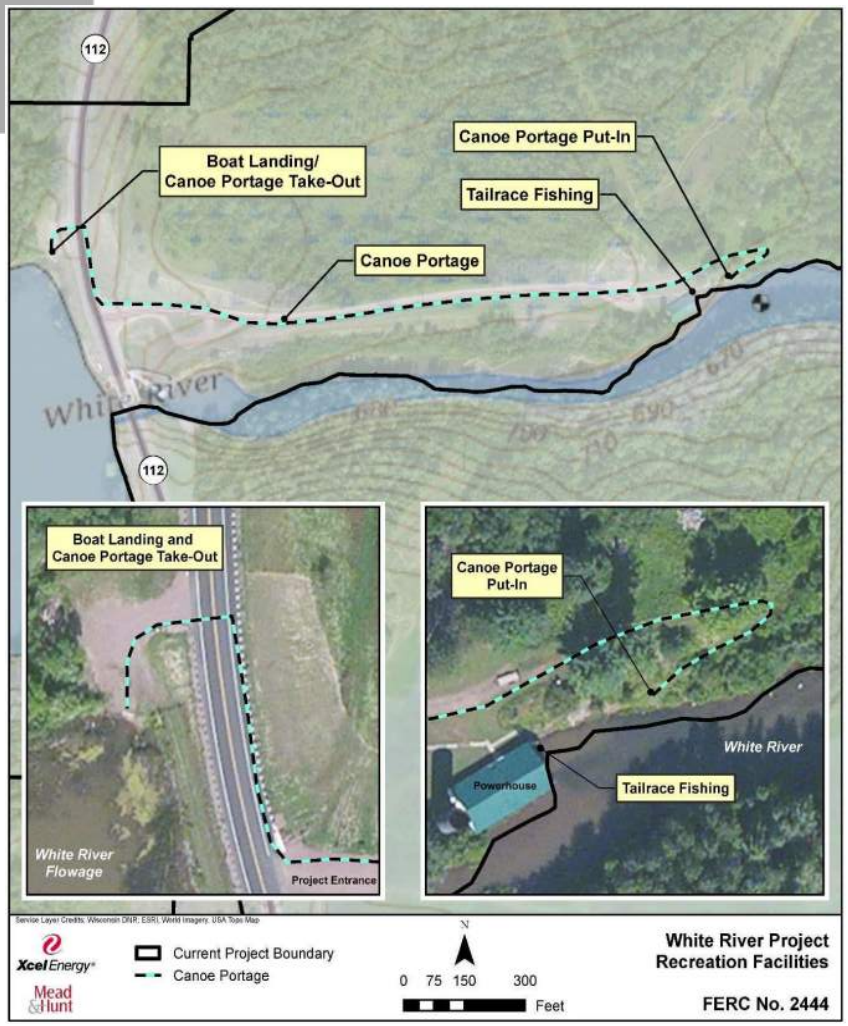

Threatened and Endangered Plant Species

Photo by Joel Trick, USFWS (May 2008)

24

24

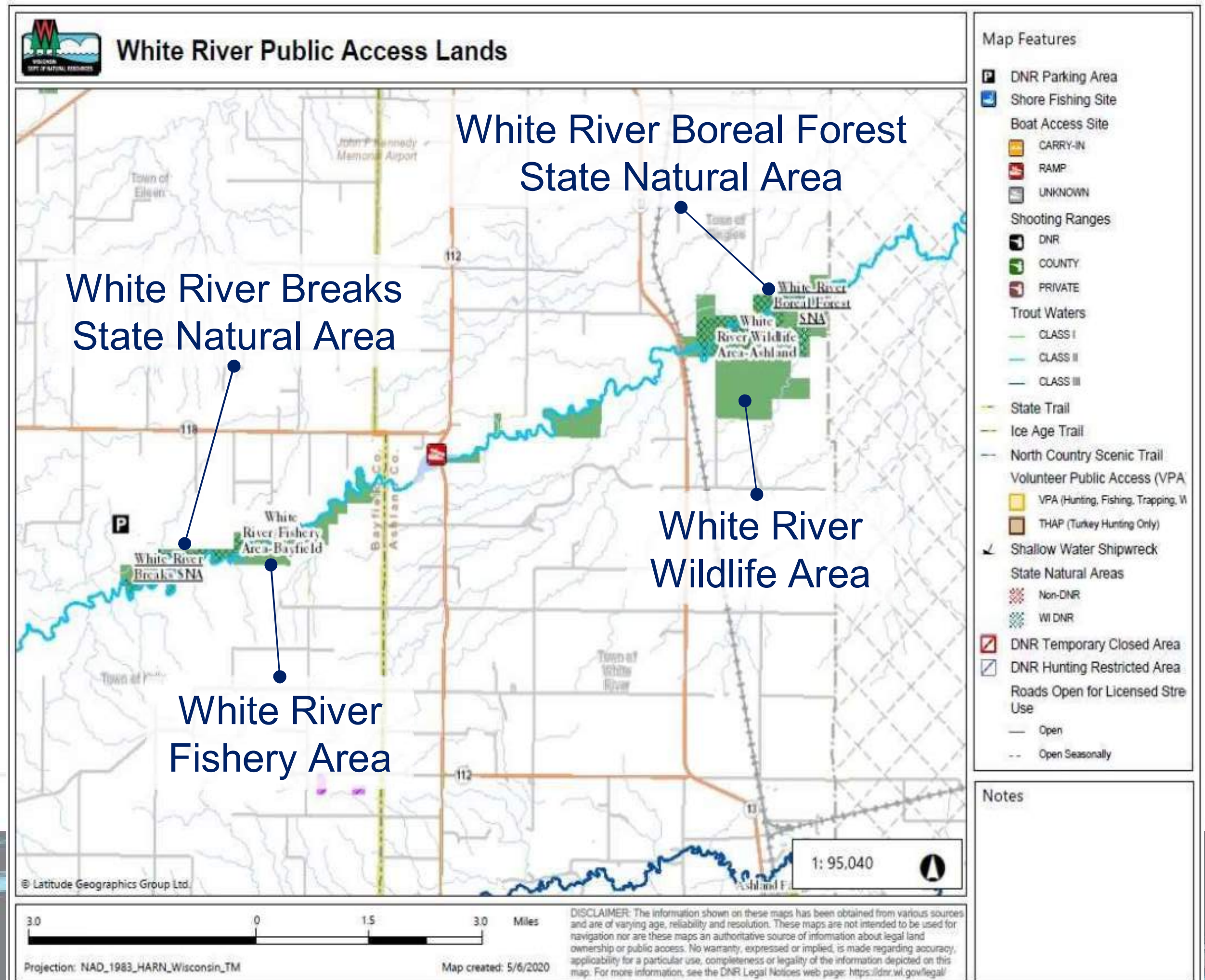
Recreation Resources within FERC Project Boundary



Boat Landing & Take-Out

Put-In & Tailrace Fishing

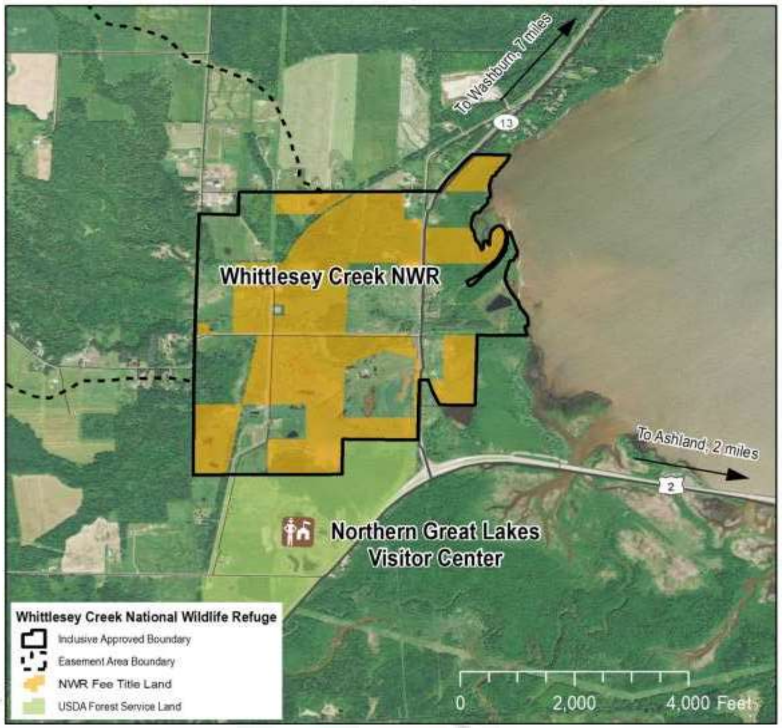
Other Recreation Resources in Project Vicinity

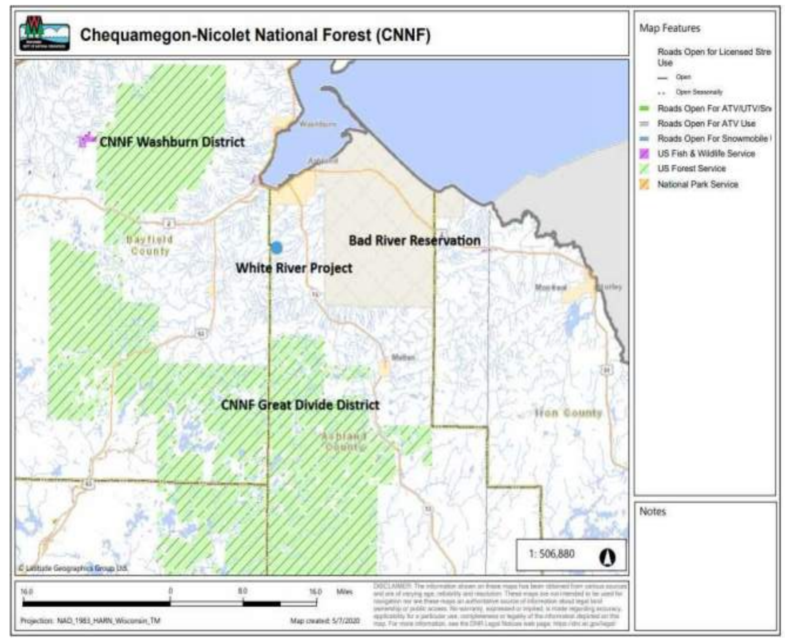


26

26

Other Recreation Resources in Project Vicinity





Cultural and Historic Resources

- White River evaluated, determined not eligible for National Register of Historic Places (NRHP)
- Existing Programmatic Agreement
- Shoreline Surveys Proposed

Next Steps

Submit comments and/or study requests to FERC with a courtesy copy to Xcel and Mead & Hunt within 60 days.

COMMENTS & STUDY REQUESTS ARE DUE DECEMBER 28, 2020

December 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Study Request Criteria

Use FERC study request criteria to facilitate better study requests:

1. Describe goals and objectives of each study proposal and information to be obtained;
2. Explain the relevant resource mgmt. goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
3. If the requestor is not a resource agency, explain any relevant public interest considerations;
4. Describe existing information concerning the subject of the study proposal and the need for additional information;
5. Explain any nexus between project operations and effects on the resource to be studied and how the study results would inform the development of license requirements;
6. Provide study methodology and describe how it is consistent with generally accepted practice in the scientific community;
7. Describe consideration of level of effort and costs, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

Please send comments or questions to:

MATTHEW MILLER

Xcel Energy

matthew.j.miller@xcelenergy.com

(715) 737-1353


Thank you
Photo Credit: birdandnaturefest.com

Xcel Energy®

1414 West Hamilton Avenue
P.O. Box 8
Eau Claire, Wisconsin 54702-0008
Telephone (800) 895-4999

October 29, 2020

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Proof of Publication of Notice of Joint Meeting**
White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose:

Northern States Power Company-Wisconsin (NSPW), d/b/a Xcel Energy, published a notice in the Ashland Daily Press, a daily newspaper of general circulation in Ashland County, Wisconsin, announcing the October 29, 2020 Joint Meeting for the White River Hydroelectric Project (FERC Project No. 2444). The notice was published on October 16, 2020 and a copy of the Affidavit of Publication is enclosed.

Should you have any questions, please contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

Scott Crotty Digitally signed by Scott Crotty Date: 2020.10.29 07:21:35 -05'00'

For: James Zyduck
Director, Hydro Plants

Enclosure: Affidavit of Publication

cc: Shawn Puzen – Mead & Hunt, Inc. (via e-mail)
Project Files

ROP AFFIDAVIT

October 19, 2020

Customized Newspaper Advertising
319 E 5th Street
Des Moines, IA 50309
515-244-2145 ext 152; Fax: 1-866-440-6028
Email: media@cnaads.com

Advertiser: Xcel Energy Brand: **Order #: 20103MX0**

ATTN: Bets North WI/Ashland Daily Press
WI/Ashland Daily Press
122 Third Street W
Ashland, Wisconsin 54806
V: 715-682-2313 F: Email: bnorth@ashlanddailypress.net

WI/Ashland Daily Press (Ashland, WI)

Run Date	*Ad Size*	*Caption / Position / Special Instructions*	*Section and Page information*
Fri 10/16/20	3.00 X 10.00	**Caption:** Excel Energy	

This is to certify that the ROP advertising scheduled to run in your newspaper ran as per the placement details above. Please sign and verify that all information is accurate and correct.
Signed by__Media Department__________(Advertising Manager)
Sworn to and subscribed before me this_____day of 10.19.2020__, 2020.

____
Notary Public

As virus breaks records, schools go back online

BY MADELINE FOX
Wisconsin Public Radio

Three days.

That's how long Julie Richardson's daughter, a freshman at Craig High School in Janesville, had in the school building before she had to switch to two weeks of all-remote learning due to a COVID-19 scare.

One of the other students in two of her classes had tested positive, so Richardson's daughter was also told to stay home as a precaution. The 14-year-old had opted for hybrid learning, with half her classes online and the other half in person, so after she was put on quarantine, she was told to make arrangements with her four in-person teachers to continue learning outside the classroom.

For her mother, communication from the district about how to handle these switches has come up a little short.

"Can you go down every rabbit hole when you're trying to figure out how you're going to do in-person school with a pandemic? I don't know," said Richardson. "But this seems to be the first rabbit hole that you would look, because I feel like what happened with my daughter was the most likely worst-case scenario."

Just over a week later, the rest of Craig High School and nearby Roosevelt Elementary followed after possible exposures hit a critical mass that prompted the district to temporarily move all learning online for two weeks. Virtual learning has since been extended through Oct. 4.

Since Wisconsin schools began reopening with in-person instruction, the reports of positive cases have popped up so quickly it's difficult to keep track.

Ashland school officials this week altered some of their class schedules as cases surged in the Bay Area.

The Oshkosh school district shuttered and reopened several school buildings in response to positive cases before deciding to go fully virtual for two weeks starting Thursday. Iowa-Grant School District's elementary and middle school closed last week. Brodhead High School credited its closure to a student party. Kenosha, the largest district in the state to offer in-person learning, has had seven students and three teachers test positive, which means more are quarantining or isolating based on their possible exposure.

Since the spring, school districts have been warning families that a decision to start the year in person was no guarantee that it would stay that way.

"We've had the same message, really, since school got out last year, that hey, when school starts in the fall, expect that we're probably going to have to transition, probably multiple times during the year, between various different platforms of instruction," said Joe Dawidziak, administrator for the Bonduel School District. "Just expect that that's going to happen."

His district decided to switch its youngest learners — pre-K through second grade — to virtual learning for a week after the district heard it had some positive tests late on a weekend. He said covering classes for staff members who would need to quarantine was one piece of the puzzle.

"The bigger story is we knew that we had to do contact tracing," he said. "It was 9:30 on a Sunday night, and we had no real good way of being able to do that at 9:30 and then notify parents their kids couldn't come into school before school started Monday morning."

Dr. Laura Cassidy, an epidemiologist with the Medical College of Wisconsin, noted that the immediate aftermath of a positive test or noticing symptoms consistent with COVID-19 is an essential period.

"Timing is very important because of the domino effect," she said. "Once one child gets sick, if you don't identify that early, and keep them from spreading it, then it spreads faster."

Dawidziak wouldn't say what the threshold was for Bonduel to switch to virtual learning, but said it's calculated based on availability of teachers, custodians and all other school staff; as well as how many kids have tested positive, and who they've been in contact with.

"That threshold, I believe, is going to continue to dwindle as (substitute teacher) pools dwindle, as the availability of coverage dwindles," he said. "Trying to get subs was a difficult thing prior to COVID, and it certainly hasn't gotten any easier."

Many substitute teachers are retired educators, who have, in many cases, decided to sit this school year out because their age puts them at higher risk for COVID-19 complications. At the same time, district teachers have been running into even more emergencies that could take them temporarily out of the classroom, whether it's possible exposure to someone who later tested positive, or having to stay home with a child who's quarantining.

In investigating why 276 of its nearly 1,700 teachers called in sick for Monday, the Kenosha Unified School District found that while 115 were out for pre-approved reasons like bereavement leave, approved family leave or jury duty, another 17 had COVID-like symptoms and 83 were out for other reasons, like a sick child or a doctor appointment.

Dawidziak, with the Bonduel district, said when they closed school for younger students, they similarly found that staff were out for a variety of reasons ranging from medical appointments to sick children — and they had those prearranged absences covered with substitutes and other teachers tagging in to help with classes.

"The issue that comes into play is when one staff member tests positive, and we already know they've been in close contact with other staff members, we started realizing this is going to be a bigger issue than we thought," he said, "because we're not just talking about getting a sub for the person who tested positive, we're also talking about trying to get a sub for other adults who work in the building that they came in close contact with."

With a staff of just over 100 people, he said it became clear pretty quickly that Bonduel couldn't staff a fully in-person school week with so many out quarantining.

Richardson, the Craig High School parent, said things did get easier for her daughter when the whole school went virtual. Now, instead of working out how to keep up virtually with each teacher, she was getting the same level of education as all her classmates.

Richardson is worried what another quarantine, separate from the whole school going virtual, could mean for her kids' education.

"If this were to happen to my daughter again, and she's out for another 14 days, that's a whole month of instruction," she said. "That's way too much to miss."

With Wisconsin reporting several single-day records in new COVID-19 cases last week and a "high level" of coronavirus activity in 71 of the state's 72 counties, it's likely more students will have to quarantine, and more districts could go virtual.

Cassidy, the epidemiologist, said as long as community spread is high, it's impossible to expect schools will be immune, since they're pulling from that same community pool of people.

"If the community spread is low, then the chance of a child, or a teacher or any staff member going into school — the chance of them having it and spreading it is lower," she said.

She added that while data from the spring didn't show a lot of younger people getting COVID-19, that was also being gathered while much of the state was sheltering in place, and children were less likely to be in spaces where they could pick up or spread the virus.

"I don't think we should dismiss children as not being at risk and not spreading it," she said. "When we closed down in March, and all the schools closed down and the kids went home, the rate of the flu went from like 30 percent to 1.8 percent in kids, so if we only looked at that snapshot in time, we might say that kids don't get the flu."

Health concerns loomed large for Richardson. Both her daughter, the freshman who quarantined early, and her son, a junior, opted for the hybrid learning model, given the choice of in-person, virtual or hybrid — he because some of the classes he wanted to take were only available in-person, and she because she wanted some semblance of a normal freshman year. Richardson said she'd have preferred to keep them both all-virtual, and healthy, but that the hybrid model was a compromise.

"Did we make the right choice going hybrid, did we make the wrong choice, is this the best thing for them? Who knows?" she said. "That's something my husband and I talk about, but that's the whole thing about parenting, right — you never know."

When students and teachers are going back into school buildings, Cassidy said it helps immensely to keep them in "pods" that keep classes or smaller groups all together with little contact outside their pod, so that if one person tests positive, they've had more limited interactions with other people who could contract COVID-19. Keeping close track of kids' and adults' movements can also make contact tracing easier, which in turn makes it easier to isolate people who may have come in contact with a positive COVID-19 case and keep them from potentially spreading it to more people.

"When you look at what professional sports teams are doing, they're living in bubbles," said Cassidy. "Don't our kids deserve that, too — don't they deserve the same protections?"

Enbridge completes 12-mile North Dakota stretch of Line 3

PEMBINA, N.D. (AP) — Enbridge Energy officials said Wednesday that they have completed a small section of its Line 3 crude oil pipeline replacement project in North Dakota, leaving only the Minnesota stretch that has been challenged by state officials and others.

Line 3 starts in Alberta and clips a corner of North Dakota before crossing northern Minnesota en route to Enbridge's terminal in Superior, Wisconsin. More than 400 construction workers started on the 12-mile North Dakota project in August, the company said in a release.

The Calgary, Alberta-based company has also completed the Canadian and Wisconsin portions of the pipeline. Plans to complete the 337-mile line in Minnesota have been approved by the the independent Public Utilities Commission but is facing its third appeal from the state Commerce Department

An administrative law judge is due to issue a report Friday that will inform the Minnesota Pollution Control Agency as it decides on water quality permits for the project.

The new line is popular among Minnesota Republicans who control the Senate and construction unions that have previously backed Democratic Gov. Tim Walz. Environmental and tribal groups oppose the project, citing climate change and spill risks.

Enbridge is replacing the line that was built in the 1960s.

YOUR NEWS IS OUR NEWS!

Document Content(s)

White River Stakeholder

Comments on PAD and Study Requests

Darrin Johnson

From: TYLER B HOWE <tyler.howe@wisconsinhistory.org>
Sent: Friday, September 4, 2020 10:46 AM
To: matthew.j.miller@xcelenergy.com; Shawn Puzen; Darrin Johnson
Subject: WI SHPO comments regarding proposed TLP and PAD for White River Hydro, FERC No. 2444,

Good morning gentlemen:

The WI State Historic Preservation Office (SHPO) has reviewed the materials provided for the proposed NOI, TLP and PAD for the relicensing of the White River Hydro project, FERC No. 2444. The SHPO has no objections to XcelEnergy's use of these procedures. The SHPO also concurs with the determinations found in Section 5.1.9 that the dam (AHI #26205) and the powerhouse and surge tank (AHI #26206), and is of the opinion they are both still considered ineleigible for inclusion on the National Register of Historic Places. We would request, however, for some updated photo-documentation to be uploaded to the AHI. We only have a few images, and these are dated, black and white still shots, and some at considerable distance. Updated photo-documentation is beneficial for future research, as well as our continueing consultations under 36CFR800. We also stand ready to continue these same consultation throughout the reliscencing procedure.

Please do not hesitate to contact me should you have any questions or concerns.

All the best,

Tyler

Tyler B. Howe, PhD
Compliance Section Manager
State Historic Preservation Office
Wisconsin Historical Society

(608) 264-6508

https://www.wisconsinhistory.org

United States Department of the Interior
NATIONAL PARK SERVICE
601 Riverfront Drive
Omaha, NE 68102

10.A.(MWR-FPI)
October 8, 2020

To: Paul Makowski
Federal Energy Regulatory Commission
paul.makowski@ferc.gov
(202) 502-6836

From: Christine Gabriel, Regional Environmental Coordinator,
Acting Planning & Compliance Division Manager

Re: FERC Docket # P-2444-036

Dear Mr. Makowski,

The National Park Service has reviewed the above project and is submitting the following comments:

The White River (River) is a large tributary of the Bad River flowing through an area of high hills in the lower reaches and through many miles of the very wild Bibon Swamp. The River has outstanding water quality in its upper reaches and is a popular canoe route. It is listed on the Nationwide Rivers Inventory (NRI) because of its scenic and recreational values from its headwaters in Bayfield County to the White River Hydroelectric Project (Project) dam at the crossing of County Road 112 in Ashland County, WI. Provided that no additional facilities will be constructed, and downstream flow from the Project will not appreciably change, the Project is not likely to preclude the River from consideration under the Wild and Scenic Rivers Act. Any and all efforts should be made to ensure that no Project activities degrade the free-flowing condition and values for which the Bad River is listed on the NRI, downstream from the project as it is a subject of local interest with respect to its potential for addition to the National Wild and Scenic Rivers System.

For more information contact Hector Santiago, Regional Rivers Coordinator at 402-661-9112.

Thank You,

Christine Gabriel

CHRISTINE GABRIEL

Digitally signed by CHRISTINE GABRIEL
Date: 2020.10.08 16:53:12 -05'00'

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
2984 Shawano Avenue
Green Bay WI 54313-6727

Tony Evers, Governor
Preston D. Cole, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

December 17, 2020

Federal Energy Regulatory Commission
Kimberly D. Bose, Secretary
888 First Street, N.E.
Washington, DC 20426

Matthew J. Miller
Hydro License Compliance Consultant
Northern States Power Company-Wisconsin, Xcel Energy
1414 W Hamilton Avenue, PO Box 8
Eau Claire, Wisconsin 54702-0008

RE: Wisconsin Department of Natural Resources Comments on Preliminary Application Document for the White River Hydroelectric Project P-2444

Dear Mr. Miller:

The Wisconsin Department of Natural Resources (department) appreciates the opportunity to participate in the process to relicense the White River hydroelectric dam as proposed in the Preliminary Application Document (PAD). This dam is licensed by Xcel Energy, under Project P-2444.

The White River Project (Project) is located in the Town of White River, Ashland County, Wisconsin.

The department has limited information regarding natural resource information associated with the hydroelectric dam and its project area. Studies associated with White River relicensing have different purposes, from a short term, long term, and cumulative impact. The department has carefully considered our responsibilities under the Clean Water Act and Navigable Waters Public Trust Doctrine for the proposed relicensing of White River.

We are providing comments to the PAD and are recommending the following studies be completed. Each study is presented as appropriate for the various alternatives that could be evaluated as part of the comprehensive review and assessment of the project area. Our requests for information and studies focus on the continued operation of the White River dam.

As Xcel Energy begins to evaluate the array of study requests, and determine their study proposal and next steps, the department will continue to provide guidance and recommendations.

Please be aware that Scientific Collectors Permits may be required to complete various surveys. Please work with the department to obtain appropriate permits and approvals prior to the collection of data.

To save time and costs, the department recommends that studies be combined, and that the licensee meet with the stakeholders who have requested studies to explore their options and still achieve desired data collection. We also recommend exploring the use of citizen monitoring groups and organizations.

The licensee should continue to work with the department to collect resource information and develop study plans and protocols. If new information becomes available through the relicensing process, we reserve the rights to require additional studies to gather appropriate information.

Please direct all inquiries to the Project Manager:

Cheryl Laatsch, Statewide FERC Coordinator

If you have any questions or comments regarding our recommendations, please contact me at 920-387-7869, or Cheryl.laatsch@wisconsin.gov. We look forward to working with you.

Regards,

Cheryl Laatsch

Cheryl Laatsch
Statewide FERC Coordinator
Wisconsin Department of Natural Resources

Comments on PAD

Relicense of White River Project P-2444

3.2 White River Project Facilities

- Please provide additional, detailed photos of the dam facility and Project structures
- The PAD states that stoplog slots are located approximately two feet upstream of and parallel to the trash rack. Please provide clarification on intake structure operations and how this relates to spillway section
- The PAD states that the reservoir maximum depth is 26 feet and an estimated average of 7 feet. Please provide where the maximum depth is reached within the project boundary. Please provide information on where the data originated and a current bathymetry map.
- The PAD states that a third of the reservoir is less than 3 feet deep, please provide details on how this information relates to the capacity of impoundment (muck, shallow). Please provide information on where the data originated and a current bathymetry map.
- Please provide more details on the proposed project boundary change described in the PAD. This includes details of the type of land and cover type that will removed/added to the proposed project boundary, why Xcel is proposing to reduce the project boundary, and the reasoning behind a proposed project boundary change that will reduce the current 125 acres to 64 acres. Land that is removed from the proposed project boundary needs to be areas not used for generation and are not sensitive resources. Please provide documentation on how Xcel is determining sensitivity of the resource.

3.3 Project Operation

- The PAD states that the Project is currently operating in a modified run-of-river (ROR) mode, however, White River Project is not actually meeting this operating plan, as provided in quarterly and annual water level reports. The PAD should clearly discuss the historical license compliance and what actions have been occurring under the temporary amendment to water levels.
- The PAD states that the temporary increase in the upper limit of reservoir operating range would accommodate the licensee’s historic practice of overtopping the spillway gates during runoff events. Overtopping is not considered a ROR mode of operations. The licensee’s historic practice is not in compliance with license requirements and was only recently identified. It is not clear what run-of-river may look like at this facility.
- The PAD states that the three-year reservoir operations test would provide sufficient operating data for both Xcel and the department to evaluate when determining if the temporary upper limit of the reservoir operating range (712.6 feet) should become permanent. The department disagrees with this statement. The purpose of the test period wasn't meant to apply the 712.6 feet operating range at all times, but only during the Spring runoff. The department is concerned that White River Project doesn’t have the

appropriate equipment to comply with their license, as the Project should have been able to control these incoming water levels based on the equipment that it has at the dam site. Additionally, there have not been any environmental resource evaluations associated with historical operations, historical non-compliance, nor the temporary order.

- The PAD states that a minimum flow of 16 cfs or inflow, whichever is less, is released at all times into the bypass reach of the White River immediately below the dam. Please explain how 16 cfs was adequately determined during the current licensing period. Please provide documentation as to where additional water goes after White River reaches their capacity limit and how it relates to the 16 cfs. Please describe how “16 cfs or inflow, whichever is less” requirement is meeting Xcel’s opinion of run-of-river.

3.4 Other Project Information

- The department will require a drawdown plan as part of the Water Quality Certification. There is a significant amount of sediment, such as sand and clay, within the project area that can mobilize during a drawdown and negatively affect aquatic resources. The department remains concerned that within this current license, White River Project didn't follow the established drawdown plans at the last drawdown event, and sediment was released downstream, affecting mussels, aquatic life, and the Bad River Band Tribe.
- The current plan to monitor the fly ash/cinders used during the “cindering” process for sealing the spillway gates will need to be revisited, as the department does not support the continued use of cinder for sealing a spillway. Use of cinders does require permits and approvals from the department’s Solid Waste/Hazardous Waste program.
- The PAD states that Xcel Energy identified two non-compliance instances during the current license term. This is subjective because the historical operations and deviations were not reported, therefore non-compliance cannot be determined, it’s assumed.
- Please explain how 16 cfs is the minimum flow, while table 3.4.3-1 shows average historical outflows are significantly greater than 16 cfs (see comments associated with Section 3.3).

4.1 General Description of the Project Area

- The PAD states that there are three state-regulated dams on the Long Lake Branch of the White River upstream of the Project. Please explain the significance of this observation.

4.3 Water Resources

- Xcel Energy is proposing to have the temporary operating range be made permanent, however, there are no proposed changes to outflow or other operations.
- White River Flowage is a PNW (Priority Navigable Waterway)
    - Definition: Lakes less than 50 acres, waters with self-sustaining musky, sturgeon and walleye populations, tributaries to and rivers connecting naturally reproducing populations, and perennial tributaries to trout streams

- The PAD states that "the waters within the Project are subject to two different temperature standards. The Project reservoir is classified as a "Warm-Small" water and the White River upstream and downstream of the reservoir is classified as a "Cold" water."
  - Temperature criteria for the White River Flowage are the same as for the White River running through it. The few differences are going to be biological metrics, but these are currently based on best professional judgement, not established Impounded Flowing Water (IFW) biological metrics. There may be specific chl-a criteria for IFW in the future. With the water residence time being so low, the river metrics apply. The flowage should also be assessed as 'cold' for temperature.
- Xcel has identified White River as a wild rice water. Additional analysis will need to be conducted to assess where wild rice is observed. Wild Rice sustainability is highly dependent upon water level management. The department will require license management plans to incorporate Wild Rice conservation practices.
- The PAD provides historic water quality monitoring data. Please provide maps with monitoring site locations.
- Disclaimers are not included in the PAD from department website references. Please update as appropriate.

4.4 Fisheries and Aquatic Resources

- PAD fisheries data was reported from the department Fish Mapping Application. The PAD states that this application and database is updated regularly, which is no longer the case. Data from this application is not updated regularly and has been removed from the department website. Please use fisheries data provided to Xcel from department program staff during the PAD Questionnaire request.
- Significant fisheries data was provided to Xcel from department program staff during the PAD Questionnaire request period. There is no summary of this data within the PAD, but acknowledgment only within an Appendix.
- The PAD states that "the Project Dam serves as an important barrier to upstream migration of the sea lamprey (Petromyzon marinus), which the department considers a nuisance species that has affected the lake trout (Salvelinus namaycush) population in the Great Lakes. The dam prevents sea lamprey from reaching potential upstream spawning areas and prevents potential parasitic infestations in upstream waters (FERC, 1995)."
  - The department offers the following revised narrative as a more representative descriptor of the dam as a barrier:

  The Project dam is the first impassable barrier upstream from Lake Superior and does not provide upstream fish passage. This blocks migratory fishes from any upstream spawning habitats, particularly sea lamprey (Petromyzon marinus), an aquatic invasive species managed through an active control program by Wisconsin DNR and Great Lakes Fishery Commission to reduce its population and negative impacts to Lake Superior fishes such as lake trout.

4.7 Rare, Threatened and Endangered Species

- The PAD states that there are no proposals of any new facilities or changes in current operations for the Project, which is incorrect. Proposing a permanent change in reservoir water level operations may affect rare, threatened, and endangered species. The department will be requesting an evaluation of proposed water levels and the effect on these species.
- Sensitive Species information must be redacted in any public documents.

- An Endangered Resources review was not completed for the reduced/proposed project boundary.

4.8 Recreation and Land Use

- More discussion is needed on the DOT roadway that is located on top of the dam, thus even though Xcel may not be proposing to change their operations or dam infrastructure, this is not saying that DOT will not be requiring changes during the next license. Therefore, more information is requested.
- More information is needed about the state fishery area within the Project Boundary. More discussion is needed upon the resources and management plans within this area.

Study Request

Relicense of White River Project P-2444

ASSESSMENT OF CURRENT DAM OPERATIONS

• Goals and Objectives: Determine if the Project is meeting the requirements of minimum flows and run-of-river operations, based on license requirements and compared to the temporary order.

• Relevant DNR Management Goals: Review the current operations relative to maintaining consistent reservoir elevations and downstream flows that mimic background hydrology, as achieved by run-of-river operations.

• Existing Information: Monthly flow duration curves for the White River Project were developed based on data recorded at USGS Gage No. 04027500, which is located at the Project tailrace.

• Operation nexus to resource and how informs license: Ensure White River Project operates within limits of hydrologic modification through run-of-river, and not causing divergence in flows that harm the downstream aquatic ecosystem.

• Methodology: Desktop review of existing inflow and outflow data, including an evaluation report of run-of-river and operations requirements.

• Level of Effort and Cost: Staff time is expected to be 20-40 hours at $125 per hour equaling $2,500-$5,000 for data analysis and report.

ASSESSMENT OF MINIMUM FLOW AND RESOURCE IMPACTS DOWNSTREAM OF THE TAILWATER

• Goals and Objectives: Provide an assessment of the average range of flows, including minimums and maximums and their relevance, associated with run-of-river operations and facility capacity.

• Relevant DNR Management Goals: Evaluate the current minimum flow and ensure that the minimum flow does not have an adverse impact on the aquatic resources within the White River Project boundary and downstream of the Project.

• Existing Information: A minimum flow of 16 cfs or inflow, whichever is less, is released at all times into the bypass reach of the White River immediately below the dam, as stated in the current license.

• Operation nexus to resource and how informs license: Ensure White River is meeting the intent of run-of-river, and not causing divergence in flows that harm the downstream aquatic ecosystem.

• Methodology: In-stream flow study, which includes a description of current habitat conditions within the bypass channel under current operation and flows to determine if the current minimum flows are impacting available habitat, fish, and macroinvertebrate communities. Assess various flow regimes to determine what is appropriate to minimize and avoid adverse impact on the cold-water resource.

• Level of Effort and Cost: Staff time is expected to be 20-40 hours of field work at $125 per hour, plus costs for equipment.

ASSESSMENT OF STREAM FLOWS, CHANNEL DIMENSIONS, AND LINEAR GRADIENT

• Goals & Objective: Determine impacts the Project has on the existing stream flows, channel dimensions and linear gradient of White River. Determine if cold-water resource criteria are being met.

• Relevant DNR Management Goals: The proposed study would investigate the impacts the Project would have on the existing stream flows, channel dimensions, and linear gradient of the White River. The impacts that the Project may cause on the existing stream flows, channel dimensions and linear gradient may alter resources and recreational and developmental management plans for the future.

• Existing Information: Data is limited relating to flow, channel dimensions, and linear gradient impacts within the Project boundary.

• Operation nexus to resource and how informs license: The relicensing of White River has the potential to have short term and long-term impacts on the aquatic community downstream of the impoundment. These impacts include, but are not limited to, dewatering and limiting available aquatic habitat in the downstream river channel depending on stream discharge and dam operation. These impacts can vary by season as well as daily. Proper management of the resource will help ensure that adequate flows are available to aquatic life at the proper time and thermal regime.

• Methodology: Conduct a study to determine stream morphology downstream of the Project at various flows, including width, depth, wetted perimeter and substrate composition. The study should identify any wetlands that are flooded. This should include available aquatic habitat under current operation through flood flow conditions. Quantitative Habitat Assessment Methodology should be used to document habitat conditions. Refer to existing management efforts (recreational, resource, habitat) to investigate the impacts the proposed Project would have.

• Level of Effort and Costs: Staff time is expected to be about 20-40 hours of fieldwork at $125 per hour plus cost of equipment.

ASSESSMENT OF WATER QUALITY

• Goals & Objectives: The department is requesting at least one year of water quality data collection. Depending on the first year of data, a second year of water quality studies may be requested. Assess and monitor the following water quality parameters:

Total Phosphorus	pH	Ammonia
Chlorophyll-a	Total Nitrogen	Chloride
Dissolved Oxygen (DO)	Sulfate, Total Mercury	Bacteria
Temperature	Dissolved Phosphorus	Total Suspended Solids
Conductivity	Nitrate (plus nitrite)	Sediment Accumulation

• Relevant DNR Management Goals:

Total Phosphorus: One of the primary causes of eutrophication and most widespread pollutant in waterbodies statewide and nationally. Impoundments are unlikely to raise the concentration of phosphorus in the downstream river but play a role in the transformation, such as the ratio of dissolved phosphorus to total phosphorus. Dam operation might influence internal phosphorus loading to the impoundment by affecting the mixing regime as water levels change.

Chlorophyll-a: A measurement of the amount of algae in a waterbody, one of the primary manifestations of eutrophication. As impoundments increase surface area, slow and warm water are likely to produce more chlorophyll-a, per unit phosphorus/nitrogen, than the upstream or downstream river. Impoundments may produce chlorophyll-a in the lake environment that is then passed to the downstream river. Dam operations may have limited ability to control chlorophyll-a, but location of discharge will play a role in the potential to release downstream. Dam operations can reduce chlorophyll-a by reducing water residence times and by artificially mixing the phytoplankton into deep waters below the euphotic zone (resulting in less primary production than expected given nutrient levels). Other tools to reduce nutrient and algal concentrations include flow by-passes, pre-impoundments, scour valves that discharge nutrient-rich hypolimnetic water, and modifications to the operating regime. Drawdown can increase internal nutrient loading by instigating a mixing event.

Dissolved Oxygen: Dissolved oxygen is critical for the health and survival of aquatic organisms. Deep impoundments may stratify and become oxygen depleted in deep water. Impoundments may then cause a decrease in dissolved oxygen in the downstream river, especially if there is bottom withdrawal of a eutrophic impoundment, or an impoundment that stratifies. Additionally, eutrophic impoundments may transform nutrients into organic matter (mainly algae) that then flows into the river, decomposes and reduces oxygen. Dam operations can influence downstream dissolved oxygen by changing/mixing withdrawal location (top versus bottom draw) or aerating discharge before it reenters the downstream riverine environment (among others). Additionally, passing anaerobic waters through turbines or similar precision machinery may also cause damage to the facility's equipment.

Temperature: Temperature regime of a waterbody structures community composition of fish, invertebrates, plants, etc. Temperature also effects rates of chemical reactions, ecosystem productivity and the ability for gasses to dissolve in water. Impoundments can increase water temperatures by slowing water velocity and increasing surface area to absorb solar radiation. Additionally, deep impoundments may cause deep water temperatures to decrease if there is stratification. Dam operations can influence downstream temperature by changing/mixing withdrawal location, top versus bottom draw (among others). White River should be considered a cold-water resource.

Conductivity: High concentrations of dissolved ions, measured as conductivity, can impair the osmoregulation of organisms with gills and other semipermeable membranes. Sources of elevated conductivity are likely from nonpoint and certain point source discharges. However, conductivity is important for classifying the impoundment and stream and is therefore needed as background information.

pH: pH can control the biologic availability, solubility and speciation of chemicals in water. Although wild rice does well in slightly acidic waters (pH 5.9 – 6.2), even moderately acidic water may irritate the gills of aquatic fish and insects or reduce the hatching success of fish eggs. Eutrophication increases swings in pH during the algal growth and die-off phases. Highly eutrophic impoundments may release high or low pH to the river downstream. In addition, fluctuating water levels can acidify the impoundment by exposing the waterbody bed to air and then flushing sulfate into the water when lake levels rise again or when it rains. Dam operation probably has very little opportunity to mitigate dramatic pH swings at short time-scales, but operations that cause sufficient changes in water levels may affect pH at a seasonal or interannual time scale.

Total Nitrogen: An oversupply of nitrogen is one of the primary causes of eutrophication. A lack of nitrogen limits wild rice development. Impoundments are unlikely to raise the concentration of nitrogen in the downstream river. Although some planktonic algae can fix atmospheric nitrogen, this amount is likely overwhelmed by the amount of nitrogen coming in from the watershed via tributary streams.

Impoundments do play a role in the transformation, such as the ratio of dissolved inorganic nitrogen to organic nitrogen.

Sulfate, Total Mercury: Dam operations can influence the sulfur and ultimately the mercury cycle. In short, long-term drawdowns can eventually lead to increased sulfate runoff when it rains. This acidifies the water and can then enhance methyl mercury concentrations in water and methyl mercury in fish. Sulfate can also be converted to toxic sulfide which affects the mitochondria of plants. When sulfate is high, sulfides are also usually high and therefore toxic to wild rice and other plants. This process has been demonstrated in formation of new reservoirs and in the regulation of existing reservoirs. Impoundments can cause this process to happen. Water levels will need to be managed to prevent increased total mercury and high sulfate levels.

Dissolved Phosphorus: An oversupply of phosphorus is one of the primary causes of eutrophication and most widespread pollutant in waterbodies, statewide and nationally. Low phosphorus levels limit wild rice seedling success and development. Impoundments are unlikely to raise the concentration of phosphorus in the downstream river, but play a role in the transformation, such as the ratio of dissolved phosphorus to total phosphorus. Dam operation might influence internal phosphorus loading to the impoundment by affecting the mixing regime as water levels change.

Nitrate (plus nitrite): One of the bioavailable forms of nitrogen, a primary cause of eutrophication. Impoundments are unlikely to raise the concentration of nitrate in the downstream river. Although some planktonic algae can fix atmospheric nitrogen, this amount is likely overwhelmed by the amount of nitrate coming in from the watershed via tributary streams.

Ammonia: One of the bioavailable forms of nitrogen, a primary cause of eutrophication. Impoundments are unlikely to raise the concentration of ammonia in the downstream river. Dam operations are unlikely to influence ammonia concentration unless there is a bottom draw of a stratified, anoxic impoundment

Chloride: Chloride, at elevated levels is toxic to fish, invertebrates and amphibians. At lower levels, it can negatively affect diversity, productivity, and increase the density of water. Chloride is increasing statewide and nationally in waterbodies that have even small percentages of their watershed in urbanized land use. The impoundment is unlikely to transform or change chloride levels from the incoming tributaries (assuming long-term stable water levels). The major exception being if the shore is heavily developed and there are major applications of road salt or point sources with high chlorides.

Bacteria: Bacterial indicators, such as E. coli, are used to detect the presence of fecal contamination in waterbodies to protect recreational uses. Impoundments are unlikely to increase E. coli in downstream rivers, unless there is heavy recreation (campgrounds, beaches, non-sewered sanitation) on the impoundment.

Total Suspended Solids (TSS): High concentrations of TSS can inhibit visibility for predators, damage gill structure of fishes, and lead to high rates of sedimentation in streams and alter benthic habitat. Impoundments are likely to lower TSS concentrations in the downstream river. In extreme cases where sediment build-up behind a dam structure is high, there may be some chance of increased concentrations of TSS. Dam operation is unlikely to influence TSS unless there is a catastrophic event, draw down or using ash cinders as a sealant.

Sediment Accumulation Behind Dam: Dams trap sediments upstream. Ecological concerns include increasing turbidity upstream and smothering spawning beds in the reservoir and upstream. Sediment build up can also threaten the longevity of the dam itself.

• Existing Information: Water quality data is limited. The PAD presents that the most recent water quality monitoring was completed in 2007.

• Operation nexus to resource and how informs license: The operation of the dam affects the water quality of the impoundment and downstream resources. The overall goal of the request is to further understand the current water quality conditions of the reservoir and river resources which will help inform management decisions in the future. Limited water quality data presented in the PAD is not representative of current or future water quality conditions.

• Methodology: The department classifies the White River Flowage, as an impounded flowing water, where a water residence time is less than 14 days. According to current department information, the upper confidence limit for water residence time for White River Flowage is one day. This means that river monitoring protocols should be applied instead of lake protocols.

River monitoring methods (including continuous monitoring) should be performed in at least three locations within the project area (or best appropriate location), including one location downstream of the dam, one location within the impounded area (within the deep area of the impoundment, typically near the dam), and one location upstream of the impounded area.

Data should be collected or analyzed using the DNR WISCALM Guidance and surface water grab sampling protocol. A list of standard operating procedures can be found in the appendix of the most current department Wisconsin Consolidated Assessment and Listing Methodology (WisCALM, https://dnr.wisconsin.gov/topic/SurfaceWater/WisCALM.html), in addition to protocols listed in the table below:

Parameter	Method	Frequency – At least one year of studies requested	DNR Protocols
Total phosphorus	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Chlorophyll *a*	Grab samples	Monthly, July 15 – September 15 **3 total**	Wisconsin Citizen Lake Monitoring Training Manual (Chemistry Procedures, 2020) https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/programs/clmn/training.aspx
Dissolved oxygen	Field measurement	Continuous, July – September	Use instruction manual from manufacturer
Temperature	Field measurement	Continuous, year-round	Use instruction manual from manufacturer
Conductivity	Field measurement	Continuous, July – September	Use instruction manual from manufacturer
pH	Field measurement	Continuous, July – September	Use instruction manual from manufacturer
Dissolved Phosphorus	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Total Nitrogen	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Sulfate, Total Mercury	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
TSS	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol

			https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Nitrate (plus nitrite)	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Ammonia	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Chloride	Grab samples	Monthly, May – Oct **6 total**	Wisconsin Citizen Lake Monitoring Training Manual (Chemistry Procedures, 2020) https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/programs/clmn/training.aspx
Bacteria	Grab samples	Monthly, May – Oct **6 total**	Citizens Monitoring Bacteria: A training manual for monitoring E. coli http://dnr.wi.gov/lakes/forms/ecoli_may162005.pdf

For the analytes without state standards, they should be analyzed by mean and median values and reported in a table by date and time annually.

Sediment accumulation should be assessed and mapped behind the dam. This includes estimated depth and volume of sediment held within the impoundment.

• Level of Effort and Costs: Six field days plus with two people $125 per hour plus costs for equipment. Estimated 40 hours for report writing and chemical analysis. Additional field work may be required to monitor/maintain continuous monitoring sensors.

ASSESSMENT OF WILDLIFE AND WILDLIFE HABITAT

• Goals & Objectives: Document wildlife presence and diversity, habitat types, and general wildlife and vegetation abundance within the Project area. The goal of this study is to evaluate the distribution and composition of vegetation, wildlife, and wildlife habitats, including wetlands, and the effects operations of those actions have on wildlife inhabiting those habitats.

• Relevant DNR Management Goals: The department has responsibility to manage wildlife, including listed species. This information will be beneficial to understanding the current environment and potential needs for resource management associated with White River.

• Existing Information: No wildlife surveys or data have been collected within the Project boundary. Additionally, the PAD does not include any field assessment or surveys of wildlife habitat or use.

• Operation nexus to resource and how informs license: The relicensing of White River has the potential to have short term and long-term impacts on habitat and wildlife use of affected habitats. Proper management of the resource will help to minimize any adverse impacts associated with the removal, restoration, and relicensing activities.

• Methodology: Using a qualified biologist or ecologist knowledgeable in local vegetation, identify, classify, and delineate on a map major vegetation cover types within Project area. Existing aerial photography, on the ground surveys, or a combination of the two to identify and map the cover types may be used. The biologist/ecologist will record all wildlife present.

