

Notice: Use of this form is required by the Department of Natural Resources for any application filed pursuant to ch. NR 193, Wis. Adm. Code. Personal Information collected on this form, will be used for administrative purpose and may be provided to requesters to the extent required by Wisconsin's Public Records Laws [ss. 19.31–19.39 Wis. Stats.] **To be considered, applications must either be submitted electronically or postmarked by November 1st.** The preferred method of application submittal is via email to DNRSurfaceWaterGrants@wisconsin.gov, using the **Submit by Email** button on this form.

Section 1: Ecosystem Type *Pre-application*

This project primarily focuses on (select one):

- Lakes Rivers Wetlands AIS

Section 2a: Application Type (check one) *Pre-application*

Education and Planning Grants:

- Surface Water Education
 Surface Water Planning
 Comprehensive Planning for Lakes & Watersheds
 County Lake Grant

Surface Water Management Grants:

- Healthy Lakes & Rivers
 Surface Water Restoration
 Management Plan Implementation
 Ordinance Development
 Fee Simple Land Easement & Acquisition
 Wetland Restoration Incentive

Aquatic Invasive Species (AIS) Control Grants:

- AIS Prevention
 Aquatic Invasive Species (AIS) Control
 Large Scale Small Scale
 Early Detection & Response

Note: For Clean Boats, Clean Waters Grants use [Form 8700-337](#)
 Lake Monitoring and Protection Network use [Form 8700-284L](#)

Section 2b: Applicant Information *Pre-application*

Project Title

Direct watershed drainage impact on constructed fisheries habitat in Lake Onalaska

Applicant Name (Organization)		Organization Type	
Lake Onalaska Protection and Rehabilitation District		Lake District	
Organization Address--Where to Send Check		City	State ZIP Code
W8155 County Road ZB		Onalaska	WI 54650
Authorized Representative (AR) Name		AR Title	
Marc Schultz		Chair, LOPRD	
AR Phone Number (include area code)	Ext.	AR E-mail Address	
(608) 781-1662		schultzma@charter.net	
Contact Representative (CR) Name (if different from AR)		CR Title	
CR Phone Number (include area code)		CR E-mail Address	

Has your organization been approved as an eligible applicant within the past 10 years?

- Not applicable. (ex. Counties, Local Units of Government, Lake Districts, Town Sanitary Districts, Tribes, or Accredited universities.)
 No. Submit [Form 8700-380](#) and required supporting documentation to your [Environmental Grants Specialist](#) 6 months prior to the grant application deadline. Your organization must be deemed eligible prior to the grant application deadline.
 Yes

Section 3: Project Information

Pre-application Scoping Meeting

Wisconsin DNR Staff Name(s)	Date
Gina Keenan	09/15/2022
Shawn Giblin	09/15/2022

Surface Water Grant Application

Form 8700-284 (R 07/06/22)

Page 3 of 12

			Proposed Start Date		Proposed End Date	
			March 15		December 31	
			(Start Date)	(Year)	(End Date)	(Year)
Waterbody Name(s)	Waterbody ID(s) <small>Look it up here! (WBIC)</small>	Lake Acreage (if applicable)	Is there public access?	No. of Public Access Sites Incl. Boat Launches & walk-ins	No. of Public Vehicle-Trailer Parking Spaces Available at Public Access Sites	
Lake Onalaska	728100	8,391.00	<input checked="" type="radio"/> Yes <input type="radio"/> No	11	164	

Project to be implemented on state land Regional project serving multiple waterbodies

County(ies)

La Crosse

State Senate District No.(s)	State Assembly District No.(s)
32	94
	95

Project location. If applicable, include a location for each practice (ex. filter strip, shoreline restoration, etc.)	Quarter	Quarter-Quarter	Section	Township (N)	Range	E or W
Lake Onalaska			16	N	7	<input type="radio"/> E <input checked="" type="radio"/> W
			17	N		<input type="radio"/> E <input checked="" type="radio"/> W

None of the project activities identified within this application are necessary to comply with a regulatory action per [NR 193.54](#).