Ground-truth any remote-sensing mapping efforts, record all wildlife observed (directly or indirectly) and document any terrestrial invasive species detected during survey efforts. Describe each cover type by species composition, successional stage, and aerial extent (acreage) within the survey area, including invasive species. As an example, the methodology expressed in the following reference could be used: https://www.fs.fed.us/research/publications/gtr/gtr_wo89/gtr_wo89.pdf

• Level of Effort and Costs: 80 hours of desktop review, field work, and data summary at an estimated $125 per hour, plus equipment costs.

ASSESSMENT OF RIVERINE AND RESERVOIR HABITAT

• Goals & Objectives: Define, measure, and assess the stream habitat conditions upstream and downstream of the hydropower facilities at current and proposed elevations. Define, measure, and assess the reservoir habitat, including upstream and downstream of the reservoir at current and proposed elevations.

• Relevant DNR Management Goals: Obtaining recent habitat assessment information is critical for future management actions and establishing baseline data. Water level fluctuations due to drawdowns may affect aquatic habitat. Obtaining information on how/if new water levels will cause shoreline erosion as a new ordinary high water mark is established

• Existing Information: Data is limited within the Project boundary, with most recent shoreline survey performed in 2003. The riparian habitat in the White River Project vicinity is undeveloped except for formal recreation sites and the Project structures.

• Operation nexus to resource and how informs license: Having updated instream and reservoir habitat assessment information is critical for evaluating the effects of the Project on the stream ecosystem. It will provide baseline data to current conditions. The data can be used to help guide river management associated with White River.

• Methodology: The riverine habitat within the project area downstream from the dam should be evaluated with the department Quantitative Habitat Assessment methodology in the wadable stretches of White River at the time of each fish survey, below. For the reservoir, department shoreland habitat protocol should be used. Newly impounded areas and any wetlands that could be affected by the new water level should be mapped.

• Level of Effort and Costs: 80 hours of field work and 40 hours of data analysis and reporting at $125 per hour, plus equipment costs.

ASSESSMENT OF FISHERIES

• Goals & Objectives: Define the diversity and abundance of the fish community within the White River Project.

• Relevant DNR Management Goal: Understand the existing environment. The department manages public water for recreational use, such as fishing, protection and management of species, and overall health of the fishery of the state.

• Existing Information: Data is limited within the Project area downstream of the dam. Fisheries data is available within the White River Flowage as part of the Project reservoir.

• Operation nexus to resource and how informs license: Having current fish survey information will help department staff make informed management decisions regarding the fishery.

• Methodology:

White River Flowage:

Early Spring Fyke Netting: Three to five fyke nets (front frame 4’x6’), set the week of ice out.

Late Spring Electrofishing: Maxi boom to survey the entire shoreline with two dippers, when water temps are between 60 – 70 degrees.

Summer Fyke netting: Three to five fyke nets (front frame 4’x6’), set when water temps are approaching 70 degrees.

Fieldwork and data reporting at $125 per hour, plus equipment costs

Downstream of White River Flowage: Seasonal catch per unit effort (CPUE) surveys in the spring, summer, and fall to quantify fish population relative abundance and summary report to document the species available to recreational fishers and general fish community composition.

• Level of Effort and Costs:

White River Flowage:

Early Spring Fyke Netting: Nets would be checked for 3 - 5 days, approximately 2 - 4 hours a day to set, check, move and workup the fish.

Late Spring Electrofishing: Approximately 1 hour of shocking and another hour of setup, take down and fish work up

Summer Fyke Netting: Approximately 2 to 4 hours a day to set, check, move and workup the fish. The nets would be deployed for 3 to 4 net nights , usually set on a Monday, checked daily and removed Thursday or Friday of that same week.

Fieldwork and data reporting at $125 per hour, plus equipment costs

Downstream of White River Flowage**:** One electrofishing pass to determine catch-per-unit-effort and fish community composition during spring, summer, and fall (e.g., early-May, late-July, and early-October) in a single survey station with a length that measures 35 times the mean stream width within the project area downstream from the dam. Mean stream width is computed from measurements at 10 intervals (e.g., every 75 feet). Electrofishing equipment to be appropriate to water depth, such as backpack or stream barge electrofishing units in wadable areas. 30 hours of fieldwork and 40 hours of data reporting at $125 per hour, plus equipment costs.

MACROINVERTEBRATE SURVEY

• Goals & Objectives: Assess the water quality using macroinvertebrate bio-indicators below and above the impoundment.

• Relevant DNR Management Goals: The department is charged with managing the water quality of the waters of the state and meeting designated criteria under the Clean Water Act.

• Existing Information: The most recent macroinvertebrate data was collected in 2015.

• Operation nexus to resource and how informs license: Macroinvertebrates are likely impacted by segmentation of the river, and impoundments can impact communities due to changing thermal and/or flow regimes. These bio-indicators are used to assess the health of the resource.

• Methodology: Wisconsin DNR Guidelines for Collecting Macroinvertebrate Samples from Wadable Streams (2017) and Large River Macroinvertebrate Sampling (2015), as appropriate. Data should be analyzed using the current department WISCALM Guidance. Macroinvertebrates should be collected upstream of the reservoir in the riverine reach, in the bypass channel and downstream of the powerhouse in the fully mixed zone.

Large River Macroinvertebrate Sampling (2015)
https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=120273145

Wadable Streams Macroinvertebrate Sampling (2017)
http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=150708168

• Level of Effort and Costs: One day of field work with an estimated 20 hours of field and data analysis at $125 per hour equals $2,500. Lab analysis at state certified lab estimated to cost $1,000. Mobilization, travel, and equipment is estimated at $2,000.

AQUATIC AND TERRESTRIAL INVASIVE SPECIES SURVEY

• Goals & Objectives: Evaluate the presence/absence of invasive species listed in NR40, including habitat preferences, within the Project area.

• Relevant DNR Management Goal: Minimize the transport and establishment of existing invasive species and establish management practices to reduce new invasive species. Compliance with NR40.

• Existing Information: Reed Canary Grass has been identified within the Project boundary and the current license requires annual Purple Loosestrife monitoring. Narrow-Leaf Cattail was identified, but not verified, in 2018. There are no additional, verified, AIS identified within the Project boundary.

• Operation nexus to resource and how informs license: The Project may influence invasive species that have the potential to directly or indirectly cause economic or environmental harm or harm to human health, including harm to native species, biodiversity, natural scenic beauty and natural ecosystem structure, function or sustainability; harm to the long−term genetic integrity of native species; harm to recreational, commercial, industrial and other uses of natural resources in the state; and harm to the safety or wellbeing of humans, including vulnerable or sensitive individuals. – per NR40.

• Methodology: Use department Early Detection Early Response Protocols. Additional methodology may be needed for terrestrial species, and other methodologies such as point-intercept may be appropriate if combing this study with other studies.

• Level of Effort and Costs: 40 hours of field work and reporting at $125 per hour equals $5,000. Mobilization, equipment, and supplies are estimated at $10,000.

AQUATIC PLANT SURVEY

• Goals & Objectives: The goal of the aquatic plant study is to provide baseline data on the condition of the aquatic plant community in the White River Project.

• Relevant DNR Management Goals: The proposed aquatic plant study will provide baseline aquatic plant information to determine if management practices would be needed to enhance the existing aquatic plant community, and overall health of White River as a bio indicator. Water levels can influence aquatic vegetation.

• Existing Information: In-water plant community data is limited within the Project boundary.

• Operation nexus to resource and how informs license: The study results will provide baseline aquatic plant data. The data informs the Department of the effects on the surface water resource and would be used to formulate management options. Plant density and diversity of aquatic and native species are important for establishing varies management plans and protecting the resource.

• Methodology: The information collected from this study includes an assessment of the density and diversity of macrophytes, which includes frequencies of occurrence of different plant species, as well as estimates of species richness, abundance, and maximum depth of plant colonization. The aquatic invasive species study should be conducted according to the department's Recommended Baseline Monitoring of Aquatic Plants in Wisconsin.

• Level of Effort and Costs: 40 hours of fieldwork and 40 hours of reporting at $125 per hour, plus equipment costs.

MUSSEL STUDY

• Goals & Objectives: The goal of the study is to determine freshwater mussel density and diversity, including characterizing mussel habitat within the White River Project area. The study would provide information on freshwater mussel species present, their diversity, density, and a better understanding of baseline conditions and associated management needs for White River relicensing.

• Relevant DNR Management Goals: This information will help the resource agencies determine if any best management practices are needed to protect listed species and any management measures to protect or enhancement the existing freshwater mussel population.

• Existing Information: Mussel data does not exist within the Project boundary.

• Operation nexus to resource and how informs license: The operations of the White River Project could influence the freshwater mussel species located within the Project boundary. The results of the survey will provide essential information to determine if any protection measures, restoration, or enhancements would be necessary as a management requirement associated with the relicensing of the White River dam.

• Methodology: A qualitative and quantitative survey for freshwater mussels should be conducted. One method that can be used is the department's Guidelines for Sampling Freshwater Mussels in Wadable Stream. Methodology should be discussed with the Department for nonwadeable areas. A Mussel Survey Plan should be submitted to the department for review at least 1 month prior to implementation.

• Level of Effort and Cost: An estimate of 40 hours of field work and 40 hours to analyze data and draft a report at an estimated $125 per hour, plus equipment costs.

ASSESSMENT OF RARE AND ENDANGERED SPECIES

• Goals & Objectives: Rare plants and animals have been found within, adjacent to, and in habitats similar to the study area. It would be recommended to complete plant and animal surveys for these species to determine if they occur within the study area and to further our understanding of their populations within this area. This will also inform the licensee as to where these plant and animal locations are.

• Relevant DNR Management Goals: The department has responsibility to manage plants and animals, including listed species. This information will be beneficial to understanding the current environment, and potential needs for resource management associated with White River. The licensee is also required to follow state Endangered Species laws.

• Existing Information: An Endangered Resources review was not completed for the reduced/proposed project boundary.

• Operation nexus to resource and how informs license: The relicensing of White River has the potential to have short term and long-term impacts on vegetation and animals-- in particular, wood turtles and their habitat. Proper management of the resource will help to minimize any adverse impacts associated with the removal, restoration, and relicensing activities.

• Methodology: Using a qualified botanist knowledgeable in area vegetation and specific species, identify, classify, and delineate on a map rare, threatened, or endangered plant species within the Project area. Using a qualified biologist or ecologist, conduct presence/absence surveys for specific rare, threatened, or endangered animal species.

• Level of Effort and Cost: 40 hours of desktop review and 40 hours of fieldwork, plus equipment costs.

WOOD TURTLE SURVEYS

• Goals & Objectives: Wood turtles are listed as Threatened in Wisconsin. In an effort to better understand the abundance and distribution of this species, several survey and management efforts are taking place across northern Wisconsin within a number of different river systems. Presence/absence surveys, population modelling and natural nest site surveys are three examples of existing work that is being done across the range of this species in Wisconsin, which is primarily the northern one-third of the state. The overall goal of this survey request is to further our knowledge of the distribution of wood turtles within the White River watershed more broadly. The two main objectives of this study request are to determine if wood turtles are present within the Project boundary of the dam and to determine whether any wood turtle nest sites occur within the Project boundary.

• Relevant DNR Management Goals: The department has responsibility to manage wildlife, which includes the wood turtle. This survey study will be beneficial to understanding the current environment and potential needs for resource management associated within the White River Project boundary. Two of the main threats to wood turtles across their range are: 1. Adult mortality due to vehicle collisions 2. Predation of eggs and hatchlings at nest sites, resulting in poor recruitment in many river systems. Wood turtles are particularly susceptible to nest predation due to their tendency to nest colonially and nest in the same location every year, providing a pattern that is recognizable by nest predators, such as raccoon and fox. In an effort to improve recruitment, the department has employed several strategies to protect existing nest sites and create protected artificial nest sites. If any natural nest sites are found within the current or proposed Project boundary, the department will work with the licensee to protect these nest sites from predation as well as from negative human-related impacts.

• Existing Information: Wood turtles are known to be present within this Project boundary, however, survey data is limited.

• Operation nexus to resource and how informs license: The relicensing of White River has the potential to have short term and long-term impacts on wood turtles and habitat use. Proper management of the resources will help to minimize any adverse impacts associated with the restoration and relicensing activities. Examples of possible impacts to wood turtles are related to seasonal water level fluctuations during vulnerable life history stages, both upstream and downstream. If nest sites are present downstream of the dam, increasing downstream water levels during the period following egg laying in June until hatchling emergence in August/September could cause nest failure if nests become submerged for extended periods of time. Depending on timing, winter drawdowns could have impacts on wood turtles upstream of the dam if the water level is lowered to a point where overwintering turtles are exposed to the elements due to low water levels where they are hibernating.

• Methodology: Using a qualified biologist or ecologist, two survey protocols are requested: (1) Presence/absence surveys for wood turtles and (2) Wood turtle nesting site surveys.

1. Presence/absence surveys for wood turtles: Surveys for wood turtles are most effective during spring and early summer, when this species emerges from hibernation and begins breeding activity in terrestrial settings but relatively close to riverbanks. Beginning after ice out, surveys should be conducted on sunny days when the air temperature is 50 – 80 degrees Fahrenheit. Depending on the year, local snow/ice conditions and weather, these surveys can typically be conducted from late April – early June. The survey consists of visual searches within approximately 50 feet of the river's edge, where wood turtles can be found basking on days that meet the abovementioned weather criteria. The frequency of these surveys will be dependent on weather conditions, but ideally at least two times per week on non-consecutive days during this timeframe.

2. Wood turtle nesting site surveys: Beginning in early to mid-June, and extending until approximately the first week in July, wood turtle nesting activity can be surveyed by conducting daily searches for adult wood turtles and/or evidence of recent nesting activity in suitable nesting habitat. Suitable nesting habitat includes a sand or sand/gravel substrate that is either unvegetated or sparsely vegetated, receives sun exposure for most of the day during late spring/summer and is within approximately 200 feet of the river's edge. Note that this can include gravel parking areas, roads or shoulders of paved roads. Many portions of the project boundary can likely be eliminated from these nesting surveys due to a lack of suitable conditions for turtle nesting.

• Level of Effort and Costs: Approximately 20 hours at $125 per hour, plus equipment costs.

1. Presence/absence surveys for wood turtles, Spring, 2021: Two surveys per week for four weeks (assume 1-2 hours per survey). These surveys should focus on free-flowing river stretches and the downstream vicinity of the dam.
2. Wood turtle nesting site surveys, Spring/Summer, 2021: Daily surveys of suitable nesting sites (if any are found) for four weeks (Assume 1 hour per survey).

ASSESSMENT OF RECREATION

• Goals & Objectives: Evaluate current recreational uses, including opportunities for low flow and high flow events, public access, natural scenic beauty, trails, water sports, and fishing, with consideration for the different seasonal uses.

• Relevant DNR Management Goals: The Department supports a wide array of recreational use. We support the need for recreational use surveys that consider a broad array of users. A quantitative recreational use survey completed within the Project boundary will evaluate potential changes associated with any modifications to water levels and operations. Information needs to be gathered in order to understand the current use, and potential future uses.

• Existing Information: There are opportunities for fishing, wildlife viewing, and water sports within the White River Project vicinity, which includes a public boat landing and canoe portages.

• Operation nexus to resource and how informs license: Hydro operations, management of impoundments, water level changes, and sufficient public access can have a significant impact on recreational value. Adequate information is necessary to determine what impacts may be occurring from the hydro operations, and what recreational opportunities may be enhanced.

• Methodology: Desktop assessment, including review of the State of Wisconsin 2019 to 2023 Statewide Comprehensive Outdoor Recreation Plan (SCORP), released in March 2019, public surveys, and existing recreational sites. This includes assessment of current uses, level of use, evaluation for additional recreational features.

• Level of Effort and Cost: 40 hours of desktop review and fieldwork at $125 per hour, plus equipment costs.

PROPOSED PROJECT BOUNDARY

• Goals & Objectives: Quantitative assessment of acres of wildlife habitat and surface water that would be modified with a proposed change in Project boundary. This includes impacts to public access and recreational activities.

• Relevant DNR Management Goals: Protection of natural resources and providing public recreational opportunities are part of the Department's mission.

• Existing Information: The current FERC license established the Project boundary to include a total area of 125.1 acres. This includes the 45.1-acre reservoir, 3.1 acres of open water downstream of the dam, and 76.9 acres of land owned in fee by Xcel. The proposed Project boundary would be reduced to include a total of 64.4 acres.

• Operation nexus to resource and how informs license: The riparian areas are critical in protecting water quality and fish and wildlife habitat in the White River system. Recreation and public access, along with natural resource protection are all part of the Public Trust Doctrine in Wisconsin.

• Methodology: Desktop evaluation of wetland and riparian habitat. Identify changes in acreage in wetland and habitat, as well as changes in acreage and use in reactional features. Additionally, identify if any of the areas proposed to be exclude from the Project boundary provide habitat for listed species.

• Level of Effort and Cost: 40 hours of desktop review at $125 per hour.

Jessica Strand, Odanah, WI.
To Whom It May Concern,

Though we are familiar with the deadline of December 28, 2020 for submitting pre-application document comments and study requests concerning the White River Hydroelectric Project, we are unable to submit a signed comment letter today due to our offices being closed. We will be following-up tomorrow with an authorized comment letter when we are able to obtain the appropriate signatures from Tribal Officials.

We have a continued interest in this projects both as a downstream sovereign and as an entity with federally-approved Water Quality Standards and treatment-as-a-state authority under the Clean Water Act.

Sincerely,

Jessica Strand
Environmental Specialist
Mashkiiziibii Natural Resources Department
Bad River Band of Lake Superior Tribe of Chippewa Indians

BAD RIVER BAND OF LAKE SUPERIOR TRIBE OF CHIPPEWA INDIANS

CHIEF BLACKBIRD CENTER Box 39 • Odanah, Wisconsin 54861

December 28, 2020

Ms. Kimberly D. Bose
Secretary Federal Energy Regulatory Commission
888 First Street
NE Washington, DC 20426

Re: Pre-Application Document and Study Request Concerning the White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose,

As a sovereign nation possessing an interest in the use and enjoyment of the sacred waters of Anishinaabeg-Gichigami, or Lake Superior, pursuant to treaties we signed with the United States, we submit our comments related to the pre-application document and study areas for the White River Dam Relicensing by Xcel Energy also known as the Northern States Power Company-Wisconsin (henceforth, "company" or "applicant"). The Bad River Band of Lake Superior Tribe of Chippewa Indians (henceforth, "Tribe") is a federally recognized Indian Tribe with its reservation centered on the northern shores of Wisconsin and Madeline Island. The Tribe also retains interest in lands ceded through the 1837, 1842 and 1854 Treaties with the United States in Wisconsin, Michigan, and Minnesota. The proposed White River Dam falls within these ceded lands where the Tribe has reserved rights to resources. In addition, the Tribe has federally approved Water Quality Standards and Treatment-as-a-State authority from the EPA, making us a downstream regulator along the White River.

As such, we are very concerned with the operation, maintenance, and relicensing of the White River Dam, especially knowing the impacts that the Tribe has experienced living downstream of the dam. Our concerns arise from negative impacts and disruption to Tribal fishing due to an improperly managed drawdown of the reservoir, and concerns about the potential of releases from the dam that contribute to erosion and flood impacts for the Tribal community downstream. In addition, we want to assure that the relicensing will not negatively impact water quality or water quantity in ways that would result in a degradation to Tribal waters, of which the White River is considered an Outstanding Resources Water, with cultural, commercial, navigable, wildlife, aquatic life and fish, recreational, and cool water fishery designated uses. The White River, after its confluence with Bad River thirteen miles downstream, contributes flow into wild rice waters of the Bad River and the Bad River and Kakagon Sloughs. (This sloughs complex is one of the largest natural manoomin, or wild rice, estuaries in the Lake Superior Basin, a wetland site of international importance under the Ramsar Convention and holds many other designations, including a National Natural Landmark listing within the National Register of

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Historic Properties.) The White River is also historically a wild rice water.

Staff from the Tribe's Mashkiiziibii Natural Resources Department (MNRD) attending the virtual Joint Agency Meeting (JAM) hosted by the applicant and their contractor on October 29, 2020. Many of the comments in this letter arise from the information presented during the JAM and from reviewing the PAD submitted to FERC. However, we may also have additional comments and concerns that we reserve the right to address in formal consultation as the relicensing process progresses.

1. The PAD claims that stakeholders have no concerns because the company had not received any responses to their mailed questionnaire sent in June 2019. This questionnaire was sent only to the Bad River Tribal Chairperson and the Tribal Historic Preservation Officer per the PAD, but there is no record that the applicant reached out to MNRD staff to follow-up to ensure the questionnaire was received or seen. Since MNRD staff are regularly in contact with Environmental Staff on Xcel's teams about other on-Reservation and upstream projects (e.g., a power pole replacement in Mellen, WI), it is disappointing to find that the applicant did not bother reaching out on this issue of importance to the Tribe. The Tribe does have concerns about the dam, and Xcel knows that these concerns exist from previous communications.
2. The Tribe, as a downstream nation with federally-approved Water Quality Standards (WQS), and regulatory authority under Clean Water Act Sections 303(c) and 401, should not be treated as every other stakeholder in the relicensing process, and should be involved in additional conversations regarding this project to ensure that federal permitting for the operation of the dam meets the Tribe's WQS.
3. The Area of Potential Affect (APE) or Study Area should be expanded to include all of the White River and its floodplain downstream of the dam, the portion of Bad River downstream of the confluence with the White River, and portions of the Bad River and Kakagon Sloughs Complex that might be impacted by any release of waters from the dam. Expanding the APE will more thoroughly assess possible downstream impacts from the operation of the dam, including impacts to tribal and treaty resources both on-Reservation and in the ceded territories. Understanding these impacts in an expanded APE will help the Tribe comment on the relicensing and ensure that resources are protected for the seventh generation, a critical underpinning for all actions taken by the Tribe. While increasing the APE to cover additional areas would increase the cost of required studies, it would be offset by potential long-term cost savings when possible impacts to the ecology and cultural resources are averted now as compared to needing to be restored or mitigated later.
4. Technical Comments on Data Used
    a. LiDAR data used to determine updated contours for application materials was the 2014 LiDAR data for Ashland County, Wisconsin, which was collected prior to severe flooding that occurred in July 2016 that drastically changed the landscape of the watershed. Thus, we feel that the more accurate data to use in determining contours should be the more recent 2019 LiDAR data and thus the application materials and other information should be updated accordingly.

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develop an emergency response plan for different dam release scenarios and could identify some operational requirements for the dam that would need to be included in the re-licensing. Methodology could be developed in coordination with the National Weather Service and the US Geological Survey, both of which have well-establishes protocols for this type of work and the expertise to tailor these protocols to the White River Subwatershed.

7. Additionally, we would like to ensure the proper lines of communication about unscheduled releases of the dam and communication about scheduled drawdowns happens in a timely manner to ensure that impacts to tribal waters and tribal events, like spring fishing, is minimized. We have not had the time to read the PAD extensively to see how these concerns are framed in this document but would like to ensure they are addressed in refined documents time for the final comment period when we'll be reviewing the proposal more closely. Protocols then should be properly addressed in the relicensing of the dam.
8. Finally, we would like to add that cultural and historical considerations do not appear to be adequately addressed, especially with the narrow scope of the APE, and we will be communicating our concerns regarding these issues with the applicant and FERC in follow-up communications, as we continue to have an interest in this project under the National Historic Preservation Act and 36 CFR 800.

We look forward to hearing FERC and the applicant's response to our concerns raised here and would gladly provide additional context and comments in follow-up communications since we realize that due to other workloads we are unable to provide more than this truncated summary of concerns at this time. If you have any questions or would like to schedule a meeting, please reach out to our Tribal Historic Preservation Officer Edith Leoso and/or our point of contact for Xcel Energy communications within MNRD, our Environmental Specialist Jessica Strand, either of whom can help coordinate from our end. (Contact information for either can be found on our website at: http://www.badriver-nsn.gov/natural-resources/.)

Sincerely,

Michael Wiggins, Jr.

Michael Wiggins, Jr.
Bad River Tribal Chairman

CC:
Matthew Miller (Xcel Energy) matthew.j.miller@xcelenergy.com
Darrin Johnson (Mead & Hunt) darrin.johnson@meadhunt.com
Cheryl Laatsch (WDNR) cheryl.laatsch@wisconsin.gov
MNRD File

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b. The wetland data used for the PAD was the National Wetland Inventory, which upon last review by MNRD staff, uses the outdated version of the Wisconsin Wetland Inventory for mapped wetlands for Ashland County from 1991. The more recently updated Wisconsin Wetland Inventory from 2013 should be used to prepare application materials and determine possible impacts to wetlands, if the step of performing a true on-the-ground delineation is not completed.

c. If the APE is expanded, per the Tribe's request in this letter, additional data and information pertaining to water quality, invasive species, aquatic macroinvertebrates, etc. may be available from the Tribe for the APE, and the application is encouraged to reach out to the MNRD for this information. (For example, a rare mayfly (Neoephemera bicolor) has been found by MNRD staff sampling the confluence of Thornapple Creek and the White River. Other information the Tribe also has may help identify possible additional survey needs for the applicant or more fully articulate possible impacts from the re-licensing of the dam.)

5. Invasive species surveys should be conducted within the Reservoir and the adjacent shoreline to understand long-term impacts of primarily static water levels on the presence of invasive species. Invasive species populations upstream of the Reservation have an established corridor along the watercourse to move onto Reservation lands and into its waters, and studies have shown water levels artificially static due to dams tend to accelerate the rate of infestations in those waterbodies. This concern coupled with the easily accessible public boat launch on the upstream side of the dam seems to be reasonable justification for surveys for aquatic invasive species to be conducted within the Reservoir. The goals and objectives are to verify the presence/absence of invasive species in the APE for possible treatment and to use in downstream monitoring efforts to address new populations in addition to influencing certain operational protocols for the dam. AIS control and monitoring matches with management goals both for Ashland County Land and Water Conservation Department and the goals of the Bad River Tribe. Preventing new populations of invasive species by treating sources upstream and quickly identifying new populations has been shown to be much more cost-effective than trying to eradicate well-established infestations. Surveys should be completed within the reservoir using the point-intercept method and along the shoreline using the rapid assessment method used by the Wisconsin Department of Natural Resources. Results of the study may suggest the certain operation changes for the dam might be needed to reduce invasive species populations, like periodic water-level fluctuations and/or required control efforts as part of relicensing.

6. The release of flood waters from the dam during the 2016 flooding in the Bayfield, Ashland, and Iron Counties had impacts downstream that are not fully understood and the Bad River Community continues to have questions about possible future impacts from a similar or worse flood event in light of climate change and an increase in severe precipitation events. We request that a flood study be conducted concurrent with the re-licensing process so that possible impacts of a release of flood waters during different scenarios can be fully understood and flood forecasting can be completed with the National Weather Service to provide the best possible emergency response planning available to the Tribal community. This study would be necessary for the Tribe to fully

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Eau Claire, WI 54702-0008

May 27, 2021 FERC Docket Nos. 2417-065 and 2711-024

VIA Electronic Filing

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Proof of Publication - Notification of Scheduled Site Visit**
Hayward Hydroelectric Project (FERC Project No. 2417)
Trego Hydroelectric Project (FERC Project No. 2711)

Dear Secretary Bose:

On November 20, 2020, Northern States Power Company – Wisconsin (NSPW), d/b/a Xcel Energy, filed with the Federal Energy Regulatory Commission (FERC or Commission) a Notice of Intent (NOI), Pre-Application Document (PAD), and Request to Use the Traditional Licensing Process (TLP) for the relicensing of the Hayward Hydroelectric Project (FERC Project No. 2417) and Trego Hydroelectric Project (FERC Project No. 2711). The Commission, by letter dated January 21, 2021, granted NSPW's request to use the TLP for both Projects.

In accordance with the first stage of consultation requirements of the TLP, NSPW held a Joint Agency Meeting on March 11, 2021. Due to COVID-19 health related concerns, the meeting was held via conference call. No site visit to either Project was conducted at that time in order to abide by Centers for Disease Control and Corporate guidelines to avoid public gatherings and discretionary travel.

NSPW has scheduled a site visit to the Hayward and Trego Projects, in conjunction with a site visit to the White River Hydroelectric Project (FERC Project No. 2444), on Thursday, June 17, 2021. The site visit will begin at 9:00 a.m. at the White River Project located at 46720 State Hwy 112, Ashland, WI 54806. The group will then proceed to the Hayward Project for a site visit, followed by lunch on your own, and finish the day with a site visit to the Trego Project.

NSPW requests those interested in participating in the June 17, 2021 Site Visit RSVP by Monday, June 14, 2021 to Mr. Matt Miller at (715) 737-1353 or matthew.j.miller@xcelenergy.com.

The Site Visit agenda includes the following:

- Welcome and Introductions at the White River Project
- Tour of the White River Project Facilities
- Tour of the Hayward Project Facilities

- Lunch on your own in the Hayward area
- Tour of the Trego Project Facilities

NSPW will publish a notice in the Sawyer County Record and Spooner Advocate, newspapers of general circulation in Sawyer and Washburn Counties, respectively, announcing the June 17, 2021 site visit. Copies of both public notices, and the corresponding Affidavits of Publication, will be submitted to the Commission once they are received.

NSPW is distributing this correspondence to the stakeholder list provided in the NOI/PAD (updated based on return mail or by request) via US Mail.

Thank you for your time and consideration in this matter. Should you have any questions, please contact Matthew Miller at (715) 737-1353 or matthew.j.miller@xcelenergy.com.

Respectfully Submitted,

James M Zyduck Digitally signed by James M Zyduck
Date: 2021.05.27 17:25:53 -05'00'

James M. Zyduck
Director, Hydro Plants

Enclosure: Certificate of Service
Stakeholder List

cc: Stakeholder List
Shawn Puzen – Mead & Hunt, Inc. (via email)
Project Files

Certificate of Service

I hereby certify that I, on behalf of Xcel Energy, have this day served (via first class mail) the foregoing documents upon each person designated on the attached Master Address Distribution List.

Dated this 27th day of May 2021.

Darrin Johnson

Darrin Johnson
MEAD & HUNT, Inc.

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1414 West Hamilton Avenue
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Eau Claire, WI 54702-0008

Hayward and Trego Hydroelectric Project Licensing Stakeholder List
FERC Project Nos. 2417 and 2711

<u>Indian Tribes</u>

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888 First Street NE
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Comm. U.S. Bureau Reclamation
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Nick Utrup, Fisheries Biologist
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Fish & Wildlife Service
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Glen Grothman, U.S. Representative
U.S. Representative from Wisconsin District 6
Washington, DC 20515

Field Supervisor
U.S. Department of the Interior
Fish & Wildlife Service
Green Bay Field Office
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Christine Gabriel, Regional Environmental Coordinator
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Julie Galonska, St. Croix National Scenic Riverway
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National Park Service
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Angie Tornes, Midwest Hydropower Coordinator
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National Park Service
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Milwaukee, WI 53202

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U.S. Department of the Interior
National Park Service
401 N Hamilton Street
St. Croix Falls, WI 54024

Jen Tyler
Mail Code: E-19J
U.S. Environmental Protection Agency
NEPA Implementation Section, Region V
77 W Jackson Boulevard, AR-18J
Chicago, IL 60604-3507

Tom Tiffany, U.S. Representative
U.S. Representative from Wisconsin District 7
1714 Longworth House Office Building
Washington, DC 20515

State
Public Service Commission of Wisconsin
P.O. Box 7894
Madison, WI 53707-7854

Wisconsin Cooperative Fishery Research Unit
U.W. Stevens Point
Stevens Point, WI 54481

Kathleen Angel, Wisconsin Coastal
Management Program
Wisconsin Department of Administration
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Connie Antonuk, WDNR
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Rhinelander, WI 54501

Macaulay Haller, WDNR
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Cheryl Laatsch, FERC Coordinator
Wisconsin Department of Natural Resources
502 E Mill Street
Beaver Dam, WI 53916

Jeffrey Schierer, Watershed Management
Wisconsin Department of Natural Resources
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Park Falls, WI 54552

Wisconsin Office of the Governor
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Madison, WI 53702-0001

Tyler Howe, Preservation Office
Wisconsin State Historical Society
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Madison, WI 53706

Local
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Eau Claire, WI 54702-5148

Lisa Poppe Clerk/Treasurer
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City Manager
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Lacrosse, WI 54601

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Ronald Pete, Town Chairman
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Thomas Hoff, County Administrator
Sawyer County
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Hayward, WI 54843

Town Chairman
Town of Hayward
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Wes Huffer, Town Chairman
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William Allard, Town Supervisor
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Trego, WI 54888

Brian Vosberg, Town Supervisor
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Trego Wi 54888

<u>Local</u> (continued)
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W6097 River Road
Trego, WI 54888

Lolita Olson, County Clerk
Washburn County
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Shell Lake, WI 54871

<u>Other</u>
James Fossum
River Alliance of Wisconsin
199 Janet Marie Lane
Winona, MN 55987

Thomas Frost, Board Member
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Charlie Petersen, Chairman
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James Zyduck, Xcel Energy
Director, Hydro Plants
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Eau Claire, WI 54702-0008

White River, Hayward, Trego Site Visit Participants

June 17, 2021

Name	Organization	White River	Hayward	Trego
Zach Lawson	WDNR	X		
Connie Antonuk	WDNR	X	X	X
Scott Crotty	Xcel	X	X	X
Matt Miller	Xcel	X	X	X
Shawn Puzen	Mead & Hunt	X	X	X
Jessica Strand	Bad River Tribe	X		
Nathan Kilger	Bad River Tribe	X		
Tim Hudak	Xcel	X		
Abi Fergus	Bad River Tribe	X		
John McCue	City of Hayward		X	
Max Walter	WDNR		X	X
Lee	WDNR		X	X
Julie Galonska	NPS		X	X
Lisa Yaeger	NPS		X	X
Jonathon Moore	NPS		X	X
Charlie Peters	Trego Lake District			X
Bob Somermeyer	Trego Lake District			X
Ryan Tjader	Xcel			X

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

June 24, 2021

FERC Docket Nos. 2444-036

VIA Electronic Filing

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Proof of Publication of Notice of Scheduled Site Visit**
White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose:

Northern States Power Company - Wisconsin (licensee), d/b/a Xcel Energy, published a notice in a newspaper of general circulation in Ashland County, Wisconsin announcing the June 17, 2021, site visit for the White River Hydroelectric Project (FERC Project No. 2444). The notice was published in the Ashland Daily Press on June 1, 2021. Copies of the public notice and Affidavit of Publication are enclosed.

Thank you for your time and consideration in this matter. If you have any questions, please contact Matthew Miller at (715) 737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

James M Zyduck
Digitally signed by James M Zyduck
Date: 2021.06.28 13:53:17 -05'00'

James Zyduck
Director, Hydro Plants

Enclosures: Public Notice and Affidavit of Publication

cc: Shawn Puzen – Mead & Hunt, Inc. (via e-mail)
Project Files

UW System returns summer youth programs

BY **RICH KREMER**
Wisconsin Public Radio

As colleges and universities ease restrictions aimed at preventing outbreaks of COVID-19, the University of Wisconsin System has announced it is bringing back pre-college and summer youth programs this summer.

Summer youth programs have been a longtime fixture at UW System campuses, typically catering to middle and high school students. Some are academic in nature, aimed at giving children a taste of college life, complete with stays in campus dormitories.

Last year, when COVID-19 cases were rising across Wisconsin, system campuses either canceled summer youth programs or moved them online, which resulted in lower attendance. In early May, UW System interim President Tommy Thompson announced summer programs were returning with extra safety protocols in place.

"The pandemic is not over, but we can safely begin to return to pre-pandemic operations, including summer programs for youth and a strong majority of in-person classes this fall," said Thompson. "We are creating a culture of responsibility on our campuses."

Michael Casbourne is the director of TRIO and pre-college programs at UW-Green Bay. TRIO programs are federally funded initiatives designed to assist students from low-income families progress from high school to college. Casbourne said his campus TRIO summer program is a six-week, residential immersion that will start in June.

BILL MARTENS/WPR

Students walking on East Campus Mall on the University of Wisconsin-Madison campus.

"We're running a model that I call the TRIO bubble," said Casbourne. "So, all of our students will be tested. They'll go into quarantine about a week before they're supposed to come to us. Three days prior to arriving, they have to upload a negative test result."

Casbourne said a local bowling alley has even agreed to close its doors to the public so TRIO students can have fun while limiting potential infections.

Jason Mathwig, UW-Green Bay director of education outreach, said the campus will also offer summer camps focused on music, art and science. He said typically they, too, offer students the chance to stay in dorms, but this year, overnight stays won't be an option.

Mathwig said 10 virtual summer camps were offered last year, and he is glad to offer in-person programs this year.

"Just like in school, camps are no different," Mathwig said. "You can do so much more in person. You can have more of the hands-on activity with the kids. They can visually do something, whether it's art or music or STEM, physically holding on to that piece while an instructor is right there with them to help troubleshoot, as well as the human-to-human interaction with their counterparts, their peers or other students."

Elisabeth Arguello, UW-Oshkosh pre-college coordinator, said her campus offers summer youth programs focusing on pre-college training, as well as medical, business and teaching careers.

She said a quick pivot to online summer camps last year affected enrollment.

"And unfortunately, we did lose some students because of the virtual format," Arguello said. "They want it to be the person they wanted to be able to get on the campus and see everything."

AP

In this 2015 file photo, mourners attend a funeral for unclaimed people who died of extreme weather, in Karachi, Pakistan, after a devastating heat wave that struck southern Pakistan the previous weekend, with over 800 confirmed deaths according to a senior health official.

Study blames climate change for 37% of global heat deaths

BY **SETH BORENSTEIN**
AP Science Writer

More than one-third of the world's heat deaths each year are due directly to global warming, according to the latest study to calculate the human cost of climate change.

But scientists say that's only a sliver of climate's overall toll — even more people die from other extreme weather amplified by global warming such as storms, flooding and drought — and the heat death numbers will grow exponentially with rising temperatures.

Dozens of researchers who looked at heat deaths in 732 cities around the globe from 1991 to 2018 calculated that 37% were caused by higher temperatures from human-caused warming, according to a study Monday in the journal Nature Climate Change.

That amounts to about 9,700 people a year from just those cities, but it is much more worldwide, the study's lead author said.

"These are deaths related to heat that actually can be prevented. It is something we directly cause," said Ana Vicedo-Cabrera, an epidemiologist at the Institute of Social and Preventative Medicine at the University of Bern in Switzerland.

The highest percentages of heat deaths caused by climate change were in cities in South America. Vicedo-Cabrera pointed to southern Europe and southern Asia as other hot spots for climate change-related heat deaths.

Sao Paulo, Brazil, has the most climate-related heat deaths, averaging 239 a year, researchers found.

About 35% of heat deaths in the United States can be blamed on climate change, the study found. That's a total of more than 1,100 deaths a year in about 200 U.S. cities, topped by 141 in New York. Honolulu had the highest portion of heat deaths attributable to climate change, 82%.

Scientists used decades of mortality data in the 732 cities to plot curves detailing how each city's death rate changes with temperature and how the heat-death curves vary from city to city. Some cities adapt to heat better than others because of air conditioning, cultural factors and environmental conditions, Vicedo-Cabrera said.

Then researchers took observed temperatures and compared them with 10 computer models simulating a world without climate change. The difference is warming humans caused. By applying that scientifically accepted technique to the individualized heat-death curves for the 732 cities, the scientists calculated extra heat deaths from climate change.

PUBLIC NOTICE

Site Visit for the Relicensing of the White River Hydroelectric Project (FERC Project No. 2444)

Northern States Power Company – Wisconsin, d/b/a Xcel Energy, (hereinafter NSPW), hereby notifies resource agencies, Indian tribes, and stakeholders, including interested members of the public, that it has scheduled a site visit regarding the Federal Energy Regulatory Commission (FERC or Commission) relicensing of the White River Hydroelectric Project (FERC Project No. 2444) (White River Project). The Project is located on the White River in the Town of White River in Ashland County, Wisconsin.

On July 29, 2020, NSPW filed with the Commission a Pre-Application Document, Notice of Intent, and Request to Use the Traditional Licensing Process (TLP) for the relicensing of the White River Project. The Commission, by letter dated Sept. 16, 2020, granted NSPW's request to use the TLP for the White River Project.

In accordance with the first stage of consultation requirements of the TLP, NSPW held a Joint Agency Meeting on Oct. 29, 2020. Due to COVID-19 health-related concerns, the meeting was held via conference call. No site visit to the White River Project was conducted at that time in order to abide by Centers for Disease Control and Corporate guidelines to avoid public gatherings and discretionary travel.

NSPW has scheduled a site visit to view the White River Project, in conjunction with a site visit to the Hayward (FERC Project No. 2417) and Trego (FERC Project No. 2711) hydroelectric projects, on Thursday, June 17, 2021. The site visit will begin at 9 a.m. at the White River Project located at 46720 State Hwy 112, Ashland, WI 54806. The group will then proceed to the Hayward Project for a site visit, followed by lunch on your own, and will finish the day with a site visit to the Trego Project.

An accurate number of attendees is necessary to allow NSPW to coordinate the site visit based on the most-recent Wisconsin COVID-19 mandate(s) and Corporate guidelines. In addition, based upon the number of attendees, participants may need to be separated into groups, if required by the mandate(s) and guidelines.

All interested parties, including members of the public, who plan to attend the site visit on Thursday, June 17, are asked to RSVP no later than Monday, June 14, to Matt Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Xcel Energy®

Last utility truck made in Wisc. city hits auction block

BY **NEIL JOHNSON**
The Janesville Gazette

JANESVILLE (AP) — The big, yellow GMC truck first operated as a snowplow on city of Janesville streets. Then, for years, it became an asphalt mule for city street maintenance.

Now, the 19-year-old city of Janesville public works truck, a diesel-powered, GMC C8500 dump truck, is phased out, retired and set to hit the auction block in June.

It's not just any truck. It's the last heavy GMC utility truck ever built in Janesville; the absolute, final big truck that ever rolled off the assembly floor before GM shut down its Janesville medium-duty line for good.

Scrawled in black grease pen on the underside of the GMC's hood are the names of workers on the Janesville Assembly line on June 26, 2002 — the day the truck was completed. Those names are faded beneath years of operating grime, yet still visible, The Janesville Gazette reported.

Who knows? Maybe one of those workers will buy the truck. If they want to, they can try.

The city of Janesville is taking sealed bid offers for the truck now. City Operations Director Maggie Darr said the city normally holds a statewide auction for surplus or retired vehicles. But she said the city is initially soliciting bids for the GMC truck locally. That is, through June 6, the city is only accepting bids mailed or hand-delivered to the City Services Center.

That is to give area residents first crack at buying a piece of city history.

"The goal is to maybe limit the exposure a little bit more so potentially it ends up in the hands of somebody local who has some local connection to GM, maybe somebody who wants to feature it at local car shows or keep it as kind of a part of local history," Darr said.

Travis Kelsey, shop crew leader at the city's service center, said it was pure happenstance that the city bought what was the last GMC dump truck to come off the Janesville Assembly lines.

The truck was just five years into service and had just a few hundred hours of working time under its belt when it shifted roles from snowplow operations to city blacktop work.

For that, it was beloved by the city's blacktop crews. It was the nicest truck they had ever gotten.

Kelsey said it was known among many city workers that the big GMC was the last of its breed. He said there was mixed sentiment among some city crews if it was right to assign asphalt duty to a truck of some historic distinction.

"The blacktop guys really appreciated the truck, but there's give and take. Some of the other guys were sad to see it getting used like that. Yet to other people, it was a truck. Either way, we used it as a truck, used it for what it was built for. Maybe that rubbed some of the history off it," Kelsey said.

GM officially shuttered its Janesville assembly plant for good in 2009 during the Great Recession and titanic shifts in the automotive industry. Trucks such as the city's big GMC weren't the last vehicles built at the Janesville plant, but the closure of the medium-duty truck line in 2002 is viewed as a turning point in GM, a sign the plant might not forever remain the city's biggest employer.

At its peak in 1977, GM employed about 7,100 people in Janesville, producing 274,286 cars and 114,681 trucks; by 2008, employment was down to 1,300.

Michael Kobelt, a former GM worker on the medium- duty line, told The Gazette he remembers signing his name with a yellow grease pen on the backside of the truck's 300-pound bumper he installed the June morning the truck rolled off the line.

Kobelt, like his father, worked years at the GM plant. He now works in food packaging. The day the big yellow was completed, Kobelt said he remembers its engine fired up on the first turn of the key.

ROP AFFIDAVIT

June 04, 2021

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Media Dept. 6.4.2021

Attachment B Stage 2 Consultation

Draft Study Summary Consultation

Darrin Johnson

From: Darrin Johnson
Sent: Monday, August 2, 2021 4:40 PM
To: Eric Andrews; Edith Leoso (THPO@badriver-nsn.gov); connie.antonuk@wisconsin.gov; Laatsch, Cheryl - DNR; tyler.howe@wisconsinhistory.org; Nick Utrup, USDOI-FWS; David Thomson (dave_thomson@NPS.gov); Michael Ostrenga; environmental@badriver-nsn.gov; Lil Jonas (lilian_jonas@contractor.nps.gov); Susan Rosebrough (susan_rosebrough@nps.gov)
Cc: Crotty, Scott A; Miller, Matthew J; Shawn Puzen
Subject: White River Hydroelectric Project Relicensing Study Summary
Attachments: 20210802 White River Study Summary sent to agencies for comment.pdf

Good Afternoon,

Please find enclosed a copy of the Proposed Study Summary for the White River Hydroelectric Project (P-2444). Please provide any comments you may have within 30 days. Any comments received will be addressed prior to submittal to FERC . NSPW will be also developing individual detailed study plans for each of the studies to be conducted. The study plans will also be sent out for review and comment once they have been developed. If you have any questions, feel free to contact me.

DARRIN JOHNSON
FERC COMPLIANCE AND LICENSING, WATER
Mead & Hunt
Direct: 608-443-0313 | Cell: 715-697-3130 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

Summary of Study Comments and Responses

White River Project
FERC Project No. 2444

White River
Ashland County, Wisconsin

Report prepared for

Xcel Energy

Eau Claire, Wisconsin

Report prepared by

Mead & Hunt

www.meadhunt.com

August 2021

Table of Contents

Appendices

1. Written Study Requests Received From[1]:

- Bad River Band of Lake Superior Tribe of Chippewa Indians (Bad River Tribe)
- National Park Service (NPS)
- Wisconsin Department of Natural Resources (WDNR)
- Wisconsin State Historic Preservation Office (SHPO)

2. Summary of Study Comments and Action Items

A. Aquatic Plant Survey – WDNR

WDNR Comment(s):

The In-water plant community data is limited within the Project boundary. The goal of the study is to provide baseline information on the condition of the aquatic plant community in the White River Project.

Methodology – The information collected from this study includes an assessment of the density and diversity of macrophytes, which includes frequencies of occurrence of different plant species, as well as estimates of species richness, abundance, and maximum depth of plant colonization. The aquatic invasive species study should be conducted according to the department's Recommended Baseline Monitoring of Aquatic Plants in Wisconsin.

NSPW Response:

NSPW will complete a point-intercept survey according to the WDNR's Recommended Baseline Monitoring of Aquatic Plants in Wisconsin methodology as part of the Invasive (Aquatic and Terrestrial) Study described in **Section H** below. NSPW will rely on the WDNR to provide the point intercept grid.

B. Assessment of Current Dam Operations – WDNR

WDNR Comment(s):

Determine if the Project is meeting the requirements of minimum flows and run-of-river operations, based on license requirements, and compared to the temporary order. Conduct a desktop review of existing inflow and outflow data, including an evaluation report of run-of-river and operations requirements.

NSPW Response:

The Licensee requested an extension of time (EOT) from the Commission via letter dated December 2, 2020, to further evaluate its reservoir operations. More specifically, the Licensee requested additional time to evaluate various gate setpoints which would hopefully reduce the frequency in which the reservoir operates in the upper one-foot band (711.6' - 712.6') of the temporary reservoir operating range. FERC issued an Order on July 15, 2021, denying Licensee's request for an EOT and stated that the Licensee must comply with the approved

[1] Actual Study Request Letters are enclosed in Appendix 1.

reservoir operating range (710.4' - 711.6') and notify the FERC of any deviations from said operating range. Recent changes to the gate setpoints have met with early success in maintaining the reservoir within the licensed operating range. Future runoff events will help determine if a revised protocol for reporting pond level deviations is necessary.

The Licensee will include all interested stakeholders in the discussion regarding the history and future of reservoir operations.

C. Assessment of Minimum Flow and Resource Impacts Downstream of the Tailwater – WDNR

WDNR Comment(s):

Provide an assessment of the average range of flows, including minimums and maximums and their relevance, associated with run-of-river operations and facility capacity. Evaluate the minimum flow and ensure that the minimum flow does not have an adverse impact on the aquatic resources within the White River Project boundary and downstream of the Project.

Methodology – Conduct an in-stream flow study, which includes a description of current habitat conditions within the bypass channel under current operation and flows to determine if the current minimum flows are impacting available habitat, fish, and macroinvertebrate communities. Assess various flow regimes to determine what is appropriate to minimize and avoid adverse impact on the cold-water resource.

NSPW Response:

The Licensee will provide an assessment of the average range of flows, including minimums and maximums and their relevance, associated with run-of-river operations and facility capacity in the DLA. Habitat within the bypass channel will be studied as described in **Section D** below. Information from that study will be used to determine acceptable habitat conditions within the bypass channel.

D. Assessment of Riverine and Reservoir Habitat – WDNR

WDNR Comment(s):

Having updated instream and reservoir habitat assessment information is critical for evaluating the effects of the project on the stream ecosystem. It will provide baseline data to current conditions. The data can be used to help guide river management for associated with White River.

Obtaining recent habitat assessment information is critical for future management actions and establishing baseline data. Water level fluctuations due to drawdowns may affect aquatic habitat. Obtaining information on how/if new water levels will cause shoreline erosion as a new ordinary high-water mark is established.

Methodology – The riverine habitat within the project area downstream from the dam should be evaluated with the department Quantitative Habitat Assessment methodology in wadable stretches of White River at the time of each fish survey. For the reservoir, department shoreland *habitat protocol should be used. Newly impounded areas and any wetlands that could be affected by the new water level should be mapped.*

NSPW Response:
NSPW is proposing to conduct fisheries surveys in the bypass channel and in the White River reach extending from the powerhouse downstream for approximately ¼ mile as discussed in **Section G**. The habitat in these two reaches will be assessed using the WDNR Guidelines for Evaluating Habitat of Wadable Streams.

There is existing information available regarding the fishery within the Project reservoir. Additionally, NSPW is proposing to conduct a point-intercept aquatic vegetation survey and analysis of vegetation along the reservoir shoreline as part of the Invasive Species (Aquatic and Terrestrial) Survey as discussed in **Section H**. This information will describe existing habitat conditions within the Project reservoir. Therefore, the Licensee is not proposing to conduct a specific reservoir habitat study. Any changes to the acreage, amount of impounded area, or wetlands that could be affected by water levels will be addressed in the DLA.

E. Assessment of Stream Flows, Channel Dimensions, and Linear Gradient – WDNR

WDNR Comment(s):
The relicensing of the White River has the potential to have short term and long-term impacts on the aquatic community downstream of the impoundment. These impacts include, but are not limited to, dewatering and limiting available aquatic habitat in the downstream river channel depending on stream discharge and dam operation. These impacts can vary by season as well as daily. Proper management of the resource will help ensure that adequate flows are available to aquatic life at the proper time and thermal regime.

Goal – Determine impacts the Project has on the existing stream flows, channel dimensions and linear gradient of the White River. Determine if cold-water resource criteria are being met.

Methodology – Conduct a study to determine stream morphology downstream of the Project at various flows, including width, depth, wetted perimeter, and substrate composition. The study should identify any wetlands that are flooded. This should include available aquatic habitat under current operation through flood flow conditions. Quantitative Habitat Assessment Methodology should be used to document habitat conditions. Refer to existing management efforts (recreational, resource, habitat) to investigate the impacts the proposed project would have.

NSPW Response:
NSPW plans to assess the habitat within the bypass channel and the White River Reach extending from the powerhouse downstream approximately ¼ mile as described in **Section D**, above. That study entails the collection of stream flow, channel dimension, and habitat data. This information will be included in the DLA.

F. Cultural/Historical Resources Study – Bad River Tribe, WSHPO

Bad River Tribe Comment(s):

Finally, we would like to add that cultural and historical considerations do not appear to be adequately addressed, especially with the narrow scope of the Area of Potential Effect (APE), and we will be communicating our concerns regarding these issues with the applicant and FERC in follow-up communications, as we continue to have an interest in this project under the National Historic Preservation Action and 36 CFR 800.

The APE or study area should be expanded to include all of the White River and its floodplain downstream of the dam, the portions of the Bad River downstream of the confluence with the White River, and portions of the Bad River and Kakagon Sloughs Complex that might be impacted by any release of waters from the dam. Expanding the APE will more thoroughly assess possible downstream impacts from the operation of the dam, including impacts to tribal and treaty resources both on-Reservation in in the ceded territories. Understanding these impacts in an expanded APE will help the Tribe comment on the relicensing and ensure that resources are protected for the seventh generation, a critical underpinning for all actions taken by the Tribe. While increasing the APE to cover additional areas would increase the cost of required studies, it would be offset by potential long-term cost savings when possible impacts to the ecology and cultural resources are averted now as compared to needing to be restored or mitigated later.

SHPO Comment(s):

The Wisconsin State Historic Preservation Office (SHPO) has reviewed the materials provided for the proposed NOI, TLP and PAD for the relicensing of the White River Hydro Project, FERC No. 2444. The SHPO has no objection to the use of these procedures. The SHPO also concurs with the determinations found in Section 5.1.9 that the dam AHI # 26205) and the powerhouse and surge tank (AHI #26206) and is of the opinion they are both still considered ineligible for inclusion on the National Register of Historic Places. We would request, however, for some updated photo-documentation to be uploaded to the AHI. We only have a few images, and these are dated, black and white still shots, and some at considerable distance. Updated photo documentation if beneficial for future research, as well as our continuing consultations under 36 CFR 800.

NSPW Response:

The APE for the project is currently defined as the existing Project boundary of the hydroelectric project. This includes the White River and Project reservoir within the zone of fluctuation and adjacent lands owned by the Licensee. APEs for hydroelectric projects are typically established to incorporate the zone of fluctuation within the reservoir, uplands necessary for project operations, and the river channel a short distance downstream of the dam. The Project is located approximately 9 river miles upstream of tribal lands located within the Bad River Reservation, and approximately 13 river miles upstream of the river's confluence with the Bad River. Both the reservation and confluence are located several miles farther downstream than what would typically be included in an APE for a hydroelectric project. The Project operates in a run-of-river mode in which inflow to the reservoir approximates what is released to the river downstream. The Licensee is not proposing to modify the APE.

NSPW will also conduct shoreline surveys at the White River Project to search for previously unidentified archaeological sites and eroding areas. The survey will visit known sites within the current Project boundary and any shoreline areas that are currently eroding. The Licensee will provide updated photo-documentation of the dam, surge tank, and powerhouse to the SHPO.

This study will be completed in 2022.

G. Fishery Study – WDNR

WDNR Comment(s):

Define the diversity and abundance of the fish community within the White River Project.

Data is limited within the Project area downstream of the dam. Fisheries data is available within the White River Flowage as part of the Project reservoir.

Methodology-

White River Flowage – Conduct early spring fyke netting (3-5 nets with a front frame of 4' x 6') set the week after ice-out, conduct late spring electrofishing of the entire shoreline when water temperatures are between 60-70 degrees, and summer fyke netting (3-5 nets with a front frame of 4' x 6') set wen water temps are approaching 70 degrees.

Downstream of White River Flowage – Conduct seasonal catch per unit effort (CPUE) surveys in the spring, summer and fall to quantify fish population relative abundance and summary report to document the species available to recreational fishers and the general fish community composition.

NSPW Response:

WDNR conducted fyke netting of the White River reservoir in 2015. This data, in conjunction with data collected during the last relicensing of the project provides information on the species assemblage. Therefore, no additional fisheries surveys are proposed within the reservoir.

Fisheries data downstream of the dam is very limited. NSPW proposes to conduct seasonal CPUE surveys in spring, summer, and fall to quantify fish population relative abundance and document the general fish community composition within the bypass channel and within the White River from the powerhouse downstream approximately ¼ mile.

This study will be completed in 2022.

H. Invasive Species (Aquatic and Terrestrial) Study – WDNR

WDNR Comment(s):

The project may influence invasive species that have the potential to directly or indirectly cause economic or environmental harm or harm to human health, including harm to native species, biodiversity, natural scenic beauty and natural ecosystem structure, function or sustainability; harm to long-term genetic integrity of native species; harm to recreational, commercial, industrial, *and other uses of natural resources in the state; and harm to the safety or wellbeing of humans including vulnerable or sensitive individuals. -per NR40.*

Methodology – Use WDNR Early Detection Early Response Protocols. Additional methodology may be needed for terrestrial species, and other methodologies such as point-intercept may be appropriate if combining this study with other studies.

NSPW Response:
NSPW is proposing to complete an aquatic invasive species survey on the project reservoir, tailrace, and bypass channel. A point-intercept survey and a rapid-response survey will be completed on the reservoir in areas up to 15 feet in depth according to protocols previously developed in consultation with the WDNR. A rapid-response plan will be developed and implemented in the tailwater and bypass channel areas that is safe and corresponds with published WDNR protocols.

NSPW is also proposing to complete terrestrial aquatic invasive species surveys in areas where project operations have the potential to impact or spread said species. These areas include project facilities, recreation sites, project tailwater, and the reservoir shoreline. NSPW lands that include project facilities or recreation sites, including the project tailwater, will be surveyed for terrestrial invasive species in conjunction with the aquatic rapid response survey. The survey will consist of a meandering survey to identify, locate, and define the perimeter of occurrences of terrestrial plant species listed in NR 40. NSPW will survey the reservoir shoreline for terrestrial invasive species by boat when conducting the reservoir aquatic surveys. In addition to surveying for invasive species, an overall characterization of the terrestrial plant composition will be made.

Reporting will include mapping of identified colonies of species listed in NR 40 on an aerial photo background with bathymetric data, estimation of abundance of plants and a relative density of species in each location. This study will be completed in 2022.

I. Macroinvertebrate Study – WDNR

WDNR Comment(s):
Assess the water quality using macroinvertebrate bio-indicators below and above impoundment.

Macroinvertebrates should be collected upstream of the reservoir in the riverine reach, in the bypass channel, and downstream of the powerhouse in the fully mixed zone. WDNR Guidelines for Collecting Macroinvertebrate Samples from Wadable Streams (2017) and Large River Macroinvertebrate Sampling (2015) should be used as appropriate.

NSPW Response:
The purpose of the study according to the WDNR is to assess water quality with the use of macroinvertebrates as a bio-indicator. NSPW has agreed to complete water quality monitoring of 14 different parameters as described in **Section O**. This will include sampling sites within the reservoir, bypass channel, and downstream of the dam. Additionally, WDNR conducted macroinvertebrate sampling downstream of State Highway 112 (monitoring station number

023127) most recently in 2015. The Macroinvertebrate Index of Biological Integrity (MIBI) from the 2015 sampling was 70, which is near the upper end of the "good" category threshold for non-wadable river MIBI according to the Wisconsin 2020 Consolidated Assessment and Listing Methodology (WisCALM). The data to be collected in the water quality monitoring study, when combined with the available existing macroinvertebrate information, should provide sufficient information to evaluate water quality within and immediately downstream of the White River Project. No additional macroinvertebrate sampling is proposed.

J. Mussel Study – WDNR

WDNR Comment(s):

The goal of the study is to determine freshwater mussel density and diversity including characterizing mussel habitat within the White River Project area. The study would provide information on freshwater mussel species present, their diversity, density, and a better understanding of baseline conditions and associated management needs for White River relicensing.

The operations of the White River Project could influence the freshwater mussel species located at the Project boundary. The results of the survey will provide essential information to determine if any protection measures, restoration, or enhancements would be necessary as a management requirement associated with the relicensing of the White River dam.

A qualitative and quantitative survey for freshwater mussels should be conducted. One method that can be used is WDNR's Guidelines for Sampling Freshwater Mussels in Wadable Stream. Methodology should be discussed with the Department for non-wadable areas. A Mussel Survey Plan should be submitted to the department for review at least 1 month prior to implementation.

NSPW Response:

NSPW will complete the mussel survey outlined above and the plan will be developed in consultation with the WDNR. The study will be completed in 2022.

K. Project Boundary Study – WDNR

WDNR Comment(s):

The goal of the study is to conduct a quantitative assessment of acres of wildlife habitat and surface water that would be modified with a proposed change in the project boundary. This includes impacts to public access and recreational activities.

Methodology – Desktop evaluation of wetland and riparian habitat. Identify changes in acre in wetland and habitat, as well as changes in acreage and use in recreational features. Additionally, identify if any of the areas proposed to be excluded from the Project boundary provide habitat for rare species.

NSPW Response:

NSPW will provide additional information regarding lands proposed for removal from the Project boundary in the DLA. This will include changes to the amount of upland, wetland, and reservoir acres as well as different types of land cover, and potential impacts to listed species, recreation sites, and historic/archaeological sites.

L. Rare and Endangered Species Study – WDNR

WDNR Comment(s):

Rare plants and animals have been found within, adjacent to, and in habitats similar to the study area. It would be recommended to complete plant and animal surveys for these species to determine if they occur within the study area and to further our understanding of their populations within this area. This will also inform the licensee as to where these plant and animal locations are.

The relicensing has the potential to have short-term and long-term impacts on vegetation and animals-in particular, wood turtles and their habitat. Proper management of the resource will help to minimize any adverse impacts associated with the removal restoration and relicensing activities.

Methodology – Using a qualified botanist knowledgeable in area vegetation and specific species, identify, classify, and delineate on a map rare, threatened, or endangered plant species within the project area. Using a qualified biologist or ecologist, conduct presence absence surveys for specific rare, threatened, or endangered animal species.

NSPW Response:

An Endangered Resource Review for the White River Project was completed on April 20, 2020. The ER Log # 20-268 identified state threatened bird species, a state threatened turtle species, and an insect species of state special concern potentially located within the Project area. The review indicated that the bird species would not be impacted due to the lack of suitable habitat in the project area.

In conjunction with development of the DLA, the Licensee will provide an analysis of the vegetation cover types within the project and potential impacts to listed species. If this analysis determines that listed species may be impacted by continuing Project operations, the Licensee will consult with WDNR (for state listed species) and FWS (for federally listed species) to propose mitigation measures to be included in the DLA. Mitigation may include measures such as using the USFWS Step-by-Step Guidance to determine whether proposed activities may impact bald eagles, restricting vegetation management activities to occur outside of sensitive periods, or conducting surveys prior to conducting ground disturbing or vegetation clearing activities. The presence of wild rice has been confirmed within the White River Project reservoir. Wild rice, while not a special concern, threatened, or endangered species, will be identified during the point-intercept plant survey conducted as part of the invasive (Aquatic and Terrestrial) study discussed in **Section H**. Other than the wood turtle study discussed in **Section Q**, no other specific rare species surveys are being proposed by the Licensee.

M. Recreation Study – WDNR

WDNR Comment(s):

Evaluate current recreational uses, including opportunities for low flow and high flow events, public access, natural scenic beauty, trails, water sports, and fishing with consideration of the different seasonal uses.

There are opportunities for fishing, wildlife viewing, and water sports within the White River which includes a public boat landing and canoe portage.

Methodology – Desktop assessment, including a review of the State of Wisconsin 2019-2023 Statewide Comprehensive Outdoor Recreation Plan (SCORP, released in March 2019, public surveys, and existing recreational sites. This includes assessment of current uses, level of use, evaluation for additional recreational features.

NSPW Response:

NSPW is proposing to complete an inventory of recreation sites and facilities in the White River Project vicinity along with an assessment of public recreational use. The inventory will identify existing recreational facilities within the project vicinity and utilize existing information and local knowledge. The assessment will include the following sites:

- *White River Boat Landing*
- *Canoe Portage*
- *Bank Fishing*

In addition to the Licensee owned recreation sites, the WDNR owns and maintains the White River Fishery area that includes lands located upstream, within, and downstream of the Project boundary. In order to obtain information about other recreation in the project vicinity, the Licensee will utilize a questionnaire distributed to Ashland County, Town of White River, and the WDNR. The questionnaire will request information about the types of recreation use at their facilities, any quantitative use data they may have, if they believe their current facilities are adequate, and if they hold any special recreation events that have attendance records.

The use counts and survey will be completed in 2022.

N. Recreation Flow Study – NPS

NPS Comment(s):

During the Joint Agency Meeting the NPS indicated that whitewater opportunities should be investigated during relicensing.

NSPW Response:

American Whitewater (AW) provides whitewater boating information on two reaches of the White River within or partially within the Project boundary. One reach extends 13.6 miles from Maple Ridge Road downstream to the White River Flowage. This reach ends at the White River Boat landing/Canoe Take-out located just north of the dam. This reach is listed as having “nearly continuous class I-II rapids and excellent scenery." AW also indicated that when the reservoir is drawn down, there are some high grade (up to class IV) rapids revealed. However, the FERC license requires the reservoir elevation to be maintained within a narrow operating band. Drawdowns are only conducted when necessary to complete repairs that cannot be performed via other dewatering methods. When a drawdown is required, NSPW must first file a drawdown management plan with the FERC to address potential environmental and recreational impacts.

The second reach identified by AW is the approximately ¼ mile long bypass channel extending from the dam downstream to the powerhouse. AW lists the reach as a "short but interesting run, routinely runnable due to generation demands." AW also indicated that the reach is shallow at flows at or below 500 cfs.

The hydraulic capacity of the turbines at the White River Project is approximately 350 cfs. A minimum flow of 16 cfs is released into the bypass channel at all times. Therefore, when flows exceed 366 cfs, all additional flows are released into the bypass channel. NSPW conducted an analysis of historic flows to determine how often flows exceed 500 cfs, the threshold flow for providing whitewater boating opportunities. The analysis revealed that river flows exceed 500 cfs approximately 15% of days in March, 42% of days in April, 18% of days in May, and 9% of days in June. The rest of the year, flows exceed 500 cfs less than 5% of the time. In order to provide information to whitewater boaters interested in boating the bypass reach, NSPW proposes to add flow information to the public website.

Since the Project already provides whitewater opportunities in two reaches of the White River, NSPW is not proposing additional whitewater boating studies.

O. Water Quality Study – Bad River Tribe, WDNR

Bad River Tribe Comments:

The Tribe as a downstream nation with federally approved Water Quality Standards (WQS), and regulatory authority under the Clean Water Act Sections 303c and 401, should not be treated as every other stakeholder in the relicensing process, and should be involved in additional conversations regarding this project to ensure that federal permitting for the operation of the dam meets the Tribes WQS.

In addition, we want to assure that the relicensing will not negatively impact water quality or water quantity in ways that would result in a degradation to Tribal waters, of which the White River is considered an Outstanding Resource Water, with cultural, commercial, navigable, wildlife, aquatic life and fish, recreational and cool water fishery designated uses. The White River, after its confluence with Bad River Thirteen miles downstream, contributes flow into wild rice waters of the Bad River and Bad River and Kakagon Sloughs. (This sloughs complex is one of the largest manoomin, or wild rice, estuaries in the Lake Superior Basin, a wetland site of international importance under the Ramsar Convention and holds many other designations, including a National Natural Landmark listing within the National Register of Historic Properties). The White River is also historically a wild rice water.

WDNR Comment(s):

The operation of the dam affects the water quality of the impoundment and downstream resources. The overall goal of the request is to further understand the current water quality conditions of the reservoir and river resources which will help inform management decisions in the future. Limited water quality data presented in the PAD is not representative of current or future water quality conditions.

Assess and monitor the following water quality parameters:

Ammonia	*Bacteria*	*Chloride*
Chlorophyll-a	*Conductivity*	*Dissolved Oxygen*
Dissolved Phosphorus	*Nitrate (plus Nitrite)*	*pH*
Sediment Accumulation	*Sulfate, Total Mercury*	*Temperature*
Total Nitrogen	*Total Phosphorus*	*Total Suspended Solids*

Methodology – The department classifies the White River Flowage, as an impounded flowing water, where water residence time is less than 14 days. According to current department information the upper confidence limit for water residence time for White River Flowage is one day. The means that river monitoring protocols should be applied instead of lake protocols.

River monitoring methods (including continuous monitoring) should be performed in at least three locations within the project area (or best appropriate location), including one location downstream of the dam, one location within the impounded area (within the deep area of the impoundment, typically near the dam), and one location upstream of the impounded area.

Data should be collected or analyzed using the DNR WISCALM Guidance and surface water grab sampling protocol.

NSPW Response:

NSPW will complete water quality monitoring for the parameters outlined by WDNR with the exception of sediment accumulation behind the dam. While previous erosion surveys have identified several erosion areas on the reservoir, the erosion appears to be related to upper bank sluffing due to topographic and soil conditions rather that project operations. Each of the sites has established vegetation along the toe at the reservoir interface. The water sampling will be conducted according to WDNR WISCALM Guidance and surface grab sampling protocols. The following parameters will be monitored:

- Ammonia, bacteria, chloride, dissolved phosphorus, nitrate (plus nitrite), sulfate-total mercury, total nitrogen, total phosphorus, and total suspended solids will be collected at each of the sampling sites monthly from May to October (6 total).
- Chlorophyll-a will be collected at each of the sites monthly from July 15 through September 15 (3 total).
- DO, temperature, conductivity, and pH will be collected at each of the sites hourly from July through September.

Study implementation will be completed in 2022.

P. Wildlife Habitat Study – WDNR

WDNR Comment(s):

Document wildlife presence and diversity, habitat types, and general wildlife and vegetation abundance within the project area. The goal of this study is to evaluate the distribution and composition of vegetation, wildlife, and wildlife habitats, including wetlands, and the effects operations has on those habitats.

Methodology – Using a qualified biologist or ecologist knowledgeable in local vegetation, identify, classify, and delineate on a map major vegetation cover types within project area. Existing aerial photography, on the ground surveys, or a combination of the two to identify and map the cover types may be used the biologist/ecologist will record all wildlife present. Ground-truth any remote-sensing mapping efforts and record all wildlife species detected (directly or indirectly) during survey efforts. Describe each cover type by species composition, successional state, and aerial extent (acreage) within the survey area, including invasive species. As an example, the methodology expressed the following reference could be used: https//www.fs.fed.us/research/publications/gtr/gtr_wo89/gtr_wo89.pdf.

NSPW Response:

NSPW will determine the dominant land cover types within the White River Project boundary via a combination of remote-sensing and ground truthing in the field. GIS mapping will be used to determine the areal extent of each cover type and an analysis of the differences in cover types between the lands within the existing and proposed boundaries will be completed. In order to gather this information, a terrestrial component was incorporated into the Invasive Species Study discussed in **Section F**. Since NSPW is not proposing any changes to the operation of the Project, no new impacts to wildlife habitat are anticipated. Therefore, no wildlife observation surveys, other than the wood turtle nesting habitat surveys discussed in **Section Q** are proposed. Information regarding terrestrial wildlife habitat collected from the Invasive Study will be provided in the DLA.

Q. Wood Turtle Study – WDNR

WDNR Comment(s):

Wood turtles are listed as threatened in Wisconsin and as special concern in Michigan. In an effort to better understand the abundance and distribution of this species, several survey and management efforts are taking place across northern Wisconsin within a number of River systems. Presence/absence surveys, population modeling and natural nest site surveys are three examples of existing work that is being done across the range of this species in Wisconsin, which is primarily the northern on-third of the state. The overall goal of this survey request is to further our knowledge of the distribution of wood turtles within the White River watershed more broadly. The two main objectives of this study request are to determine if wood turtles are present within the project boundary of the dam and to determine whether any wood turtle nest sites occur within the Project boundary.

Methodology – Using a qualified biologist or ecologist, two survey protocols are requested:

(1) Presence/absence surveys for wood turtles: Surveys for wood turtles are most effective during spring and early summer, when this species emerges from hibernation and begins breeding activity in terrestrial settings but relatively close to riverbanks. Beginning after ice-out, surveys should be conducted on sunny days when the air temperature is 50-80 degrees Fahrenheit. Depending on the year, local snow/ice conditions and weather, these surveys can typically be conducted from late April to Early June. The survey consists of visual searches within approximately 50 feet of the river's edge where wood turtles can be found basking on days that meet the abovementioned weather criteria. The frequency of these surveys will be dependent on weather conditions, but ideally at least two times per week on non-consecutive days during this timeframe.

(2) Wood Turtle nesting site surveys: Beginning in early to mid-June, and extending until approximately the first week of July, wood turtle nesting activity can be surveyed by conducting daily searches for adult wood turtles and/or evidence of recent nesting activity in suitable nesting habitat. Suitable nesting habitat includes sand or sand/gravel substrate that is either unvegetated or sparsely vegetated, receives sun exposure for most of the day during late/spring Summer and is within approximately 200 feet of the river's edge. Note that this can include gravel parking areas, roads, or shoulders of paved roads. Many portions of the project boundaries can likely be eliminated from these nesting surveys due to a lack of suitable conditions for turtle nesting.

NSPW Response:

Wood turtles have been documented to be present within the Project vicinity as recently as 2014 and 2020. Since the species is known to be present in the area, NSPW does not propose to conduct additional presence/absence surveys and will instead assume that the species is present in the Project vicinity. There is a potential that wood turtle nesting habitat could be impacted by Project operations. Wood turtle nesting habitat includes areas with exposed sand or gravel substrate that are either unvegetated or sparsely vegetated, receive sun exposure for most of the day during late spring or summer, and are within approximately 200 feet of the river's edge. This can include gravel parking areas, gravel roads, or shoulders of paved roads.

NSPW proposes to conduct a survey to identify and map potential wood turtle nesting habitat within the Project during the nesting season. The survey will be completed by traveling along the shoreline by boat or on foot (in areas where boating is not feasible) and on foot on Licensee owned lands with Project facilities (i.e., recreation sites, project structures, regularly maintained areas) where Project operations could impact nesting habitat. All areas with suitable nesting habitat will be identified and mapped. If any wood turtles are identified during the survey, their locations will be recorded via handheld GPS and a rare animal field report form will be completed and forwarded to WDNR. All specific wood turtle location information will be considered privileged and will not be publicly released. A map showing suitable wood turtle nesting habitat within the Project will be provided to the WDNR to help identify mitigation measures that may be necessary. Information collected during the study, and any proposed mitigation measures, will be included in the DLA.

The nesting habitat survey will take place in 2022.

R. Tribal Concerns on Drawdowns & Flooding downstream due to dam releases – Bad River Tribe

Bad River Tribe Comment(s):

We are very concerned with the operation, maintenance, and relicensing of the White River Dam, especially knowing the impacts that the Tribe has experience living downstream of the dam. Our concerns arise from negative impacts and disruption to Tribal fishing due to an improperly managed drawdown of the reservoir, and concerns about the potential releases from the dam that contribute to erosion and flow impacts for the Tribal community downstream.

NSPW Response:

The impacts from drawdowns should be handled on a case-by-case basis. NSPW is willing to consult with the Tribal Community prior to any planned deviations from normal operations or temporary amendments (drawdowns). NSPW has proposed to maintain a run-of-river operation and plans to work with the WDNR regarding reservoir operations as described in **Section B**. This will assure run-of-river operation with gate changes is defined appropriately.

TABLE 1: Study Commitments and Timing

Commitment	Explanation	Time of Implementation
Aquatic Plant Study (Completed as part of Invasives Study)	Will be completed as part of Invasive Species Study.	NA
Assessment of Minimum Flow and Resource Impacts Downstream of the Tailwater	Information requested in this study will be provided in Assessment of Riverine and Reservoir Habitat Study below.	NA
Assessment of Riverine and Reservoir Habitat	Complete Study.	2022
	Include information in DLA.	2023
Assessment of Stream Flows, Channel Dimensions, and Linear Gradient	Information requested in this study request will be provided in Assessment of Riverine and Reservoir Habitat Study.	NA
Cultural/Historic Resources Study	Conduct shoreline survey.	2022
	Conduct photo-documentation.	2022
Fisheries Study	Complete CPUE fish surveys in bypass channel and river reach downstream of powerhouse.	2022
	Include information in DLA.	2023
Invasive Study (Aquatic and Terrestrial)	Complete Study.	2022
	Include information in DLA.	2023

Commitment	Explanation	Time of Implementation
Macroinvertebrate Study	Not proposing to complete this study.	NA
Mussel Study	Work out study protocol and sampling locations with WDNR.	2021
	Complete Study.	2022
	Include in DLA.	2023
Project Boundary Change Study	Analyze differences of lands in each proposed and existing Project boundary.	2022
	Include information in DLA.	2023
Rare and Endangered Species Study	Evaluate cover types within project to determine potential rare species impacts.	2022
	Include information in DLA.	2023
Recreation Use	Complete Recreation Site Inventory of NSPW sites.	2022
	Develop and send out questionnaire.	2022
	Include information in DLA.	2023
Recreation Flow Study	Not proposing to complete this study.	NA
Water Quality Study	Complete water quality monitoring.	2022
	Include information in DLA.	2023
Wildlife Habitat Study	Assess cover type information.	2022
	Include information in DLA.	2023
Wood Turtle Study	Complete Wood Turtle Study.	2022
	Include results in DLA.	2023

Appendix 1. Study Requests

Darrin Johnson

From: TYLER B HOWE <tyler.howe@wisconsinhistory.org>
Sent: Friday, September 4, 2020 10:46 AM
To: matthew.j.miller@xcelenergy.com; Shawn Puzen; Darrin Johnson
Subject: WI SHPO comments regarding proposed TLP and PAD for White River Hydro, FERC No. 2444,

Good morning gentlemen:

The WI State Historic Preservation Office (SHPO) has reviewed the materials provided for the proposed NOI, TLP and PAD for the relicensing of the White River Hydro project, FERC No. 2444. The SHPO has no objections to XcelEnergy's use of these procedures. The SHPO also concurs with the determinations found in Section 5.1.9 that the dam (AHI #26205) and the powerhouse and surge tank (AHI #26206), and is of the opinion they are both still considered ineleigible for inclusion on the National Register of Historic Places. We would request, however, for some updated photo-documentation to be uploaded to the AHI. We only have a few images, and these are dated, black and white still shots, and some at considerable distance. Updated photo-documentation is beneficial for future research, as well as our continueing consultations under 36CFR800. We also stand ready to continue these same consultation throughout the reliscencing procedure.

Please do not hesitate to contact me should you have any questions or concerns.

All the best,

Tyler

Tyler B. Howe, PhD
Compliance Section Manager
State Historic Preservation Office
Wisconsin Historical Society

(608) 264-6508

https://www.wisconsinhistory.org

United States Department of the Interior
NATIONAL PARK SERVICE
601 Riverfront Drive
Omaha, NE 68102

10.A.(MWR-FPI)
October 8, 2020

To: Paul Makowski
Federal Energy Regulatory Commission
paul.makowski@ferc.gov
(202) 502-6836

From: Christine Gabriel, Regional Environmental Coordinator,
Acting Planning & Compliance Division Manager

Re: FERC Docket # P-2444-036

Dear Mr. Makowski,

The National Park Service has reviewed the above project and is submitting the following comments:

The White River (River) is a large tributary of the Bad River flowing through an area of high hills in the lower reaches and through many miles of the very wild Bibon Swamp. The River has outstanding water quality in its upper reaches and is a popular canoe route. It is listed on the Nationwide Rivers Inventory (NRI) because of its scenic and recreational values from its headwaters in Bayfield County to the White River Hydroelectric Project (Project) dam at the crossing of County Road 112 in Ashland County, WI. Provided that no additional facilities will be constructed, and downstream flow from the Project will not appreciably change, the Project is not likely to preclude the River from consideration under the Wild and Scenic Rivers Act. Any and all efforts should be made to ensure that no Project activities degrade the free-flowing condition and values for which the Bad River is listed on the NRI, downstream from the project as it is a subject of local interest with respect to its potential for addition to the National Wild and Scenic Rivers System.

For more information contact Hector Santiago, Regional Rivers Coordinator at 402-661-9112.

Thank You,

Christine Gabriel

CHRISTINE GABRIEL

Digitally signed by CHRISTINE GABRIEL
Date: 2020.10.08 16:53:12 -05'00'

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
2984 Shawano Avenue
Green Bay WI 54313-6727

Tony Evers, Governor
Preston D. Cole, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

December 17, 2020

Federal Energy Regulatory Commission
Kimberly D. Bose, Secretary
888 First Street, N.E.
Washington, DC 20426

Matthew J. Miller
Hydro License Compliance Consultant
Northern States Power Company-Wisconsin, Xcel Energy
1414 W Hamilton Avenue, PO Box 8
Eau Claire, Wisconsin 54702-0008

RE: Wisconsin Department of Natural Resources Comments on Preliminary Application Document for the White River Hydroelectric Project P-2444

Dear Mr. Miller:

The Wisconsin Department of Natural Resources (department) appreciates the opportunity to participate in the process to relicense the White River hydroelectric dam as proposed in the Preliminary Application Document (PAD). This dam is licensed by Xcel Energy, under Project P-2444.

The White River Project (Project) is located in the Town of White River, Ashland County, Wisconsin.

The department has limited information regarding natural resource information associated with the hydroelectric dam and its project area. Studies associated with White River relicensing have different purposes, from a short term, long term, and cumulative impact. The department has carefully considered our responsibilities under the Clean Water Act and Navigable Waters Public Trust Doctrine for the proposed relicensing of White River.

We are providing comments to the PAD and are recommending the following studies be completed. Each study is presented as appropriate for the various alternatives that could be evaluated as part of the comprehensive review and assessment of the project area. Our requests for information and studies focus on the continued operation of the White River dam.

As Xcel Energy begins to evaluate the array of study requests, and determine their study proposal and next steps, the department will continue to provide guidance and recommendations.

Please be aware that Scientific Collectors Permits may be required to complete various surveys. Please work with the department to obtain appropriate permits and approvals prior to the collection of data.

To save time and costs, the department recommends that studies be combined, and that the licensee meet with the stakeholders who have requested studies to explore their options and still achieve desired data collection. We also recommend exploring the use of citizen monitoring groups and organizations.

The licensee should continue to work with the department to collect resource information and develop study plans and protocols. If new information becomes available through the relicensing process, we reserve the rights to require additional studies to gather appropriate information.

Please direct all inquiries to the Project Manager:

Cheryl Laatsch, Statewide FERC Coordinator

If you have any questions or comments regarding our recommendations, please contact me at 920-387-7869, or Cheryl.laatsch@wisconsin.gov. We look forward to working with you.

Regards,

Cheryl Laatsch

Cheryl Laatsch
Statewide FERC Coordinator
Wisconsin Department of Natural Resources

Comments on PAD

Relicense of White River Project P-2444

3.2 White River Project Facilities

- Please provide additional, detailed photos of the dam facility and Project structures
- The PAD states that stoplog slots are located approximately two feet upstream of and parallel to the trash rack. Please provide clarification on intake structure operations and how this relates to spillway section
- The PAD states that the reservoir maximum depth is 26 feet and an estimated average of 7 feet. Please provide where the maximum depth is reached within the project boundary. Please provide information on where the data originated and a current bathymetry map.
- The PAD states that a third of the reservoir is less than 3 feet deep, please provide details on how this information relates to the capacity of impoundment (muck, shallow). Please provide information on where the data originated and a current bathymetry map.
- Please provide more details on the proposed project boundary change described in the PAD. This includes details of the type of land and cover type that will removed/added to the proposed project boundary, why Xcel is proposing to reduce the project boundary, and the reasoning behind a proposed project boundary change that will reduce the current 125 acres to 64 acres. Land that is removed from the proposed project boundary needs to be areas not used for generation and are not sensitive resources. Please provide documentation on how Xcel is determining sensitivity of the resource.

3.3 Project Operation

- The PAD states that the Project is currently operating in a modified run-of-river (ROR) mode, however, White River Project is not actually meeting this operating plan, as provided in quarterly and annual water level reports. The PAD should clearly discuss the historical license compliance and what actions have been occurring under the temporary amendment to water levels.
- The PAD states that the temporary increase in the upper limit of reservoir operating range would accommodate the licensee's historic practice of overtopping the spillway gates during runoff events. Overtopping is not considered a ROR mode of operations. The licensee's historic practice is not in compliance with license requirements and was only recently identified. It is not clear what run-of-river may look like at this facility.
- The PAD states that the three-year reservoir operations test would provide sufficient operating data for both Xcel and the department to evaluate when determining if the temporary upper limit of the reservoir operating range (712.6 feet) should become permanent. The department disagrees with this statement. The purpose of the test period wasn't meant to apply the 712.6 feet operating range at all times, but only during the Spring runoff. The department is concerned that White River Project doesn't have the

appropriate equipment to comply with their license, as the Project should have been able to control these incoming water levels based on the equipment that it has at the dam site. Additionally, there have not been any environmental resource evaluations associated with historical operations, historical non-compliance, nor the temporary order.

- The PAD states that a minimum flow of 16 cfs or inflow, whichever is less, is released at all times into the bypass reach of the White River immediately below the dam. Please explain how 16 cfs was adequately determined during the current licensing period. Please provide documentation as to where additional water goes after White River reaches their capacity limit and how it relates to the 16 cfs. Please describe how "16 cfs or inflow, whichever is less" requirement is meeting Xcel's opinion of run-of-river.

3.4 Other Project Information

- The department will require a drawdown plan as part of the Water Quality Certification. There is a significant amount of sediment, such as sand and clay, within the project area that can mobilize during a drawdown and negatively affect aquatic resources. The department remains concerned that within this current license, White River Project didn't follow the established drawdown plans at the last drawdown event, and sediment was released downstream, affecting mussels, aquatic life, and the Bad River Band Tribe.
- The current plan to monitor the fly ash/cinders used during the "cindering" process for sealing the spillway gates will need to be revisited, as the department does not support the continued use of cinder for sealing a spillway. Use of cinders does require permits and approvals from the department's Solid Waste/Hazardous Waste program.
- The PAD states that Xcel Energy identified two non-compliance instances during the current license term. This is subjective because the historical operations and deviations were not reported, therefore non-compliance cannot be determined, it's assumed.
- Please explain how 16 cfs is the minimum flow, while table 3.4.3-1 shows average historical outflows are significantly greater than 16 cfs (see comments associated with Section 3.3).

4.1 General Description of the Project Area

- The PAD states that there are three state-regulated dams on the Long Lake Branch of the White River upstream of the Project. Please explain the significance of this observation.

4.3 Water Resources

- Xcel Energy is proposing to have the temporary operating range be made permanent, however, there are no proposed changes to outflow or other operations.
- White River Flowage is a PNW (Priority Navigable Waterway)
    - Definition: Lakes less than 50 acres, waters with self-sustaining musky, sturgeon and walleye populations, tributaries to and rivers connecting naturally reproducing populations, and perennial tributaries to trout streams

- The PAD states that "the waters within the Project are subject to two different temperature standards. The Project reservoir is classified as a "Warm-Small" water and the White River upstream and downstream of the reservoir is classified as a "Cold" water."
    - Temperature criteria for the White River Flowage are the same as for the White River running through it. The few differences are going to be biological metrics, but these are currently based on best professional judgement, not established Impounded Flowing Water (IFW) biological metrics. There may be specific chl-a criteria for IFW in the future. With the water residence time being so low, the river metrics apply. The flowage should also be assessed as 'cold' for temperature.
- Xcel has identified White River as a wild rice water. Additional analysis will need to be conducted to assess where wild rice is observed. Wild Rice sustainability is highly dependent upon water level management. The department will require license management plans to incorporate Wild Rice conservation practices.
- The PAD provides historic water quality monitoring data. Please provide maps with monitoring site locations.
- Disclaimers are not included in the PAD from department website references. Please update as appropriate.

4.4 Fisheries and Aquatic Resources

- PAD fisheries data was reported from the department Fish Mapping Application. The PAD states that this application and database is updated regularly, which is no longer the case. Data from this application is not updated regularly and has been removed from the department website. Please use fisheries data provided to Xcel from department program staff during the PAD Questionnaire request.
- Significant fisheries data was provided to Xcel from department program staff during the PAD Questionnaire request period. There is no summary of this data within the PAD, but acknowledgment only within an Appendix.
- The PAD states that "the Project Dam serves as an important barrier to upstream migration of the sea lamprey (Petromyzon marinus), which the department considers a nuisance species that has affected the lake trout (Salvelinus namaycush) population in the Great Lakes. The dam prevents sea lamprey from reaching potential upstream spawning areas and prevents potential parasitic infestations in upstream waters (FERC, 1995)."
    - The department offers the following revised narrative as a more representative descriptor of the dam as a barrier:

    The Project dam is the first impassable barrier upstream from Lake Superior and does not provide upstream fish passage. This blocks migratory fishes from any upstream spawning habitats, particularly sea lamprey (Petromyzon marinus), an aquatic invasive species managed through an active control program by Wisconsin DNR and Great Lakes Fishery Commission to reduce its population and negative impacts to Lake Superior fishes such as lake trout.

4.7 Rare, Threatened and Endangered Species

- The PAD states that there are no proposals of any new facilities or changes in current operations for the Project, which is incorrect. Proposing a permanent change in reservoir water level operations may affect rare, threatened, and endangered species. The department will be requesting an evaluation of proposed water levels and the effect on these species.
- Sensitive Species information must be redacted in any public documents.

- An Endangered Resources review was not completed for the reduced/proposed project boundary.

4.8 Recreation and Land Use

- More discussion is needed on the DOT roadway that is located on top of the dam, thus even though Xcel may not be proposing to change their operations or dam infrastructure, this is not saying that DOT will not be requiring changes during the next license. Therefore, more information is requested.
- More information is needed about the state fishery area within the Project Boundary. More discussion is needed upon the resources and management plans within this area.

Study Request

Relicense of White River Project P-2444

ASSESSMENT OF CURRENT DAM OPERATIONS

• Goals and Objectives: Determine if the Project is meeting the requirements of minimum flows and run-of-river operations, based on license requirements and compared to the temporary order.

• Relevant DNR Management Goals: Review the current operations relative to maintaining consistent reservoir elevations and downstream flows that mimic background hydrology, as achieved by run-of-river operations.

• Existing Information: Monthly flow duration curves for the White River Project were developed based on data recorded at USGS Gage No. 04027500, which is located at the Project tailrace.

• Operation nexus to resource and how informs license: Ensure White River Project operates within limits of hydrologic modification through run-of-river, and not causing divergence in flows that harm the downstream aquatic ecosystem.

• Methodology: Desktop review of existing inflow and outflow data, including an evaluation report of run-of-river and operations requirements.

• Level of Effort and Cost: Staff time is expected to be 20-40 hours at $125 per hour equaling $2,500-$5,000 for data analysis and report.

ASSESSMENT OF MINIMUM FLOW AND RESOURCE IMPACTS DOWNSTREAM OF THE TAILWATER

• Goals and Objectives: Provide an assessment of the average range of flows, including minimums and maximums and their relevance, associated with run-of-river operations and facility capacity.

• Relevant DNR Management Goals: Evaluate the current minimum flow and ensure that the minimum flow does not have an adverse impact on the aquatic resources within the White River Project boundary and downstream of the Project.

• Existing Information: A minimum flow of 16 cfs or inflow, whichever is less, is released at all times into the bypass reach of the White River immediately below the dam, as stated in the current license.

• Operation nexus to resource and how informs license: Ensure White River is meeting the intent of run-of-river, and not causing divergence in flows that harm the downstream aquatic ecosystem.

• Methodology: In-stream flow study, which includes a description of current habitat conditions within the bypass channel under current operation and flows to determine if the current minimum flows are impacting available habitat, fish, and macroinvertebrate communities. Assess various flow regimes to determine what is appropriate to minimize and avoid adverse impact on the cold-water resource.

• Level of Effort and Cost: Staff time is expected to be 20-40 hours of field work at $125 per hour, plus costs for equipment.

ASSESSMENT OF STREAM FLOWS, CHANNEL DIMENSIONS, AND LINEAR GRADIENT

• Goals & Objective: Determine impacts the Project has on the existing stream flows, channel dimensions and linear gradient of White River. Determine if cold-water resource criteria are being met.

• Relevant DNR Management Goals: The proposed study would investigate the impacts the Project would have on the existing stream flows, channel dimensions, and linear gradient of the White River. The impacts that the Project may cause on the existing stream flows, channel dimensions and linear gradient may alter resources and recreational and developmental management plans for the future.

• Existing Information: Data is limited relating to flow, channel dimensions, and linear gradient impacts within the Project boundary.

• Operation nexus to resource and how informs license: The relicensing of White River has the potential to have short term and long-term impacts on the aquatic community downstream of the impoundment. These impacts include, but are not limited to, dewatering and limiting available aquatic habitat in the downstream river channel depending on stream discharge and dam operation. These impacts can vary by season as well as daily. Proper management of the resource will help ensure that adequate flows are available to aquatic life at the proper time and thermal regime.

• Methodology: Conduct a study to determine stream morphology downstream of the Project at various flows, including width, depth, wetted perimeter and substrate composition. The study should identify any wetlands that are flooded. This should include available aquatic habitat under current operation through flood flow conditions. Quantitative Habitat Assessment Methodology should be used to document habitat conditions. Refer to existing management efforts (recreational, resource, habitat) to investigate the impacts the proposed Project would have.

• Level of Effort and Costs: Staff time is expected to be about 20-40 hours of fieldwork at $125 per hour plus cost of equipment.

ASSESSMENT OF WATER QUALITY

• Goals & Objectives: The department is requesting at least one year of water quality data collection. Depending on the first year of data, a second year of water quality studies may be requested. Assess and monitor the following water quality parameters:

Total Phosphorus	pH	Ammonia
Chlorophyll-a	Total Nitrogen	Chloride
Dissolved Oxygen (DO)	Sulfate, Total Mercury	Bacteria
Temperature	Dissolved Phosphorus	Total Suspended Solids
Conductivity	Nitrate (plus nitrite)	Sediment Accumulation

• Relevant DNR Management Goals:

Total Phosphorus: One of the primary causes of eutrophication and most widespread pollutant in waterbodies statewide and nationally. Impoundments are unlikely to raise the concentration of phosphorus in the downstream river but play a role in the transformation, such as the ratio of dissolved phosphorus to total phosphorus. Dam operation might influence internal phosphorus loading to the impoundment by affecting the mixing regime as water levels change.

Chlorophyll-a: A measurement of the amount of algae in a waterbody, one of the primary manifestations of eutrophication. As impoundments increase surface area, slow and warm water are likely to produce more chlorophyll-a, per unit phosphorus/nitrogen, than the upstream or downstream river. Impoundments may produce chlorophyll-a in the lake environment that is then passed to the downstream river. Dam operations may have limited ability to control chlorophyll-a, but location of discharge will play a role in the potential to release downstream. Dam operations can reduce chlorophyll-a by reducing water residence times and by artificially mixing the phytoplankton into deep waters below the euphotic zone (resulting in less primary production than expected given nutrient levels). Other tools to reduce nutrient and algal concentrations include flow by-passes, pre-impoundments, scour valves that discharge nutrient-rich hypolimnetic water, and modifications to the operating regime. Drawdown can increase internal nutrient loading by instigating a mixing event.

Dissolved Oxygen: Dissolved oxygen is critical for the health and survival of aquatic organisms. Deep impoundments may stratify and become oxygen depleted in deep water. Impoundments may then cause a decrease in dissolved oxygen in the downstream river, especially if there is bottom withdrawal of a eutrophic impoundment, or an impoundment that stratifies. Additionally, eutrophic impoundments may transform nutrients into organic matter (mainly algae) that then flows into the river, decomposes and reduces oxygen. Dam operations can influence downstream dissolved oxygen by changing/mixing withdrawal location (top versus bottom draw) or aerating discharge before it reenters the downstream riverine environment (among others). Additionally, passing anaerobic waters through turbines or similar precision machinery may also cause damage to the facility's equipment.

Temperature: Temperature regime of a waterbody structures community composition of fish, invertebrates, plants, etc. Temperature also effects rates of chemical reactions, ecosystem productivity and the ability for gasses to dissolve in water. Impoundments can increase water temperatures by slowing water velocity and increasing surface area to absorb solar radiation. Additionally, deep impoundments may cause deep water temperatures to decrease if there is stratification. Dam operations can influence downstream temperature by changing/mixing withdrawal location, top versus bottom draw (among others). White River should be considered a cold-water resource.

Conductivity: High concentrations of dissolved ions, measured as conductivity, can impair the osmoregulation of organisms with gills and other semipermeable membranes. Sources of elevated conductivity are likely from nonpoint and certain point source discharges. However, conductivity is important for classifying the impoundment and stream and is therefore needed as background information.

pH: pH can control the biologic availability, solubility and speciation of chemicals in water. Although wild rice does well in slightly acidic waters (pH 5.9 – 6.2), even moderately acidic water may irritate the gills of aquatic fish and insects or reduce the hatching success of fish eggs. Eutrophication increases swings in pH during the algal growth and die-off phases. Highly eutrophic impoundments may release high or low pH to the river downstream. In addition, fluctuating water levels can acidify the impoundment by exposing the waterbody bed to air and then flushing sulfate into the water when lake levels rise again or when it rains. Dam operation probably has very little opportunity to mitigate dramatic pH swings at short time-scales, but operations that cause sufficient changes in water levels may affect pH at a seasonal or interannual time scale.

Total Nitrogen: An oversupply of nitrogen is one of the primary causes of eutrophication. A lack of nitrogen limits wild rice development. Impoundments are unlikely to raise the concentration of nitrogen in the downstream river. Although some planktonic algae can fix atmospheric nitrogen, this amount is likely overwhelmed by the amount of nitrogen coming in from the watershed via tributary streams.

Impoundments do play a role in the transformation, such as the ratio of dissolved inorganic nitrogen to organic nitrogen.