Laboratory Analysis

Does this project include Laboratory sample analysis (if applicable)? Yes No

If yes, then complete [Form 8700-360](#) and indicate the lab service provider:

- State Lab of Hygiene
- Other Program-Approved Lab: _____
- Other: _____

If the lab you intended to use is not available within the dropdown list, you must contact biologist prior to the application deadline to discuss if feasible.

Permitting

Are state, local and/or federal permits required for this project? Yes No Unknown

Permit Name	Agency	Status (i.e., to be submitted, submitted, approved)	Agency Contact
"Special Use Permit" for sampling activities	US Fish and Wildlife Service	Verbal Approval, app. to be submitted	Tim Miller, La Crosse District Mgr, USFWS

Section 4: External Financial Support

List organizations (e.g., school, town, county, nonprofit organization, etc.) other than the applicant and their subcontractors that are providing financial support in the project. Identify the type of financial support (cash, volunteer hours, equipment, etc) and attach a copy of the organizations letter of financial commitment. Do not list Wisconsin Department of Natural Resources funds or resources.

Organization Name	Type of Support	Amount of Support
University of Wisconsin - La Crosse	Student Stipend	\$6,000.00

Section 5. Project Budget

Part A. Provide a detailed budget of eligible costs including all wages, services, supplies and equipment necessary to accomplish the project related to in Section 8 of the application, the budget category it best fits, number of units (e.g. hours, plants, square feet, days, miles) and unit to administration of the project. See guidance for more information.

Item Description	Activity in Section 8 (ex. 1.a.)	Budget Category	Cash or Donation/ Match	Unit	# of Units	
Acoustic Bathymetry Survey and Analysis	1.a	Consultants/Contractual	cash		1	\$ 10
2. Acoustic Bathymetry Univ. Student Field work/ Analysis assistance	1.a	Personnel	donation	ea	1	\$ €
3. Volunteer Monitoring: Sediment	2.a	Personnel	donation	hr	30	\$
4. Volunteer Monitoring: Hydrology	2.b	Personnel	donation	hr	50	\$
5. Volunteer Monitoring: Precipitation	2.c	Personnel	donation	hr	40	\$
6. Volunteer Monitoring Equip: Hydrology (Gaging staffs)		Equipment	cash	ea	4	\$
7. Volunteer Monitoring Equip: Hydrology (Trailcams for continuous recording gaging staff observations)		Equipment	cash	ea	2	\$
8. Volunteer Monitoring Equip: Sediment Plume - Secchi Discs		Equipment	cash	ea	2	\$
						Total Project Cos
						Adm
State Share Requested cannot exceed Cash Cost Subtotal						Eligible S
						Grant Awar

Part B – Cost Estimate Summary. Summary of all costs from Part A.

Cost Category	A. Cash Costs	B. Donated Value
1. Personnel	\$	\$ 7,440.00
2. Employee Benefits	\$	\$
3. Travel	\$	\$
4. Equipment	\$ 430.00	\$
5. Supplies & Operating Expenses	\$	\$
6. Consultant/Contractual	\$ 10,000.00	\$
7. Construction	\$	\$
8. Other (ex. Acquisition)	\$	\$
Subtotals	\$ 10,430.00	\$ 7,440.00
Total Project Cost Estimate	\$ 17,870.00	
Administration	\$ 0.00	
Grant Award Request	\$ 10,000.00	
Grantee Share	\$ 7,870.00	

Grantee Share

Part C – Cost Containment and Professional Service Agreements.

- I acknowledge that a professional service agreement is required if the grantee subcontracts or hires an agent to undertake any portion of the grant funding prior to the commencement of any contracted work. (Does not apply to counties, cities, towns, villages or Wisconsin tribes.)
- I acknowledge that cost containment measures must be implemented per NR 193.08 for all capital assets and any supply, service or equipment if the cost exceeds \$2,500.