Sulfate, Total Mercury: Dam operations can influence the sulfur and ultimately the mercury cycle. In short, long-term drawdowns can eventually lead to increased sulfate runoff when it rains. This acidifies the water and can then enhance methyl mercury concentrations in water and methyl mercury in fish. Sulfate can also be converted to toxic sulfide which affects the mitochondria of plants. When sulfate is high, sulfides are also usually high and therefore toxic to wild rice and other plants. This process has been demonstrated in formation of new reservoirs and in the regulation of existing reservoirs. Impoundments can cause this process to happen. Water levels will need to be managed to prevent increased total mercury and high sulfate levels.

Dissolved Phosphorus: An oversupply of phosphorus is one of the primary causes of eutrophication and most widespread pollutant in waterbodies, statewide and nationally. Low phosphorus levels limit wild rice seedling success and development. Impoundments are unlikely to raise the concentration of phosphorus in the downstream river, but play a role in the transformation, such as the ratio of dissolved phosphorus to total phosphorus. Dam operation might influence internal phosphorus loading to the impoundment by affecting the mixing regime as water levels change.

Nitrate (plus nitrite): One of the bioavailable forms of nitrogen, a primary cause of eutrophication. Impoundments are unlikely to raise the concentration of nitrate in the downstream river. Although some planktonic algae can fix atmospheric nitrogen, this amount is likely overwhelmed by the amount of nitrate coming in from the watershed via tributary streams.

Ammonia: One of the bioavailable forms of nitrogen, a primary cause of eutrophication. Impoundments are unlikely to raise the concentration of ammonia in the downstream river. Dam operations are unlikely to influence ammonia concentration unless there is a bottom draw of a stratified, anoxic impoundment

Chloride: Chloride, at elevated levels is toxic to fish, invertebrates and amphibians. At lower levels, it can negatively affect diversity, productivity, and increase the density of water. Chloride is increasing statewide and nationally in waterbodies that have even small percentages of their watershed in urbanized land use. The impoundment is unlikely to transform or change chloride levels from the incoming tributaries (assuming long-term stable water levels). The major exception being if the shore is heavily developed and there are major applications of road salt or point sources with high chlorides.

Bacteria: Bacterial indicators, such as E. coli, are used to detect the presence of fecal contamination in waterbodies to protect recreational uses. Impoundments are unlikely to increase E. coli in downstream rivers, unless there is heavy recreation (campgrounds, beaches, non-sewered sanitation) on the impoundment.

Total Suspended Solids (TSS): High concentrations of TSS can inhibit visibility for predators, damage gill structure of fishes, and lead to high rates of sedimentation in streams and alter benthic habitat. Impoundments are likely to lower TSS concentrations in the downstream river. In extreme cases where sediment build-up behind a dam structure is high, there may be some chance of increased concentrations of TSS. Dam operation is unlikely to influence TSS unless there is a catastrophic event, draw down or using ash cinders as a sealant.

Sediment Accumulation Behind Dam: Dams trap sediments upstream. Ecological concerns include increasing turbidity upstream and smothering spawning beds in the reservoir and upstream. Sediment build up can also threaten the longevity of the dam itself.

• Existing Information: Water quality data is limited. The PAD presents that the most recent water quality monitoring was completed in 2007.

• Operation nexus to resource and how informs license: The operation of the dam affects the water quality of the impoundment and downstream resources. The overall goal of the request is to further understand the current water quality conditions of the reservoir and river resources which will help inform management decisions in the future. Limited water quality data presented in the PAD is not representative of current or future water quality conditions.

• Methodology: The department classifies the White River Flowage, as an impounded flowing water, where a water residence time is less than 14 days. According to current department information, the upper confidence limit for water residence time for White River Flowage is one day. This means that river monitoring protocols should be applied instead of lake protocols.

River monitoring methods (including continuous monitoring) should be performed in at least three locations within the project area (or best appropriate location), including one location downstream of the dam, one location within the impounded area (within the deep area of the impoundment, typically near the dam), and one location upstream of the impounded area.

Data should be collected or analyzed using the DNR WISCALM Guidance and surface water grab sampling protocol. A list of standard operating procedures can be found in the appendix of the most current department Wisconsin Consolidated Assessment and Listing Methodology (WisCALM, https://dnr.wisconsin.gov/topic/SurfaceWater/WisCALM.html), in addition to protocols listed in the table below:

Parameter	Method	Frequency – At least one year of studies requested	DNR Protocols
Total phosphorus	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Chlorophyll *a*	Grab samples	Monthly, July 15 – September 15 **3 total**	Wisconsin Citizen Lake Monitoring Training Manual (Chemistry Procedures, 2020) https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/programs/clmn/training.aspx
Dissolved oxygen	Field measurement	Continuous, July – September	Use instruction manual from manufacturer
Temperature	Field measurement	Continuous, year-round	Use instruction manual from manufacturer
Conductivity	Field measurement	Continuous, July – September	Use instruction manual from manufacturer
pH	Field measurement	Continuous, July – September	Use instruction manual from manufacturer
Dissolved Phosphorus	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Total Nitrogen	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Sulfate, Total Mercury	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
TSS	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol

			https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Nitrate (plus nitrite)	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Ammonia	Grab samples	Monthly, May – Oct **6 total**	Nutrient Grab Sample Protocol https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765
Chloride	Grab samples	Monthly, May – Oct **6 total**	Wisconsin Citizen Lake Monitoring Training Manual (Chemistry Procedures, 2020) https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/programs/clmn/training.aspx
Bacteria	Grab samples	Monthly, May – Oct **6 total**	Citizens Monitoring Bacteria: A training manual for monitoring E. coli http://dnr.wi.gov/lakes/forms/ecoli_may162005.pdf

For the analytes without state standards, they should be analyzed by mean and median values and reported in a table by date and time annually.

Sediment accumulation should be assessed and mapped behind the dam. This includes estimated depth and volume of sediment held within the impoundment.

• Level of Effort and Costs: Six field days plus with two people $125 per hour plus costs for equipment. Estimated 40 hours for report writing and chemical analysis. Additional field work may be required to monitor/maintain continuous monitoring sensors.

ASSESSMENT OF WILDLIFE AND WILDLIFE HABITAT

• Goals & Objectives: Document wildlife presence and diversity, habitat types, and general wildlife and vegetation abundance within the Project area. The goal of this study is to evaluate the distribution and composition of vegetation, wildlife, and wildlife habitats, including wetlands, and the effects operations of those actions have on wildlife inhabiting those habitats.

• Relevant DNR Management Goals: The department has responsibility to manage wildlife, including listed species. This information will be beneficial to understanding the current environment and potential needs for resource management associated with White River.

• Existing Information: No wildlife surveys or data have been collected within the Project boundary. Additionally, the PAD does not include any field assessment or surveys of wildlife habitat or use.

• Operation nexus to resource and how informs license: The relicensing of White River has the potential to have short term and long-term impacts on habitat and wildlife use of affected habitats. Proper management of the resource will help to minimize any adverse impacts associated with the removal, restoration, and relicensing activities.

• Methodology: Using a qualified biologist or ecologist knowledgeable in local vegetation, identify, classify, and delineate on a map major vegetation cover types within Project area. Existing aerial photography, on the ground surveys, or a combination of the two to identify and map the cover types may be used. The biologist/ecologist will record all wildlife present.

Ground-truth any remote-sensing mapping efforts, record all wildlife observed (directly or indirectly) and document any terrestrial invasive species detected during survey efforts. Describe each cover type by species composition, successional stage, and aerial extent (acreage) within the survey area, including invasive species. As an example, the methodology expressed in the following reference could be used: https://www.fs.fed.us/research/publications/gtr/gtr_wo89/gtr_wo89.pdf

• Level of Effort and Costs: 80 hours of desktop review, field work, and data summary at an estimated $125 per hour, plus equipment costs.

ASSESSMENT OF RIVERINE AND RESERVOIR HABITAT

• Goals & Objectives: Define, measure, and assess the stream habitat conditions upstream and downstream of the hydropower facilities at current and proposed elevations. Define, measure, and assess the reservoir habitat, including upstream and downstream of the reservoir at current and proposed elevations.

• Relevant DNR Management Goals: Obtaining recent habitat assessment information is critical for future management actions and establishing baseline data. Water level fluctuations due to drawdowns may affect aquatic habitat. Obtaining information on how/if new water levels will cause shoreline erosion as a new ordinary high water mark is established

• Existing Information: Data is limited within the Project boundary, with most recent shoreline survey performed in 2003. The riparian habitat in the White River Project vicinity is undeveloped except for formal recreation sites and the Project structures.

• Operation nexus to resource and how informs license: Having updated instream and reservoir habitat assessment information is critical for evaluating the effects of the Project on the stream ecosystem. It will provide baseline data to current conditions. The data can be used to help guide river management associated with White River.

• Methodology: The riverine habitat within the project area downstream from the dam should be evaluated with the department Quantitative Habitat Assessment methodology in the wadable stretches of White River at the time of each fish survey, below. For the reservoir, department shoreland habitat protocol should be used. Newly impounded areas and any wetlands that could be affected by the new water level should be mapped.

• Level of Effort and Costs: 80 hours of field work and 40 hours of data analysis and reporting at $125 per hour, plus equipment costs.

ASSESSMENT OF FISHERIES

• Goals & Objectives: Define the diversity and abundance of the fish community within the White River Project.

• Relevant DNR Management Goal: Understand the existing environment. The department manages public water for recreational use, such as fishing, protection and management of species, and overall health of the fishery of the state.

• Existing Information: Data is limited within the Project area downstream of the dam. Fisheries data is available within the White River Flowage as part of the Project reservoir.

• Operation nexus to resource and how informs license: Having current fish survey information will help department staff make informed management decisions regarding the fishery.

• Methodology:

White River Flowage:

Early Spring Fyke Netting: Three to five fyke nets (front frame 4’x6’), set the week of ice out.

Late Spring Electrofishing: Maxi boom to survey the entire shoreline with two dippers, when water temps are between 60 – 70 degrees.

Summer Fyke netting: Three to five fyke nets (front frame 4’x6’), set when water temps are approaching 70 degrees.

Fieldwork and data reporting at $125 per hour, plus equipment costs

Downstream of White River Flowage: Seasonal catch per unit effort (CPUE) surveys in the spring, summer, and fall to quantify fish population relative abundance and summary report to document the species available to recreational fishers and general fish community composition.

• Level of Effort and Costs:

White River Flowage:

Early Spring Fyke Netting: Nets would be checked for 3 - 5 days, approximately 2 - 4 hours a day to set, check, move and workup the fish.

Late Spring Electrofishing: Approximately 1 hour of shocking and another hour of setup, take down and fish work up

Summer Fyke Netting: Approximately 2 to 4 hours a day to set, check, move and workup the fish. The nets would be deployed for 3 to 4 net nights , usually set on a Monday, checked daily and removed Thursday or Friday of that same week.

Fieldwork and data reporting at $125 per hour, plus equipment costs

Downstream of White River Flowage**:** One electrofishing pass to determine catch-per-unit-effort and fish community composition during spring, summer, and fall (e.g., early-May, late-July, and early-October) in a single survey station with a length that measures 35 times the mean stream width within the project area downstream from the dam. Mean stream width is computed from measurements at 10 intervals (e.g., every 75 feet). Electrofishing equipment to be appropriate to water depth, such as backpack or stream barge electrofishing units in wadable areas. 30 hours of fieldwork and 40 hours of data reporting at $125 per hour, plus equipment costs.

MACROINVERTEBRATE SURVEY

• Goals & Objectives: Assess the water quality using macroinvertebrate bio-indicators below and above the impoundment.

• Relevant DNR Management Goals: The department is charged with managing the water quality of the waters of the state and meeting designated criteria under the Clean Water Act.

• Existing Information: The most recent macroinvertebrate data was collected in 2015.

• Operation nexus to resource and how informs license: Macroinvertebrates are likely impacted by segmentation of the river, and impoundments can impact communities due to changing thermal and/or flow regimes. These bio-indicators are used to assess the health of the resource.

• Methodology: Wisconsin DNR Guidelines for Collecting Macroinvertebrate Samples from Wadable Streams (2017) and Large River Macroinvertebrate Sampling (2015), as appropriate. Data should be analyzed using the current department WISCALM Guidance. Macroinvertebrates should be collected upstream of the reservoir in the riverine reach, in the bypass channel and downstream of the powerhouse in the fully mixed zone.

Large River Macroinvertebrate Sampling (2015)
https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=120273145

Wadable Streams Macroinvertebrate Sampling (2017)
http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=150708168

• Level of Effort and Costs: One day of field work with an estimated 20 hours of field and data analysis at $125 per hour equals $2,500. Lab analysis at state certified lab estimated to cost $1,000. Mobilization, travel, and equipment is estimated at $2,000.

AQUATIC AND TERRESTRIAL INVASIVE SPECIES SURVEY

• Goals & Objectives: Evaluate the presence/absence of invasive species listed in NR40, including habitat preferences, within the Project area.

• Relevant DNR Management Goal: Minimize the transport and establishment of existing invasive species and establish management practices to reduce new invasive species. Compliance with NR40.

• Existing Information: Reed Canary Grass has been identified within the Project boundary and the current license requires annual Purple Loosestrife monitoring. Narrow-Leaf Cattail was identified, but not verified, in 2018. There are no additional, verified, AIS identified within the Project boundary.

• Operation nexus to resource and how informs license: The Project may influence invasive species that have the potential to directly or indirectly cause economic or environmental harm or harm to human health, including harm to native species, biodiversity, natural scenic beauty and natural ecosystem structure, function or sustainability; harm to the long−term genetic integrity of native species; harm to recreational, commercial, industrial and other uses of natural resources in the state; and harm to the safety or wellbeing of humans, including vulnerable or sensitive individuals. – per NR40.

• Methodology: Use department Early Detection Early Response Protocols. Additional methodology may be needed for terrestrial species, and other methodologies such as point-intercept may be appropriate if combing this study with other studies.

• Level of Effort and Costs: 40 hours of field work and reporting at $125 per hour equals $5,000. Mobilization, equipment, and supplies are estimated at $10,000.

AQUATIC PLANT SURVEY

• Goals & Objectives: The goal of the aquatic plant study is to provide baseline data on the condition of the aquatic plant community in the White River Project.

• Relevant DNR Management Goals: The proposed aquatic plant study will provide baseline aquatic plant information to determine if management practices would be needed to enhance the existing aquatic plant community, and overall health of White River as a bio indicator. Water levels can influence aquatic vegetation.

• Existing Information: In-water plant community data is limited within the Project boundary.

• Operation nexus to resource and how informs license: The study results will provide baseline aquatic plant data. The data informs the Department of the effects on the surface water resource and would be used to formulate management options. Plant density and diversity of aquatic and native species are important for establishing varies management plans and protecting the resource.

• Methodology: The information collected from this study includes an assessment of the density and diversity of macrophytes, which includes frequencies of occurrence of different plant species, as well as estimates of species richness, abundance, and maximum depth of plant colonization. The aquatic invasive species study should be conducted according to the department's Recommended Baseline Monitoring of Aquatic Plants in Wisconsin.

• Level of Effort and Costs: 40 hours of fieldwork and 40 hours of reporting at $125 per hour, plus equipment costs.

MUSSEL STUDY

• Goals & Objectives: The goal of the study is to determine freshwater mussel density and diversity, including characterizing mussel habitat within the White River Project area. The study would provide information on freshwater mussel species present, their diversity, density, and a better understanding of baseline conditions and associated management needs for White River relicensing.

• Relevant DNR Management Goals: This information will help the resource agencies determine if any best management practices are needed to protect listed species and any management measures to protect or enhancement the existing freshwater mussel population.

• Existing Information: Mussel data does not exist within the Project boundary.

• Operation nexus to resource and how informs license: The operations of the White River Project could influence the freshwater mussel species located within the Project boundary. The results of the survey will provide essential information to determine if any protection measures, restoration, or enhancements would be necessary as a management requirement associated with the relicensing of the White River dam.

• Methodology: A qualitative and quantitative survey for freshwater mussels should be conducted. One method that can be used is the department's Guidelines for Sampling Freshwater Mussels in Wadable Stream. Methodology should be discussed with the Department for nonwadeable areas. A Mussel Survey Plan should be submitted to the department for review at least 1 month prior to implementation.

• Level of Effort and Cost: An estimate of 40 hours of field work and 40 hours to analyze data and draft a report at an estimated $125 per hour, plus equipment costs.

ASSESSMENT OF RARE AND ENDANGERED SPECIES

• Goals & Objectives: Rare plants and animals have been found within, adjacent to, and in habitats similar to the study area. It would be recommended to complete plant and animal surveys for these species to determine if they occur within the study area and to further our understanding of their populations within this area. This will also inform the licensee as to where these plant and animal locations are.

• Relevant DNR Management Goals: The department has responsibility to manage plants and animals, including listed species. This information will be beneficial to understanding the current environment, and potential needs for resource management associated with White River. The licensee is also required to follow state Endangered Species laws.

• Existing Information: An Endangered Resources review was not completed for the reduced/proposed project boundary.

• Operation nexus to resource and how informs license: The relicensing of White River has the potential to have short term and long-term impacts on vegetation and animals-- in particular, wood turtles and their habitat. Proper management of the resource will help to minimize any adverse impacts associated with the removal, restoration, and relicensing activities.

• Methodology: Using a qualified botanist knowledgeable in area vegetation and specific species, identify, classify, and delineate on a map rare, threatened, or endangered plant species within the Project area. Using a qualified biologist or ecologist, conduct presence/absence surveys for specific rare, threatened, or endangered animal species.

• Level of Effort and Cost: 40 hours of desktop review and 40 hours of fieldwork, plus equipment costs.

WOOD TURTLE SURVEYS

• Goals & Objectives: Wood turtles are listed as Threatened in Wisconsin. In an effort to better understand the abundance and distribution of this species, several survey and management efforts are taking place across northern Wisconsin within a number of different river systems. Presence/absence surveys, population modelling and natural nest site surveys are three examples of existing work that is being done across the range of this species in Wisconsin, which is primarily the northern one-third of the state. The overall goal of this survey request is to further our knowledge of the distribution of wood turtles within the White River watershed more broadly. The two main objectives of this study request are to determine if wood turtles are present within the Project boundary of the dam and to determine whether any wood turtle nest sites occur within the Project boundary.

• Relevant DNR Management Goals: The department has responsibility to manage wildlife, which includes the wood turtle. This survey study will be beneficial to understanding the current environment and potential needs for resource management associated within the White River Project boundary. Two of the main threats to wood turtles across their range are: 1. Adult mortality due to vehicle collisions 2. Predation of eggs and hatchlings at nest sites, resulting in poor recruitment in many river systems. Wood turtles are particularly susceptible to nest predation due to their tendency to nest colonially and nest in the same location every year, providing a pattern that is recognizable by nest predators, such as raccoon and fox. In an effort to improve recruitment, the department has employed several strategies to protect existing nest sites and create protected artificial nest sites. If any natural nest sites are found within the current or proposed Project boundary, the department will work with the licensee to protect these nest sites from predation as well as from negative human-related impacts.

• <u>Existing Information:</u> Wood turtles are known to be present within this Project boundary, however, survey data is limited.

• <u>Operation nexus to resource and how informs license</u>: The relicensing of White River has the potential to have short term and long-term impacts on wood turtles and habitat use. Proper management of the resources will help to minimize any adverse impacts associated with the restoration and relicensing activities. Examples of possible impacts to wood turtles are related to seasonal water level fluctuations during vulnerable life history stages, both upstream and downstream. If nest sites are present downstream of the dam, increasing downstream water levels during the period following egg laying in June until hatchling emergence in August/September could cause nest failure if nests become submerged for extended periods of time. Depending on timing, winter drawdowns could have impacts on wood turtles upstream of the dam if the water level is lowered to a point where overwintering turtles are exposed to the elements due to low water levels where they are hibernating.

• <u>Methodology:</u> Using a qualified biologist or ecologist, two survey protocols are requested: (1) Presence/absence surveys for wood turtles and (2) Wood turtle nesting site surveys.

1. Presence/absence surveys for wood turtles: Surveys for wood turtles are most effective during spring and early summer, when this species emerges from hibernation and begins breeding activity in terrestrial settings but relatively close to riverbanks. Beginning after ice out, surveys should be conducted on sunny days when the air temperature is 50 – 80 degrees Fahrenheit. Depending on the year, local snow/ice conditions and weather, these surveys can typically be conducted from late April – early June. The survey consists of visual searches within approximately 50 feet of the river's edge, where wood turtles can be found basking on days that meet the abovementioned weather criteria. The frequency of these surveys will be dependent on weather conditions, but ideally at least two times per week on non-consecutive days during this timeframe.

2. Wood turtle nesting site surveys: Beginning in early to mid-June, and extending until approximately the first week in July, wood turtle nesting activity can be surveyed by conducting daily searches for adult wood turtles and/or evidence of recent nesting activity in suitable nesting habitat. Suitable nesting habitat includes a sand or sand/gravel substrate that is either unvegetated or sparsely vegetated, receives sun exposure for most of the day during late spring/summer and is within approximately 200 feet of the river's edge. Note that this can include gravel parking areas, roads or shoulders of paved roads. Many portions of the project boundary can likely be eliminated from these nesting surveys due to a lack of suitable conditions for turtle nesting.

• <u>Level of Effort and Costs:</u> Approximately 20 hours at $125 per hour, plus equipment costs.

1. Presence/absence surveys for wood turtles, Spring, 2021: Two surveys per week for four weeks (assume 1-2 hours per survey). These surveys should focus on free-flowing river stretches and the downstream vicinity of the dam.
2. Wood turtle nesting site surveys, Spring/Summer, 2021: Daily surveys of suitable nesting sites (if any are found) for four weeks (Assume 1 hour per survey).

ASSESSMENT OF RECREATION

• Goals & Objectives: Evaluate current recreational uses, including opportunities for low flow and high flow events, public access, natural scenic beauty, trails, water sports, and fishing, with consideration for the different seasonal uses.

• Relevant DNR Management Goals: The Department supports a wide array of recreational use. We support the need for recreational use surveys that consider a broad array of users. A quantitative recreational use survey completed within the Project boundary will evaluate potential changes associated with any modifications to water levels and operations. Information needs to be gathered in order to understand the current use, and potential future uses.

• Existing Information: There are opportunities for fishing, wildlife viewing, and water sports within the White River Project vicinity, which includes a public boat landing and canoe portages.

• Operation nexus to resource and how informs license: Hydro operations, management of impoundments, water level changes, and sufficient public access can have a significant impact on recreational value. Adequate information is necessary to determine what impacts may be occurring from the hydro operations, and what recreational opportunities may be enhanced.

• Methodology: Desktop assessment, including review of the State of Wisconsin 2019 to 2023 Statewide Comprehensive Outdoor Recreation Plan (SCORP), released in March 2019, public surveys, and existing recreational sites. This includes assessment of current uses, level of use, evaluation for additional recreational features.

• Level of Effort and Cost: 40 hours of desktop review and fieldwork at $125 per hour, plus equipment costs.

PROPOSED PROJECT BOUNDARY

• Goals & Objectives: Quantitative assessment of acres of wildlife habitat and surface water that would be modified with a proposed change in Project boundary. This includes impacts to public access and recreational activities.

• Relevant DNR Management Goals: Protection of natural resources and providing public recreational opportunities are part of the Department's mission.

• Existing Information: The current FERC license established the Project boundary to include a total area of 125.1 acres. This includes the 45.1-acre reservoir, 3.1 acres of open water downstream of the dam, and 76.9 acres of land owned in fee by Xcel. The proposed Project boundary would be reduced to include a total of 64.4 acres.

• Operation nexus to resource and how informs license: The riparian areas are critical in protecting water quality and fish and wildlife habitat in the White River system. Recreation and public access, along with natural resource protection are all part of the Public Trust Doctrine in Wisconsin.

• Methodology: Desktop evaluation of wetland and riparian habitat. Identify changes in acreage in wetland and habitat, as well as changes in acreage and use in reactional features. Additionally, identify if any of the areas proposed to be exclude from the Project boundary provide habitat for listed species.

• Level of Effort and Cost: 40 hours of desktop review at $125 per hour.

BAD RIVER BAND OF LAKE SUPERIOR TRIBE OF CHIPPEWA INDIANS

CHIEF BLACKBIRD CENTER Box 39 • Odanah, Wisconsin 54861

December 28, 2020

Ms. Kimberly D. Bose
Secretary Federal Energy Regulatory Commission
888 First Street
NE Washington, DC 20426

Re: Pre-Application Document and Study Request Concerning the White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose,

As a sovereign nation possessing an interest in the use and enjoyment of the sacred waters of Anishinaabeg-Gichigami, or Lake Superior, pursuant to treaties we signed with the United States, we submit our comments related to the pre-application document and study areas for the White River Dam Relicensing by Xcel Energy also known as the Northern States Power Company-Wisconsin (henceforth, "company" or "applicant"). The Bad River Band of Lake Superior Tribe of Chippewa Indians (henceforth, "Tribe") is a federally recognized Indian Tribe with its reservation centered on the northern shores of Wisconsin and Madeline Island. The Tribe also retains interest in lands ceded through the 1837, 1842 and 1854 Treaties with the United States in Wisconsin, Michigan, and Minnesota. The proposed White River Dam falls within these ceded lands where the Tribe has reserved rights to resources. In addition, the Tribe has federally approved Water Quality Standards and Treatment-as-a-State authority from the EPA, making us a downstream regulator along the White River.

As such, we are very concerned with the operation, maintenance, and relicensing of the White River Dam, especially knowing the impacts that the Tribe has experienced living downstream of the dam. Our concerns arise from negative impacts and disruption to Tribal fishing due to an improperly managed drawdown of the reservoir, and concerns about the potential of releases from the dam that contribute to erosion and flood impacts for the Tribal community downstream. In addition, we want to assure that the relicensing will not negatively impact water quality or water quantity in ways that would result in a degradation to Tribal waters, of which the White River is considered an Outstanding Resources Water, with cultural, commercial, navigable, wildlife, aquatic life and fish, recreational, and cool water fishery designated uses. The White River, after its confluence with Bad River thirteen miles downstream, contributes flow into wild rice waters of the Bad River and the Bad River and Kakagon Sloughs. (This sloughs complex is one of the largest natural manoomin, or wild rice, estuaries in the Lake Superior Basin, a wetland site of international importance under the Ramsar Convention and holds many other designations, including a National Natural Landmark listing within the National Register of

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Historic Properties.) The White River is also historically a wild rice water.

Staff from the Tribe's Mashkiiziibii Natural Resources Department (MNRD) attending the virtual Joint Agency Meeting (JAM) hosted by the applicant and their contractor on October 29, 2020. Many of the comments in this letter arise from the information presented during the JAM and from reviewing the PAD submitted to FERC. However, we may also have additional comments and concerns that we reserve the right to address in formal consultation as the relicensing process progresses.

1. The PAD claims that stakeholders have no concerns because the company had not received any responses to their mailed questionnaire sent in June 2019. This questionnaire was sent only to the Bad River Tribal Chairperson and the Tribal Historic Preservation Officer per the PAD, but there is no record that the applicant reached out to MNRD staff to follow-up to ensure the questionnaire was received or seen. Since MNRD staff are regularly in contact with Environmental Staff on Xcel's teams about other on-Reservation and upstream projects (e.g., a power pole replacement in Mellen, WI), it is disappointing to find that the applicant did not bother reaching out on this issue of importance to the Tribe. The Tribe does have concerns about the dam, and Xcel knows that these concerns exist from previous communications.
2. The Tribe, as a downstream nation with federally-approved Water Quality Standards (WQS), and regulatory authority under Clean Water Act Sections 303(c) and 401, should not be treated as every other stakeholder in the relicensing process, and should be involved in additional conversations regarding this project to ensure that federal permitting for the operation of the dam meets the Tribe's WQS.
3. The Area of Potential Affect (APE) or Study Area should be expanded to include all of the White River and its floodplain downstream of the dam, the portion of Bad River downstream of the confluence with the White River, and portions of the Bad River and Kakagon Sloughs Complex that might be impacted by any release of waters from the dam. Expanding the APE will more thoroughly assess possible downstream impacts from the operation of the dam, including impacts to tribal and treaty resources both on-Reservation and in the ceded territories. Understanding these impacts in an expanded APE will help the Tribe comment on the relicensing and ensure that resources are protected for the seventh generation, a critical underpinning for all actions taken by the Tribe. While increasing the APE to cover additional areas would increase the cost of required studies, it would be offset by potential long-term cost savings when possible impacts to the ecology and cultural resources are averted now as compared to needing to be restored or mitigated later.
4. Technical Comments on Data Used
   a. LiDAR data used to determine updated contours for application materials was the 2014 LiDAR data for Ashland County, Wisconsin, which was collected prior to severe flooding that occurred in July 2016 that drastically changed the landscape of the watershed. Thus, we feel that the more accurate data to use in determining contours should be the more recent 2019 LiDAR data and thus the application materials and other information should be updated accordingly.

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b. The wetland data used for the PAD was the National Wetland Inventory, which upon last review by MNRD staff, uses the outdated version of the Wisconsin Wetland Inventory for mapped wetlands for Ashland County from 1991. The more recently updated Wisconsin Wetland Inventory from 2013 should be used to prepare application materials and determine possible impacts to wetlands, if the step of performing a true on-the-ground delineation is not completed.
c. If the APE is expanded, per the Tribe's request in this letter, additional data and information pertaining to water quality, invasive species, aquatic macroinvertebrates, etc. may be available from the Tribe for the APE, and the application is encouraged to reach out to the MNRD for this information. (For example, a rare mayfly (Neoephemera bicolor) has been found by MNRD staff sampling the confluence of Thornapple Creek and the White River. Other information the Tribe also has may help identify possible additional survey needs for the applicant or more fully articulate possible impacts from the re-licensing of the dam.)

5. Invasive species surveys should be conducted within the Reservoir and the adjacent shoreline to understand long-term impacts of primarily static water levels on the presence of invasive species. Invasive species populations upstream of the Reservation have an established corridor along the watercourse to move onto Reservation lands and into its waters, and studies have shown water levels artificially static due to dams tend to accelerate the rate of infestations in those waterbodies. This concern coupled with the easily accessible public boat launch on the upstream side of the dam seems to be reasonable justification for surveys for aquatic invasive species to be conducted within the Reservoir. The goals and objectives are to verify the presence/absence of invasive species in the APE for possible treatment and to use in downstream monitoring efforts to address new populations in addition to influencing certain operational protocols for the dam. AIS control and monitoring matches with management goals both for Ashland County Land and Water Conservation Department and the goals of the Bad River Tribe. Preventing new populations of invasive species by treating sources upstream and quickly identifying new populations has been shown to be much more cost-effective than trying to eradicate well-established infestations. Surveys should be completed within the reservoir using the point-intercept method and along the shoreline using the rapid assessment method used by the Wisconsin Department of Natural Resources. Results of the study may suggest the certain operation changes for the dam might be needed to reduce invasive species populations, like periodic water-level fluctuations and/or required control efforts as part of relicensing.
6. The release of flood waters from the dam during the 2016 flooding in the Bayfield, Ashland, and Iron Counties had impacts downstream that are not fully understood and the Bad River Community continues to have questions about possible future impacts from a similar or worse flood event in light of climate change and an increase in severe precipitation events. We request that a flood study be conducted concurrent with the re-licensing process so that possible impacts of a release of flood waters during different scenarios can be fully understood and flood forecasting can be completed with the National Weather Service to provide the best possible emergency response planning available to the Tribal community. This study would be necessary for the Tribe to fully

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develop an emergency response plan for different dam release scenarios and could identify some operational requirements for the dam that would need to be included in the re-licensing. Methodology could be developed in coordination with the National Weather Service and the US Geological Survey, both of which have well-establishes protocols for this type of work and the expertise to tailor these protocols to the White River Subwatershed.

7. Additionally, we would like to ensure the proper lines of communication about unscheduled releases of the dam and communication about scheduled drawdowns happens in a timely manner to ensure that impacts to tribal waters and tribal events, like spring fishing, is minimized. We have not had the time to read the PAD extensively to see how these concerns are framed in this document but would like to ensure they are addressed in refined documents time for the final comment period when we'll be reviewing the proposal more closely. Protocols then should be properly addressed in the relicensing of the dam.
8. Finally, we would like to add that cultural and historical considerations do not appear to be adequately addressed, especially with the narrow scope of the APE, and we will be communicating our concerns regarding these issues with the applicant and FERC in follow-up communications, as we continue to have an interest in this project under the National Historic Preservation Act and 36 CFR 800.

We look forward to hearing FERC and the applicant's response to our concerns raised here and would gladly provide additional context and comments in follow-up communications since we realize that due to other workloads we are unable to provide more than this truncated summary of concerns at this time. If you have any questions or would like to schedule a meeting, please reach out to our Tribal Historic Preservation Officer Edith Leoso and/or our point of contact for Xcel Energy communications within MNRD, our Environmental Specialist Jessica Strand, either of whom can help coordinate from our end. (Contact information for either can be found on our website at: http://www.badriver-nsn.gov/natural-resources/.)

Sincerely,

Michael Wiggins, Jr.
Bad River Tribal Chairman

CC:
Matthew Miller (Xcel Energy) matthew.j.miller@xcelenergy.com
Darrin Johnson (Mead & Hunt) darrin.johnson@meadhunt.com
Cheryl Laatsch (WDNR) cheryl.laatsch@wisconsin.gov
MNRD File

Telephone (715) 682-7123 *Natural Resources Department* Fax (715) 682-7118

Darrin Johnson

From: Shawn Puzen
Sent: Wednesday, August 18, 2021 8:07 AM
To: Darrin Johnson
Subject: FW: White River: WDNR Comments on Summary of Study Comments

Welcome Back!!!!

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
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From: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Sent: Wednesday, August 18, 2021 7:51 AM
To: Miller, Matthew J <Matthew.j.miller@xcelenergy.com>
Cc: Shawn Puzen <Shawn.Puzen@meadhunt.com>; Antonuk, Connie J - DNR <Connie.Antonuk@wisconsin.gov>
Subject: White River: WDNR Comments on Summary of Study Comments

The Department has reviewed your Summary of Study Comments and Responses. We have comments on 4 specific studies. Additionally, we are looking forward to a robust overview and discussion regarding historic, recent, and future dam operations; including information on how Xcel plans to remain in compliance with their dam operations.

1. Minimum Flow – Instream Flow Study
    a. Xcel states they will provide an "assessment" of flows associated with operations in the Draft License Application. The WDNR is requesting study, as noted in our letter. The proposed "assessment" is vague and does not indicate that a flow study will be conducted. More discussion is needed regarding the need for a flow study.
2. Assessment of Stream Flows, Channel Dimensions, and Linear Gradient
    a. Xcel plans to assess habitat in the bypass channel. Please confirm that Xcel will be using the WDNR Quantitative Habitat Assessment Guidelines/Methods.
3. Habitat Evaluation
    a. The proposed habitat assessment implies that only aquatic vegetation will be used to assess habitat. Invasive Species Surveys do not sufficiently document habitat types. We request that the Lake Shoreland & Shallows Habitat Monitoring Field Protocols be used.
4. Water Quality
    a. Severe erosion has been documented in the project reservoir. The erosion may be due to the frequent water level fluctuations that have historically occurred. Xcel states that the erosion "appears to be related to upper bank sluffing…". Please provide a study that is appropriate to document how dam operations and reservoir fluctuations affect sedimentation, erosion, and water quality.

If you have any questions, or would like to discuss our comments, I can be reached at cheryl.laatsch@wisconsin.gov.

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Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Cheryl Laatsch
Statewide FERC Coordinator
Bureau of Environmental Analysis and Sustainability
Wisconsin Dept of Natural Resources
N7725 Hwy 28
Horicon WI 53032
(T) 920-387-7869 (Fax) 920-387-7888
Cheryl.laatsch@wisconsin.gov

dnr.wi.gov

Recreation Study Report Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Friday, January 7, 2022 2:21 PM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River Recreation Study Protocol
Attachments:	20220107 Draft White River Recreation Use Study Protocol Sent for Comments.pdf

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete a recreation survey.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than February 6, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
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WDNR did not provide any comments.

ATIS Study Report Consultation

Shawn Puzen

From:	Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Sent:	Tuesday, February 1, 2022 10:57 AM
To:	Shawn Puzen
Subject:	RE: White River Invasive Species DRAFT Monitoring Plan
Categories:	Filed by Newforma

You don't often get email from malcolm.gregory@wisconsin.gov. Learn why this is important

Morning Shawn,

I just got word from on of our AIS specialists regarding this item:

- Some of the information in the Appendix 2 document is rather out of date but I am not sure if we have an updated version of that document. Primarily it is the contact information and some of the screenshots related to computer programs, etc... Please provide this information and we will be happy to include it.

An updated document doesn't exist yet so don't worry about it. Thanks for being so responsive.

Best,

Malcolm

Malcolm Gregory (he/him)
Environmental Analysis & Review Specialist
Wisconsin Department of Natural Resources
101 S. Webster Street
Madison, WI 53707-7921
malcolm.gregory@wisconsin.gov

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Thursday, January 27, 2022 1:28 PM
To: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>; Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>; Shawn Puzen <Shawn.Puzen@meadhunt.com>; Miller, Matthew J <Matthew.j.miller@xcelenergy.com>; Crotty, Scott A <scott.a.crotty@xcelenergy.com>
Subject: RE: White River Invasive Species DRAFT Monitoring Plan

Hi Malcom,

Please see our responses listed below in red.

If we receive the information you request within 10 days, we will include it. If we do not receive a response from you, we will assume you are not interested in sending it for inclusion. It seems like you are not sure in some of the comments if you want it included or not.

Thanks,

SHAWN PUZEN
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From: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Sent: Thursday, January 27, 2022 12:55 PM
To: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>; Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>
Subject: FW: White River Invasive Species DRAFT Monitoring Plan

You don't often get email from malcolm.gregory@wisconsin.gov. Learn why this is important

Good afternoon Shawn,

I'm helping Cheryl with FERC work and sent your draft monitoring plan to the department's relevant invasive species personnel. Below are the comments I received. It appears that the draft is in good shape but requires some administrative revisions. If you would like to discuss these comments in further detail, I can set up a meeting between you, Cheryl, and I.

Best,

Malcolm

Malcolm Gregory (he/him)
Environmental Analysis & Review Specialist
Wisconsin Department of Natural Resources
101 S. Webster Street
Madison, WI 53707-7921
malcolm.gregory@wisconsin.gov

From: Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>
Sent: Wednesday, January 26, 2022 10:12 AM
To: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: RE: White River Invasive Species DRAFT Monitoring Plan

Hey Malcolm,

Below are some additional comments related to the White River Dam invasive species monitoring plan. I copied the comments from the Trego/Hayward one just for consistency but did add some other stuff...

Comments:

- Pg 4: Had a link to the DNR webpage regarding whom to report new invasive species to... this is a dead link and I think this should be the one used...
  - Link: https://dnr.wi.gov/lakes/invasives/Contacts.aspx?role=AIS_POC we will make the change.
- Pg 4: We don't like to use the word "rapid" anymore when it comes to response actions just due to the perceived nature of that process with using rapid. So I would just suggest removing that to say "If any response sections are identified..." we will make the change.
- If a new version of the Wisconsin Aquatic Invasive Species Early Detector Handbook during the duration of this project are we able to add some language around using the most up to date version of the handbook? I don't know for sure if a new version will be coming out in next couple years but I know it was in talks last year at least... This study will be completed this summer and I doubt anything will be available. Thanks for the heads-up.
- Some of the information in the Appendix 2 document is rather out of date but I am not sure if we have an updated version of that document. Primarily it is the contact information and some of the screenshots related to computer programs, etc... Please provide this information and we will be happy to include it.
- Pg 4: It mentions that "one water sample will be collected in both the reservoir and the tailwater..." – Do we want to include the DNR's monitoring protocol for Zebra Mussel and Spiny Waterflea monitoring in an additional Appendix? Cause it is a little more complicated than just collecting a "water sample", specific equipment and techniques need to be utilized. The consultants completing the study have prior experience in this area. If you want to provide us a link we can include it.
- NEW Comment: Pg4 – Under "Information Reporting" – I think we remove the invasive.species@wisconsin.gov email and change the reporting language to something along the lines of "the WDNR AIS regional coordinators as soon as possible..." and use the same link I provided above for reporting. That "invasive.species" email is primarily for terrestrial invasive species reporting and doesn't get checked all too often. Although the email was provided in comments on previous similar plans, we can include the link and make the change.

Lemme know if you have any additional questions or comments on my comments,

Thanks,
-Alex Selle

From: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Sent: Friday, January 21, 2022 3:06 PM
To: Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: FW: White River Invasive Species DRAFT Monitoring Plan

Hi Alex,

Sorry for flooding your email on a Friday afternoon, but here's one more draft study that requires your input. Please see the attached Invasive Species Study Plan and related materials for the *White River Dam* in Ashland County. The licensee for this project is Xcel Energy.

Please review and provide feedback at least one week before February 11, 2022.

Thank you!

Best,

Malcolm

Malcolm Gregory (he/him)
Environmental Analysis & Review Specialist
Wisconsin Department of Natural Resources
101 S. Webster Street
Madison, WI 53707-7921
malcolm.gregory@wisconsin.gov

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Thursday, January 13, 2022 4:34 PM
To: Leoso, Edith <THPO@badriver-nsn.gov>; Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>; Climate@badriver-nsn.gov; wildlife@badriver-nsn.gov; environmental@badriver-nsn.gov
Cc: Darrin Johnson <Darrin.Johnson@meadhunt.com>; Miller, Matthew J <Matthew.j.miller@xcelenergy.com>; Shawn Puzen <Shawn.Puzen@meadhunt.com>; brey.j.maurer@xcelenergy.com; Crotty, Scott A <scott.a.crotty@xcelenergy.com>
Subject: White River Invasive Species DRAFT Monitoring Plan

Good Afternoon,

Attached is a draft White River Invasive Species Monitoring Plan for your review and comment. The intent is to complete this study during this field season.

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete an invasive species survey.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than February 11, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
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The Bad River Tribe did not respond with comments.

Mussel Study Report Consultation

Shawn Puzen

From:	Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Sent:	Wednesday, February 16, 2022 12:24 PM
To:	Shawn Puzen
Cc:	Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	RE: Request for Comments on White River Mussel Study Protocol
Categories:	Filed by Newforma

Staff have reviewed the information provided, and do not have any additional comments.

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Cheryl Laatsch
Statewide FERC Coordinator
Bureau of Environmental Analysis and Sustainability
Wisconsin Dept of Natural Resources
N7725 Hwy 28
Horicon WI 53032
(T) 920-387-7869 (Fax) 920-387-7888
Cheryl.laatsch@wisconsin.gov

dnr.wi.gov

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Wednesday, February 2, 2022 2:15 PM
To: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Cc: Shawn Puzen <Shawn.Puzen@meadhunt.com>; Darrin Johnson <Darrin.Johnson@meadhunt.com>; brey.j.maurer@xcelenergy.com; Miller, Matthew J <Matthew.j.miller@xcelenergy.com>; Crotty, Scott A <scott.a.crotty@xcelenergy.com>
Subject: Request for Comments on White River Mussel Study Protocol

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete a mussel survey.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 4, 2022.

Please feel free to contact me if you have any questions.

Thanks,

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Fisheries and Riverine Habitat Assessment Study Report Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, February 3, 2022 1:09 PM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River Fisheries Study and Habitat Assessment DRAFT Monitoring Protocol
Attachments:	20220203 White River Fisheries Study and Habitat Assessment DRAFT sent to WDNR.pdf

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete a Fisheries Study and Habitat Assessment Monitoring.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 7, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
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The Wisconsin Department of Natural Resources did not respond with any additional comments.

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, February 3, 2022 10:23 AM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River Wood Turtle Nesting Habitat Monitoring Protocol
Attachments:	20220203 White River Wood Turtle Nesting Habitat DRAFT Study Plan sent to WDNR.pdf

Good Morning Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete Wood Turtle Nesting Habitat Monitoring.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 7, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
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The Wisconsin Department of Natural Resources did not respond with any additional comments.

Water Quality Monitoring Study Report Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, February 3, 2022 8:22 AM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River WQ Monitoring Protocol
Attachments:	20220203 White River WQ DRAFT Study sent to WDNR complete.pdf

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete WQ Monitoring.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 6, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
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The Wisconsin Department of Natural Resources did not respond with comments

Final Study Plans

XcelEnergy®
RESPONSIBLE BY NATURE®

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

April 21, 2022

VIA Electronic Filing

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Study Plans for Relicensing**
White River Hydroelectric Project (FERC Project No. 2444-036)

Dear Secretary Bose:

Per the request of the relicensing participants that requested studies, Northern States Power Company, a Wisconsin corporation (NSPW), developed draft study plans which are being pursued as part of the relicensing process for the White River Hydroelectric Project (P-2444). The draft study plans were provided to the requesting party for their comments prior to finalizing the plans and conducting the studies.

The final study plans, summarized in the table below, are attached herein and include the stakeholders' comments along with NSPW's responses to said comments. They are attached to notify each requestor what studies will be implemented during the relicensing process.

Final Study Plans for Relicensing the White River Hydroelectric Project

Study Name	Requesting Entities	Attachment Name
Fisheries Study and Riverine Aquatic Habitat Assessment	Wisconsin Department of Natural Resources	Attachment A
Aquatic and Invasive Species Study	Bad River Band and Wisconsin Department of Natural Resources	Attachment B
Mussel Study	Wisconsin Department of Natural Resources	Attachment C
Recreation Study	Wisconsin Department of Natural Resources	Attachment D
Water Quality Monitoring Study	Wisconsin Department of Natural Resources	Attachment E
Wood Turtle Nesting Habitat Study	Wisconsin Department of Natural Resources	Attachment F

Should you have any questions, please contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

Scott Crotty

Digitally signed by Scott Crotty
Date: 2022.04.21 15:24:16 -05'00'

Scott A. Crotty
Senior Hydro Operations Manager

Attachments: A through F

cc: Ms. Cheryl Laatsch - WDNR (via e-mail)
Ms. Jessica Strand – Bad River Band (via email)

Attachment A Fisheries and Riverine Habitat Assessment Study Plan

White River
Hydroelectric Project
FERC No. 2444
Work Scope 22 WRF
Final Study Plan

Fisheries Study and Riverine Aquatic Habitat Assessment

Prepared for
Northern States Power Company,
a Wisconsin Corporation

Prepared by

Mead & Hunt

meadhunt.com

March 2022

1. Introduction

Northern States Power Company, a Wisconsin corporation (NSPW or Licensee), currently holds a license issued by the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the White River Hydroelectric Project (Project). The Project is owned, operated, and maintained by the Licensee. The current license, which designates the Project as FERC No. 2444, expires on July 31, 2025. To obtain a subsequent license, the Licensee must submit a final license application to FERC no later than July 31, 2023. The final license application, in part, must include an evaluation of the existing fishery associated with the Project.

On October 29, 2020, the Licensee held a Joint Agency Meeting to present information about the Project. At the meeting, and during the 60-day comment period immediately following, the Licensee received comments and study requests from several entities. The Wisconsin Department of Natural Resources (WDNR) requested that a fishery study be completed at the Project.

The WDNR requested that spring and summer fyke netting and late spring electrofishing be completed on the Project reservoir. They also requested that seasonal catch per unit effort (CPUE) surveys be completed in the spring, summer, and fall downstream of the dam to quantify fish population relative abundance. A final report will be developed to document the composition of the general fish community as well as those species available to anglers.

The WDNR also requested that riverine habitat be assessed using the WDNR Guidelines for Evaluating Habitat of Wadable Streams and that the reservoir be assessed using the WDNR shoreland habitat protocol.

There is existing fisheries information from 2015 fyke surveys on the White River Flowage. Therefore, the Licensee is not proposing any fish studies on the Project reservoir. Due to the lack recent fisheries information downstream of the Project dam, the Licensee is proposing to conduct seasonal CPUE surveys in spring, summer, and fall. These surveys will help quantify fish population relative abundance and document the composition of the general fish community within the bypassed reach and downstream of the powerhouse for approximately ¼ mile.

The riverine habitat assessment will be conducted on the same two downstream river reaches where the fishery surveys will be completed, using the WDNR Guidelines for Evaluating Habitat of Wadable Streams. The shoreline habitat of the reservoir is addressed in the Aquatic and Terrestrial Invasive Species Study and is not part of this study plan.

The study plan is consistent with the WDNR’s request that the Licensee provide current fisheries information, including an assessment of fish habitat downstream of the Project dam.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of this fisheries study and riverine habitat assessment is to define the diversity and abundance of the fish community downstream of the White River Dam. It will also provide information for evaluating any potential effects of Project operations on the fishery.

2.2 Background and Existing Information

Fyke netting surveys were last completed on the reservoir in 2015.

The following is a list of the most predominant fish (in order of abundance) identified on the White River Flowage based on data collected between 1989 and 2015 (NSPW, 2020):

- Bullheads (*Ameriurus spp.*)
- Northern pike (*Esox luscius*)
- Shorthead redhorse (*Moxostoma macrolepidotum*)
- White sucker (*Catostomus commersonii*)
- Blacknose Shiner (*Notropis heterolepis*)

There is no recent information regarding the status of the fishery downstream of the Project dam.

2.3 Nexus between project operations and effects on resources

Operation of the Project may affect the fishery and the usable aquatic habitat downstream of the Project.

2.4 Study Area

The study area is depicted in Appendix 1.

2.5 Methodology

2.5.1 Fishery Survey

Seasonal CPUE surveys will be conducted in spring (early May), summer (late July), and fall (early-October). One electrofishing pass will be completed during each season in a single survey station with an overall length of 2,670 feet (~1,350 feet bypass channel+ ~1,320 feet downstream of powerhouse) as shown in Appendix 1. Electrofishing equipment should be appropriate for water depth, such as backpack or stream barge electrofishing units in wadable areas.

2.5.1.1 Downstream Survey Locations

The bypass channel and the reach downstream of the powerhouse will be included in a single survey station. However, the surveyor will ensure that the results from the bypass channel survey are not influenced by flow releases from the powerhouse.

2.5.1.2 Personnel Qualifications

All surveys will be conducted by individuals with prior fisheries survey training and experience[1].

2.5.2 Downstream Habitat Assessment

During a period when only minimum flow is being released into the bypass reach, a fish habitat assessment shall be completed that follows the WDNR Guidelines for Evaluation Habitat of Wadable Streams (revised June 2002) to the greatest extent possible.

2.5.2.1 Downstream Assessment Locations

The bypass channel and the reach downstream of the powerhouse will be included in the habitat assessment. However, the surveyor will ensure that the results from the bypass channel are not influenced by flows released from the powerhouse.

2.6 Consistency with generally accepted scientific practice

The Fisheries Study follows generally accepted scientific practice regarding field data collection and reporting. Similar protocols have been used in other relicensing studies.

2.7 Project Schedule and Deliverables

The results of the study will be summarized in a Study Report. The study report will include the following elements:

- Project information and background
- Study Area
- Methodology
- Study Results
- Analysis and Discussion
- Agency correspondence and/ or consultation
- Literature cited

NSPW anticipates that the field work will be completed between May and early October 2022 and the draft study report will be completed by November 30, 2022.

[1] Consultant(s) selected to complete the work are responsible for obtaining any WDNR scientific or other permits necessary to complete the work.

3. Consultation

The Fisheries Study and riverine habitat assessment was requested by the WDNR. As a result, the Licensee consulted with the WDNR as discussed below.

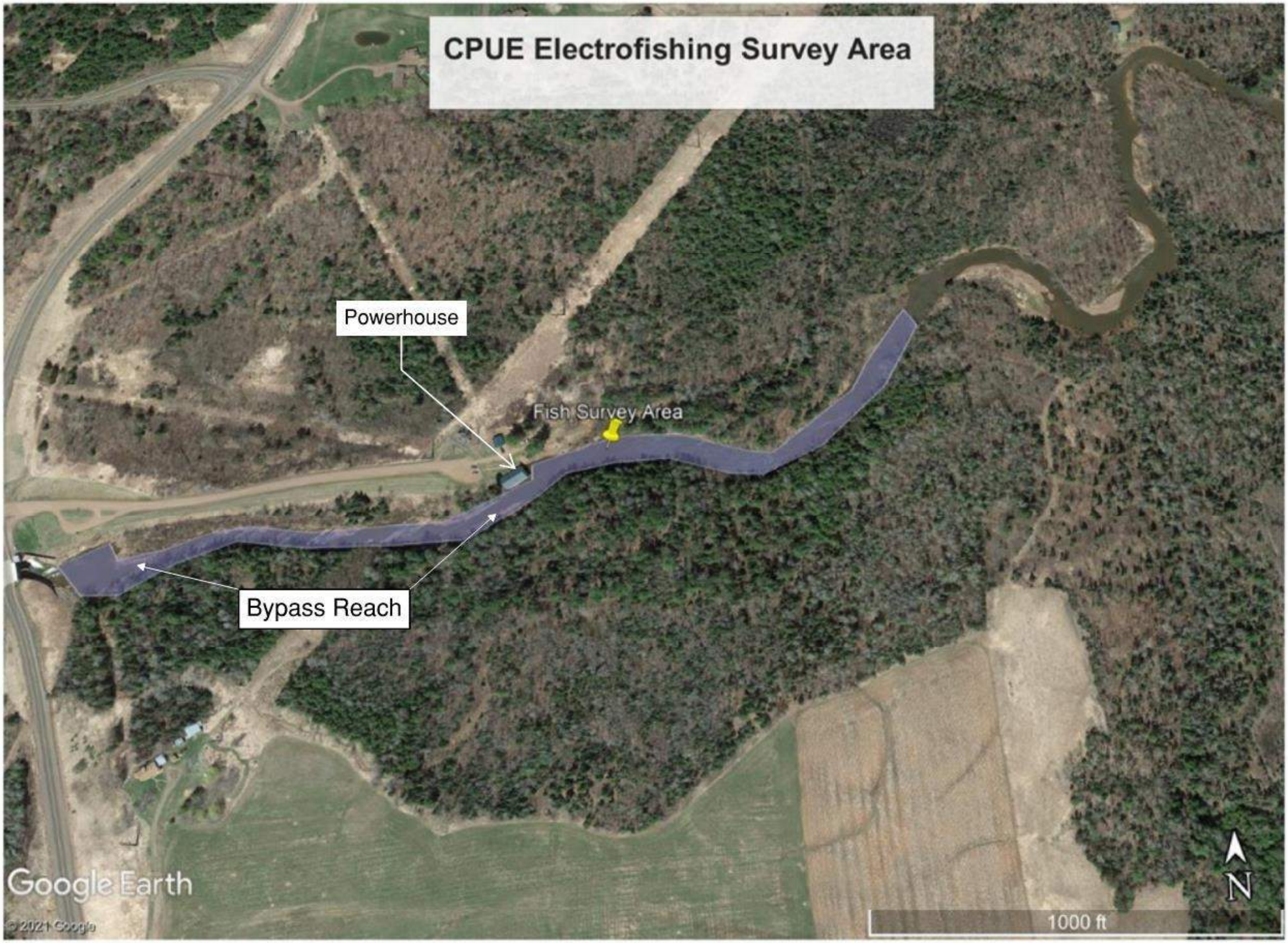
3.1 Wisconsin Department of Natural Resources

On February 3, 2022, the Licensee, through its consultant Mead & Hunt, provided a draft copy of the Fisheries Study and Riverine Habitat Assessment Plan to the WDNR for comment. The WDNR did not respond with comments. Documentation of Consultation is included in Appendix 2.

4. References

Northern States Power Company – Wisconsin, dba Xcel Energy. 2020. Preliminary Application Document-White River Project. Prepared by Mead & Hunt. July 30, 2020.

Appendix 1 – Fisheries Study and Habitat Assessment Area


CPUE Electrofishing Survey Area
Powerhouse
Fish Survey Area
Bypass Reach
Google Earth
© 2021 Google
1000 ft
N

Appendix 2 – Documentation of Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, February 3, 2022 1:09 PM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River Fisheries Study and Habitat Assessment DRAFT Monitoring Protocol
Attachments:	20220203 White River Fisheries Study and Habitat Assessment DRAFT sent to WDNR.pdf

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete a Fisheries Study and Habitat Assessment Monitoring.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 7, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

The Wisconsin Department of Natural Resources did not respond with any additional comments.

Attachment B Aquatic and Terrestrial and Invasive Species Study Plan

White River
Hydroelectric Project
FERC No. 2444

Final Study Plan

Aquatic and Terrestrial Invasive Species Study

Prepared for
Northern States Power Company,
a Wisconsin Corporation

Prepared by

Mead & Hunt
meadhunt.com

February 2022

1. Introduction

Northern States Power Company – Wisconsin (NSPW or Licensee), d/b/a Xcel Energy, currently holds a license issued by the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the White River Hydroelectric Project (Project). The Project is owned, operated, and maintained by the Licensee. The current license, which designates the Project as FERC No. 2444, expires on July 31, 2025. The Licensee must submit a Final License Application (FLA) to FERC no later than July 31, 2023 to obtain a subsequent license. The FLA, in part, must include an evaluation of the existing botanical resources (including invasive species) and potential impacts to botanical resources associated with continued Project operations.

On October 29, 2020, the Licensee held a virtual Joint Agency Meeting to present information about the Project. At the meeting, and during the 60-day comment period immediately following, the Licensee received comments and study requests from several entities. The Bad River Tribe and Wisconsin Department of Natural Resources (WDNR) requested that the Licensee complete an invasive species study as part of the relicensing process.

The Bad River Tribe requested that invasive species surveys be conducted within the reservoir and the adjacent shoreline. The WDNR recommended that the Licensee conduct an aquatic and terrestrial invasive species study using the WDNR Early Detection Early Response Protocols. The WDNR also noted that additional methodology may be needed for terrestrial species, and other methodologies such as point-intercept, may be appropriate if combined with other studies. The WDNR also requested in-water plant community data within the project boundary to provide baseline information on the condition of the aquatic plant community.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of this aquatic and terrestrial invasive species (ATIS) study is to provide baseline data on native and invasive aquatic and terrestrial species. The study also provides a method for identifying newly established invading species early enough to increase chances of control and will help prevent the spread of other nearby invasive species.

2.2 Background and Existing Information

There is limited information available regarding invasive species within the Project boundary. The WDNR indicated in their comments on the Pre-Application Document (PAD) that there are two invasive species known within the Project boundary. Reed canary grass (*Phalarix arundinacea*)[1] is known to occur within the Project boundary. The Ashland County Land and Water Conservation Department identified the restricted species narrow leaf cattail (*Typhia angustifolia*) in the reservoir in 2019 (NSPW, 2020).

[1] Currently only the ribbon grass cultivar is proposed to be listed as a restricted species under NR40. The remaining cultivars of reed canary grass are not currently listed or proposed to be listed in NR40.

2.3 Nexus between project operations and effects on resources

Invasive species can be introduced to Project waters and lands through recreational activities such as boating, bank fishing, and hiking. These species, once established within the Project boundary, can be transferred downstream through water releases or to areas outside of the Project boundary by recreationists.

2.4 Study Area

The ATIS Study will encompass the upstream and downstream areas inundated by the Project and contained within the existing and proposed Project boundaries as outlined in the PAD. Project and recreational facilities located on Licensee's property will be subject to an "on the ground" meander survey. The study area is depicted in Appendix 1.

2.5 Methodology

2.5.1 Upstream and Downstream Inundated Areas

Samples will be collected in locations outlined in a point intercept grid provided by the WDNR. Sampling will be conducted once in June and once in late July or early August of 2022 to account for both early season and late season species. The sampling will be conducted by boat using either a pole-mounted or rope-mounted rake. The methods will be similar to the protocol found in the WDNR Recommended Baseline Monitoring of Aquatic Plants in Wisconsin (point-intercept protocol), including the voucher collection (see Appendix 2). The methodology will also incorporate as many parameters as applicable of those listed in Table 1, page 31 of the protocol.

One rake sample per collection site will be taken by lowering the rake to the bottom and slowly drawing it up to the surface. The sample will be inspected for the presence of invasive species as included in NR40[2]. Their presence and percentage of abundance within the sample will be recorded on a field data sheet accordingly along with the presence and percentage of abundance of native species.

Any areas that are not safely accessible will be noted in the report with one of the following reasons:

- Non-navigable (due to thick emergent plant growth or shallow water);
- Terrestrial (point intercept located in an upland area not owned by Licensee);
- Obstacle (rocks, dock, swim area);
- Temporary obstacle (temporary obstacle should be noted);
- No information (accidentally missed or inaccessible, state reason); and
- Other (provide brief description).

Vouchers shall be collected for all NR40 listed aquatic and terrestrial invasive species not currently verified within each Project. Steps for vouchering invasive plant species are listed as follows:

[2] https://dnr.wi.gov/topic/invasives/documents/NR40plantlist.pdf

- Take a digital photo(s) of the plant in the setting where it was found. Try to capture details such as flowers, leaf shape, leaf and stem arrangement, and fruits. Include a common object in the photo such as a dollar bill, coin or pencil for a size scale, or stand next to tall plants.
- If possible, collect 5-10 intact specimens to ensure precise identification. Try to get the root system and all leaves, as well as seed heads and flowers when present. Place in a zip-lock bag with a damp paper towel. Place on ice and store in a refrigerator as soon as possible.
- Note the location of the plant you found. If using a GPS device please note the datum being used (e.g., WGS 84 {preferred}, UTM, WI Transverse Mercator, etc.).
- Notify Applicant Representative and then complete the WDNR Form 3200-125 – Aquatic Invasive Plant Incident Report and deliver it, your photo(s), and specimens to your WDNR AIS regional coordinator as soon as possible. See: https://dnr.wi.gov/lakes/invasives/Contacts.aspx?role=AIS_POC

Additional information on bed substrates will be collected at each sample point in water depths up to 15 feet. Under normal point-intercept protocols, the bed substrate is classified into one of three types; muck, sand, or rock. In order to help assist determining habitat within the littoral zone, bed substrates will be classified into one of the following nine substrate types: clay, silt, sand, gravel, cobble, boulder, bedrock, wood, or organic. The presence of woody debris on the bottom will also be identified during the rake sampling. Water depth information for all points will be collected during the survey to develop a bathymetric map of the reservoir.

Areas not included in the point intercept grid will be monitored for the aquatic invasive response species identified in the ***Wisconsin Aquatic Invasive Species Early Detector Handbook*** which is included in Appendix 3. If any response species are identified in any of the surveying efforts, WDNR notification as described in Section 2.5.5 below will occur.

In addition to the rake sampling, one water sample will be collected in both the reservoir and the tailwater during the July/August survey period. The water samples will be provided to the WDNR invasive species coordinator who will then analyze them for the presence of spiny water flea (*Bythotrepohes longimanus*), fishhook water flea (*Cercopagis pengoi*), and zebra mussel (*Dreissena polymnorpha*).

In order to determine the presence/absence of Asian clam and other invasive macroinvertebrates, the Licensee will conduct sediment samples at all existing public boat landings. The sampling method will involve using a shovel to scoop approximately 6 inches of sediment into a net with a maximum 3/8-inch mesh. Fine sediment will be flushed out of the net and the remaining materials will be examined for Asian clam and other invasive macroinvertebrates.

2.5.2 Upland Shorelines Not Owned by the Licensee

Upland reservoir shoreline areas not owned by the Licensee will be surveyed from a boat (or on foot where the use of a boat is not feasible) while moving slowly along the shoreline. During the survey, the locations of course woody habitat (greater than 4 inches in diameter and five feet in length) that is in the water and/or below the high-water mark will be noted for future mapping. An overall characterization of the terrestrial plant community will also be made. Invasive terrestrial plants listed in NR40 will be noted and their locations on the shoreline identified by latitude and longitude. If any terrestrial invasive plants listed in NR40 are observed, their location will be recorded via Global Positioning System (GPS). An estimate of relative abundance and the extent of the area where the species is present will be recorded for future mapping. The route traveled during the boat-based surveys will also be recorded for future mapping.

2.5.3 Upland Shoreline Owned by the Licensee and Recreation Sites

Project and recreational facilities, as shown in Appendix 1, will be subject to an "on the ground" meander survey. These areas are primarily located adjacent to and downstream of the dam. These lands have the potential to spread terrestrial invasive species through routine Project operations and/or public recreational use.

In addition to surveying for terrestrial invasive species, an overall characterization of the terrestrial plant community will be made. If any terrestrial invasive plants listed in NR40 are observed, their location will be recorded via Global Positioning System (GPS). An estimate of each species relative abundance and areal coverage will be recorded for future mapping. The route traveled during the meander surveys will also be recorded for future mapping.

2.5.4 Personnel Qualifications

All surveys will be conducted by an individual with prior aquatic plant identification training and experience with aquatic and terrestrial invasive species monitoring.

2.5.5 Information Reporting

Should monitoring reveal a new occurrence of an invasive species listed in the ***Wisconsin Aquatic Invasive Species Early Detector Handbook,*** contained in Appendix 3, the WDNR shall be notified through the AIS regional coordinator as found at: https://dnr.wi.gov/lakes/invasives/Contacts.aspx?role=AIS_POC as soon as possible, but no later than five working days after its discovery[3]. The notification shall include photographs and the online WDNR Early Detection Form.

Information collected during the study will be summarized in a final report. Completed survey sheets will be appended to the report. Based upon the data collected, additional invasive species mitigation and enhancement recommendations (if any) may be included in the FLA.

2.6 Consistency with generally accepted scientific practice

The ATIS Survey follows generally accepted scientific practice regarding field data collection and reporting. Similar protocols have been approved by the Commission in post-licensing compliance plans.

[3] In addition to notifying the WDNR, the consultant shall notify the Licensee representative.

2.7 Project Schedule and Deliverables

Results from this study will be summarized in an ATIS Study Report. The study report will include the following elements:

- Project information and background
- Study Area
- Methodology
- Study Results
- Analysis and Discussion
- Agency correspondence and/or consultation
- Literature cited

The written report will summarize the monitoring results, including the location of each species observed and their relative abundance. The information will be provided in an Excel spreadsheet format following the point-intercept protocol. The survey locations depicting the presence of aquatic invasive species listed in NR40 will be differentiated from the locations with negative sample results. The report will also include all field sheets and completed forms for any observed new occurrences of aquatic or terrestrial species as identified in the ***Wisconsin Aquatic Species Invasive Species Early Detector Handbook***, including the verification photographs.

Several maps will be developed and presented in the report including:

1) a map showing the overall predominant species along shoreline areas;
2) a map showing the locations of coarse woody habitat;
3) a map showing the locations and identities of invasive species observed during the surveys;
4) a map showing the substrates identified during the point-intercept survey;
5) a map showing the predominant substrate type and presence or absence of woody habitat;
6) a bathymetric map of the reservoir

NSPW anticipates that field work will be completed by the end of August 2022 and the draft study report available by October 31, 2022.

3. Consultation

The ATIS study was requested by the Bad River Tribe and the WDNR. As a result, the Licensee consulted with the Bad River Tribe and WDNR as follows.

3.1 Bad River Tribe

On January 13,2022, the Licensee, through its consultant Mead & Hunt, provided a draft copy of the ATIS plan to the Bad River Tribe for comment. The Bad River Tribe did not respond with comments. Documentation of Consultation is included in Appendix 5.

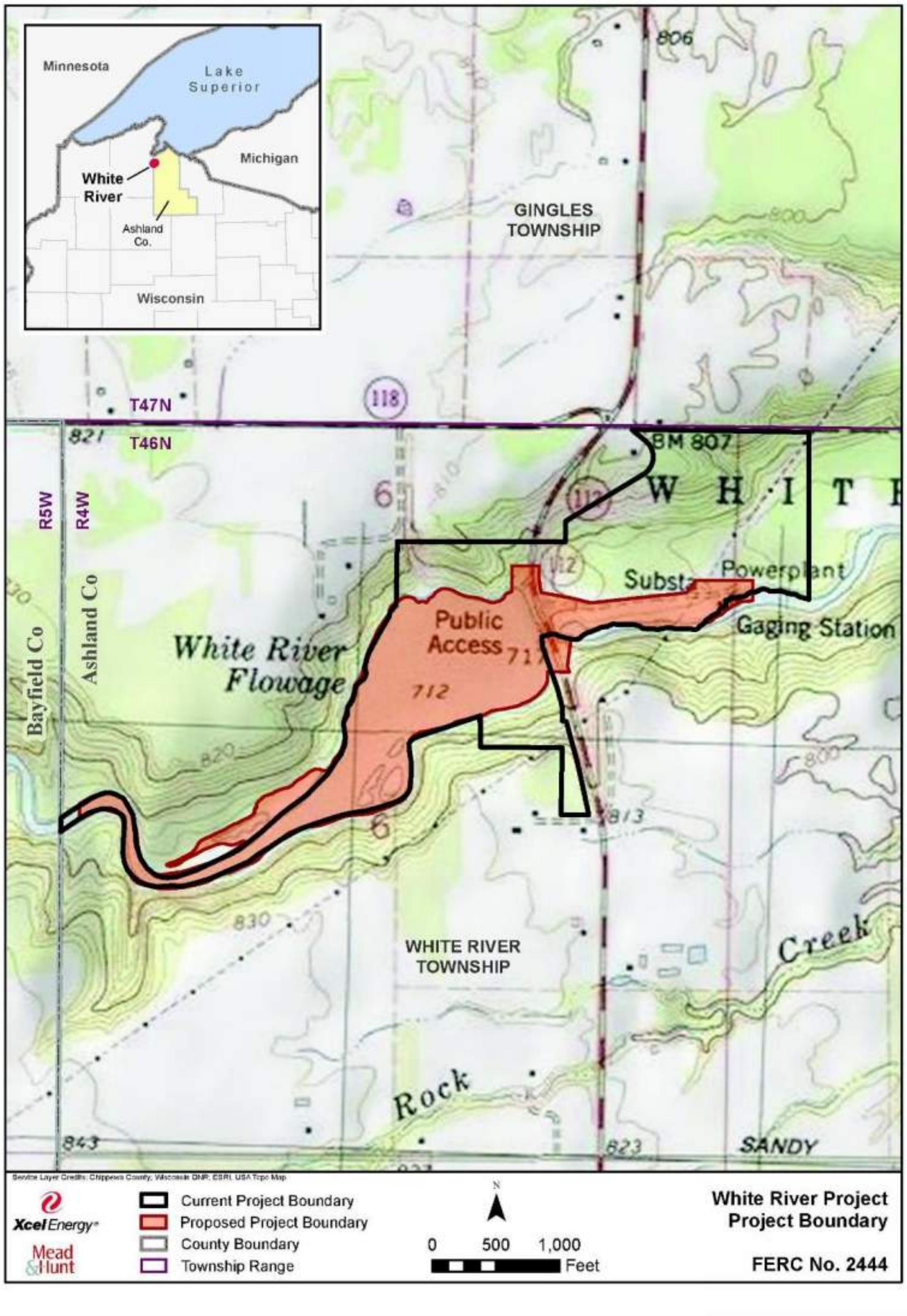
3.2 Wisconsin Department of Natural Resources

On January 13, 2022, the Licensee, through its consultant Mead & Hunt, provided a draft copy of the ATIS plan to the WDNR for comment. The comments have been addressed in the email contained in Appendix 5. Documentation of Consultation is included in Appendix 5.

4. References

Northern States Power Company – Wisconsin, 2020. White River Hydroelectric Project, FERC Project No. 2444, Pre-Application Document. July 29, 2020.

Appendix 1 – Invasive Species Study Area


Minnesota
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White River
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WHITE RIVER TOWNSHIP
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Current Project Boundary
Proposed Project Boundary
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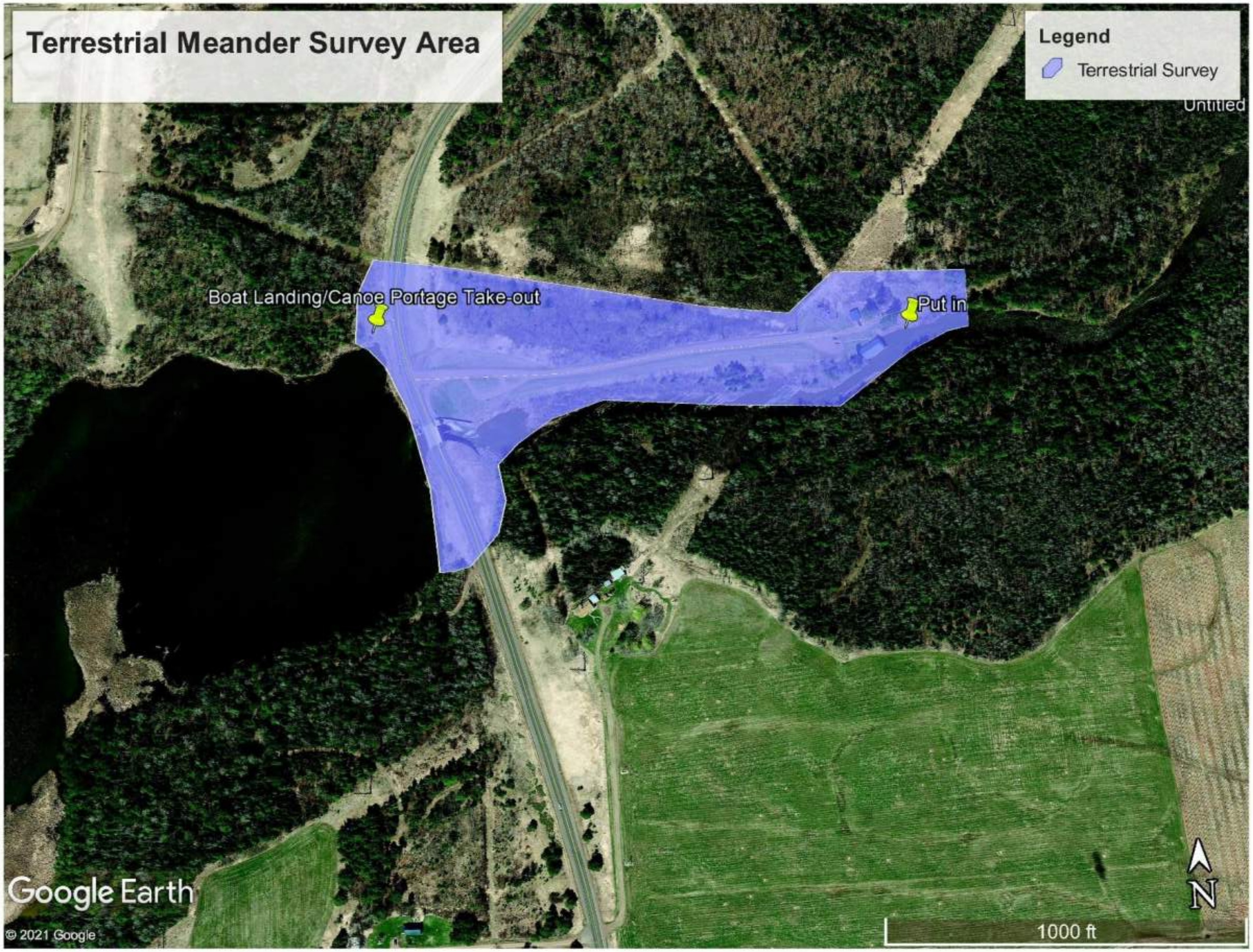
White River Project
Project Boundary
FERC No. 2444


Terrestrial Meander Survey Area
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Terrestrial Survey
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Boat Landing/Canoe Portage Take-out
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Appendix 2 – Point Intercept Protocol-See Separate File

Appendix 3 – Aquatic Invasive Species Early Detector Handbook-See Separate File

Appendix 4 – Terrestrial Invasive Species Monitoring Form

Terrestrial Invasive Species Montoring Form

		Site #	Latitude Coordinates	Longitude Coordinates		Japanese honeysuckle	Multiflora rose	Purple loosestrife	Common buckthorn	Glossy buckthorn	Saw-toothed buckthorn	Daharian buckthorn	Japanese buckthorn	Chinese buckthorn	Dahrian buckthorn	Kudzu-vine	Exotic bush honeysuckles	Exotic olives	Salt cedars	Poison hemlock	Giant hogweed	Oriental bittersweet	Lesser celandine	Teasel	Japanese knotweed	Giant knotweed	Bohemian knotweed
Project		1			Relative Abundance																						
County					Length of Shoreline																						
Date		2			Relative Abundance																						
					Length of Shoreline																						
Field Crew		3			Relative Abundance																						
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Appendix 5 – Documentation of Consultation

The Bad River Tribe did not respond with comments.

Shawn Puzen

From: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Sent: Tuesday, February 1, 2022 10:57 AM
To: Shawn Puzen
Subject: RE: White River Invasive Species DRAFT Monitoring Plan

Categories: Filed by Newforma

Morning Shawn,

I just got word from on of our AIS specialists regarding this item:

- Some of the information in the Appendix 2 document is rather out of date but I am not sure if we have an updated version of that document. Primarily it is the contact information and some of the screenshots related to computer programs, etc... Please provide this information and we will be happy to include it.

An updated document doesn't exist yet so don't worry about it. Thanks for being so responsive.

Best,

Malcolm

Malcolm Gregory (he/him)
Environmental Analysis & Review Specialist
Wisconsin Department of Natural Resources
101 S. Webster Street
Madison, WI 53707-7921
malcolm.gregory@wisconsin.gov

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Thursday, January 27, 2022 1:28 PM
To: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>; Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>; Shawn Puzen <Shawn.Puzen@meadhunt.com>; Miller, Matthew J <Matthew.j.miller@xcelenergy.com>; Crotty, Scott A <scott.a.crotty@xcelenergy.com>
Subject: RE: White River Invasive Species DRAFT Monitoring Plan

Hi Malcom,

Please see our responses listed below in red.

If we receive the information you request within 10 days, we will include it. If we do not receive a response from you, we will assume you are not interested in sending it for inclusion. It seems like you are not sure in some of the comments if you want it included or not.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

120 YEARS OF SHAPING THE FUTURE

From: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Sent: Thursday, January 27, 2022 12:55 PM
To: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>; Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>
Subject: FW: White River Invasive Species DRAFT Monitoring Plan

Good afternoon Shawn,

I'm helping Cheryl with FERC work and sent your draft monitoring plan to the department's relevant invasive species personnel. Below are the comments I received. It appears that the draft is in good shape but requires some administrative revisions. If you would like to discuss these comments in further detail, I can set up a meeting between you, Cheryl, and I.

Best,

Malcolm

Malcolm Gregory (he/him)
Environmental Analysis & Review Specialist
Wisconsin Department of Natural Resources
101 S. Webster Street
Madison, WI 53707-7921
malcolm.gregory@wisconsin.gov

From: Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>
Sent: Wednesday, January 26, 2022 10:12 AM
To: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: RE: White River Invasive Species DRAFT Monitoring Plan

Hey Malcolm,

Below are some additional comments related to the White River Dam invasive species monitoring plan. I copied the comments from the Trego/Hayward one just for consistency but did add some other stuff...

Comments:

- Pg 4: Had a link to the DNR webpage regarding whom to report new invasive species to... this is a dead link and I think this should be the one used...
    - Link: https://dnr.wi.gov/lakes/invasives/Contacts.aspx?role=AIS_POC we will make the change.
- Pg 4: We don't like to use the word "rapid" anymore when it comes to response actions just due to the perceived nature of that process with using rapid. So I would just suggest removing that to say "If any response sections are identified..." we will make the change.
- If a new version of the Wisconsin Aquatic Invasive Species Early Detector Handbook during the duration of this project are we able to add some language around using the most up to date version of the handbook? I don't know for sure if a new version will be coming out in next couple years but I know it was in talks last year at least... This study will be completed this summer and I doubt anything will be available. Thanks for the heads-up.
- Some of the information in the Appendix 2 document is rather out of date but I am not sure if we have an updated version of that document. Primarily it is the contact information and some of the screenshots related to computer programs, etc... Please provide this information and we will be happy to include it.
- Pg 4: It mentions that "one water sample will be collected in both the reservoir and the tailwater..." – Do we want to include the DNR's monitoring protocol for Zebra Mussel and Spiny Waterflea monitoring in an additional Appendix? Cause it is a little more complicated than just collecting a "water sample", specific equipment and techniques need to be utilized. The consultants completing the study have prior experience in this area. If you want to provide us a link we can include it.
- NEW Comment: Pg4 – Under "Information Reporting" – I think we remove the invasive.species@wisconsin.gov email and change the reporting language to something along the lines of "the WDNR AIS regional coordinators as soon as possible..." and use the same link I provided above for reporting. That "invasive.species" email is primarily for terrestrial invasive species reporting and doesn't get checked all too often. Although the email was provided in comments on previous similar plans, we can include the link and make the change.

Lemme know if you have any additional questions or comments on my comments,

Thanks,
-Alex Selle

From: Gregory, Malcolm K - DNR <malcolm.gregory@wisconsin.gov>
Sent: Friday, January 21, 2022 3:06 PM
To: Selle, Alexander J - DNR <Alexander.Selle@wisconsin.gov>
Cc: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Subject: FW: White River Invasive Species DRAFT Monitoring Plan

Hi Alex,

Sorry for flooding your email on a Friday afternoon, but here's one more draft study that requires your input. Please see the attached Invasive Species Study Plan and related materials for the *White River Dam* in Ashland County. The licensee for this project is Xcel Energy.

Please review and provide feedback at least one week before February 11, 2022.

Thank you!

Best,

Malcolm

Malcolm Gregory (he/him)
Environmental Analysis & Review Specialist
Wisconsin Department of Natural Resources
101 S. Webster Street
Madison, WI 53707-7921
malcolm.gregory@wisconsin.gov

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Thursday, January 13, 2022 4:34 PM
To: Leoso, Edith <THPO@badriver-nsn.gov>; Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>; Climate@badriver-nsn.gov; wildlife@badriver-nsn.gov; environmental@badriver-nsn.gov
Cc: Darrin Johnson <Darrin.Johnson@meadhunt.com>; Miller, Matthew J <Matthew.j.miller@xcelenergy.com>; Shawn Puzen <Shawn.Puzen@meadhunt.com>; brey.j.maurer@xcelenergy.com; Crotty, Scott A <scott.a.crotty@xcelenergy.com>
Subject: White River Invasive Species DRAFT Monitoring Plan

Good Afternoon,

Attached is a draft White River Invasive Species Monitoring Plan for your review and comment. The intent is to complete this study during this field season.

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete an invasive species survey.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than February 11, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

Attachment C Mussel Study Plan

White River
Hydroelectric Project
FERC No. 2444

Final Mussel Study Plan

Prepared for
Northern States Power Company,
a Wisconsin Corporation

Prepared by

Mead & Hunt

meadhunt.com

February 2022

1. Introduction

Northern States Power Company – Wisconsin (NSPW or Licensee), d/b/a Xcel Energy, currently holds a license issued by the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the White River Hydroelectric Project (Project). The Project is owned, operated, and maintained by the Licensee. The current license, which designates the Project as FERC No. 2444, expires on July 31, 2025. To obtain a subsequent license, the Licensee must submit a final license application to FERC no later than July 31, 2023. The final license application, in part, must include a review of freshwater mussel data in the vicinity of the Project.

On October 29, 2020, the Licensee held a Joint Agency Meeting to present information about the Project. At the meeting, and during the 60-day comment period immediately following, the Licensee received comments and study requests from several entities. Wisconsin Department of Natural Resources (WDNR) requested that mussel surveys be completed.

The WDNR recommended that the Licensee conduct a mussel study using the WDNR Guidelines for Sampling Freshwater Mussels in Wadable Streams and that the methodology should be discussed with the Department for non-wadable areas. This study plan is consistent with the WDNR request.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of this study is to provide baseline data regarding the general density and diversity of freshwater mussels, including characterizing mussel habitat within the Project area.

2.2 Background and Existing Information

There is no mussel data available in the Project vicinity (WDNR, 2020).

2.3 Nexus between project operations and effects on resources

The operations of the Project could influence the freshwater mussel populations located within the Project boundary.

2.4 Study Area

The mussel study will include the sampling of two riverine reaches in the Project vicinity, one upstream of the dam in a riverine area of the impoundment and one downstream of the Project powerhouse outside of the mixing zone. The study areas are depicted in Appendix 1.

2.5 Methodology

2.5.1 Mussel Survey

The 2015 Wisconsin Department of Natural Resources Guidelines for Sampling Freshwater Mussels in Wadable Streams (Guidelines) and other standard survey methodologies were used to develop the mussel survey parameters (Piette, 2015). The Guidelines provide information on minimum survey efforts for wadable conditions and have been modified for non-wadable conditions. The objective of this mussel study is to provide baseline data regarding mussel diversity within the vicinity of the Project including a general characterization of mussel habitat within the Project boundary.

Two river reaches will be surveyed at the Project. Reach 1 begins approximately 1,200 meters above the dam and extends 1,000 meters upstream. Reach 2 begins approximately 35 meters below the powerhouse and extends 1,000 meters downstream.

Surveys will consist of sampling transects extending bank to bank that will be spaced every 100 meters in each reach creating a series of 10 transects per reach. Transects will be numbered 1-10 from downstream to upstream, and a random number selector will be utilized to select five transects for survey in each reach.

Searches along each transect will be conducted in 10-meter-long segments and will extend 0.5 meters on each side of the transect. A rapid visual search for signs of freshwater mussels (living or shell material) will be performed within the segment. The rapid visual search entails an initial search of 0.2 minutes per square meter along each 10-meter segment (2 minutes total) to determine if mussels are present. If mussels are present within a segment, a semi-quantitative search will be triggered, and the time will be extended to 1 minute per square meter. During the semi-quantitative search, divers will visually search, probe the substrate, and turn over rocks to detect small, burrowed mussels.

General stream conditions and morphology within the study area will be recorded, including river bottom substrate composition using the Wentworth Scale (% observed of silt, sand, gravel, etc.). The survey will be conducted only when visibility at depth is at least 20 inches.

In addition to the mussel sampling within the transects, a general description of mussel habitat within the Project boundary will be provided.

2.5.2 Data and Mussel Handling

Live mussels found will be kept submersed in ambient river water and kept cool and moist during processing. All live mussels will be identified to species, counted, and sexed (sexually dimorphic species only) by the team malacologist. Dead shell specimens will be scored as fresh dead (dead < 1 year; lustrous nacre), weathered dead (dead one to many years; chalky nacre, fragmented, and worn periostracum), or subfossil (dead many years to many decades; severely worn and fragmented). Detailed digital images of the study area and representative mussel species will be recorded. A station location data sheet will also be populated per the Guidelines. Data will be recorded using the forms in Appendix 2 to allow distinction between searches. Mussel taxonomy will follow the names presented by Williams et al., 2017.

If any federally or state-listed species is observed, alive or dead, the Licensee will be notified immediately. WDNR and U.S. Fish and Wildlife Service (USFWS) will be notified per surveyor collection permit requirements. No live mussels will be harmed or taken during the study. Any federally or state-listed species that are encountered will be individually hand placed into their places of origin.

2.5.3 Personnel Qualifications

All surveys will be conducted by individuals with prior mussel identification training and experience with aquatic and mussel surveys.[1]

2.5.4 Survey Report

A draft report will be developed within 30 days of completion of field work for agency review and comment. A final report will be completed within two weeks of receiving agency comments. The report shall include a description of mussel survey activities and provide summary tables of all data collected, including mussel species numbers, sizes, and distribution within the study area. The report shall also describe general mussel density and diversity within the vicinity of the Project.

A general description of mussel habitat within the Project boundary, including the reservoir, bypass reach and tailwater area, will also be provided. GIS-based mapping will provide a visual representation of the findings. The report, including completed survey sheets, will be summarized and appended to the DLA.

2.6 Consistency with generally accepted scientific practice

The Mussel Study follows generally accepted scientific practice regarding field data collection and reporting. Similar protocols have been used in other FERC relicensing studies.

2.7 Project Schedule and Deliverables

The study will be completed in 2022. Scientific collector's permits will be obtained from the WDNR prior to the work commencing. To minimize thermal stress to the mussel specimens, field work will generally be conducted between June and mid-September when water temperatures exceed 50 degrees Fahrenheit. Normal to low water conditions and good underwater visibility must be present to effectively conduct field work; therefore, project activities will be planned accordingly.

[1] Consultant(s) selected to complete the work will be responsible for obtaining any WDNR or any other scientific collectors permits required.

It should be noted that NSPW is planning a drawdown of the reservoir beginning in July of 2022. The drawdown is not expected to impact the riverine sections where surveys are planned. However, the drawdown schedule will be taken into account when planning the surveys.

NSPW anticipates that all field work will be completed by mid-September with the draft study report available by October 1, 2022.

3. Consultation

The mussel study was requested by WDNR. As a result, the Licensee consulted with WDNR as follows.

3.1 Wisconsin Department of Natural Resources

On February 2, 2022, the Licensee, through its consultant Mead & Hunt, provided a draft copy of the Mussel Study plan to the WDNR for comment. The WDNR responded on February 16, 2022 indicating it did not have any additional comments. Documentation of Consultation is included in Appendix 3.

4. References

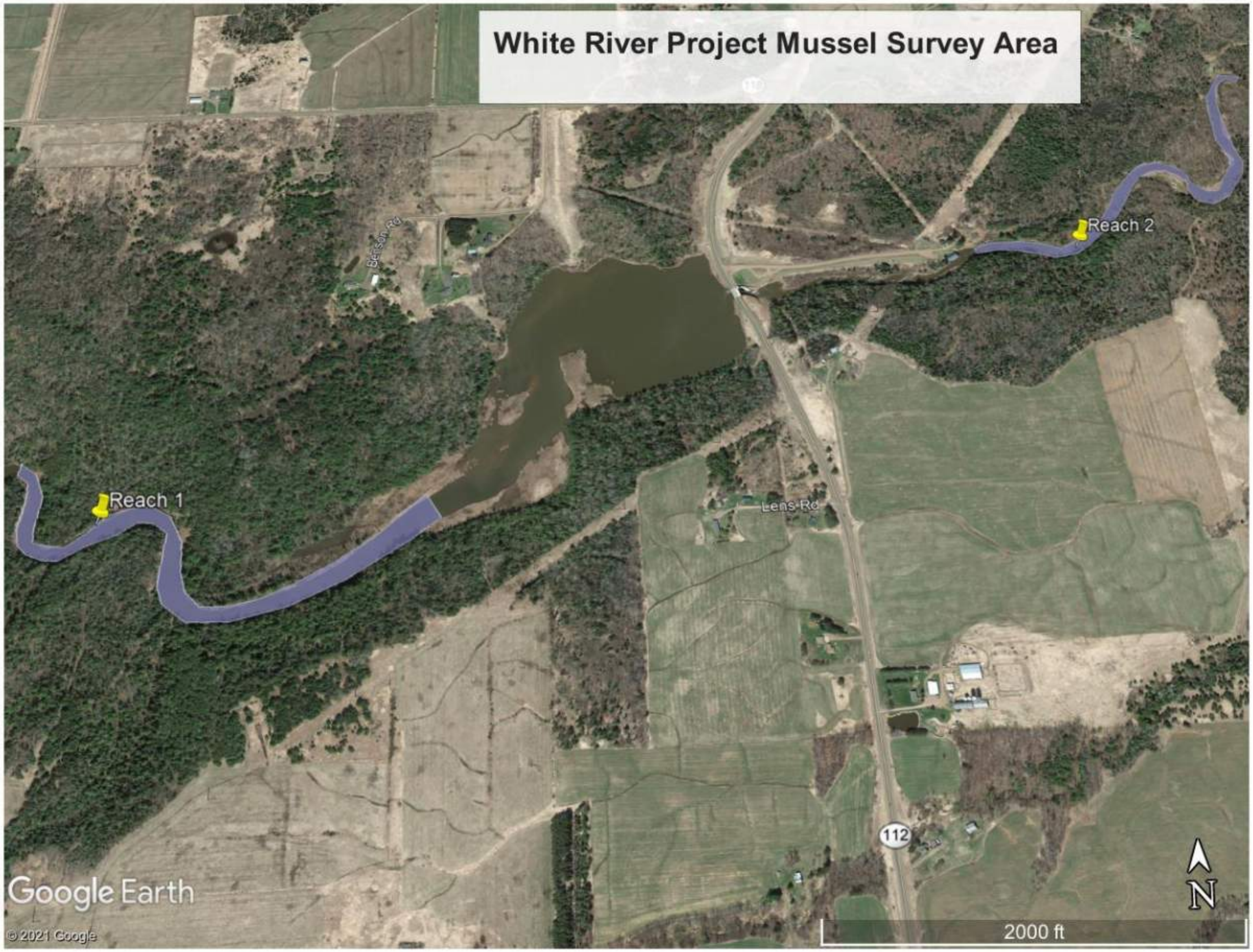
Piette, R.R. 2015. Guidelines for sampling freshwater mussels in wadable streams. Wisconsin Department of Natural Resources. 50 pp.

Smith, D.R. 2006. Survey design for detecting rare freshwater mussel species. Journal of the North American Benthological Society 25:701-711.

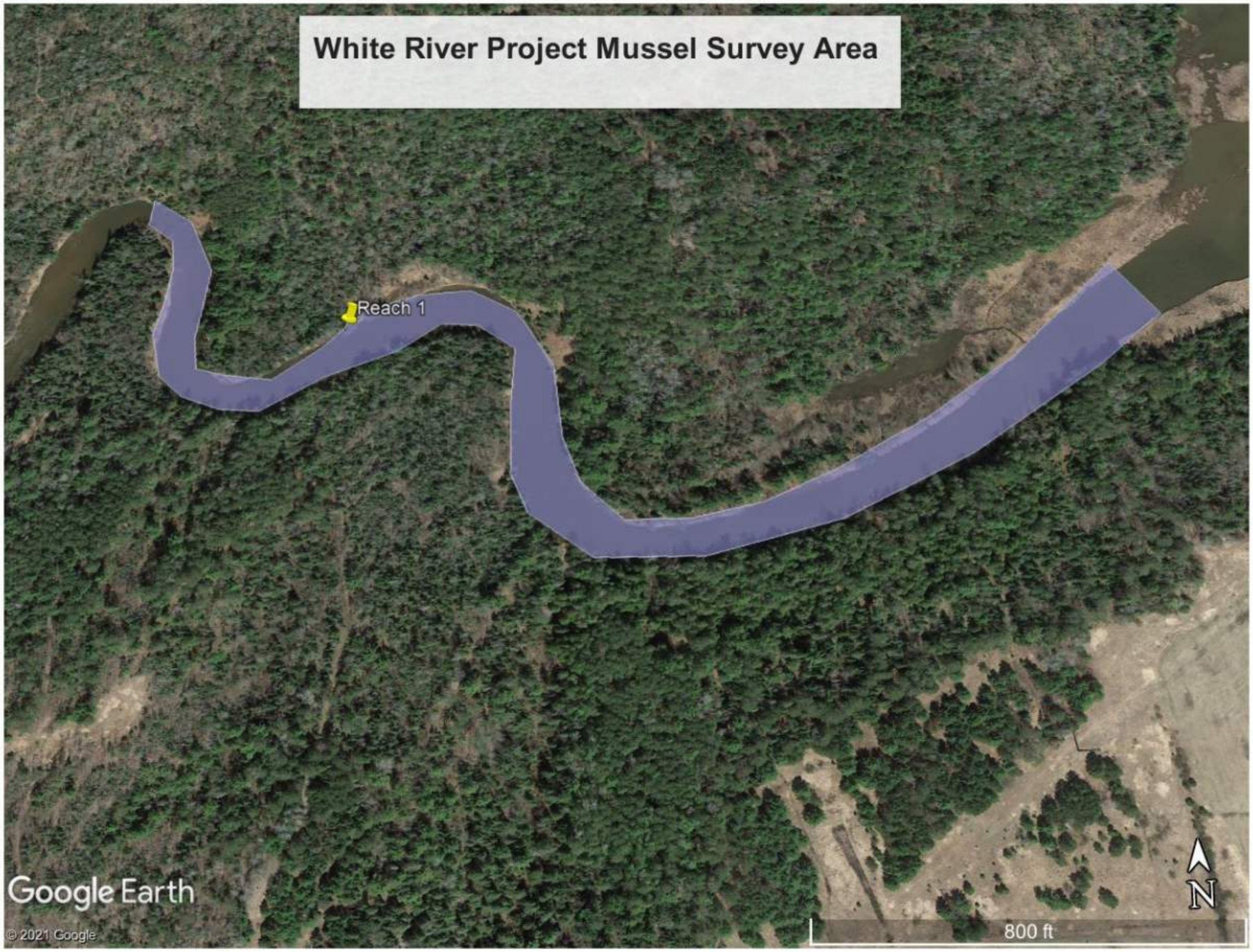
Williams, J.D et. al. 2017. A revised list of the freshwater mussels (Mullusca: Bibalvia Unionida) of the United States and Canada. Freshwater Mollusk Biology and Conservation, 20(2), 33-58.