Budget Items > \$2,500	Cost-Containment Methods	Description of Methods
Acoustic Bathymetry Survey and Analysis	Alternative Measures/Other	University of Wisconsin - La Crosse provided design, based on their professional experience with acoustic surveys dating back to 2008 (2013) in the lower Halfway Creek M

Surface Water Grant Application

Form 8700-284 (R 07/06/22)

Page 6 of 12

Section 6: Attachments (check all that are included)

- Authorizing resolution (required).
- Letters of financial support specifying cash or donated value.
- Map of project location, public access, public land and other use and access features (required).

Section 7: Certification

Marc Schultz, Chair, LOPRD

Signature of Authorized Representative

11/15/2022

Date Signed

NOTE: Section 8 has a 10 page limit. Additional pages will not be considered.

Section 8: Project Description**Pre-application****A. Brief Project Summary (2-3 sentences)**

Provide a short description of the overarching goals of the project and/or work that will be completed during the grant period. This may be used in program promotional materials if the grant is awarded.

Quantify deepwater habitat loss critical to overwintering fish populations in Lake Onalaska and link habitat loss to high sediment discharge events in the adjacent Halfway Creek watershed. Also, collaborative planning events will be sponsored in the watershed with natural resource agencies, local governments, NGOs and public with interests in eastern Lake Onalaska fisheries habitat and the Halfway Creek watershed.

B. Project Area and Public Access/Use

Describe where the project is located, including information on the waterbody or community served. For projects addressing waterbodies or watersheds, include physical characteristics like size, depth, hydrological type and land use. Describe public use and access features. For AIS projects, also briefly describe how the site and project will address priorities for AIS prevention.

The project area is Lake Onalaska, an 8,391 acre eutrophic impoundment formed by Mississippi River Lock & Dam 7, of average depth 6 feet. Lake Onalaska is unique in the upper Mississippi River (UMR) system because of its lakelike character, isolated from the UMR main channel by a network of barrier islands. Inflows are from Mississippi and Black Rivers, Halfway (36 sq mi) and Sand Lake Creeks.

Classifications: 303(d) listed "impaired lake"; Black River, Halfway Creek also 303(d) listed; FAL designated use area; Low priority TMDL area; SPARROW Catchment: 0.9-1.0; adjacent PNW-ASNRI State Nat. Areas (Midway Railroad, Great River Trail Prairies); PNW for sturgeon and lakes < 50 acres.

Rare species likely in project area: Black tern, Blanding's Turtle, Black Buffalo, Prothonotory Warbler. The UMR National Wildlife and Fish Refuge lists 305 bird species, 57 mammals, 45 amphibians and reptiles, and 134 species of fish, most of which are found in Lake Onalaska. Peak counts of over 100,000 waterfowl occur during fall migrations on Lake Onalaska, including significant percentages of the continental population of canvasback ducks and tundra swans. The Lake supports one of the premier centrarchid fisheries on the Upper Mississippi River and has attracted national-level fishing tournaments, along with local ice fishing derbies. Commercial fishing was formerly important, but has declined in recent years. Large visible wildlife species important for wildlife observation and photography include thousands of tundra swans in fall migrations, nesting and migrating sandhill cranes and bald eagles, and summer-resident juvenile and migrating adult white pelicans. Most of Lake Onalaska is closed to waterfowl hunting, but the sport is popular during the fall in public hunting areas around the edges of the Lake.

8 boat landings, 3 canoe launches and 4 shore-fishing sites provide public access, as well as lateral access from a federally-owned shoreline strip surrounding the entire lake.

C. Problem Statement

Provide a clear and concise description of the problem that this project will address. What is the purpose of the project?