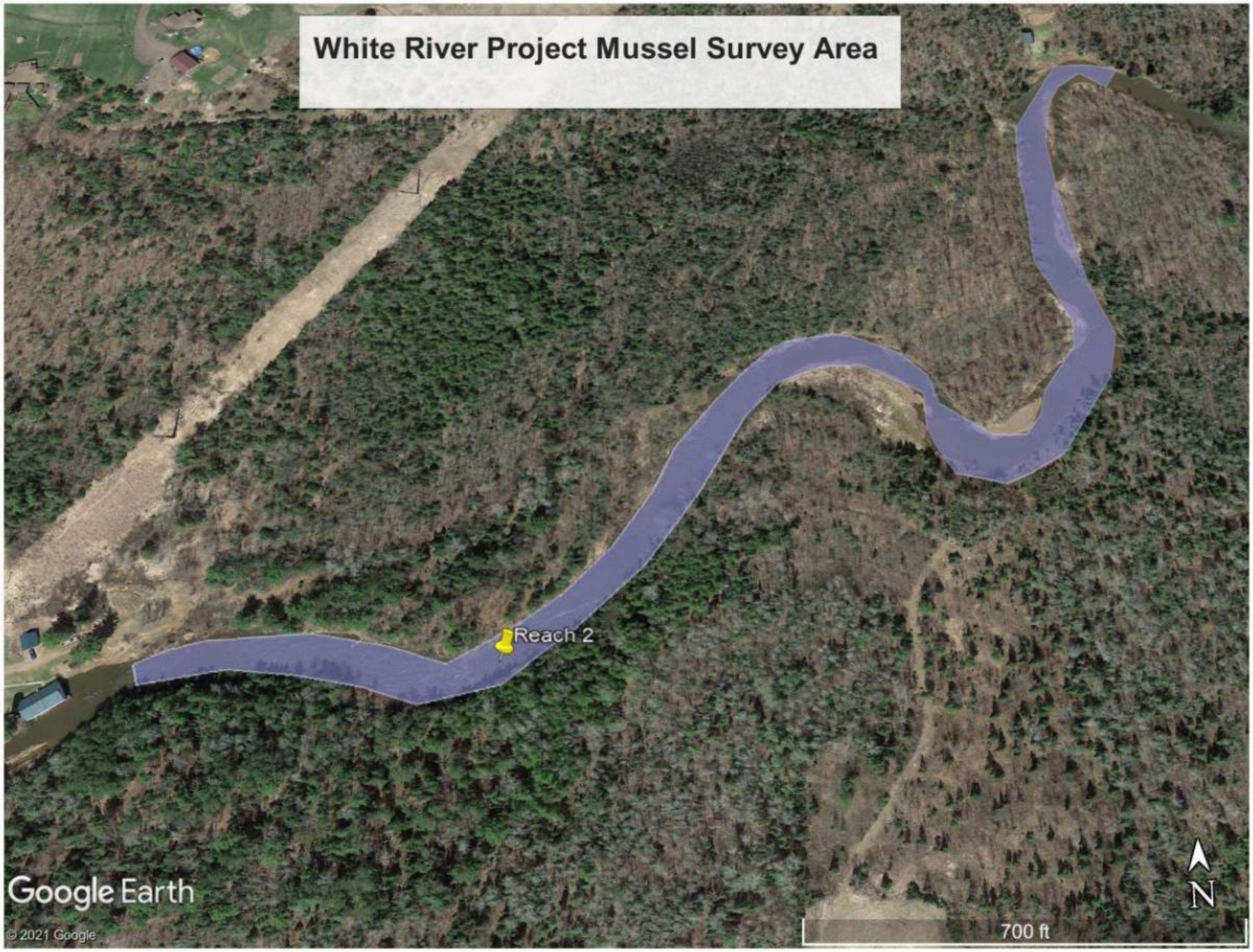
Wisconsin Department of Natural Resources. 2020. Study Request Relicensing of White River Project P-2444. December 17, 2020.

Appendix 1 – Mussel Survey Locations



White River Project Mussel Survey Area
Reach 1
Reach 2
Lens Rd
112
Google Earth
© 2021 Google
2000 ft
N


White River Project Mussel Survey Area
Reach 1
Google Earth
© 2021 Google
800 ft
N


White River Project Mussel Survey Area
Reach 2
Google Earth
© 2021 Google
700 ft
N

Appendix 2 – Mussel Survey Data Forms

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
Reach 1	T1	10								
	T1	20								
	T1	30								
	T1	40								
	T1	50								
	T1	60								
	T1	70								
	T1	80								
	T1	90								
	T1	100								
	T1	110								
	T1	120								
	T1	130								
	T1	140								
	T1	150								
	T1	160								
	T1	170								
	T1	180								
Reach 1	T2	10								
	T2	20								
	T2	30								
	T2	40								
	T2	50								
	T2	60								
	T2	70								
	T2	80								
	T2	90								
	T2	100								
	T2	110								
	T2	120								
	T2	130								
	T2	140								
	T2	150								
	T2	160								
	T2	170								
	T2	180								
Reach 1	T3	10								
	T3	20								
	T3	30								
	T3	40								
	T3	50								
	T3	60								
	T3	70								
	T3	80								
	T3	90								
	T3	100								
	T3	110								
	T3	120								
	T3	130								

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
	T3	140								
	T3	150								
	T3	160								
	T3	170								
	T3	180								
Reach 1	T4	10								
	T4	20								
	T4	30								
	T4	40								
	T4	50								
	T4	60								
	T4	70								
	T4	80								
	T4	90								
	T4	100								
	T4	110								
	T4	120								
	T4	130								
	T4	140								
	T4	150								
	T4	160								
	T4	170								
	T4	180								
Reach 1	T5	10								
	T5	20								
	T5	30								
	T5	40								
	T5	50								
	T5	60								
	T5	70								
	T5	80								
	T5	90								
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	T5	140								
	T5	150								
	T5	160								
	T5	170								
	T5	180								
	T1	10								
	T1	20								
	T1	30								
	T1	40								
	T1	50								
	T1	60								
	T1	70								
	T1	80								

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
Reach 2	T1	90								
	T1	100								
	T1	110								
	T1	120								
	T1	130								
	T1	140								
	T1	150								
	T1	160								
	T1	170								
	T1	180								
Reach 2	T2	10								
	T2	20								
	T2	30								
	T2	40								
	T2	50								
	T2	60								
	T2	70								
	T2	80								
	T2	90								
	T2	100								
	T2	110								
	T2	120								
	T2	130								
	T2	140								
	T2	150								
	T2	160								
	T2	170								
	T2	180								
Reach 2	T3	10								
	T3	20								
	T3	30								
	T3	40								
	T3	50								
	T3	60								
	T3	70								
	T3	80								
	T3	90								
	T3	100								
	T3	110								
	T3	120								
	T3	130								
	T3	140								
	T3	150								
	T3	160								
	T3	170								
	T3	180								
	T4	10								
	T4	20								
	T4	30								

Substrate and Water Depth Per Segment										
Reach	Transect	Segment	Water Depth (ft)	Substrate Characteristic (%)						
				Bedrock	Boulder	Cobble	Gravel	Sand	Silt	LWD
Reach 2	T4	40								
	T4	50								
	T4	60								
	T4	70								
	T4	80								
	T4	90								
	T4	100								
	T4	110								
	T4	120								
	T4	130								
	T4	140								
	T4	150								
	T4	160								
	T4	170								
	T4	180								
Reach 2	T5	10								
	T5	20								
	T5	30								
	T5	40								
	T5	50								
	T5	60								
	T5	70								
	T5	80								
	T5	90								
	T5	100								
	T5	110								
	T5	120								
	T5	130								
	T5	140								
	T5	150								
	T5	160								
	T5	170								
	T5	180								

PROJECT:																								
Mussels Observed within WhiteRiver, 2022																								
Species		Reach 1							Reach 2							Reach 3 (if applicable)							Overall (All Reaches Together)	
Common Name	Scientific Name	T1	T2	T3	T4	T5	Total Number Reach 1	Relative Abundance (% of total-Reach 1)	T1	T2	T3	T4	T5	Total Number Reach 2	Relative Abundance (% of total-Reach 2)	T1	T2	T3	T4	T5	Total Number Reach 3	Relative Abundance (% of total-Reach 3)	Total Number	Relative Abundance (% of total)
Abundance (total number of mussels)																								
Number of Species (Live)																								
Effort (size of transect m^2)																								
Surface Density (# per m^2)																								

Appendix 3 – Documentation of Consultation

Shawn Puzen

From:	Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Sent:	Wednesday, February 16, 2022 12:24 PM
To:	Shawn Puzen
Cc:	Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	RE: Request for Comments on White River Mussel Study Protocol
Categories:	Filed by Newforma

Staff have reviewed the information provided, and do not have any additional comments.

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Cheryl Laatsch
Statewide FERC Coordinator
Bureau of Environmental Analysis and Sustainability
Wisconsin Dept of Natural Resources
N7725 Hwy 28
Horicon WI 53032
(T) 920-387-7869 (Fax) 920-387-7888
Cheryl.laatsch@wisconsin.gov

dnr.wi.gov

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Wednesday, February 2, 2022 2:15 PM
To: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Cc: Shawn Puzen <Shawn.Puzen@meadhunt.com>; Darrin Johnson <Darrin.Johnson@meadhunt.com>; brey.j.maurer@xcelenergy.com; Miller, Matthew J <Matthew.j.miller@xcelenergy.com>; Crotty, Scott A <scott.a.crotty@xcelenergy.com>
Subject: Request for Comments on White River Mussel Study Protocol

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete a mussel survey.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 4, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

Attachment D Recreation Study Plan

White River
Hydroelectric Project
FERC No. 2444

Final Study Plan

Recreation Study

Prepared for

Northern States Power Company,
a Wisconsin Corporation

Prepared by

Mead & Hunt

meadhunt.com

February 2022

1. Introduction

Northern States Power Company – Wisconsin (NSPW or Licensee), d/b/a Xcel Energy, currently holds a license issued by the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the White River Hydroelectric Project (Project). The Project is owned, operated, and maintained by the Licensee. The current license, which designates the Project as FERC No. 2444, expires on July 31, 2025. To obtain a subsequent license, the Licensee must submit a final license application to FERC no later than July 31, 2023. The final license application, in part, must include an evaluation of the existing recreational facilities associated with the Project along with proposed recreation enhancements.

On October 29, 2020, the Licensee held a Joint Agency Meeting to present information about the Project. At the meeting, and during the 60-day comment period immediately following, the Licensee received comments and study requests from several entities. The Wisconsin Department of Natural Resources (WDNR) requested a study of recreation facilities (or public access) and an investigation of recreation enhancements as part of the relicensing process.

WDNR requested that the Licensee evaluate current recreational uses, including opportunities for low flow and high flow events, public access, natural scenic beauty, trails, water sports, and fishing with consideration for the different seasonal uses. This study plan is consistent with the WDNR request.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of this study is to provide a subjective assessment of existing recreation facility conditions as well as recommend enhancements. The study will also determine the capacity of existing facilities to help assess current and future user demand, produce sufficient information to evaluate such impacts, and provide the rational for recommended recreation enhancements.

2.2 Background and Existing Information

Recreation in the vicinity of the Project is dominated by activity near the Project’s facilities. The existing recreational facilities within the Project will be evaluated for recreational use and improvements.

The last Form 80 survey was completed in 2014 and filed with the Commission on March 30, 2015. The Form 80 survey indicated that the tailwater fishing area received the highest use (approximately 40% of capacity). Light use (approximately 10-15% of capacity) was noted at the reservoir boat landing and canoe portage (NSPW, 2020).

In March 2019, the State of Wisconsin published its Statewide Comprehensive Outdoor Recreation Plan (SCORP) for 2019-2023. The SCORP did not identify any specific recreation needs in the immediate Project vicinity.

The SCORP places an emphasis on nature-based recreation including hiking, fishing, and boating. The Licensee currently provides a boat landing for launching small watercraft on the Project reservoir, a tailrace fishing area downstream of the powerhouse, and a canoe portage that helps fulfill recreation needs. These recreational opportunities are consistent with the SCORP.

2.3 Nexus between Project Operations and Effects on Resources

Project operations, including fluctuations in reservoir elevation, as well as insufficient public access, can limit recreational opportunities. Therefore, adequate information is necessary to determine what impacts to recreation, if any, are caused by Project operations. The information is also necessary to help determine which recreational opportunities may require enhancement.

2.4 Study Area

Since it is believed no additional recreation sites are necessary, the inventory and recreational use study will incorporate the recreation sites listed below in Table 2.4-1.

Table 2.4-1. Recreation Sites to be Inventoried and Surveyed for Existing Use

White River Boat Landing
Tailwater Fishing Area
Canoe Portage

2.5 Methodology

2.5.1 Recreation Inventory (to be completed by Xcel Energy Employees in 2022)

Each of the recreation sites listed in Table 2.4-1 will be inventoried during the summer using the forms enclosed in Appendix 1 to collect information on recreation amenities and capacity. The following types of information will be recorded:

1) The primary type(s) of recreation provided at the site.
2) Existing sanitation facilities (if any).
3) Type of vehicle access and parking capacity (if any).
4) The presence and type (if any) of barrier-free facilities.
5) The GPS location of the facility.
6) Photographs of the recreation site, amenities, signage, and entryways to the sites from the main road(s), including photographs of any adverse impacts the site may have on environmental resources, including shoreline erosion.

2.5.2 Facility Condition Assessment (to be completed by Xcel Energy Employees in 2022)

During at least one visit to each of the recreation sites listed in Table 2.4-1, the condition of each amenity or feature (including recreational wayfinding signs and interpretive signs) and its immediate vicinity will be assessed. A rating for each site will be made according to the following scale:

1) Unusable and Needs Replacement
2) Needs Repair
3) Needs Maintenance or cleaning
4) Good Working Condition (does not need any attention)
5) Facility Lacking; need to install facility or otherwise add enhancement (identify item).

If a rating is assigned indicating that additional attention is required, the specific item that needs additional attention will be noted on the form.

2.5.3 Recreation Use Survey (to be completed by Xcel Energy Employees in 2022)

Regular site visits to each of the recreation sites listed in Table 2.4-1 will be made between the hours of 7:00 a.m. and 7:00 p.m. During the regular site visits, recreation observation data will be collected using the form enclosed in Appendix 2. Regular site visits will be conducted according to the following schedule in Table 2.5.3-1. Surveying will be on a rotating schedule to avoid repeatedly conducting surveys at the same time of day and to account for time-of-day use patterns.

Table 2.5.3-1. Recreation Use Survey Schedule

Survey Month	Recurrence Interval
April	One randomly selected weekend
May	One randomly selected weekend One day during Memorial Day weekend
June	One randomly selected weekday Two randomly selected weekend days
July	One randomly selected weekday Two randomly selected weekend days
August	One randomly selected weekday Two randomly selected weekend days
September	One weekend day the weekend following Labor Day weekend

2.5.4 Future and Potential Recreation

To assess future recreation needs within the Project vicinity, the questionnaire enclosed in Appendix 3 will be sent to municipalities and other entities responsible for existing recreation within the Project vicinity. Specifically, the questionnaire will be sent to Ashland County, Town of White River, and the WDNR.

Each entity will be allowed 30 days to respond to the questionnaire and their responses will be incorporated into the draft license application (DLA). The DLA will also summarize the need for additional recreational mitigation and enhancement recommendations (if any).

2.6 Consistency with Generally Accepted Scientific Practice

The overall design of the recreational survey is similar to that commonly used in relicensing proceedings and is consistent with generally accepted methods for recreation studies.

2.7 Project Schedule

NSPW anticipates the fieldwork for the recreation assessment will be completed in 2022. Information collected during the study will be summarized in the DLA. Completed survey sheets will be appended to the DLA. Based on the data collected, additional recreational mitigation and enhancement recommendations (if any) will be included.

3. Consultation

The Recreation Study was requested by the WDNR. As a result, the Licensee consulted with the WDNR on the study plan as described in Section 3.1. Consultation on the results of the Recreation Study will be completed as part of the consultation on the DLA.

3.1 Wisconsin Department of Natural Resources

On January 7, 2022, the Licensee, through its consultant Mead & Hunt, provided a draft copy of the Recreation Study Plan to the WDNR for comment. The WDNR responded verbally that they would not be providing any comments. Documentation of Consultation is included in Appendix 4.

4. References

Northern States Power Company – Wisconsin, 2020. White River Hydroelectric Project, FERC Project No. 2444, Pre-Application Document. July 29, 2020.

Wisconsin Department of Natural Resources. 2020. Study Request Relicense of White River Project P-2444. December 17, 2020.

Appendix 1 – Recreation Site Inventory Form

Recreation Inventory and Condition Assessment						
Location:					Date:	
White River Hydroelectric Project P-2444						
Survey Person:						
GPS Location:						
Amenity Photo Numbers:						
Shoreline Photo Numbers:						
Entryway Photo Number:						
Type of Amenity:		**Quanitity of Amenities:**	**Condition of Amenity:** -Not Usable (N) -Needs Repair (R) -Needs Maintenance (M) -Good Working Condition (G)		**Notes:**	**Barrier Free?** (Y or N)
Boat Launch		Lanes: 1 Launches: 1	N R M G			N
Scenic Overlook			N R M G			N
Tailwater Access			N R M G			N
Restroom			N R M G			N
Trash Receptacles			N R M G			NA
Other			N R M G			

Parking	**No. Spaces (each type):**				**Condition:**	**Notes:**
	Standard:	Barrier-Free:	Trailer:	Other (specify):		
					N R M G	Gravel?

Signage:	**Number:**	**Condition:**	**Comments: Provide Details on which signs need attention.**
FERC Project Sign		N R M G	
Regulations Signs		N R M G	
Directional		N R M G	
Interpretive		N R M G	

Additional Comments:

Describe any signs of overuse or anything observed that is not already documented above.

Appendix 2 – Recreation Use Survey Form

Recreation Observation Form

Date:		Time:	

White River Project P-2444

Survey Person:						Note: Please list primary activity by placing a "P" in the box. Use and "S" for secondary activities.
Temperature:		Weather:		Wind Speed:		

Recreation Site	Number of People	Recreation Activities: ATV/Snowmobile	Shore Fishing	Boat Fishing	Swimming	Hiking/Walking/Jogging	Bicycling	Picnicking	Bird Watching	Wildlife Viewing	Non-Powered Boating	Power Boating	Other (specify)	Notes
Boat Launch														
Canoe Portage														
Tailwater Fishing Area														

Additional Comments:

Appendix 3 – Future and Potential Recreation Questionnaire

Xcel Energy is in the process of relicensing the White River Hydroelectric Project (Project) located on the White River in Ashland County, Wisconsin. Xcel Energy is gathering information about potential recreation needs in the vicinity of the White River Hydroelectric Project.

The Project vicinity is defined as the area upstream and downstream of the White River Dam and Powerhouse Dam and Powerhouse within 1/2 mile of the shoreline extending two (2) miles upstream and (1) mile downstream of the White River Dam.

If you have any questions, please contact Matthew Miller at matthew.j.miller@xcelenergy.com or 715-737-1353.

1. Information about person completing the questionnaire:

Name & Title: ______________________________

Organization: ______________________________

Address: ______________________________

____

Phone: ______________________________

Email Address: ______________________________

2. Is your organization responsible for recreation sites, amenities, formal access sites, or planning for recreation sites within the Project vicinity as defined above?

☐ Yes ***(Please proceed to 2a below)***

☐ No ***(No additional information is needed and thank you for your input)***

a. Please describe your primary function pertaining to recreation and list any recreation sites or access sites (formal or informal) in the Project vicinity you are responsible for in the space provided below: ***(Additional information may be provided on the final sheet of this questionnaire.)***

____

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Please proceed to question 2b on the next page.

b. Please list all recreation amenities available at each recreation site or access site you manage (e.g. docks, restrooms, parking areas, interpretive signage, picnic tables, trails, etc.) below: ***(Additional information may be provided on the final sheet of this questionnaire.)***

c. Please provide the location of each site listed above using a map, street address, or GPS location: ***(Additional information may be provided on the final sheet of this questionnaire.)***

d. Have any of the sites or amenities listed in 2a and 2b exceeded capacity or not had sufficient parking? ***(Additional information may be provided on the final sheet of this questionnaire.)***

☐ Yes ***(Please list location, amenity and when capacity is exceeded.)*** ☐ No

Recreation Site/Amenity	Event(s) Exceeding Capacity

Please proceed to question 2e on the next page.

e. Based on the specific recreation sites listed in 2a and amenities listed in 2b, do you have any planned improvements of existing recreation sites or any plans for development of new recreation sites? ***(Additional information may be provided on the final sheet of this questionnaire.)***

☐ Yes ***(Please list location, planned improvement, and anticipated opening date below.)*** ☐ No

Planned Improvements/Locations	**Anticipated Opening Date**

f. Do you believe additional recreation sites/amenities are needed within the Project vicinity? **(Additional information may be provided on the final sheet of this questionnaire.)**

☐ Yes ***(Please list reasoning below.)*** ☐ No

Additional Recreation Sites/Amenities Reasoning

____

____

____

____

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____

____

g. Please indicate if there is a specific representative you wish to designate as a follow-up contact by Xcel Energy or their representative for any recreation site listed above: ***(Additional information may be provided on the final sheet of this questionnaire.)***

Representative Contact Information

Name: ____

Address: ____

____

Phone: ____

Email: ____

Additional Information or Comments:
(***Please indicate applicable section***)

Please return this questionnaire to Xcel Energy in the enclosed self-addressed, stamped envelope within 30 days of receipt to allow for follow-up contact by Xcel or Xcel's representative, if needed. *Not responding within 30 days will indicate you or your agency are not aware of any relevant information regarding potential recreation needs in the vicinity of the White River Hydroelectric Project.*

Comments, questions, and/or this completed questionnaire may also be sent via email to: Matthew.J.Miller@XcelEnergy.com

Appendix 4 – Documentation of Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Friday, January 7, 2022 2:21 PM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River Recreation Study Protocol
Attachments:	20220107 Draft White River Recreation Use Study Protocol Sent for Comments.pdf

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete a recreation survey.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than February 6, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

Attachment E Water Quality Monitoring Study Plan

White River
Hydroelectric Project
FERC No. 2444

WORK SCOPE 22 QW
Study Plan

Water Quality Monitoring Study

Prepared for

Northern States Power Company,
a Wisconsin corporation

Prepared by

Mead & Hunt

meadhunt.com

March 2022

1. Introduction

Northern States Power Company, a Wisconsin corporation (NSPW or Licensee), currently holds a license issued by the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the White River Hydroelectric Project (Project). The Project is owned, operated, and maintained by the Licensee. The current license, which designates the Project as FERC No. 2444, expires on July 31, 2025. To obtain a new license, the Licensee must submit a final license application to FERC no later than July 31, 2023. The final license application, in part, must include an evaluation of the existing water quality associated with the Project.

On October 29, 2020, the Licensee held a Joint Agency Meeting to present information about the Project. At the meeting, and during the 60-day comment period immediately following, the Licensee received comments and study requests from several entities. The Wisconsin Department of Natural Resources (WDNR) requested that a water quality monitoring study be completed. More specifically, the WDNR requested that the following water quality parameters be assessed and monitored:

- Ammonia
- Bacteria
- Chloride
- Chlorophyll-a
- Conductivity
- Dissolved Oxygen (DO)
- Dissolved Phosphorus
- Nitrate (plus nitrite)
- pH
- Sediment Accumulation
- Sulfate
- Temperature
- Total Mercury
- Total Nitrogen
- Total Phosphorus
- Total Suspended Solids

WDNR indicated that the data should be collected and/or analyzed using river monitoring protocols. River monitoring methods should be implemented in at least three locations within the Project area, including one location downstream of the dam, one location within the impounded area (within the deep area of the impoundment, typically near the dam), and one location upstream of the impoundment. The licensee has developed this study plan to include monitoring for all parameters requested by WDNR with the exception of sediment accumulation. The study plan is otherwise consistent with the WDNR request.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of this water quality monitoring study is to determine if the Project meets current state water quality standards.

2.2 Background and Existing Information

Limited information is available on water quality data within the Project boundary. The most recent water quality monitoring was completed in 2007 (WDNR, 2020).

2.3 Nexus between project operations and effects on resources

The operation of the dam affects the water quality of the impoundment and downstream resources. The overall goal of the request is to further understand the current water quality conditions of the reservoir and river resources which will help inform management decisions in the future (WDNR, 2020).

2.4 Study Area

The study includes water quality monitoring at three locations within the Project. Monitoring site 1 is located approximately 4,800 feet upstream of the dam in a riverine area. Monitoring site 2 is located approximately 300 feet upstream of the dam in the deep hole within the reservoir. Monitoring site 3 is located approximately 165 feet downstream of the powerhouse at the existing WDNR Monitoring Station No. 023127. The location of each monitoring site and their coordinates are shown in Appendix 1.

2.5 Methodology

2.5.1 Upstream, Deep Hole, and Downstream Monitoring

Since the White River is classified as impounded flowing waters with a residence time of less than 14 days[1], river monitoring protocols should be applied instead of lake monitoring protocols (WDNR, 2020).

The parameters to be monitored, type of sampling, and sampling frequency are detailed in Table 2.5.1-1 below. Each sampling event should occur near the middle of the sampling month.

[1] WDNR indicated that the upper confidence limit for water residence time for the White River Flowage is one day.

Table 2.5.1-1 Upstream and Downstream Monitoring Parameters and Frequency

Parameter	Samples	Type of Sampling	Sampling Frequency					
			May	June	July	Aug.	Sept.	Oct.
Ammonia	6 total	Lab	X	X	X	X	X	X
Bacteria	6 total	Lab	X	X	X	X	X	X
Chloride	6 total	Lab	X	X	X	X	X	X
Chlorophyll-a	3 total	Lab			X	X	X	
Conductivity	Continuous Jul-Sept	Field Measurement			X	X	X	
DO	Continuous Jul-Sept	Field Measurement			X	X	X	
Dissolved Phosphorus	6 total	Lab	X	X	X	X	X	X
Nitrate (plus nitrite)	6 total	Lab	X	X	X	X	X	X
pH	Continuous Jul-Sept	Field Measurement			X	X	X	
Sulfate	6 total	Lab	X	X	X	X	X	X
Total Mercury	6 total	Lab	X	X	X	X	X	X
Temperature[2]	Continuous May-Oct	Field Measurement	X	X	X	X	X	X
Total Nitrogen	6 total	Lab	X	X	X	X	X	X
Total Phosphorus	6 total	Lab	X	X	X	X	X	X
Total Suspended Solids	6 total	Lab	X	X	X	X	X	X

Data should be collected or analyzed using the *WDNR Wisconsin Consolidated Assessment and Listing Methodology* (*WisCALM Guidance*) located online at the following web address: https://dnr.wisconsin.gov/topic/SurfaceWater/WisCALM.html. A list of standard operating procedures can be found in the Appendix of the *WisCALM Guidance*.

WDNR Nutrient Grab Sample Protocols located online at https://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=114118765 should be used for the following parameters:

> Ammonia, dissolved phosphorus, nitrate (plus nitrite), sulfate, total mercury, total nitrogen, total phosphorus, and total suspended solids

The procedures listed in the *Wisconsin Citizen Lake Monitoring Training Manual (Chemistry Procedures)* located online at https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/programs/CLMN/ChemistryMan.pdf should be used for the following parameters:

> Chlorophyll a, Chloride

[2] WDNR recommended year-round continuous temperature monitoring. However, it is extremely unlikely that temperature standards will be exceeded between the months of November and April and any data collected during this timeframe would likely not help inform FERC in developing license conditions. NSPW has restricted continuous temperature monitoring to the same timeframe as other monitoring commitments (i.e., May-October).

The procedures identified in the publication *Citizens Monitoring Bacteria: A training manual for monitoring E. coli*, located in Appendix 2, should be used for monitoring bacteria.

WDNR did not recommend that hydrographic profiles for the deep hole upstream of the dam be developed in their study request. Since the water residence time within the reservoir is only 1 day, it is unlikely that the reservoir will become stratified. Therefore, no hydrographic profiles within the reservoir have been included in the study plan.

2.5.2 Personnel Qualifications

All surveys will be conducted by individuals with prior water quality monitoring training and experience.[3]

2.6 Consistency with generally accepted scientific practice

The Water Quality Monitoring Study follows generally accepted scientific practice regarding field data collection and reporting. Similar protocols have been used in other relicensing studies.

2.7 Project Schedule and Deliverables

Results of the study will be summarized in a final study report. The report will include the following elements:

- Project Information and Background
- Study Area
- Methodology
- Study Results
- Analysis and Discussion
- Agency Correspondence and Consultation
- Literature Cited

NSPW anticipates that field work will be completed between mid-May and mid-October 2022 and the study report to be completed by November 30, 2022.

3. Consultation

The Water Quality Study was requested by WDNR. As a result, the Licensee consulted with WDNR as discussed below.

3.1 Wisconsin Department of Natural Resources

On February 3, 2022, the Licensee, through its consultant Mead & Hunt, provided a draft copy of the Water Quality Monitoring Study plan to the WDNR for comment. The WDNR did not respond with Comments. Documentation of Consultation is included in Appendix 3.

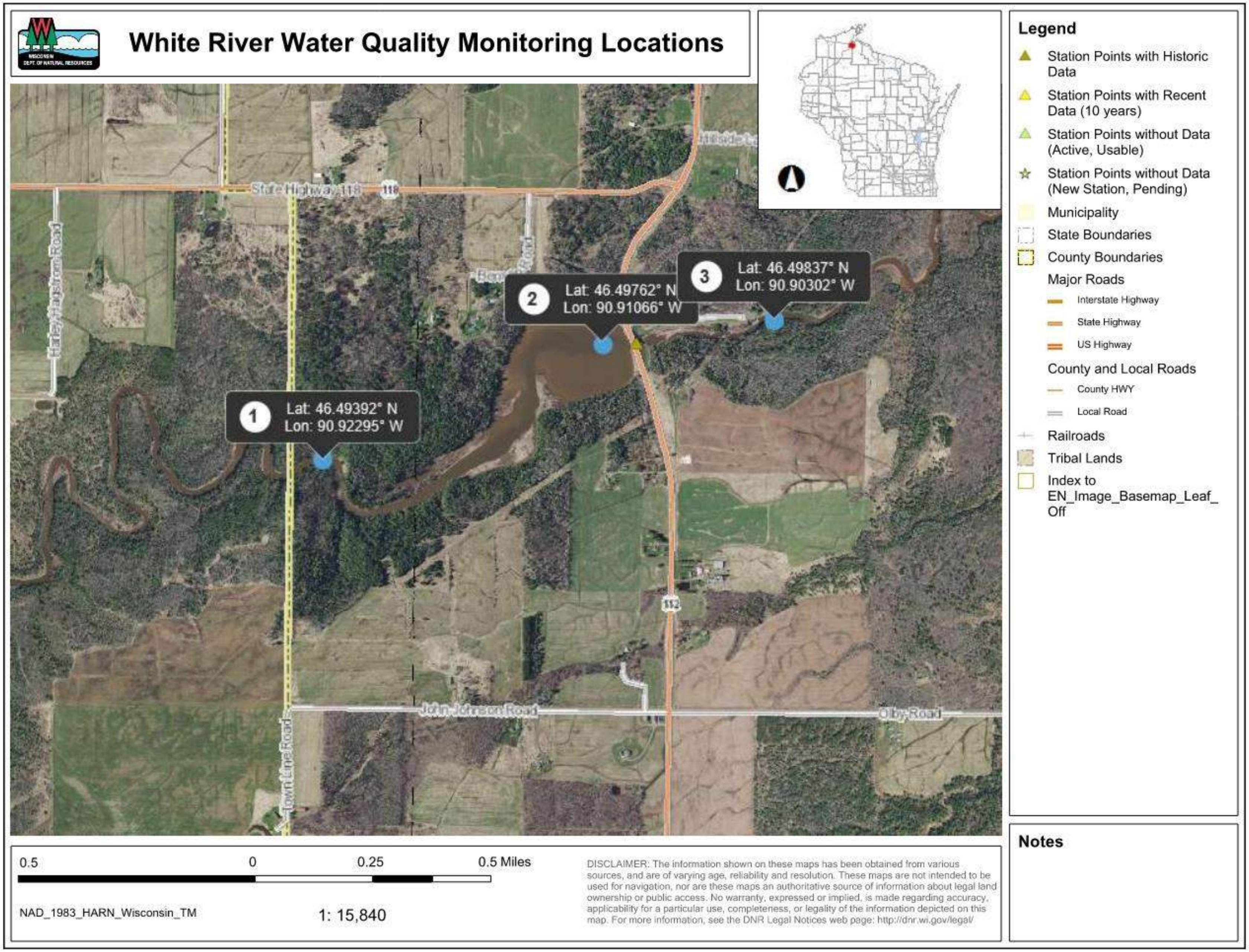
[3] The Consultant(s) selected to complete the work are responsible to obtain any required scientific collection permits required by WDNR, or other entities.

4. References

Bruhm, Laura, and Lois Wolfson. 2007. Citizens Monitoring Bacteria: A training manual for monitoring E. coli. Michigan State University. East Lansing, Michigan. 49pp.

Wisconsin Department of Natural Resources. 2020. Study Request Relicense of White River Project P-2444. December 17, 2020.

Appendix 1 – Water Quality Monitoring Study Area


White River Water Quality Monitoring Locations
WISCONSIN DEPT. OF NATURAL RESOURCES
State Highway 118
118
Harley Hagstrom Road
Town Line Road
John Johnson Road
Olby Road
112
1 Lat: 46.49392° N Lon: 90.92295° W
2 Lat: 46.49762° N Lon: 90.91066° W
3 Lat: 46.49837° N Lon: 90.90302° W
Legend
Station Points with Historic Data
Station Points with Recent Data (10 years)
Station Points without Data (Active, Usable)
Station Points without Data (New Station, Pending)
Municipality
State Boundaries
County Boundaries
Major Roads
Interstate Highway
State Highway
US Highway
County and Local Roads
County HWY
Local Road
Railroads
Tribal Lands
Index to EN_Image_Basemap_Leaf_Off
Notes
0.5 0 0.25 0.5 Miles
NAD_1983_HARN_Wisconsin_TM
1: 15,840
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Appendix 2 – Citizens Monitoring Bacteria: A training manual for monitoring E. coli

Citizens Monitoring Bacteria:

A training manual for monitoring *E. coli*






2nd Edition

A regional partnership between IN, IA, MI, MN, OH and WI

Citizens Monitoring Bacteria:

A training manual for monitoring *E. coli*

By:
Laura Bruhn
Lois Wolfson
Michigan State University

Edited by:
Lyn Crighton
Indiana DNR Hoosier Riverwatch

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Michigan State University Extension

Jerry Iles
The Ohio State University

Barbara Liukkonen
University of Minnesota

Eric O'Brien
Lynette Seigley
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2007

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Copies of this manual can be obtained on the web in pdf format at:

http://www.uwex.edu/ces/csreesvolmon/EColi/ProjectVolunteers.htm

Table of Contents

Chapter *Page*

Preface

This manual is a result of a joint project to enhance citizen E. coli monitoring in streams of the upper Midwest. The partners involved in this project include the Iowa Department of Natural Resources IOWATER, Purdue University, the Indiana Department of Natural Resources, Hoosier Riverwatch, Michigan State University, the Ohio State University, the University of Minnesota Extension Service, Minnesota Water Resources Center, the Volunteer Stream Monitoring Partnership, the University of Wisconsin Extension, the Wisconsin Department of Natural Resources, and the Water Action Volunteers Program. Others who have lent support to this manual include local units of government, citizen leaders, and all the volunteers who have helped throughout this project.

Funding for this Citizens Monitoring Bacteria (CMB) project was granted from the U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service (CSREES) 406 Water Quality program. Additional funding was provided by the CSREES Great Lakes Regional Water Program.

Several excellent training manuals already exist that instruct citizens on monitoring various parameters of water quality in streams, and several are cited at the end of this manual. The content of this training manual will not provide a comprehensive approach to stream monitoring methods but will instead supplement other training manuals by focusing on the single parameter, *E. coli*, and provide detailed information on methods and analyses for *E. coli* stream monitoring.

Chapter 1: Introduction: Stream Monitoring

Why monitor streams?

Streams have been referred to as the arteries of the earth since they carry and transport the water that supports aquatic life. Humans also depend on this water for a multitude of activities including irrigation, drinking supply, energy production, recreation, industry, and aesthetics. Clean water is important to the health and livelihood of all people, and many groups and stakeholders are working together to protect water resources. However, 39% of the rivers and streams assessed in the United States in 2000 were polluted or had degraded habitat. According to the USEPA's 2000 National Water Quality Inventory, polluted water runoff from the land was the leading cause of water quality problems nationwide (USEPA, 2002a). Major pollutant sources were sediment, bacteria, heavy metals and nutrients. Stream monitoring programs can be invaluable in assessing current conditions and tracking changes in water quality over time to determine if remediation or protection actions have been successful.

Volunteer programs

State and regional agency staff as well as funds are often limited, yet stream monitoring needs can be vast. Volunteer monitoring programs can be an extremely valuable asset to states' water quality monitoring programs by expanding data collection efforts and resource assessment opportunities. Volunteer-collected data can provide important baseline information to assist with decision-making and resource assessment.

Volunteer monitoring programs are also a way to tap the expertise of volunteer monitors on local water quality conditions and history. Volunteer monitoring teams are often more "in-touch" with local settings and events and can be available to respond quickly when a pressing need for monitoring arises.

Volunteer monitoring programs are also a great opportunity for citizens of various backgrounds to become more involved in and to gain greater understanding of water quality issues. The training for and involvement in monitoring programs can empower citizens to become involved in informed debate, taking action, and making an impact in their community. In fact, a study in Wisconsin found that experienced volunteer monitors are more active politically in their communities (Overdevest et al, 2004).

Goals of *E. coli* bacteria monitoring

Many parameters can be monitored to help assess a stream's condition or to follow trends in water quality. One that has received increasing attention as an important water quality indicator is *E. coli* bacteria. While other factors may be just as important to monitor, this training manual focuses on *E. coli* monitoring.

Citizens Monitoring Bacteria Program Goals:

- Build the capacity of volunteer monitoring programs to understand and use the most appropriate *E. coli* testing protocols (test kits, laboratory analysis, etc.) and watershed-based sampling strategies with their volunteers
- Enhance the public's understanding about the role of bacteria in water quality
- Increase awareness and acceptance of the use of volunteer-collected water quality data in various watershed programs, including watershed assessments and TMDL development and implementation
- Share results with other states across the country, primarily via the National Volunteer Monitoring Facilitation Project
- Demonstrate how to set up an appropriate watershed-based *E. coli* sampling strategy utilizing volunteer networks and begin collecting usable data

Setting goals and designing a sampling program

The objectives of this program are to provide citizens involved in *E. coli* monitoring programs with the scientific background, practical applicability, and tools needed to develop an understanding of the role of bacteria in stream water quality.

Before embarking on a bacteria monitoring program, it is suggested that your group first review and determine your own goals in terms of data collection and use. Where, when, and how often you sample will depend on these set goals. A reference you may wish to use is the Volunteer Water Quality Monitoring National Facilitation project website's Guide for Growing Programs. In the "Designing Your Monitoring Strategy," groups are introduced to goal-setting processes, and also referred to a number of valuable resources for working towards step-by-step goal making (www.usawaterquality.org/volunteer/).

The time involved with volunteer monitoring can be demanding, but rewarding. First assess how often your group is prepared to monitor. The amount of time allocated to volunteer monitoring depends on your group's goals. For example, one goal may be to conduct baseline monitoring. This plan would involve monitoring every few weeks over many years. You may also choose to monitor your selected stream to see if it is meeting water quality standards. This plan may call for more frequent monitoring but not necessarily for years and years. A short-term, intensive study, such as monitoring the effects of storm water runoff, is another option which may involve daily sampling. All these monitoring plans are not necessarily mutually exclusive.

If your group has the time and has set goals to monitor more frequently, such a plan will provide you with additional data. For example, many states have an active beach monitoring program because of the high level of full-contact recreational use of beaches. Standards have been developed by state and local agencies that indicate the level of risk to human health by swimming in beach waters. According to USEPA standards, when a one-time high count is reached (235 colony forming units (cfu)/100 milliliters (ml)) or a 30-day geometric mean (with a sample size of at least 5 samples per 30-day period or the total number of samples collected over the specified monitoring period) is exceeded (126 cfu/100 ml), the beach is closed until levels decrease (see Chapter 7 for a description of a geometric mean and how it is calculated). If your group has set a goal to determine a 30-day geometric mean, it is recommended that you monitor at least once a week.

Another group goal may include collecting data to further watershed management plans that will develop from coordination with other water quality monitoring programs. You may also want to work on fostering connections and partnerships with state agencies and other groups that promote sound land and watershed management.

In general, the time involved will include driving to and from the selected sites, taking water samples at these sites, and returning to your home or designated laboratory space to process and incubate the samples. You also must be available 24 to 48 hours later (depending on the test) to read the plates after incubation. Counting the *E. coli* colonies and recording them on a data sheet could take up to an hour.

Finally, remember that good sampling plans are flexible and can be updated and refined according to goals and objectives. You can visit the CSREES Best Education Practices (BEP) website for further information on this process (http://wateroutreach.uwex.edu/).

Other important water quality indicators

Bacteria monitoring, while an important and valuable water quality indicator, is only one part of total stream water quality. A comprehensive assessment program of stream water quality should consider monitoring for other water quality indicators.

Biologically and chemically, water quality is defined by a number of factors, and these parameters can generally indicate if a water body is degraded or polluted. How the water will be used may influence which or how many characteristics are used to determine water quality. In addition to bacteria, other common water quality measurements include clarity, conductivity, dissolved oxygen, hardness, nutrients (particularly nitrogen and phosphorus), pH, temperature, total suspended solids, and biological communities (see box, next page).

Various water quality standards exist based on many of these parameters, however the standards may vary depending on the use of the water. For example, drinking water and irrigation water have different standards for bacteria. Zero levels of *E. coli* are required in drinking water, but the presence of some *E. coli* are a tolerated risk in irrigation or swimming waters.

Other Important Water Quality Parameters

Temperature

Temperature varies depending on time of day, season, and vegetation along the stream. Temperature affects the oxygen content of the water since colder water can hold more dissolved oxygen than warmer water. Temperature also affects the rate of photosynthesis by aquatic plants, metabolic rates of aquatic organisms, and the sensitivity of organisms to toxic wastes and diseases.

Dissolved oxygen (DO)

Dissolved oxygen (DO) is necessary for the maintenance of a healthy aquatic ecosystem. Aquatic organisms differ in the amount of oxygen they require for survival. For example, fish such as trout and pike require higher concentrations of DO for survival, while carp and catfish are able to survive at much lower concentrations (less than 5 mg/L). Dissolved oxygen is supplied to a water body through the atmosphere where oxygen mixes with water through wind and wave action, and through photosynthesis by algae and other aquatic plants. Oxygen is more easily dissolved in cold water than in warm water; therefore, the amount of oxygen that water will hold increases as the temperature decreases. Low DO levels can have negative impacts on biota causing stress and sometimes death if levels fall below tolerance values for organisms.

pH

The pH is a measure of the acidity or the alkaline (basic) nature of the water. Since the scale is logarithmic, a drop in the pH by 1 unit is equivalent to a 10-fold increase in acidity. A pH of 7 is neutral. Thus a pH of 5 is 10 times more acidic than a pH of 6 and 100 times more acidic than a pH of 7. pH affects many chemical and biological processes in the water. Different organisms do well or poorly within different ranges of pH. The majority of aquatic animals prefer a pH range from 6.0-8.0. Outside this range reduces the diversity in the stream because it stresses the physiological systems of most organisms and can reduce reproduction. Low pH can also allow toxic elements and compounds to become mobile and "available" for uptake by aquatic plants and animals. This can produce conditions that are toxic to aquatic life, particularly to sensitive species such as salmon and trout. Changes in acidity can be caused by atmospheric deposition (acid rain), surrounding rock, and certain wastewater discharges.

Nutrients

Excess nutrients such as nitrogen and phosphorus can accelerate eutrophication in surface waters, a condition that often results in excessive plant growth, declining oxygen levels and changes in the aquatic community. Often, phosphorus is the nutrient in the shortest supply relative to the organisms' needs in fresh water systems, and even a modest increase in phosphorus can set off a chain of undesirable events. This includes accelerated plant growth, algal blooms, low dissolved oxygen, and the death of certain fish, invertebrates, and other aquatic animals. Sources of nutrients can be both natural and human. Natural sources include soil and rocks. Human sources include discharge from wastewater treatment plants, runoff from fertilized lawns and cropland, failing septic systems, animal manure inputs, storm water runoff and disturbed land areas.

Other Important Water Quality Parameters **(continued)**

Transparency/Water Clarity

Transparency or water clarity is a measure of how well light passes through the water column. Transparency is usually measured with a Secchi disk (for lakes) or transparency tube (for streams), although it can be measured in the field with a light meter. Secchi disk readings are probably the most commonly collected water quality data across the U.S. Transparency measurements are typically made *in situ* (on site) and can be affected by suspended sediment, by algae, and by the color of the water (i.e., humic acids that stain the water red or brownish).

Turbidity

Turbidity is a measure of how much light is scattered by particles in the water. Algal blooms or suspended sediment can increase turbidity because light is scattered by particles in the water, whether those particles are sediment or algae. Other sources contributing to turbidity include soil erosion, runoff from urban and agricultural areas, wastewater and storm water inputs, plant materials and sediment being stirred up by bottom feeders. Materials causing turbidity may also be responsible for clogging fish gills, reducing available habitat, interfering with egg and larvae development, smothering fish eggs and aquatic insect larvae, and suffocating newly-hatched insect larvae. Turbidity is most commonly reported in NTUs (Nephelometric Turbidity Units) and is most accurately measured with a nephelometer which may cost several hundred dollars.

Total Solids

Total solids consist of dissolved and suspended materials in water. Dissolved solids, or those particles that will pass through a filter with pores of around 2 microns (0.002 cm) in size, include calcium, chlorides, nitrate, phosphorus, iron, and sulfur. Total suspended solids (TSS) will not pass through a 2-micron filter and are a direct measurement of the particles suspended in the water - by weight. That means you must collect a sample and take it back to the lab where the water is filtered and dried in an oven, before being weighed. Suspended solids include silt and clay particles, algae, fine organic debris, and other particulate matter. Sediment weighs more than algae, so TSS is a more accurate measurement of how much sediment is in the water, whereas turbidity is affected equally by sediment or algae.

If you collect samples for turbidity or TSS, be sure to shake the container thoroughly before taking a measurement, so whatever has settled out is re-suspended. Neither TSS nor turbidity measurements are affected by colored water.

Biological Communities

Various biological communities can be used to assess stream ecosystem health. Aquatic macroinvertebrates, the animals without a backbone but larger than microscopic organisms, include the aquatic insects, mollusks, crustaceans, and aquatic worms. Macroinvertebrates often are used as indicators of water quality since their tolerance range to pollution varies among species, they are easy and inexpensive to collect, and many are sensitive to both physical and chemical changes in the water. Since they cannot easily escape pollution once it enters, they can be valuable in detecting pollution even after it is no longer detected by chemical methods. Fish may also be used as indicator species. Many fish cannot tolerate low dissolved oxygen concentrations or low pH. Others have narrow temperature tolerances. Some are also sensitive to high turbidity levels, which can clog their gills or interfere with their ability to see their prey.

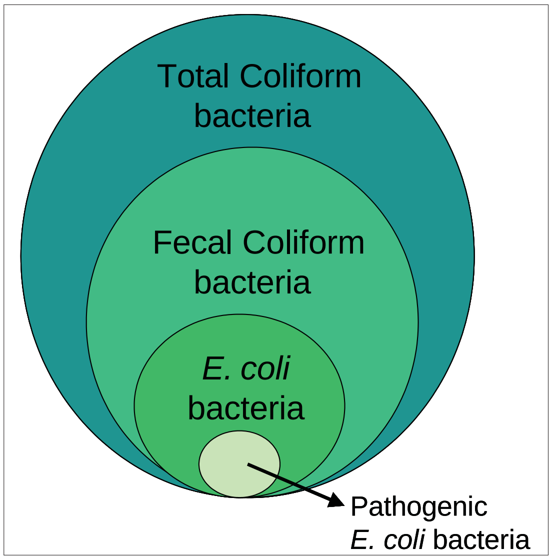
Chapter 2: Bacteria and Water Quality

What are bacteria?

Bacteria are microscopic, single-celled organisms that are the most numerous organisms on earth. They are so small that over five million could be placed on the head of a pin. Bacteria can live in numerous environments and perform many complex actions, some of which are beneficial and some harmful. Most bacteria, however, are not harmful and do not cause human health problems. Those that are disease producing are referred to as pathogenic. Viruses and some protozoans can also be pathogenic.

Coliform bacteria are part of the Enterobacteriaceae family and individual cells cannot be seen with the naked eye due to their small size (but colonies can be seen.) While some coliform bacteria can be naturally found in soil, the type of coliform bacteria that lives in the intestinal tract of warm-blooded animals and originates from animal and human waste is called fecal coliform bacteria.

Escherichia coli (*E. coli*) is one subgroup of fecal coliform bacteria. Even within this species, there are numerous different strains, some of which can be harmful. However, the release of these naturally-occurring organisms into the environment is generally not a cause for alarm. But, other disease causing bacteria, which can include some pathogenic strains of *E. coli*, or viruses may also be present in these wastes and pose a health threat.



Fecal coliform bacteria which include E. coli are part of a larger group of colifom bacteria.

What are indicator bacteria?

The use of an organism that can serve as a surrogate for another is called an indicator organism. Trying to detect disease-causing bacteria and other pathogens in water is expensive and may pose potential health hazards. Further, testing for pathogens requires large volumes of water, and the pathogens can often be difficult to grow in the laboratory and isolate. *E. coli* bacteria are good indicator organisms of fecal contamination because they generally live longer than pathogens, are found in greater numbers, and are less risky to collect or culture

in a laboratory than pathogens. However, their presence does not necessarily mean that pathogens are present, but rather indicates a potential health hazard.

The EPA has determined that *E. coli* are one of the best indicators for the presence of potentially pathogenic bacteria (EPA, 2002b). Because *E. coli* monitoring does not measure the actual pathogens, the assessment is not foolproof, however, it is a good approach for assessing the likelihood of risks to human health. Monitoring for these indicator organisms is an easy and economical method for citizens or professionals to assess health risks due to bacterial contamination of surface waters.

Common sources of *E. coli*

Bacteria in water can originate from the intestinal tracts of both humans and other warm-blooded animals, such as pets, livestock and wildlife. Human sources include failing septic tanks, leaking sewer lines, wastewater treatment plants, combined sewer overflow (CSOs), boat discharges, swimming “accidents” and urban storm water runoff. In urban watersheds, fecal indicator bacteria are significantly correlated with human density (Frenzel and Couvillion, 2002).

Animal sources of fecal coliform bacteria include manure spread on land, livestock in runoff or in streams, improperly disposed farm animal wastes, pet wastes (dogs, cats), wildlife (deer, elk, raccoons, etc.), and birds (geese, pigeons, ducks, gulls, etc.). If you are sampling in a watershed area without significant human impact and are finding *E. coli*, the source may be birds or wildlife. In a study comparing *E. coli* concentrations in waters from agricultural and “pristine” sites, contamination was found in both settings. The researchers deduced that the levels of *E. coli* at the pristine site likely came from wildlife, such as deer and elk, living the area (Niemi and Niemi, 1991).

Common routes of bacteria to streams

How does *E. coli* bacteria get into streams and rivers? Polluted water runoff from the land is the leading cause of water quality problems nationwide (USEPA, 2002a). Fecal material as well as other pollutants can be transported to waterways through runoff. How quickly they are transported partially depends on the type of land use. Non-developed lands including grasses and other vegetation tend to soak up rainfall, thereby increasing infiltration into the ground and reducing runoff to waterways. Developed lands such as streets, rooftops, sidewalks, parking lots, driveways, and other hard surfaces tend to create more impervious surfaces, and runoff increases. Lands that support domesticated animals, such as cattle, hogs, or horses, can also be a source of bacteria, particularly if animals enter the water for drinking or if heavy rains wash manure from the land into receiving waters.

Top: Cattle crossing on a stream in northeast Iowa. Bottom: The crossing keeps the cattle out of the stream. (Photos courtesy USDA NRCS)

Another source of bacteria pollution to stream waters comes from Combined Sewer Overflows (CSOs). Some sewer and storm water pipes are not separated. When a large storm event occurs, the wastewater treatment plants cannot handle the excess volume of water being pumped to them. As a result, untreated sewage along with storm water is dumped directly into rivers and streams.

The presence and levels of *E. coli* in a stream do not give an indication of the source of the contamination. However, it can be a good first step in investigating the watershed for potential sources.

Risks to human health

Most people are concerned about the risk that bacteria may pose to human health. When numbers are above health standards, people exposed to water that contain bacteria may exhibit fever, diarrhea and abdominal cramps, chest pain, or hepatitis. While *E. coli* by itself is not generally a cause for alarm, other pathogens of fecal origin that are health threats include *Salmonella*, *Shigella*, and *Psuedomonas aeruginosa.* Non-bacterial pathogens that may be present with fecal material include protozoans, such as *Cryptosporidium* and *Giardia*, and viruses.

There are some strains of *E. coli* that are pathogenic themselves. One that has received much attention is the *E. coli* strain named 0157:H7 that lives in the intestinal tract of cattle. This strain is primarily spread to people by eating contaminated, undercooked beef or drinking unpasteurized milk and is not generally found in surface waters.

Examples of at-risk concentration levels

Criteria for concentrations of indicator bacteria in recreational waters (USEPA 1986) have been developed by the USEPA. Initially, total coliform bacteria were used as the benchmark. However, because it was shown that *E. coli* were more closely correlated with swimming-related illnesses, the USEPA later recommended that *E. coli* be used as the indicator in freshwater recreational areas (USEPA 2002b).

Many states have since adopted this recommendation, however, some still use total fecal coliform bacteria when determining concentrations. The acceptable risk level for total body contact recreation, which involves activities such as swimming or water skiing, is 126 colonies of organisms (referred to as colony forming units or cfu) per 100 milliliters (ml) of water or less based on a geometric mean (calculated over 30 days with at least 5 samples) or a one-time concentration of 235 cfu/100 ml. The risk of getting sick increases as total numbers of colonies are exceeded.

The number of colony forming units of *E. coli* organisms per 100 ml of water and the method of determination may vary slightly by state based on State Public Health Codes and Water Quality Standards (See Chapter 7). The USEPA recommends a set of standards for *E. coli* in fresh water bodies as a single maximum allowable count. These rates correspond to an acceptable risk level of 8 people out of 1000 getting sick.

	Designated swimming	Moderate swimming area	Light swimming area	Infrequent swimming area
E. coli (colony forming units/100 ml of water)	235	298	410	576

(from USEPA 1986, 2002b)

Even with good watershed management measures, there will always be fecal material in the environment. If you repeatedly find unusually high levels of *E. coli* on a long-term, regular basis in your stream samples, you should alert and work with your local health agency.

Weather and seasonal influences

The number of bacteria colonies can be influenced by weather and seasonal effects. This variability makes the bacterial concentrations in natural water difficult to predict at any one time. Bacteria numbers often increase following a heavy storm, snow melt or other excessive runoff. *E. coli* bacteria are often more prevalent in turbid waters because they live in soil and can attach to sediment particles. Bacteria can also remain in streambed sediments for long periods of time. If the streambed has been stirred up by increased flow or rainfall, your sample could have elevated bacteria levels. This is why you should avoid disturbing the streambed as you wade out into the stream. You should also collect the water sample upstream from you. If you are collecting at several sites within the stream, collect the furthest downstream sample first and proceed upstream.

A number of other weather influences may affect bacteria levels in the stream. Higher *E. coli* counts may be found in warmer waters because they survive more easily in these waters. (*E. coli* are used to living in the warm environment of the intestines of warm-blooded animals). Ultraviolet rays of sunlight, however, can also kill bacteria, so a warm sunny day may produce numbers lower than expected.

Chapter 3: Preparation for Sampling

Selecting your equipment and supplies

There are several containers that can be used to collect your water sample. One recommended type is the pre-sterilized and disposable Whirl-pak® bags. These plastic self-seal bags are easy to use, carry, and transport. Because they are used only once, they are not re-sterilized. However, sterilized plastic bottles are also acceptable. They can be reused, and they're much sturdier than the bags. However, if bottles are re-used, then both the bottles and lids must be sterilized and sealed before collection. The sterilization procedure calls for the use of an autoclave for 15 minutes at 121°C (USEPA, 1997), which may require assistance from a professional laboratory.

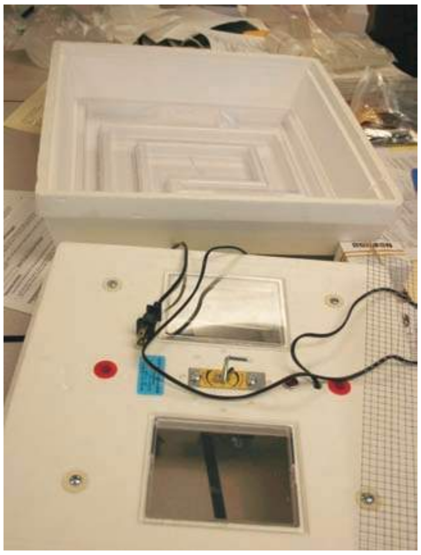
Equipment and supplies checklist

Before going out to a stream, refer to the check-list of the items needed, and make sure you bring them with you.

- ✓ Waders and/or rubber boots (depending on water depth)
- ✓ Bucket with rope or grab sample pole (if sampling from a bridge or water is too deep to enter)
- ✓ Sealed, sterilized, wide mouth bottles (plastic or glass) or Whirl-pak® bags
- ✓ Labels & clear tape to cover them
- ✓ Long rubber/latex gloves—elbow length if possible
- ✓ Clipboard and field data sheets
- ✓ Pencil and Sharpie® marking pen
- ✓ Cooler with frozen ice packs (or ice)
- ✓ Shipping containers
- ✓ First aid kit
- ✓ Personal flotation device (PFD)
- ✓ Monitoring reference sheet
- ✓ Chain of custody record
- ✓ Weather gear: sun-screen and hat for sun protection, rain gear, or cold weather gear
- ✓ Towel for drying off after sampling, if necessary
- ✓ Disinfectant hand wipes, antibacterial lotion or gel

Once you return from the field trip, you will need the following:

- ✓ Space for sample processing with good lighting
- ✓ Incubator or heating lamp and thermometer (if the sample requires incubation)
- ✓ Sterilized laboratory supplies
- ✓ Paper towels or Kimwipes
- ✓ Isopropyl alcohol
- ✓ Latex gloves
- ✓ Bleach and water-tight bag for sample disposal



A temperature-controlled egg incubator can be used for incubating the samples.

Use of an incubator

Several kits require that the sample be incubated. If this is the method you are using, you will need to either make or purchase an incubator to help the *E. coli* colonies grow once you have collected the water samples and plated them. You can buy an egg incubator for about $40 to $50. Use a small cup or tray to add water (deionized if possible) to keep the Petri plates/films from drying out. Incubation time will generally run 24 hours to 48 hours for *E. coli*, depending on the type of kit used.

Labeling and identification of bottles

It is advisable to use a specific system to assign a site number to your sampling locations. One option is to begin with the two-character abbreviation for your state. Next, use the assigned two digit county code that is pre-assigned for each county in a state. Follow this number with a sequential site number. For example, if Iowa's volunteers will be monitoring Prairie Creek in Boone County (county code 08) at 2 locations, the first site would be IA0801 and the second site would be IA0802. Organizations may have their own system of labeling.

When preparing the bottles:

- ✓ Stick tape over the lid to indicate that it has been sterilized
- ✓ Prior to collecting the sample, label each bottle with the location/sample number, time and date of sampling, initials of sample collector and type of sample
- ✓ Cover label with tape for water-proofing
- ✓ Wrap labeling tape around the circumference of the bottle. This will prevent the tape from coming off when the bottle gets wet. Do not, however, cover the lid with the tape
- ✓ Mark replicate samples with an *"R"* or appropriate marking
- ✓ Label 10% of your bottles as field blanks. Only distilled water will be added to these bottles

Safety is most important!

When sampling in a stream, always bring along a partner. It's also recommended that you inform people of where you are going and when you plan to return. It is advisable to carry a cellular phone with you in case of an emergency.

Other important tips include:

- ✓ Obtaining permission from the landowner, if needed
- ✓ Listening to weather reports prior to leaving and rescheduling the sampling if severe weather or temperatures are on the way. (Try www.weather.com for current weather conditions)
- ✓ Dressing appropriately for the weather conditions
- ✓ Bringing a first aid kit with you
- ✓ Parking your vehicle in a safe location so that you do not block traffic. Keep your keys in a safe and secure location
- ✓ Avoiding sampling in areas with very steep or unstable banks and making sure you can access the stream safely while wearing waders
- ✓ Wearing waders or rubber boots to help protect you from cold water and sharp rocks or surfaces in the streambed
- ✓ Making sure the water depth is not so deep nor the stream flow so swift that you risk losing your footing and being carried downstream
- ✓ Wearing a personal flotation device (PFD) while wading in the stream, if needed
- ✓ NOT entering the stream if you observe chemical, oil, or other hazardous substances in or discharging to the water

Once you return to your vehicle and/or home, wash your hands and be careful not to touch your eyes or mouth when processing your water samples.

You should consider reviewing the safety section of the USEPA's *Volunteer Stream Monitoring: A Methods Manual* (see Chapter 9) prior to field sampling.

Site selection

Your selected site should align with the goals of the study. When determining where you should sample, start with a USGS topographic map or similar map of your watershed and determine the extent of the stream and its tributaries (other streams entering the stream in question). If you have Internet access, several online sites listed at the end of this manual provide online maps that can give you latitude/longitude or other locational information. Sampling near a USGS gauging station will help with site identification and allow you to assess *E. coli* results with stream flow data (waterdata.usgs.gov/nwis/rt).

If your stream has many tributaries feeding into it, a site both upstream and downstream of the incoming water can help you determine if a specific tributary or sub-watershed is contributing more *E. coli* than another. If you are doing an impact assessment of a particular activity, you may also want to select sites above and below the suspected area. However, try to select far enough downstream from stream convergences to allow even mixing of the waters.

As stated in your checklist, if the site is on private land, be sure to obtain written permission to sample prior to going on-site, or find a publicly accessible site instead.

When to sample

The number of times that you'll need to sample varies and depends on what you want to know. The more you sample, however, the better information you'll have when interpreting your data. At a minimum, it is recommended that you sample one time per month between May and September. You should also try to be consistent as to the time of day you sample and the interval of time between sampling. These factors help in the comparison of your data over time. If you have the opportunity to do so, also try to sample just after a relatively heavy storm. Remember that when and how often you sample will depend on the goals of your local program.

Wet versus dry weather sampling may help you identify general sources of the bacteria. For example, if you sample during dry weather, continuous sources will be more easily detected, such as leaking septic tanks or wildlife. If you sample after wet weather, sources that would increase in-stream bacteria levels due to runoff, such as storm water outfalls or field runoff, may be easier to identify.

Quality assurance/Quality control

You've likely heard the term QA/QC. It stands for Quality Assurance/Quality Control. Quality assurance is a method of maintaining quality in all practices and procedures used during your project. Quality control procedures assure that samples are being collected in a consistent and accurate manner at all sites and from all volunteer monitors.

Quality assurance measures include:

- ❑ Assigning responsibilities to volunteer members
- ❑ Training volunteers in collection techniques, handling of equipment, and analysis of samples
- ❑ Calibrating instruments
- ❑ Specifying procedures for field analyses
- ❑ Keeping accurate records of all procedures and conditions.
- ❑ Following chain of custody procedures or tracking samples from their collection in the field to final analyses or destination

Quality control measures include:

- ❑ Blank samples in the field: sampler fills a bottle at the bank of the stream with distilled water at 10% of your sampling sites or 10% of the times you sample. (This sample is plated as usual with the rest of your samples and helps identify contamination errors in the field)
- ❑ Field replicates: taking additional samples with another bottle(s) at 5-10% of your monitoring sites. (This method helps assess variability in the stream)
- ❑ Control plates: plating with distilled water to assure no lab contamination, or plating with a known quantity of sample
- ❑ Split samples: two different analyses from the same sample. In this case, it could involve sending the same sample to another lab for independent analysis
- ❑ Lab replicates: plating two or more separate plates from 1 bottle. (This technique helps assess the variability of the techniques of the person doing the plating and reading)
- ❑ Regular inspection of equipment, growth media, and other items being used

It is important that all volunteers use the same procedures so that samples within and between streams can be compared to each other. Consistency and keeping good field notes is key! Occasionally you may have staff from your local health agency taking side-by-side samples and readings with you to compare results.

The closer you adhere to QA/QC measures, the more confident you and others can be about your data results. Recognition of the importance and continued use of QA/QC protocols are good ways to assure agencies and the public that your data are worth considering.

The USEPA discusses the five key components of QA/QC:

- **Accuracy**: how similar your results are to a true or expected value.
- **Comparability**: the degree that data can be compared between sampling sites or across time.
- **Completeness**: how much data you planned to gather versus how much you actually were able to collect.
- **Precision**: how reproducible your results are, the level of consensus between repeated measurements.
- **Representativeness**: how much your data characterize the true environmental condition when the sample was collected (USEPA, 1996).

Why use replicates?

In the stream, bacteria concentrations can be highly variable since they often grow in clumps, so taking several samples can be very important. Variability can also occur during the transfer of water from one bottle or bucket to another bottle, during plating and culturing the bacteria, and in counting the colonies. Replicates (in duplicates or triplicates) help identify and minimize variability in the sample. Replicates can be two or more samples taken from the same collection bottle or bucket and transferred to other collection bottles or be two separate samples with separate containers taken at the same time at the same place. Split samples always come from the same collection bottle. When sending a replicate to a laboratory for verification, you should use a split sample. As a general rule, replicate samples should be taken at 10% of your monitoring sites or 10% of the time you sample.

Chapter 4: Field Sampling

Site assessment - Choosing a site within a stretch of stream

Safety should be a priority when selecting a sampling site. First make sure the stream has flowing water and that you can reach the site without difficulty. Look for uniform flow across the main streambed. Walk about 60-100 feet upstream and downstream to assess each site and conditions of the bank. Check for any obvious pollutant sources, such as storm water outfalls, lake/pond outflows, or sewage input. If the source is too close to your sampling site, your bacteria samples may not be representative of the stream overall. If the site is acceptable, take pictures, if possible, and be sure to thoroughly describe the site on your datasheet. Identify landmark features, such as crossroads and bridges or unique vegetation, that will help you or another person find your site again.

In-stream field collection

Once you're in the field, it is important to record all information. Forms may include a bacteria data sheet and site description form.

There are several methods for obtaining a sample from the stream depending on stream access, the depth of water, and safety. If you can safely enter the stream, you should obtain your sample where the main current is flowing. As you are wading into the water, try to disturb as little sediment as possible so that the sample is not contaminated by bacteria attached to or living in the soil. You should position yourself downstream of the sampling point (i.e. hold the bottle upstream of your body) so that if sediments are stirred up they won't affect your sample. If a stream site is curved, sample near the outside of the curve. Before entering the water, make sure your sample bottles are labeled correctly and completely.

If you cannot safely access the water, you should sample from a bridge following the procedures at the end of this section. If conditions are safe and you are a skilled boater, you may also sample from a canoe in the stream. If possible, do not take the sample at the stream bank's edge since the water may be stagnant or not well mixed with the rest of the water.

If sampling within the stream, follow these steps:

- ❑ Take 1-2 steps upstream, reach out your arm, and collect the sample upstream from where you are standing. It is recommended that you wear rubber gloves.
- ❑ Open the bottle and remember to not touch the inside of the bottle or the cap with your hands.
- ❑ Rinse the bottle and lid three times.
- ❑ Hold the bottle near its base and plunge it with the top facing downwards into the water to 3-5 inches below the surface or at approximately wrist level. Don't worry if you cannot get the bottle to this exact distance. Just try to avoid sampling water from the surface.
- ❑ Turn the bottle into the current (upstream) and wait for it to fill.
- ❑ Bring the bottle up, pour out some water so that there is 1 inch of air space and close and tighten the bottle with its lid or cap.
- ❑ Place the sample in a cooler with ice packs to be transported back to your house or wherever the tests will be done.
- ❑ Be sure to record all necessary information on field data sheets.

If Whirl-pak® bags are being used instead of bottles, follow these steps:

- ❑ Correctly label the Whirl-pak® bag with indelible marker.
- ❑ Remove the perforated seal from edge of Whirl-pak® bag.
- ❑ Use the two small white tabs to open the bag.
- ❑ Place the bag in the water below the surface and allow the water to flow into the bag.
- ❑ Grab the ends of the twist ties and "whirl" the bag shut.
- ❑ Make sure the bag is securely closed by testing the seal.
- ❑ Place the Whirl-pak® bag in a cooler with frozen ice packs.

If you are collecting your sample with a bucket or other container from a bridge, the following steps are recommended:

- ❑ Attach the bucket/container to a secure rope and lower it into a fast flowing section of the stream.
- ❑ Rinse the bucket/container three times with the stream water.

- ❑ Rinse the sample bottle three times.
- ❑ Do not let the rope, bucket/container or bottle touch the ground.

To minimize exposure to potential pathogens in the water, use disinfectant wipes or gel to wash up after sampling, as a preventive measure.

If you are taking a pipette sample directly from the water, you should:

- ❑ Unwrap the sterile pipette and do not touch its tip
- ❑ Squeeze the bulb of the pipette, lower it into the water to wrist level, and then release the bulb while the pipette is under water
- ❑ Remove the pipette from the water and adjust water volume in the pipette to the exact marking (1 ml)
- ❑ Squirt the water from the pipette into the collection bottle

Packaging your water samples for shipping

All samples taken should be analyzed within 24 hours. So, if you need to ship your water samples to an analytical lab, try to collect them in the early part of the week and no later than a Wednesday to allow time for the lab to process them prior to the weekend. Make arrangements with your mail carrier prior to sampling to make sure the samples will be collected promptly and delivered within 24 hours. On the day of sampling, you will need to sample early in the day so the samples can be shipped out the afternoon of the same day.

When shipping, make sure the bottles are secure, cold, and not going to leak. You should consider:

- ✓ Using a plastic garbage bag to line the shipping container to prevent leaks of water.
- ✓ Sealing each sample in its own plastic bag to prevent any cross-contamination and to contain the sample in case of leaks or breakage.
- ✓ Packing the samples with ice or ice packs.
- ✓ Using a Styrofoam container, cooler, cardboard box, or specialized water sample shipping container.

Be sure to fill out the sampling form completely, the chain of custody form, and any other paperwork, and place them on the top of the container before sealing the box. You may want to first seal the paperwork in a large zippered storage bag. Finally, attach the provided pre-addressed, pre-paid mailing label and ship overnight.

Chapter 5: Use of Kits

Value of volunteer analyses

The expense of sending E. coli samples to a commercial laboratory for analysis can be costly over time. Completing the analyses at your "home lab" is one way to determine E. coli levels in your stream without excessive costs. Through your work, you also help extend limited agency resources for water quality assessments.

General methods and procedures with kits

For the most reliable results, USEPA recommends that you should prepare your sample for analysis within 6 hours of taking it (USEPA, 1997). In many cases it is not possible to meet this recommendation, but samples should not be held longer than 24 hours. In all cases, you should store your samples on ice before lab analysis, and the quicker you get your sample processed the less chance there is for variability. Make sure you indicate on the data sheet the length of time between collecting and processing.

Regardless of the kit used, it is essential that you maintain sterile conditions while filtering and plating, since this is the time with the greatest potential for external contamination of the samples. Thus, it is recommended that you do your plating all at once in the lab and not at the field site. Sanitize your working surface by spraying or wiping it with a 70% isopropyl alcohol solution or with bleach.

You should also:

- ✓ Wash your hands thoroughly with soap
- ✓ Have the following with you: paper towels or wipes; isopropyl alcohol, distilled water, waste container, permanent marker and gloves
- ✓ Label both your bottles and plates/films with the date, time, sampling site number, and replicate number (if applicable). For the petri dishes, make sure the written information does not interfere with your ability to read the plate.
- ✓ Always shake your sample bottle before drawing a sample with a pipette

There are many kits on the market that are being used for determining *E. coli* numbers in water. During the research phase of this project, five kits and variations within the kits were tested by volunteers. Their results were compared with laboratory results. Four of the five methods were found to be acceptable. However, when ease of use, volunteer preference, and economics were added to the equation, one kit, 3M™ Petrifilm™, stood out over the others.

Methods and procedures using Coliscan® Easy Gel® (incubated)

The following information comes from the Indiana Hoosier Riverwatch Program and the Iowa IOWATER program.

Coliscan media incorporates a patented combination of color-producing chemicals and nutrients that make *E. coli* colonies appear blue, coliform bacteria that are not *E. coli* as a pink magenta and non coliforms as white or teal-green colonies. Coliscan® Easygel® employs a pour plate technique, where a liquid media is inoculated with a sample and poured into a Petri dish to solidify.

Preparation and Setup

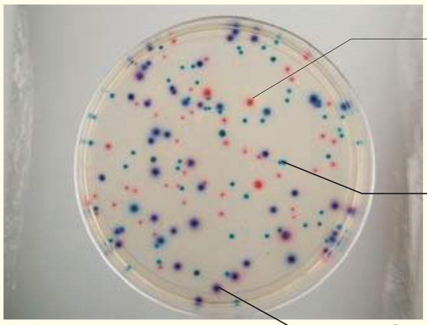
1. Thaw Coliscan® Easygel® at room temperature by removing from freezer before sampling.
2. Label the bottom of Petri dishes using a permanent marker. This label should include site ID, date and time of sample collection, volume of water collected, and sample number.

Preparing the Sample

1. Always SHAKE sample collection bottle before drawing a sample with a pipette!
2. Using a sterile pipette, transfer 0.5 – 5 mL of stream sample directly into the Easygel bottle.
3. Swirl the Coliscan® Easygel® bottles to mix the contents and pour each bottle into the already labeled Petri dishes. Gently swirl the mixture in the Petri dish making a figure eight on the tabletop with the dish until the mixture is evenly distributed, being careful not to splash over the side or on the lid.
4. Place the Petri dishes on a level location out of direct sunlight for 45 minutes to 1 hour. The mixture will solidify on the bottom of Petri dish.

Incubation and Interpretation

Invert the Petri dish(es) and incubate at 35 degrees Celsius for 24 hours. After incubation is complete, count the colonies. Do not count "pin-point" sized colonies. *E. coli* colonies appear blue, dark blue, or purple. Other coliforms appear pink/magenta, and non-coliforms appear white or teal green.



Sample Disposal

1. Carefully place about a teaspoon of household bleach onto the surface of the Coliscan® Easygel® of each plate.
2. Allow to sit at least five minutes.
3. Place in watertight bag and discard in normal trash.

Methods and procedures using 3M™ Petrifilm™

The following information comes from the Indiana Hoosier Riverwatch Program and the Iowa IOWATER program.

Storage and Disposal

Store unopened Petrifilm plate pouches at temperatures <8°C (46°F) – REFRIGERATE!

Official 3M Instructions

Return unused plates to pouch. To prevent exposure to moisture, do not refrigerate opened pouches. Store resealed pouches in a cool, dry place for no longer than one month. Exposure of Petrifilm plates to temperatures greater than 25°C (77°F), and/or humidity greater or equal to 50% relative humidity can affect the performance of the plates.

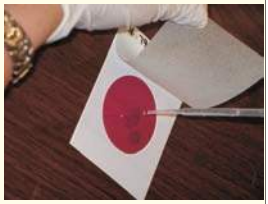
Citizens Monitoring Bacteria Research Project Instructions

Store plates from opened packages in sets of no more than 8 in a small "snack-size" ziplock or similar type storage bag. Place a weight on top of the package to keep it from curling. Plates may be stored for up to a year.

Allow pouches to come to room temperature before opening – at least 10-15 minutes.

Do not use plates that show orange or brown discoloration.

Expiration date and lot number are noted on each package. (Example expiration date: 2007-10, would expire in the 10th month (October) of the year 2007. The lot number is also printed on individual plates.



Plating

Inoculate and spread one Petrifilm plate before inoculating the next plate.

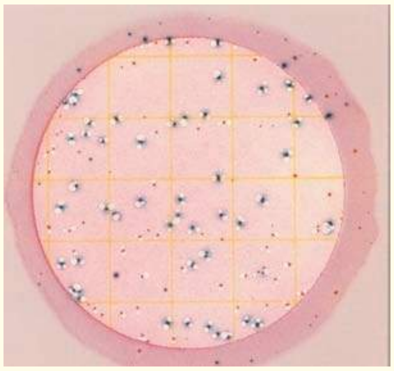
1. Place a Petrifilm plate on a level surface.
2. Lift the top film and dispense 1 ml of sample or diluted sample on the center bottom film.
3. Slowly roll the top film down onto the sample to prevent trapping air bubbles.
4. With the smooth side down, place the plastic spreader near the top of the plate.
5. If necessary, distribute sample evenly using gentle downward pressure on the center of the plastic spreader.
6. Remove the spreader and leave plate undisturbed for at least one minute to permit the gel to solidify. Incubate plates in a horizontal position, with the clear side up in stacks of up to 20 plates. Incubator should be humidified with distilled water. Incubate 24 hours at 35°C.

Count blue colonies with gas bubble(s) after 24 hours at 35°C

3M™ Petrifilm™ (continued)

Interpretation

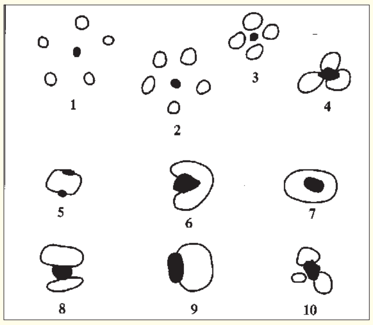
1. Petrifilm *E. coli* plates can be counted on a standard colony counter or other magnified light source. Only count colonies within circle. Do not count artifact bubbles. Approximately 95% of *E. coli* produce gas.



This plate has 49 E. coli colonies as depicted by blue colonies with gas. (From 3M™ Petrifilm™ interpretation guide)

2. In general, *E. coli* colonies are blue to blue-purple and closely associated (approximately one colony diameter) with entrapped gas. General coliform colonies are bright red and closely associated (approximately one colony diameter) with entrapped gas (figure below). **Only count colonies that have one or more associated gas bubbles!**

3. The circular growth area is approximately 20 cm^2. Estimates can be made on plates containing greater than 150 colonies by counting the number of colonies in one or more representative squares and determining the average number per square. Multiply the average number by 20 to determine total count per plate.



All 10 examples depict various bubble patterns associated with gas producing colonies. Each numbered picture would be counted as one colony. (From 3M™ Petrifilm™ interpretation guide)

4. Petrifilm *E. coli* plates with colonies that are too numerous to count (TNTC) have one or more of the following characteristics: many small colonies, many gas bubbles, and deepening of the gel color. High concentrations of *E. coli* will cause the growth area to turn blue while high concentrations of coliforms (non-*E. coli*) will cause the growth area to turn dark red. When any of these occur, you will not be able to count the sample – and should write TNTC on the data sheet. Next time, you may want to use less sample if the stream is under similar conditions.

Disposal

Place the Petrifilm plate in a sealed Ziplock or similar type bag with the Easygel plates that have already been treated with bleach. The excess bleach will spill out and disinfect the Petrifilm plates, too. Discard with regular trash.

Further Information

http://solutions.3m.com/wps/portal/3M/en_US/Microbiology/FoodSafety/products/petrifilm-plates/

Other Kits

Other kits on the market are being used for *E. coli* analysis. Appendix D (beginning on page 45) provides information on three additional kits. Further information on these and other kits can be obtained from the manufacturer or on various web sites.

Chapter 6: Sampling Results

Reading the Results

After removal from the incubation unit, colonies of bacteria with a particular color are counted. The normal incubation time is 24 hours, but if the colonies are not developed enough, wait a total of 48 hours. The E. coli colonies will stand out from general coliforms because they will turn a distinct color. The exact color depends on the test method used. Place the plate on a grid and place a white sheet of paper as a background. Count colonies that are visible to the naked eye. Be sure to have adequate lighting. Sometime it helps to use a pen to mark on the outside of the plate the colonies you have already counted. If there are more than 200 colonies per plate, report this as "too numerous to count" (TNTC) since the colonies are not considered distinct enough for an accurate reading.

The standard reporting unit is colony forming units per 100 ml of water sample (cfu/100ml). To determine the number of colony forming units (cfu) per 100 ml of water sample, the following steps should be taken:

STEP I. Count the number of colonies of the color specified in the test kits you are using and record that number:	Let's assume you counted 6 colonies
STEP II. Take the amount of sample water used and divide it into 100 since you want to report your sample per 100 ml of water:	Assume you used a 5 ml sample Thus, 100 / 5 = 20
STEP III. Now, multiply the number of colonies you counted in step #1 by the number you obtained in step #2:	6 x 20 = 120
STEP IV. You have now determined the number of colony forming units per 100 ml of sample:	120 cfu / 100 ml

Averaging Samples

If you want to obtain an average of replicate samples, and the amount of sample used varies in each replicate, you must first count the total number of colonies in each sample, add them together, and then divide by the total milliliters of sample. Then, multiply both numerator and denominator by 100 to obtain total number of colonies per 100 ml. In the example below if you simply took an average of the three replicate sample totals (1200 + 1100 + 900)/3, your answer would be 1066.6 colonies/100ml which would be incorrect.

<table>
<tr><th>Sample Number</th><th>Number of ml Used</th><th>Colonies Counted</th><th>Total # / 100 ml</th><th>Average # / 100ml</th></tr>
<tr><td>1</td><td>1</td><td>12</td><td>1200 / 100 ml</td><td rowspan="3">12 + 33 + 45 / 1 + 3 + 5 = 90 colonies / 9ml or 10 colonies / ml

Thus, the average equals 1000 colonies / 100 ml</td></tr>
<tr><td>2</td><td>3</td><td>33</td><td>1100 / 100 ml</td></tr>
<tr><td>3</td><td>5</td><td>45</td><td>900 / 100ml</td></tr>
</table>

Disposal safety

After counting the colonies of bacteria on the plates, add ¼ teaspoon of household bleach using either a dropper or other dispensing unit to each plate. Be careful not to get the bleach on your hands or clothes. Place the plates in an airtight ziplock or sealable plastic bag and seal it shut. Finally, dispose of the bag in the trash. Do not be overly apprehensive with this step, since in general, *E. coli* do not pose a huge health risk.

Chapter 7: Interpreting Results

State standards

Using guidance provided by the USEPA, states have developed standards for fecal coliform bacteria and/or E. coli. Compliance is often based on the arithmetic mean of three or more samples taken during the same sampling event at representative locations within a defined sampling area or on the geometric mean based on at least five samples taken over a 30-day period or a total number of samples collected over a specified monitoring period.

State	***E. coli or* Fecal coliform**	**Water Use**	**One-time Standard**	**30-day Geometric Mean**
Indiana	*E. coli*	Primary bathing contact. This standard only applies April to October (the recreation season). From November to March, there is no standard.	235 colony forming units (cfu)/100ml	125cfu/100ml
Iowa	*E. coli*	Full contact recreation	235 cfu/100ml	126cfu/100ml
Michigan	*E. coli*	Full body contact recreation	300 cfu/100ml (3 or more samples)	130cfu/100ml
Minnesota	*E. coli**	Full body contact recreation	1260 cfu/100ml	126cfu/100ml
Ohio	*E. coli*	Primary bathing contact	298 cfu/100ml (not exceeded in more than 10% of samples)	126cfu/100ml
Wisconsin	Fecal coliform *E. coli***	Recreational Waters Beach Closures	400 cfu/100ml (not exceeded in more than 10% of samples) 235 cfu/100ml	200cfu/100 ml 126 cfu/100ml
YOUR STATE				

**Proposed in September 2007*

***EPA Guidelines* (see page 10 for other *E. coli* standards in fresh water bodies)

Determining the geometric mean

E. coli concentrations are reported as colony forming units (cfu) per 100 ml of water sample. When measuring *E. coli* concentrations over time, using the geometric mean is a useful reporting tool. The geometric mean takes into account that a few extreme counts may be found among many more closely grouped values. Calculating a geometric mean provides a number that is more representative of the median (or that number where half the samples are higher and half are lower) and helps reduce the effect of a few extreme values. Also, use of a geometric mean over time (often 30 days) minimizes fluctuations in the levels of bacteria in the water or one-time high counts. The 30-day geometric mean helps determine if a stream has a continually high level of *E. coli*.

The geometric mean (GM) can be calculated as follows:

$$GM = (s1 \times s2 \times s3 \times sn)^{1/N}$$

Where "s" is the number of *E. coli* colonies per 100 mls for samples 1, 2, 3, though the n^{th} sample, and N is the number of samples collected.

For example, let's say you have 5 samples and your counts of cfu/100ml at one site over a 30-day period were:

5, 10, 120, 20, 2600

The geometric mean would be determined by taking the 5th root of the product of the 5 readings:

$$(5 \times 10 \times 120 \times 20 \times 2600)^{1/5} = 50$$

If you had just taken an average of the five samples for the 30-day period, your answer would be:

$$(5 + 10 + 120 + 20 + 2600) = 2755$$

and

$$2755/5 = 551$$

The simple average does not reflect the typical value of the set of numbers as well as the geometric mean does, nor does it take into account the one result that is much higher than the others.

Note: The geometric mean can only be used with positive numbers greater than zero.

Getting "high" bacteria counts

If you find a "high" bacteria count (over your state's standard for a one-time sampling), it may be a one-time event or occurrence. This information is useful, but before taking further action, you should return to the site to take more samples. When you return, pay careful attention to anything out of the ordinary at the site. Look for the presence of animals and be alert for any unusual odors. Walk the banks again to look for obvious sources of pollution (see Chapter 2), and note past and current weather conditions. Continue to sample and contact your local health agency if numbers remain high. Be sure to wear long rubber gloves while sampling and wash your hands carefully afterwards.

If you do find a high *E. coli* count what steps should you take? Generally, you should:

- ❑ Continue to monitor the site. This will help identify if there is a chronic bacteria problem or a high count resulting from a one-time event.
- ❑ If you continue to find a high count, work through your volunteer monitoring program to alert your local agency.

You may wish to alert your local watershed group or local agency about your monitoring efforts and the results so far. These groups will likely have an interest in your results regardless of whether or not you have detected a problem. They may be able to work with you on determining the possible sources of *E. coli* pollution if a problem does exist.

Tracking, storing and retrieval of data

Keep track of your *E. coli* data on a spreadsheet (electronic, if possible) or data form (see Appendix B for a sample data sheet). An electronic spreadsheet may be advantageous in that it allows for easy calculations to show ranges, pollutant loads, or to make graphs. After entering the results on your data sheet, mail or fax this to your program leader as promptly as possible.

Alternatively, you can enter the data on the *E. coli* electronic database website developed as a part of this project. It can be accessed at www.iwr.msu.edu/cmb. The site is password protected; however, the password can be obtained by emailing any of the contacts listed near the beginning of this manual.

Source tracking

One method for determining sources of *E. coli* is called bacterial source tracking. Bacterial Source Tracking (BST) is a collective group of new methodologies being developed to determine sources of fecal pollution in environmental samples. Sources of fecal pollution may come from domestic pets, cows, deer, geese, hogs, other wild animals, and humans.

If used successfully, BST methodologies have the potential to turn nonpoint (diffuse) sources into point sources. Current BST research is being driven by the recent implementation of the Total Maximum Daily Load (TMDL) concept by EPA. BST methods represent the best tools available for determining sources of fecal pollution in water and should be an integral part of any project that involves TMDL development for fecal coliform. BST methods can also be used in the design and implementation of Best Management Practices to reduce fecal loading in water.

Currently, both molecular (genotypic) and biochemical (phenotype) BST methods are under development. DNA fingerprinting has received the greatest publicity, but numerous methods show potential. Most researchers believe that some combination of BST methods will be needed to provide the most accurate and reliable source identification answers. It is doubtful that any one BST method will emerge as the "best" method for all situations.

While this is not a procedure that the volunteers will be conducting, it is a procedure to be aware of, and a possible step that state agencies might take. At this point, it is still an emerging and costly technology, even for agencies, so it is not used routinely.

Pollution prevention actions you can take

Our valued streams and rivers are subject to pollution stress from land uses in the watershed. These pollutants come from many sources, including those around our own homes. You can practice certain activities that can help reduce water pollution risks from bacteria. Some examples may include:

- Planting any bare soil with native grasses, shrubs, or other plants. The roots of these plants will help contain the soil from running off into the nearest stream.
- Cleaning up after your pet. Pet wastes can be a source of *E. coli* and excess nutrient contamination in our waterways. Pet wastes can make their way from the lawn to a river, so dispose of wastes in the toilet or trash.
- Draining roof downspouts onto vegetated areas, not on the street or pavement, so that water can soak into the ground.
- Limiting paved surfaces; landscape with rocks, plants, or gravel.
- Supporting active interaction, communication, and education between technical advisors and land users.
- Encouraging community appreciation of watershed health through community events, e.g. outdoor sports, river cleaning, and other events.

Chapter 8: Conclusions

The purpose of this training manual is to discuss sampling and monitoring techniques for E. coli and to highlight the test kits that are reliable, economical and usable by volunteers. However, it is important to keep in mind that bacteria monitoring is only one component of water quality monitoring, and that E. coli data alone do not indicate the ecological health of your stream. They do, however, provide valuable information that can be used in concert with other monitoring data to help assess overall ecosystem health.

Volunteer time is valuable, and the remarkable power of your efforts is your positive impact on the environment and the enthusiasm and commitment of your teams. By using standardized sampling and analysis procedures along with acceptable test kits, the *E. coli* data you collect as a volunteer can be very useful and utilized in various watershed programs. The bacteria monitoring data you collect and disseminate will help determine baseline conditions, provide continued data on your stream, and assist in assessing future water quality trends. It can help build partnerships with agencies and other groups from the local to federal level.

By remaining vigilant in your monitoring efforts, water quality problems can often be targeted and addressed before they become major.

Notes

Chapter 9: Resources for Further Information

Internet sites

Center for Disease Control's information on the pathogenic *E. coli* 0157:H7
www.cdc.gov/ncidod/dbmd/diseaseinfo/escherichiacoli_g.htm

The **Center for Watershed Protection** provides local governments, activists, and watershed organizations around the country with the technical tools for protecting our streams, lakes and rivers. www.cwp.org/

Volunteer Water Quality Monitoring National Facilitation Project is designed to expand and strengthen the capacity of existing Extension volunteer monitoring programs and support development of new groups. www.usawaterquality.org/volunteer/

Building Capacity of *E. coli* Monitoring By Volunteers: A Multi-State Effort is the web site that complements this training manual. www.uwex.edu/ces/csreesvolmon/EColi/index.html

EPA: **Microbiology** homepage: www.epa.gov/nerlcwww/

EPA: **National Newsletter of Volunteer Water Quality Monitoring**
www.epa.gov/owow/monitoring/volunteer/issues.htm

EPA: **STORET** (short for STOrage and RETrieval) is a repository for water quality, biological, and physical data. www.epa.gov/storet/

EPA: The **Volunteer Monitor's Guide To Quality Assurance Project Plans**
www.epa.gov/owow/monitoring/volunteer/qappcovr.htm

Michigan State University's **Digital Watershed**: Type in any address and obtain an aerial photograph as well as data on the watershed. www.iwr.msu.edu/dw

Purdue University's **stream delineation** site: Pick your stream from an interactive map. Click on a portion of the stream and the tool delineates the watershed of the stream from that point to upstream. pasture.ecn.purdue.edu/~watergen/owls/htmls/select_your_state.htm

U.S. Geological Survey's **Water Science Glossary** of Terms.
ga.water.usgs.gov/edu/dictionary.html

Water Resources of the United States (U.S. Geological Survey) Access to water-resources data.
water.usgs.gov/

Volunteer stream monitoring manuals

Volunteer Stream Monitoring: A Methods Manual, US Environmental Protection Agency
www.epa.gov/volunteer/stream/stream.pdf

Volunteer Stream Monitoring Training Manual, Hoosier Riverwatch, Indiana Department of Natural Resources - http://www.in.gov/dnr/riverwatch/trainingmanual/

Volunteer Surface Water Monitoring Guide, Minnesota Pollution Control Agency
http://www.pca.state.mn.us/water/monitoring-guide.html

Vermont Citizen's Guide to Bacteria Monitoring in Vermont Waters, Department of Environmental Conservation - http://www.anr.state.vt.us/dec//waterq/lakes/docs/lp_citbactmonguide.pdf

Washington State's Department of Ecology, A Citizen's Guide to Understanding and Monitoring Lakes and Streams - http://www.ecy.wa.gov/programs/wq/plants/management/joysmanual/

Watershed Watch (University of Rhode Island) - http://www.uri.edu/ce/wq/ww/Manuals.htm

Wisconsin Water Action Volunteers Citizen Stream Monitoring
http://watermonitoring.uwex.edu/wav/monitoring/methods.html

Other Guides to Volunteer Monitoring can be found on the National Volunteer Monitoring website at:
http://www.uwex.edu/ces/csreesvolmon/links.html

Watershed and stream management guides

A **Beginner's Guide to Water Management - Bacteria,** University of Florida
edis.ifas.ufl.edu/FA103

Developing a Watershed Plan for Water Quality: An Introductory Guide (Michigan)
www.deq.state.mi.us/documents/deq-swq-nps-Watershe.pdf

Getting to Know Your Local Watershed - A Guide for Watershed Partnerships
www.ctic.purdue.edu/KYW/Brochures/GetToKnow.html

Indiana Watershed Planning Guide from the Indiana Department of Environmental Management, August 2003. http://www.in.gov/idem/catalog/documents/water/iwpg.pdf

Michigan Department of Environmental Quality's **Stormwater Management Guidebook**
http://www.deq.state.mi.us/documents/deq-water-sw-links-SW_Management_Guidebook.pdf

Minnesota Shoreland Management Resource Guide - www.shorelandmanagement.org/quick/

Ohio **Stream Management Guide** fact sheets - www.dnr.state.oh.us/water/pubs/fs_st/streamfs.htm

Rapid Watershed Planning Handbook: A Comprehensive Guide for Managing Urbanizing Watersheds. 1999. Center for Watershed Protection. Ellicott City, MD

U.S. Geological Survey: **National Field Manual** for the collection of water-quality data
water.usgs.gov/owq/FieldManual/

Wisconsin Department of Natural Resources **Runoff Management**
http://www.dnr.state.wi.us/runoff/about.htm

Chapter 10: References

Frenzel, S.A. and C.S. Couvillion (2002) Fecal-indicator bacteria in streams along a gradient of residential development. Journal of the American Water Resources Association. 38:265-273.

Niemi, R.M. and J.S. Niemi (1991) Bacterial pollution of waters in pristine and agricultural lands. Journal of Environmental Quality. 20:620-627.

Overdevest, C., C. Huyck Orr, and K. Stepenuck (2004) Volunteer stream monitoring and local participation in natural resource issues. Human Ecology Review. Vol. 11(2): 177-185.

USDA Natural Resources Conservation Service photo gallery http://photogallery.nrcs.usda.gov

USEPA (1986) Ambient Water Quality Criteria for Bacteria EPA 440/5-84-002. Office of Water. Regulations and Standards. Criteria and Standards Division. January 1986.

USEPA (1996) The Volunteer Monitor's Guide To Quality Assurance Project Plans. (http://www.epa.gov/owow/monitoring/volunteer/qappcovr.htm) EPA 841-B-96-003. Office of Wetlands, Oceans and Watersheds. September 1996.

USEPA (1997) Volunteer Stream Monitoring: A Methods Manual. (www.epa.gov/OWOW/monitoring/volunteer/stream) EPA 841-B-97-003. Office of Water. November 1997.

USEPA (2002a). Water Quality Conditions in the United States: 2000 National Water Quality Inventory. EPA-841-R-02-001. August 2002.

USEPA (2002b). Implementation Guidance for Ambient Water Quality Criteria for Bacteria (Draft). May 2002 (www.epa.gov/waterscience/standards/bacteria/bacteria.pdf).

United States Geological Survey (2004). National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A9 http://pubs.usgs.gov/twri

Appendix A: Glossary of Terms

Agar - A gelatinous medium on which to grow *E. coli* colonies.

CFU - Colony Forming Units (bacteria colonies).

Colony – Visible growth of microorganisms.

Culture - Growing microorganisms (i.e., *E. coli*) in a nutrient medium that encourages their growth.

Delineate - To define or portray, often by drawing.

***E. coli* -** A species of fecal bacteria that lives in the intestinal tract of warm-blooded animals and is essential in digestion.

EPA - The U.S. Environmental Protection Agency, a government agency who's mission is "…to protect human health and the environment."

Gastroenteritis - Irritation of the digestive tract, often resulting in abdominal pain, vomiting and/ or diarrhea.

GIS - Geographic Information Systems. A software program that combines different layers of information (streams, land use, cities, counties, elevation, etc.) for analyses.

GPS - Global Positioning System. Hand-held or larger devices that triangulate your position on earth from satellites in orbit. One can take reading(s) at a sampling site, and later download this data into a software program.

Imperviousness - Impenetrable surfaces such as driveways, roads, etc.

Pathogen – A disease-causing life form such as a virus, bacterium, or other microorganism.

Replicate – Samples collected in the field in duplicate, triplicate, or more. Or samples plated in the lab in duplicate, triplicate, or more. Replicates help identify any variability in the stream or lab procedures.

TMDL - Total Maximum Daily Load. A TMDL is a regulation that specifies the sum of the pollutant contributions from point source discharges, *non-point* (diffuse) sources, and natural background levels that a water body can process and still meet water quality standards.

TNTC - Too Numerous To Count. If there are too many *E. coli* colonies on a plate, they are considered as too many or numerous to count.

Tributary - Smaller streams that feed into a larger portion of the main stream or river.

Watershed - The area of land that drains to a common water body.

Appendix B: Forms

Survey tools and other forms have been developed to help in the implementation of a volunteer monitoring program. These include: pre-post knowledge surveys given to volunteers at the start and end of the training sessions, to assessments done following the training, to those following a season of monitoring to assess user preferences in regards to using the test methods. These tools are available at www.uwex.edu/ces/csreesvolmon/EColi/SurveyTools.htm as pdf files.

Various forms have been developed for recording data, gathering information about your volunteer samplers, and keeping track of sites to be sampled and the data collected from these sites. A summary sheet that provides a step-by-step approach for sampling has also been developed. An example Data Sheet to record site conditions and bacteria data, and a Sampling Plan Summary are included beginning on the following page.

Citizens Monitoring Bacteria Data Sheet

Date ____/____/____ Volunteer ID ______________

Collection Time _____:_____ (am/pm) Site ID _______________

Monitor's Name _______________________________________

Stream/River Name ______________________________________

Stream Flow

❐ High ❐ Normal ❐ Low

Air Temp ________ (°C)

Water Temp_______ (°C)

Current Weather

❐ Clear/Sunny ❐ Overcast ❐ Showers ❐ Rain (Steady) ❐ Storm

Worst Weather in Past 48 hrs.

❐ Clear/Sunny ❐ Overcast ❐ Showers ❐ Rain (Steady) ❐ Storm

Transparency ____ (cm) or ____ (NTU) *(optional)*

Stream assessment comments and observations:

For each method, record the volume of water (in mL) used when plating the Easygel samples. Note the incubation temperature and the time samples were placed in the incubator. After incubating for 24 hours, count how many colonies you see on the plate. Repeat after 48 hours. To calculate the number of *E. coli* colony forming units (CFUs) per 100 mL, divide 100 by the number of mL of sample you used and multiply that result by the number of colonies you counted. You now have the estimated number of CFUs in 100 mL of sample. To properly average your replicates, see page 26.

Test Method	**Sample Volume (mL)**	**Number *E. coli* colonies counted @ 24 hours**	**Number *E. coli* (calculated) CFU /100mL @ 24 hours**	**Number *E. coli* colonies counted @ 48 hours**	**Number *E. coli* (calculated) CFU /100mL @ 48 hours**
EASYGEL – Sample 1		**A**		**A**	
EASYGEL – Replicate 2		**A**		**A**	
EASYGEL – Replicate 3		**A**		**A**	
3M Petrifilm – Sample 1	**1 mL**	**B**		**B**	
3M Petrifilm – Replicate 2	**1 mL**	**B**		**B**	
3M Petrifilm – Replicate 3	**1 mL**	**B**		**B**	

Incubation Temperature

________°C

Time Samples Placed in Incubator

____

A = count dark blue and purple colonies; **B** = count blue (or blue-purple) colonies with gas bubbles

Comments, observations and concerns about the sample prep or the analysis (include the time samples were counted if different from 24 or 48 hours):

Citizens Monitoring Bacteria Sampling Plan

Note: *This sampling plan includes steps for both Easygel and Petrifilm tests. Volunteers may decide to just use one of the tests. The sampling plan also includes steps to take if you are sending split samples to a laboratory for comparison of results. Depending on your location, you may need to sample on Monday, Tuesday, or Wednesday to get samples shipped overnight to the lab in time for them to complete the tests.*

Before You Go Out to Sample

1. Take 3 bottles of Easygel per each site out of freezer to thaw – if rapid thawing is required, they may be rinsed in warm water.
2. Take 3M™ Petrifilm™ out of the refrigerator – 3 for each site.
3. Turn on incubator – be sure the lid is tight and that it's the correct temperature (35°C) Fill appropriate channels in plastic tray with distilled water and set in bottom of incubator. Place wire tray on top.

Take to the Sampling Site

- ❑ soap, antibacterial lotion or wipes
- ❑ plastic gloves
- ❑ waders
- ❑ cooler with ice
- ❑ Sharpie® or permanent marker (to label bottles)
- ❑ shipping containers/ice packs and forms
- ❑ sterile collection containers (one per site)
- ❑ sterile lab sample bottles (one per site)
- ❑ 2-3 data sheets (one per site) on clipboard
- ❑ 1 or 2 thermometers
- ❑ transparency tube
- ❑ sampling device with rope (if sampling from bridge)

At the Site

1. Hang thermometer where it is not in direct wind or sunlight (for air temperature reading) – it may take about 5 minutes to stabilize
2. Complete top of data sheet, stream flow stage, and stream assessment comments
3. Take water temperature (hold approximately 2 minutes in main stream flow) – record on data sheet
4. Rinse labeled sterile collection bottle (500mL bottle) three times with sample water using proper sample collection technique – lower in upside down position to a depth of 3-5 inches below the water's surface (or approximately up to your wrist), fill at an angle facing upstream – be sure your hand and or fingers are not in front of the mouth of the bottle
   - ❑ If sampling from a bridge – rinse sampling device with stream water 3 times, then collect a sample and rinse the collection bottle three times – then fill collection bottle (be sure the bucket and rope do not come into contact with the ground during this process)
5. After rinsing the bottle 3 times, collect sample and top with lid after removing from stream – place collection bottle in cooler with ice for transporting
   - ❑ If shipping samples to lab before returning home/office, SHAKE COLLECTION BOTTLE TO MIX THE SAMPLE, then fill the lab sample bottle to its shoulder from the collection bottle (DO NOT rinse the laboratory sample bottle; it may be filled with a preservative) – also put this bottle in cooler on ice.
6. Record air temperature reading on data sheet

7. Take transparency reading and record on data sheet
8. Wash hands when finished

Tips for Preparing/Plating the Samples

1. Prepare table by cleaning with bleach or isopropyl alcohol
2. Wash hands thoroughly with soap
3. Items to have at home/office "lab" station

- ❑ paper towels or Kimwipes
- ❑ isopropyl alcohol/bleach
- ❑ distilled water
- ❑ rinse/waste container
- ❑ Sharpie® or permanent marker
- ❑ gloves
- ❑ pipettes
- ❑ Petrifilm spreader

4. Set up stations for each site you sample:
   - ✓ You should have one collection bottle and one lab sample bottle **per site**
   - ✓ You should have 3 Petrifilm plates and/or 3 Easygel bottles and 3 Easygel petri dishes, and 1 pipette **per site**
   - ✓ Label Easygel bottles with site #s; label bottom of petri dishes and Petrifilm plates with site #, replicate number, date, and volume (mL) of sample to be used.
5. ALWAYS SHAKE SAMPLE BOTTLE BEFORE DRAWING A SAMPLE WITH A PIPETTE!
6. Add an appropriate volume of sample water (using a sterile pipette and drawing from the collection bottle) to the three duplicate Petrifilm plates and/or Easygel bottles. You will always use 1mL for the Petrifilm. You can chose between 0.5 mL up to 5 mL for the Easygel bottles. (Note: you can use the same pipette to transfer the sample water to each of the appropriate tests if you use sterile technique.). Each site you sample requires using a new sterile pipette.
7. Complete the Petrifilm test by using the spreader as described on page 23.
8. Complete the Easygel tests by inverting each bottle, pouring each into a separate petri dish and swirling each as described on page 22.

Incubation **(Remember to write down what time incubation begins!)**

- ✓ Place plated samples in incubator: Easygel petri dish (upside down) and 3M™ Petrifilm™ (right side up) – three per site. **Remember:** Easygel needs to sit for at least 45 minutes to gel before placed in incubator upside down
- ✓ After 24 hours, count *E.coli* colonies on the Petrifilm plates and Easygel petri dishes
- ✓ After 48 hours, count *E.coli* colonies on Petrifilm plates and Easygel petri dishes (*optional*)
- ✓ After use, rinse incubator with dilute bleach or distilled water and let it dry
- ✓ Dispose of petri dishes and plates in a ziplock bag with a teaspoon of bleach added

Which items need to be sterile?

- ✓ Collection bottles and any bottle sent to the lab for confirmation
- ✓ Pipettes

Don't forget to **take photos** (or have someone take photos of you) at your site and while performing the methods – these can be used for a variety of purposes!

Appendix C: Sample Training Agenda

Below is a recommended agenda for an *E. coli* volunteer monitoring workshop. We recommend that you cover these essential topics, but you may wish to add additional information of your own.

1. Introduction
2. What the Citizen Monitoring Bacteria Project is
3. Implementation of the Pre-Test Survey and Demographics Survey; Liability and Photo Release Forms
4. Bacteria 101 – What is bacteria, why should we monitor for it, what do we know about bacteria, and how do we monitor for bacteria?
5. Site selection – how to pick a site to monitor (where, how, why). Sampling frequency
6. Safety
7. How to collect a field sample – hands on; QA/QC, field replicates
8. Lab protocol – how to collect a lab sample, how to ship the sample FedEx, chain of custody, shipping instructions
9. Field parameter instructions
10. How to use the kits – hands on
11. How to use the incubator and other bacteria equipment
12. Practice reading the plates
13. Data sheets
14. Disposal of kits
15. What does the data mean – interpretation of results
16. Post-Test Survey; End of Training Volunteer Assessment; End of Training Staff Assessment
17. Contact information for questions; wrap up; hand out kits and supplies

Appendix D: Other Methods

IDEXX Colisure

Because of the equipment costs associated with the IDEXX Colisure, it was not selected for use by volunteers. However, its accuracy when compared with laboratory analyses was as good as the two methods selected.

Preparation and Setup

1. Turn on IDEXX Quanti-Tray® Sealer.
2. Label Quanti-Trays using a permanent marker. This label should include site ID, date and time of sample collection, and sample number.

Preparing the Sample

1. Water samples are collected in 100 ml plastic IDEXX bottles by filling the bottles up to the 100 ml graduation.
2. Add Colisure reagent and two drops of anti-foam solution into sample.
3. Mix thoroughly until reagent is dissolved.
4. Pour sample into Quanti-Tray.
5. Place Quanti-Tray on rubber insert, and seal with Quanti-Tray Sealer.
6. Remove from back of sealer as soon as sealing is completed.

Incubation and Interpretation

Incubate at 35 degrees Celsius for 24-48 hours. After incubation is complete, read results. Wells containing total coliforms will turn from yellow to magenta. Wells containing *E. coli* will turn from yellow to magenta and fluoresce under UV radiation. If wells appear pink or orange, return tray to incubator and reexamine in 4 hours.

After all positive wells are counted, refer to a table of Most Probable Numbers (MPN) to determine total coliform MPN and *E. coli* MPN.

Sample Disposal

Because Quanti-Trays need to be sterilized by autoclaving, used trays are stored in large Ziplock bags and returned for disposal during each subsequent sample transfer.

IDEXX Colilert

Because of the equipment costs associated with the IDEXX Colilert, it was not selected for use by volunteers. However, its accuracy when compared with laboratory analyses was as good as the two methods selected.

Preparation and Setup

1. Turn on IDEXX Quanti-Tray® Sealer.
2. Label Quanti-Trays using a permanent marker. This label should include site ID, date and time of sample collection, and sample number.

Preparing the Sample

1. Water samples are collected in 100 ml plastic IDEXX bottles by filling the bottles up to the 100 ml graduation.
2. Add Colilert reagent and two drops of anti-foam solution into sample.
3. Mix thoroughly until reagent is dissolved.
4. Pour sample into Quanti-Tray.
5. Place Quanti-Tray on rubber insert, and seal with Quanti-Tray Sealer.
6. Remove from back of sealer as soon as sealing is completed.

Incubation and Interpretation

Incubate at 35 degrees Celsius for 24. After incubation is complete, read results. Wells containing total coliforms will turn from clear to yellow. Wells containing *E. coli* will turn from clear to yellow and fluoresce under UV radiation.

After all positive wells are counted, refer to a table of Most Probable Numbers (MPN) to determine total coliform MPN and *E. coli* MPN.

Sample Disposal

Because Quanti-Trays need to be sterilized by autoclaving, used trays are stored in large Ziplock bags and returned for disposal during each subsequent sample transfer.

Coliscan Membrane Filtration

Coliscan media incorporate a patented combination of color-producing chemicals and nutrients that make *E. coli* colonies appear blue, coliform bacteria that are not *E. coli* as a pink magenta and non coliforms as white or teal-green colonies.

There are two methods of Coliscan® : Coliscan-MF (membrane filter) and Coliscan® Easygel®. Coliscan-MF uses a sterile soaked pad in Coliscan medium as platform growth. Coliscan® Easygel® forms a gelled surface on which bacteria grows.

The Coliscan-MF method can be used when the water being tested has very few coliforms and/or *E. coli*. About a half cup (115 ml) of sample water is drawn through a membrane filter apparatus that traps bacteria on the surface of the filter. The filter is placed within a small petri dish on a sterile pad saturated with Coliscan-MF. The incubated colonies grow on the surface of the filter and are then counted.

Equipment

- ✓ 1.8 - 2 ml Coliscan-MF from a 20 ml bottle
- ✓ Membrane filter apparatus with holding pad
- ✓ 1 sterile dropper
- ✓ membrane filter with grid
- ✓ 2 inch petri dish with sterile pad
- ✓ forceps or tweezers (alcohol for sterilizing)

How To Use Coliscan-MF

Preparation and Setup

1. Thaw Coliscan-MF at room temperature by removing from freezer the night before sampling. (Note: Unused MF medium may be refrozen.)
2. Carefully open petri dish and use a sterile dropper to add less than 2 ml (1.8 ml) Coliscan-MF to soak the pad in the petri dish. Replace lid. (Note: the same pipette may be used to transfer the MF medium to each petri dish – one per site – if all are done at the same time following sterile technique.)
3. Twist the funnel to remove it from the collection container. Place a sterile holding pad on the top blue circle of the container. (Note: This pad does not have to be sterile, but should be clean. Store in Gelman plastic container or Ziplock bag. Use tweezers to transfer to the blue filter top. Only one pad will be used for each day's sampling. The same pad can be used for different sites because only sterile water is passed through the membrane filter. Discard holding pad after one day's use.)
4. Wipe forceps with alcohol to sterilize. Open a sterile filter envelope and remove the membrane filter with clean forceps. Be sure to separate the filter from the 2 blue protective backings when taking the filter from the filter envelope. Handle the filter carefully with tweezers or forceps so the filter does not tear. Place the filter grid-side up on top of the holding pad on the collection container. Be sure there are no air spaces between filter and pad.
5. Firmly push the funnel back down onto the filtering device bottom to hold the membrane filter in place and to create a seal. Double check that the funnel is securely against the blue filtering plate, over the red "O" ring, and touching the bottom vessel before filtering the water. Press down firmly.
6. Attach the hose to the collection container by pushing the end of the hose onto the side port of the container. Be sure the syringe plunger is pushed in.

Preparing the Sample

1. ALWAYS SHAKE SAMPLE COLLECTION BOTTLE BEFORE DRAWING A SAMPLE WITH A PIPETTE!

   Option 2a.) Using a sterile pipette, transfer 0.25 – 5 mL of stream sample to the filter funnel, then add distilled water (about 10-15 mL) to the filter funnel and gently swirl to mix.

   Option 2b.) Using a sterile pipette, transfer 0.25 – 5 mL of water sample to a pre-labeled bottle of diluent (sterile water) and shake vigorously to mix well. Mixing the sample with 10 – 99 mL of diluent helps distribute the colonies over the membrane filter more evenly. (Note: You will calculate the number of colonies/100 ml using the original sample size, disregarding the added volume of sterile water.)

Filtering the Water

1. Create a vacuum by pulling out the plunger of the syringe or by squeezing the handle of the pump.

   The water will be pulled through the filter, depositing any microorganisms present onto the filter. If all of the sample water is not drawn through the filter after the plunger has been pulled out, remove the plunger hose from the collection container, push the plunger back in, reattach the plunger hose and pull the plunger out again
2. When the water sample has been completely passed through the filter, disconnect the syringe and remove the funnel. With clean tweezers, remove the filter (grab near the edge) and place it grid-size up directly on top of the pad in the dish which was soaked with 2 ml of Coliscan-MF earlier. Place the lid on the dish, and place the dish in the incubator.
3. The filtered water in the collection container should be emptied and the filter apparatus prepared for repeat use by sterilization.

<You now need to sterilize the filter funnel for use during your next sampling event.>

Option 1. Rinse the funnel with isopropyl alcohol and let air dry

Option 2. Immerse in boiling water for at least 5 minutes and let dry

Place caps on funnels and store filtering device in plastic bag or sealed container until next use.

Incubation and Interpretation

Incubate the prepared dish (do not turn upside down) at 35^{o}C for 48 hours. After incubation is complete, count the colonies. *E. coli* colonies appear blue, dark blue, or purple. Other coliforms appear pink/magenta and non-coliforms appear white or teal green.

Confirmation Media Double Checks for Presence of *E. coli*

When using the Coliscan MF method, if the color of a colony is in question, you can add a drop of Kovac's reagent on or at the edge of the colony in question. A bright red zone will develop within 5 seconds if the colony is *E. coli.* An unused toothpick, plastic loop or small wire may be used to transfer the drop. The red color must be observed within the first minute after transferring the drop.

Funding for this manual has been provided by:

- CSREES 406 National Integrated Water Quality Program
- CSREES Great Lakes Regional Water Project

With support from:

This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, Agreement number 2003-51130-01787. "Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture."

Appendix 3 – Documentation of Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, February 3, 2022 8:22 AM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River WQ Monitoring Protocol
Attachments:	20220203 White River WQ DRAFT Study sent to WDNR complete.pdf

Good Afternoon Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete WQ Monitoring.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 6, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

The Wisconsin Department of Natural Resources did not respond with comments

Attachment F Wood Turtle Nesting Habitat Study Plan

White River Hydroelectric Project FERC No. 2444

Study Plan

Wood Turtle Nesting Habitat Study
Work Scope 22 TWR

Prepared for

Northern States Power Company,
a Wisconsin Corporation

Prepared by

meadhunt.com

February 2022

1. Introduction

Northern States Power Company, a Wisconsin corporation (NSPW or Licensee), currently holds a license issued by the Federal Energy Regulatory Commission (FERC or Commission) to operate and maintain the existing White River Hydroelectric Project (Project). The current license, which designates the Project as FERC No. P-2444, expires on July 31, 2025. To obtain a subsequent license, the Licensee must submit a final license application to FERC no later than July 31, 2023. The final license application, in part, must include an evaluation of rare species within the Project vicinity.

On October 29, 2020, the Licensee held a Joint Agency Meeting to present information about the Project. At the meeting, and during the 60-day comment period immediately following, the Licensee received comments and study requests from several entities. The Wisconsin Department of Natural Resources (WDNR) requested that the Licensee conduct a wood turtle study as part of relicensing.

The WDNR requested that a wood turtle study be conducted to "…further our knowledge of the distribution of wood turtles within the White River watershed more broadly. The two main objects of this study request are to determine if wood turtles are present within the Project boundary of the dam and to determine whether any wood turtle nest sites occur within the project boundary" (WDNR, 2020).

Licensee is proposing to conduct a Wood Turtle Nesting Habitat Study to identify areas with suitable wood turtle nesting habitat within the existing and proposed Project boundaries.

2. Study Plan Elements

2.1 Study Goals and Objectives

The objective of this Wood Turtle Study is to identify areas with suitable wood turtle nesting habitat within the existing and proposed Project boundaries.

2.2 Resource Management Goals

The resource management goal is to ensure compliance with Wisconsin Endangered Species Act of 1972 and the federal Endangered Species Act of 1973.

2.3 Public Interest

WDNR expressed interest in this study.

2.4 Background and Existing Information

WDNR indicated in their study request that wood turtles are "known to be present within this Project boundary, however survey data is limited" (WDNR, 2020).

The WDNR issued ER Review Log # 20-268 (ER Review) for the White River vicinity on April 10, 2020. The ER Review indicated that there was suitable habitat for state-threatened wood turtles in the Project vicinity.

2.5 Project Nexus

The operation of the dam may affect nesting or overwintering wood turtles in areas with suitable habitat. Identifying areas with suitable wood turtle nesting habitat will help determine whether mitigation measures are necessary as part of relicensing.

2.6 Study Area

The study area will include all shorelines upstream and downstream of the White River Dam within both the existing and proposed Project boundaries as shown in Appendix 1.

Study results will be filed as privileged information as requested by WDNR to avoid disclosing specific threatened or endangered species location information.

2.7 Methodology

2.7.1 Nesting Habitat Survey, Nesting Survey & Presence/Absence Surveys

NSPW will survey all shorelines for the presence of wood turtle nesting habitat within the existing and proposed Project boundaries as shown in Appendix 1. The reservoir shoreline will be surveyed by boat or on foot as necessary. The bypassed channel, and river downstream of the Project's powerhouse, will be surveyed by boat, or on foot for those areas not accessible by boat. The survey will take place during the month of June (preferably on a sunny day) when the air temperature is between 50-80 degrees Fahrenheit.

The surveyors will identify all areas with suitable nesting habitat. Suitable nesting habitat includes a sand or gravel substrate that is either unvegetated or sparsely vegetated, receives sun exposure for most of the day during late spring or summer, and is within 200 feet of the river's edge. Note that this can include gravel parking areas, roads, or shoulders of paved roads. GIS locations of all suitable nesting habitat identified will be collected to develop a map of suitable nesting sites within the study area.

In addition to identifying areas with suitable nesting habitat, the surveyors will conduct visual searches for the presence of any basking wood turtles or evidence of wood turtle nesting activity within the survey area.

Since the wood turtle is known to be present within the Project vicinity, it is assumed that the species is also present within the Project boundary. Therefore, the presence/absence surveys (identifying individual wood turtles) and nesting surveys (identifying evidence of wood turtle nesting) will only be conducted once, concurrent with the nesting habitat surveys.

The information provided by the study will help inform FERC in identifying any enhancement and mitigation measures necessary to minimize or avoid impacts to the species. The study also meets the WDNR's goals of determining if wood turtles are present and whether there are suitable wood turtle nesting sites within the Project boundary.

2.7.2 Personnel Qualifications

All surveys will be conducted by individuals qualified and approved by WDNR to identify wood turtles and wood turtle nesting habitat.

2.8 Consistency with Generally Accepted Scientific Practice

This Wood Turtle Study follows generally accepted scientific practice regarding field data collection and reporting.

2.9 Project Schedule and Deliverables

Results of this study will be summarized in a study report. The report will include the following elements:

- Project Information and Background
- Study Area
- Methodology
- Study Results
- Mapping
- Analysis and Discussion
- Agency Correspondence and/or Consultation
- Literature Cited

NSPW anticipates that field work will be completed in June 2022. The study report will be completed by August 1, 2022. Any information identifying the specific locations of wood turtles will be filed as privileged, non-public information per WDNR guidelines.

3. Consultation

The Wood Turtle Study was requested by the WDNR. As a result, the Licensee consulted with the WDNR as discussed below.

3.1 Wisconsin Department of Natural Resources

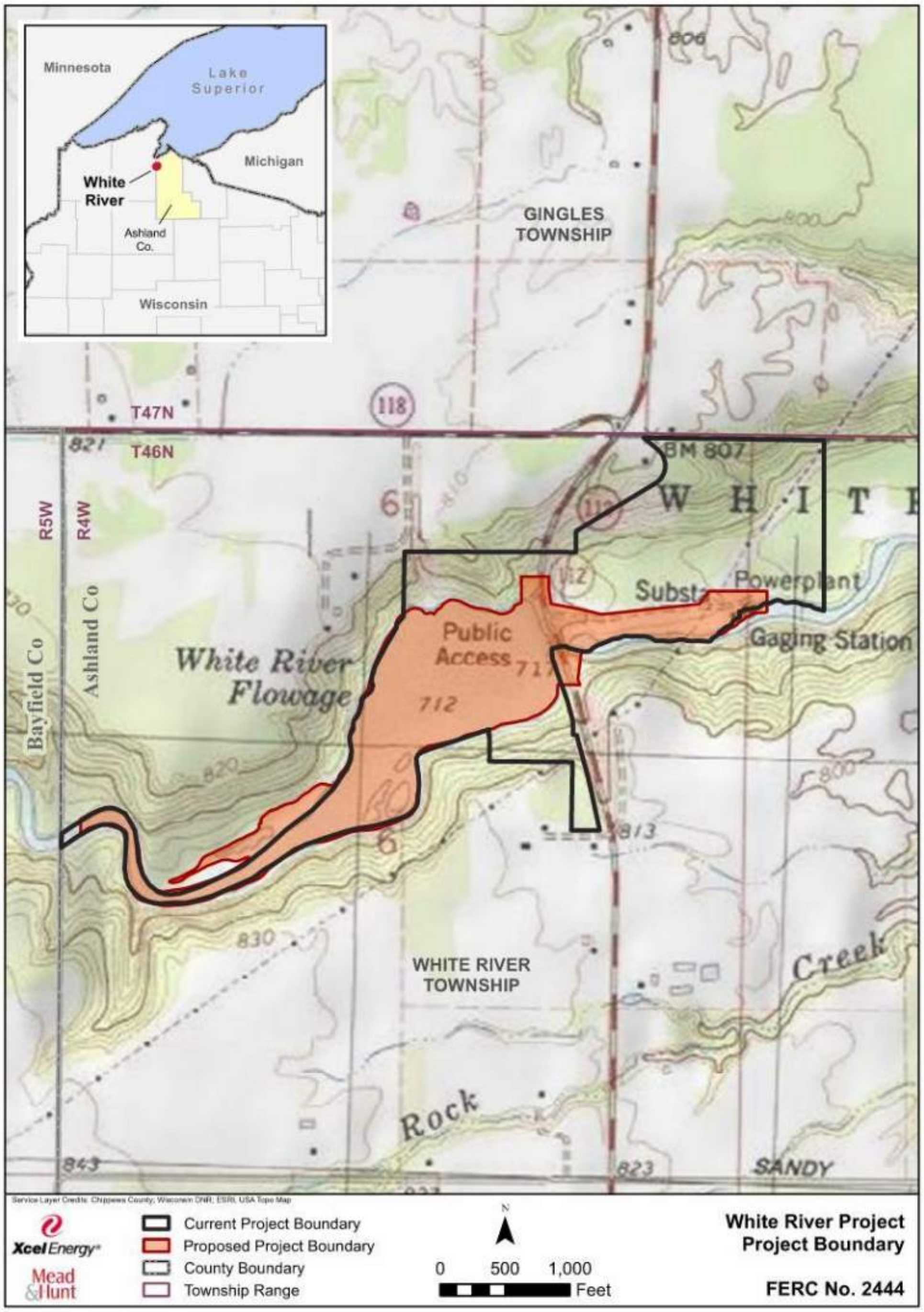
On February 3, 2022, the Licensee, through its consultant Mead & Hunt, provided a draft copy of the Wood Turtle Study plan to the WDNR for comment. The WDNR did not respond with any additional comments. Documentation of Consultation is included in Appendix 2.

4. References

Wisconsin Department of Natural Resources. 2020. Study Request Relicense of White River Project P-2444. December 17, 2020.

Endangered Resources Review (ERR Log # 19-734) Proposed White River Licensing, Bayfield and Ashland County, WI. April 10, 2020.

Appendix 1 – Wood Turtle Survey Area


Minnesota
Lake Superior
Michigan
White River
Ashland Co.
Wisconsin
GINGLES TOWNSHIP
T47N
T46N
R5W
R4W
Bayfield Co
Ashland Co
White River Flowage
Public Access
Subst
Powerplant
Gaging Station
WHITE RIVER TOWNSHIP
Creek
Rock
SANDY
Service Layer Credits: Chippewa County, Wisconsin DNR, ESRI, USA Topo Map
Xcel Energy
Mead & Hunt
Current Project Boundary
Proposed Project Boundary
County Boundary
Township Range
0 500 1,000 Feet
White River Project
Project Boundary
FERC No. 2444

Appendix 2 – Documentation of Consultation

Shawn Puzen

From:	Shawn Puzen
Sent:	Thursday, February 3, 2022 10:23 AM
To:	cheryl.laatsch@wisconsin.gov
Cc:	Shawn Puzen; Darrin Johnson; brey.j.maurer@xcelenergy.com; Miller, Matthew J; Crotty, Scott A
Subject:	Request for Comments on White River Wood Turtle Nesting Habitat Monitoring Protocol
Attachments:	20220203 White River Wood Turtle Nesting Habitat DRAFT Study Plan sent to WDNR.pdf

Good Morning Cheryl,

By your initial comments on the relicensing of the White River Hydroelectric Project, you requested NSPW complete Wood Turtle Nesting Habitat Monitoring.

Prior to executing the study, NSPW is requesting your comments on the enclosed draft study plan.

Please provide your comments as soon as possible, but no later than March 7, 2022.

Please feel free to contact me if you have any questions.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

The Wisconsin Department of Natural Resources did not respond with any additional comments.

Study Report Consultation

Darrin Johnson

From:	Shawn Puzen
Sent:	Wednesday, December 14, 2022 8:20 AM
To:	Jessica Strand
Cc:	Darrin Johnson
Subject:	FW: White River Hydroelectric Project Study Reports
Attachments:	20221206 AIS Report.pdf; 20221206 Fisheries Survey and Habitat Assessment Report.pdf; 20221206 Mussel Report.pdf; 20221206 Turtle Report.pdf; 20221206 WQ Appendix B.pdf; 20221206 WQ Appendix C.pdf; 20221206 WQ Report.pdf
Categories:	Filed by Newforma

Good Morning Jessica,

I am just checking to make sure you received these.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Tuesday, December 6, 2022 10:34 AM
To: cheryl.laatsch@wisconsin.gov; Jessica Strand <environmental@badriver-nsn.gov>
Cc: Miller, Matthew J <Matthew.j.miller@xcelenergy.com>; Darrin Johnson <Darrin.Johnson@meadhunt.com>; Crotty, Scott A <scott.a.crotty@xcelenergy.com>; Shawn Puzen <Shawn.Puzen@meadhunt.com>
Subject: White River Hydroelectric Project Study Reports

Hi Cheryl and Jessica,

Per your request, I have attached the reports for the studies that were completed as part of the White River relicensing effort (these are separate from any studies completed as part of the recent drawdown).

Please confirm you have received these and please provide any comments you may have about the study report content within 30 days.

Should you have any additional questions, please do not hesitate to reach out to me.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

No comments were received from the Bad River Tribe

Darrin Johnson

From: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>
Sent: Tuesday, December 6, 2022 10:39 AM
To: Shawn Puzen; BadRiverNSN, Environmental - DNR
Cc: Miller, Matthew J; Darrin Johnson; Crotty, Scott A
Subject: RE: White River Hydroelectric Project Study Reports

Categories: Filed by Newforma

Thanks Shawn.

Cheryl Laatsch
Statewide FERC Coordinator
Bureau of Environmental Analysis and Sustainability
Wisconsin Dept of Natural Resources
N7725 Hwy 28
Horicon WI 53032
NEW (Work Cell) 920-382-9975
Cheryl.laatsch@wisconsin.gov

From: Shawn Puzen <Shawn.Puzen@meadhunt.com>
Sent: Tuesday, December 6, 2022 10:34 AM
To: Laatsch, Cheryl - DNR <Cheryl.Laatsch@wisconsin.gov>; BadRiverNSN, Environmental - DNR <Environmental@badriver-nsn.gov>
Cc: Miller, Matthew J <matthew.j.miller@xcelenergy.com>; Darrin Johnson <Darrin.Johnson@meadhunt.com>; Crotty, Scott A <scott.a.crotty@xcelenergy.com>; Shawn Puzen <Shawn.Puzen@meadhunt.com>
Subject: White River Hydroelectric Project Study Reports

Hi Cheryl and Jessica,

Per your request, I have attached the reports for the studies that were completed as part of the White River relicensing effort (these are separate from any studies completed as part of the recent drawdown).

Please confirm you have received these and please provide any comments you may have about the study report content within 30 days.

Should you have any additional questions, please do not hesitate to reach out to me.

Thanks,

SHAWN PUZEN
FERC HYDROPOWER LICENSING AND COMPLIANCE, WATER
Mead & Hunt
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
meadhunt.com | LinkedIn | Twitter | Facebook | Instagram

No comments were received from the WDNR

Archaeological Study Report Consultation

Darrin Johnson

From:	Shawn Puzen
Sent:	Friday, January 20, 2023 8:33 AM
To:	Darrin Johnson
Subject:	FW: Compliance Submittal Accepted
Categories:	Filed by Newforma

For the consultation record.

Shawn Puzen
FERC Hydropower Licensing and Compliance | Water
Direct: 920-593-6865 | Cell: 920-639-2480 | Transfer Files
Mead&Hunt
LinkedIn | Twitter | Facebook | Instagram | My LinkedIn

From: WHPD <compliance@wisconsinhistory.org>
Sent: Friday, January 20, 2023 8:13 AM
To: Shawn Puzen <shawn.puzen@meadhunt.com>; tyler.howe@wisconsinhistory.org
Subject: Compliance Submittal Accepted

White River Hydroelectric Project Relicensing Shoreline Survey Report FERC Project No. 2444 (MH 1853) has been accepted by the State Historic Preservation Office as project 23-0117.

Shawn Puzen

From:	kimberly.cook@wisconsinhistory.org
Sent:	Wednesday, February 15, 2023 10:14 AM
To:	Shawn Puzen
Subject:	23-0117/AS - MH 1853 - White River Hydroelectric Project Relicensing Shoreline Survey Report FERC Project No. 2444

Dear Mr. Shawn C. Puzen,

This email is acknowledgment that we received and accepted the monitoring report for the above-mentioned project. We concur with the consultant's recommendations.

Sincerely,

Kimberly Cook
State Historic Preservation Office

Wisconsin Historical Society
816 State Street, Madison, WI 53706

kimberly.cook@wisconsinhistory.org

Wisconsin Historical Society
Collecting, Preserving, and Sharing Stories Since 1846

CZMA Coordination

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

February 23, 2023

VIA Electronic Mail

Ms. Kathleen Angel
Wisconsin Coastal Management Program Department of Administration
101 E. Wilson Street, 9th Floor
P.O. Box 8944
Madison, WI 53708-8944

Re: **Request for Determination of Compliance**
Gile Flowage Storage Reservoir Project (P-15055)

Dear Ms. Angel:

Northern States Power Company – Wisconsin (NSPW) is the owner and operator of the Gile Flowage Storage Reservoir Project. NSPW is pursuing an original license from the Federal Energy Regulatory Commission (FERC) under FERC Project No. 15055.

A Preliminary Application Document providing a description of the Project and its proposed operation was submitted to your office in November 2020 and is available for review at hydrorelicensing.com/gile-flowage/. It is anticipated that the draft and final applications for an original license will be submitted by March and August 2023, respectively.

As part of the federal licensing process for the Project, NSPW must provide the FERC with documentation that a determination has been made that the licensing process complies with the policies of Wisconsin's approved Coastal Management Plan, and that any activities associated with the licensing will be conducted in a manner that is consistent with said policies. This letter constitutes a formal request on behalf of NSPW for a written determination of consistency with Wisconsin's Coastal Management Program.

If you are unable to submit a letter, please provide your determination to me via e-mail so that I may incorporate your comments into FERC's licensing record. My email address is matthew.j.miller@xcelenergy.com. Should you have any questions, you may contact me at 715-737-1353.

Sincerely,

Matthew J. Miller Digitally signed by Matthew J. Miller
Date: 2023.02.23 14:19:53 -06'00'

Matthew J. Miller
Environmental Analyst

CC: Shawn Puzen, Darrin Johnson – Mead & Hunt (via e-mail)
Scott Crotty – Xcel Energy (via e-mail)

1414 West Hamilton Avenue
PO Box 8
Eau Claire, WI 54702-0008

March 6, 2023

VIA Electronic Filing

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: **Draft License Application for Subsequent License**
White River Hydroelectric Project (FERC No. 2444-036)

Dear Secretary Bose:

Northern States Power Company – Wisconsin (NSPW or Licensee) is the owner and operator of the White River Hydroelectric Project (Project) (FERC No. 2444). The Project is located on the White River, in the Town of White River in Ashland County, Wisconsin and the Town of Kelly in Bayfield County, Wisconsin. The current license expires on July 31, 2025.

In accordance with 18 CFR 4.32 (h), NSPW hereby files the enclosed Draft License Application for the relicensing of the Project. The Licensee has prepared the DLA to conform to the requirements of the Commission's regulations at 18 CFR §§ 4.38, 4.61, and 16.10 as required under the Traditional Licensing Process (TLP). The Commission approved NSPW's request to the use the TLP via their September 16, 2020 letter.

Pursuant to 18 CFR § 4.38, and by copy of this letter (via e-mail and/or US mail), the Licensee is providing a link to the Project's relicensing website at http://hydrorelicensing.com/. From this website, an electronic copy of the DLA's public documents may be downloaded for review by the resource agencies, tribes, non-governmental organizations, and other potential interested parties included in the attached distribution list. Written comments are due within 90 days of the date of this filing. Should stakeholders experience difficulty downloading any documents, or prefer to receive an electronic version on a USB drive via US mail, they may contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

It should be noted that three of the enclosed documents are unavailable to the public. Those three documents are as follows:

- Exhibit F drawings included in Volume 2 contain Critical Energy Infrastructure Information (CEII). Therefore, NSPW has filed the CEII version of Volume 2 separately with the Commission and designated it as such.

- Appendix E-5 included in Volume 3 contains privileged locational information regarding archaeological resources. Therefore, NSPW has filed Appendix E-5 separately with the Commission and designated the information as privileged.

- Appendix E-21 included in Volume 3 contains privileged locational information regarding threatened and endangered species. Therefore, NSPW has filed Appendix E-21 separately with the Commission and designated the information as privileged.

Should you have any questions, please contact Matthew Miller at 715-737-1353 or matthew.j.miller@xcelenergy.com.

Sincerely,

Donald Hartinger Digitally signed by Donald Hartinger
Date: 2023.03.06 10:38:57 -06'00'

Donald R. Hartinger
Plant Director, Renewable Operations – Hydro

Enclosure

cc: Distribution List

Certificate of Service

I hereby certify that I, on behalf of Northern States Power Company, a Wisconsin corporation, have this day served by U.S. mail or via email (if a mailing address was not available), the foregoing documents in electronic format upon each person designated on the attached distribution list.

Dated this 6th[th] day of March, 2023

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Comments on the DLA

June 2, 2023

Ms. Kimberly D. Bose
Secretary Federal Energy Regulatory Commission
888 First Street
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Re: Comments on the Draft Licensing Agreement Concerning the White River Hydroelectric Project (FERC Project No. 2444)

Dear Secretary Bose,

As a sovereign nation possessing an interest in the use and enjoyment of the sacred waters of Anishinaabeg-Gichigami, or Lake Superior, pursuant to treaties we signed with the United States, we submit our preliminary written comments related to the draft licensing agreement for the White River Dam by Xcel Energy also known as the Northern States Power Company-Wisconsin (henceforth, "company" or "applicant"). The Bad River Band of Lake Superior Tribe of Chippewa Indians (henceforth, "Tribe") is a federally recognized Indian Tribe with its reservation centered on the northern shores of Wisconsin and Madeline Island. The Tribe also retains interest in lands ceded through the 1837, 1842 and 1854 Treaties with the United States in Wisconsin, Michigan, and Minnesota. The proposed White River Dam falls within waters that are directly connected to the Reservation and held in trust by the United States as well as ceded lands where the Tribe has reserved rights to resources. In addition, the Tribe has federally approved Water Quality Standards and Treatment-as-a-State authority from the EPA, making us a downstream regulator along the White River.

As such, we are very concerned with the operation, maintenance, and relicensing of the White River Dam, especially knowing the impacts that the Tribe has experienced living downstream of the dam. Our concerns arise from negative impacts and disruption to Tribal fishing due to an improperly managed drawdown of the reservoir, and concerns about the potential of releases from the dam that contribute to erosion and flood impacts for the Tribal community downstream. In addition, we want to assure that the relicensing will not negatively impact water quality or water quantity in ways that would result in a degradation to Tribal waters, of which the White River is considered an Outstanding Resources Water, with cultural, commercial, navigable, wildlife, aquatic life and fish, recreational, and cool water fishery designated uses. The White River, after its confluence with Bad River thirteen miles downstream, contributes flow into wild rice waters of the Bad River and the Bad River and Kakagon Sloughs. (This sloughs complex is one of the largest natural manoomin, or wild rice, estuaries in the Lake Superior Basin, a wetland site of international importance under the Ramsar Convention and holds many other designations, including a National Natural Landmark listing within the National Register of Natural Landmarks.) The White River is also historically a wild rice water.

Staff from the Tribe's Mashkiiziibii Natural Resources Department (MNRD) discussed concerns stemming from planning meetings held April and May of 2023 with the Great Lakes Indian Fish and Wildlife Commission, the Bureau of Indian Affairs, and the United States Fish and Wildlife Service. MNRD staff submit comments in this letter regarding the draft license agreement. However, we may also have additional comments and concerns that we reserve the right to address in formal consultation as the relicensing process progresses. Requests for information, data, studies and consultation focus on the continued operation of the White River dam.

1. The Tribe, as a downstream nation with federally-approved Water Quality Standards (WQS), and regulatory authority under Clean Water Act Sections 303(c) and 401, should not be treated as every other stakeholder in the relicensing process, and should be involved in additional conversations regarding this project to ensure that federal permitting for the operation of the dam meets the Tribe's WQS.

2. Technical Comments on Data Used
    a. LiDAR data used to determine updated contours for application materials was the 2014 LiDAR data for Ashland County, Wisconsin, which was collected prior to severe flooding that occurred in July 2016 that drastically changed the landscape of the watershed. Thus, we feel that the more accurate data to use in determining contours should be the more recent 2019 LiDAR data and thus the application materials and other information should be updated accordingly.
    b. The wetland data used for the PAD was the National Wetland Inventory, which upon last review by MNRD staff, uses the outdated version of the Wisconsin Wetland Inventory for mapped wetlands for Ashland County from 1991. The more recently updated Wisconsin Wetland Inventory from 2013 should be used to prepare application materials and determine possible impacts to wetlands, if the step of performing a true on-the-ground delineation is not completed.

3. We believe that long-term prevention and management of aquatic invasive species (AIS) influenced by the White River Hydroelectric project were not addressed for the following reasons. Both aquatic and terrestrial invasive species studies were completed, profiling the White River Flowage for potential threats both upstream and downstream of the dam. We've also noted a commitment to allocating capital costs to develop a rapid response management plan, presumably to prevent and manage the introduction and spread of non-local beings. We think this settles short-term prevention and management, however we also raise concerns related to long-term prevention and management of aquatic invasive species (AIS) influenced by the White River Hydroelectric project.
    a. **Invasive Species** -- concerns from the PAD from 2020 we can transfer to this application. Since it's well known that AIS are established in the headwaters of the White River and subsequently Bad River, and they colonize downstream emergent zones in northern sedge meadow/wet meadow, peat bog or wetland upland transitions. AIS have long occupied the corridor that leads into the Bad River and the sloughs, down White River. Also, AIS have a complicated relationship with water levels and climate change. Increased ambient water temperatures, decreased water levels, more intense water level fluctuations and a decrease in ice cover all greatly benefit invasive species colonization. In addition, even though flowing waters transport viable seeds and other plant parts that may germinate elsewhere, static or stagnant waters created by dams also work to the benefit of invasive plants through the accumulation and build-up of nutrients (i.e. eutrophication). Aquatic invasive plants like cattails and phragmites are anatomically gifted as bioaccumulators capable of absorbing toxic metals and nutrients in nutrient rich water but are capable of thriving in nutrient poor environments too. Built or artificial manipulations of natural watercourses, creating static water, increase AIS infestations. The White River flowage contains aquatic invasive plants like cattail which are a threat to downstream native floral and faunal communities and natural habitats for various fish and wildlife. Just like during dam drawdowns, it would be prudent to conduct AIS surveys and treatment in the reservoir and incorporate not just short-term but long-term monitoring and management of the reservoir. The license should include a botanical

survey of the cattail clones, reed canary grass or other nonnative plant populations upstream of the White River dam to establish a baseline volume/extent of nonnative plant populations/density. This data could be shared with local AIS coordinators including Bad River and the Ashland County LWCD.

b. The goals would be to suppress aquatic invasive plants like cattails and reed canary grass. This will help MNRD meet its invasive species prevention and management plan, and those management plans of the Ashland County Land and Water Conservation Department.
c. Resource: WDNR to NSP Xcel, PAD concerns (Dec. 17, 2020; attached) -- Concerns raised by the Wisconsin Department of Natural Resources over drawdown -- the non-local beings program with the MNRD shares the concerns of the DNR over the implementation of the drawdown. Compliance with the drawdown process also helps limit the mobility of invasive propagules spreading from the reservoir.

4. The licensee should conduct appropriate studies to investigate the delivery and passage of sediment upstream and downstream of the White River Hydroelectric Project during the new license period. These studies should adequately compare sediment transport models with empirical sediment yield to produce meaningful models, calibrate, and validate those models. Derived models could then be used to assess different land use, project management scenarios, and specifically model the White River with and without the hydroelectric dam. Additionally, the licensee should conduct thorough and comprehensive sediment and sampling program to access the entrainment of heavy and toxic metals, industrial chemicals, and non-point source agricultural and nutrient pollution entrained in the facies of trapped sediment within the impoundments inundated area.

   Therefore, the licensee, at a minimum should be required to conduct the following studies (note: staff with MNRD would like these studies to be conducted every five years):

   a. Define the mechanisms of sedimentation and fluvial response by assessing current conditions with historical photogrammetry and records. This should include bathymetric calculations with comparisons pre-construction and with current bathymetry and storage calculations.
   b. Analyze sediment particle distribution, channel storage, bedload flux and rate of entrapment by the White River Hydroelectric Dam.
   c. Conduct an investigation of suspended sediment load throughout the full range of flow for at least 2 years.
   d. Use Bathymetry mapping for pre and post drawdown to ensure the effectiveness of drawdown methods to determine if sediments are being resuspended and released.
   e. Conduct comprehensive bedload core and grab sampling and suspended sediment sampling to assess heavy and toxic metal, industrial and agricultural chemical pollution to include nonpoint source nutrient entrainment of facies deposition.
   f. Model future conditions of bedload and suspended sedimentation to predict effects upon project alternatives to include project decommissioning and river restoration.
   g. Climate change study -- the Northwoods is expected to see increases in ambient air and water temperatures, longer growing seasons, lower water levels, and an expected decline in ice cover and snow accumulation. These create long-term concerns over wetland habitat loss and wildlife occupancy and success, nutrient enrichment, erosion and

sedimentation. A cumulative impacts study should capture the long-term effects that the dam has on floral and faunal communities, habitat quality, water quality, and water flow.

h. The release of flood waters from the dam during the 2016 flooding in the Bayfield, Ashland, and Iron Counties had impacts downstream that are not fully understood and the Bad River Community continues to have questions about possible future impacts from a similar or worse flood event in light of climate change and an increase in severe precipitation events. We request that a flood study be conducted concurrent with the re-licensing process so that possible impacts of a release of flood waters during different scenarios can be fully understood and flood forecasting can be completed with the National Weather Service to provide the best possible emergency response planning available to the Tribal community. This study would be necessary for MNRD to fully develop an emergency response plan for different dam release scenarios and could identify some operational requirements for the dam that would need to be included in the re-licensing. Methodology could be developed in coordination with the National Weather Service and the US Geological Survey, both of which have well-establishes protocols for this type of work and the expertise to tailor these protocols to the White River Subwatershed.

The studies as proposed are consistent with numerous studies from past re-licensing efforts with other hydroelectric dams and facilities under the regulatory authority of FERC.

The license should include timely and appropriate steps for sharing data based on the above suggested studies. Staff from MNRD must be provided with data from these studies to be conducted every five years, and to be provided directly to MNRD, including any associated reports and consultation work. Upon completion of these studies, MNRD must also be provided with the reports and raw data associated with these studies.

5. Safe operation of the White River dam mitigates social and ecological risk associated with the downstream impacts. The appropriate channels of communication and notification to authorities should be followed. MNRD must also be an authority to notify and coordinate with in the event of sediment releases, an emergency or imminent risk of dam compromising events like floods, or any likelihood of dam failure. Emergency tabletop exercises are a helpful and effective tool to bring together staff and tribal members from Bad River to work through, and practice, scenarios and appropriate effective communication steps to manage a range of risks to the downstream area.

6. Additionally, we would like to ensure the proper lines of communication about unscheduled releases of the dam and communication about scheduled drawdowns happens in a timely manner to ensure that impacts to tribal waters and tribal events, like spring fishing, is minimized. In addition MNRD would also like to be notified - same as FERC, WDNR and USFWS – of any planned or unplanned deviations. Communication protocols and procedures should be properly addressed in the relicensing of the dam.

7. Finally, we would like to add that cultural and historical considerations do not appear to be adequately addressed, and we will be communicating our concerns regarding these issues with the applicant and FERC in follow-up communications, as we continue to have an interest in this project under the National Historic Preservation Act and 36 CFR 800.

The above is preliminary view of information necessary to sufficiently evaluate protection of Reserved Water Uses, including accustomed sources of fisheries, plants and other water – dependent resources uses. We look forward to hearing FERC and the applicant's response to our concerns raised here and would gladly provide additional context and comments in follow-up communications since we realize that due to other workloads we are unable to provide more than this truncated summary of concerns at this time. If you have any questions or would like to schedule a meeting, please reach out to our Tribal Historic Preservation Officer Lawrence Plucinski and/or our point of contact for Xcel Energy communications within MNRD, our Environmental Specialist Jessica Strand, either of whom can help coordinate from our end. (Contact information for either can be found on our website at: http://www.badriver-nsn.gov/natural-resources/.)

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