The primary fish overwintering habitat for Lake Onalaska is located just downstream of the outfall of Halfway Creek, which has been discharging large volumes of sediment following major precipitation events. This overwintering habitat was created by dredged removals of one million cubic yards of sediment in 1989-90 (costing \$30 million today at \$30/yard), a substantial investment. The dredging project's goal was to create depths optimal for overwintering fish with a lifespan of 50 years before supplemental maintenance dredging would be required. However, 32 years later, it is obvious that substantial deepwater habitat has already been lost from the project, but no bathymetric surveys have been performed for two decades to evaluate the present habitat loss. Claflin (1977) noted that during flooding the suspended and bed loads from Halfway Creek are a significant contribution to sedimentation in the project area, with Kreiling et al. 2013 describing in detail sediment flow through Halfway Creek's delta wetlands. Despite substantial investment in 1999 for a sediment-trapping wetland project and in-watershed investments in soil conservation from 1983-1993 as part of a Wisconsin Priority Watershed Project, these muddy discharges from Halfway Creek continue, with a sediment plume that visibly tracks directly over the diminishing deepwater fish habitat.

This project proposes to evaluate deepwater fish habitat loss using standardized hydroacoustic methods, as well as using citizen-science monitoring and local government planning to begin to scope and address future projects to improve conditions upstream in the Halfway Creek watershed. Given the enormous public investment in creating this deepwater habitat, it is in the public's interest to make it last as long as possible, while also improving water quality in Halfway Creek and Lake Onalaska.

D. Phased Projects:

Is this project being completed in Phases? Yes No

If yes, briefly explain where this phase fits into the whole project including the work done previously and expected work in future phases.

E. Project Description and Timeline**1. Goals and Objectives**

Assess fish overwintering habitat loss in the 300 acre dredged fish habitat zone in eastern Lake Onalaska using standardized hydroacoustic methods and compare to the depth-stratified optimal fish habitat goal for this zone identified in Sullivan (1992).

1.a. Activity

Bathymetric survey with survey-grade single-beam echosounder of the 300 acre fish overwintering habitat zone. This activity was developed as a collaborative effort with the University of Wisconsin - La Crosse River Studies Center and Geography and Earth Science Department, with Lake District volunteers to assist with vessel logistics. The River Studies Center has a long history of professional expertise in Lake Onalaska and the Halfway Creek watershed, dating back to assessments and acoustic surveys of Claflin (1977) and many subsequent studies, including Kreiling et al. (2013) in the Halfway Creek delta wetlands. The University of Wisconsin - La Crosse will also contribute a grant for a student project to assist with the field and analysis portions of the project.

Method and Data Collected

Hydroacoustic survey transects will be spaced at 50 meter intervals along the 3km length of the dredged fish habitat zone, to be integrated with positional data obtained via a cm-accuracy GPS unit mounted above the echosounder. This 3-dimensional survey data will be screened and imported into GIS software, and interpolated to create raster models reported as 1) depth below the Pool 7 Flat Pool Elevation of 194.61 m (638.5 ft) used in the Sullivan (1992) study, 2) bed elevation referenced to the National Geodetic Vertical Datum (NGVD) 1912, and 3) bed elevation referenced to the North American Vertical Datum (NAVD) 1988. Acoustic transects will be performed in late spring 2023, ideally prior to aquatic vegetation growth.

Deliverable and Outcomes

Final report summarizing the findings to include contour lines and bathymetric maps generated from the raster models. The area of the study reach within each of the optimal bathymetric habitat depth classes provided in the Sullivan (1992) report will be quantified from the depth raster model. The raster model from the 2023 survey will also be compared to a bathymetric model developed by the USGS from an early 1990s survey to create a spatial representation quantifying fish overwintering habitat loss. All data will be provided to the Lake Onalaska Protection and Rehabilitation District and made available to other agencies. It is anticipated that the data analysis and report development will be completed by the end of 2023.

2. Goals and Objectives

Link fish habitat loss to the adjacent watershed and related watershed issues. The fish habitat loss in Lake Onalaska is driven primarily by sediment loads transported during high-discharge events (Claflin 1977 and subsequent observations), which have increased in frequency and magnitude in the nearly two decades since Halfway Creek hydrology was last studied. This task will use primarily citizen science to characterize timing, duration, and magnitude of the contemporary peak event, high-sediment discharge flow events at multiple locations in the watershed. This will allow better placement of hydrology and sediment monitoring resources in studies to be proposed for 2024, better formulation of a proposed future 9-key element plan for Halfway Creek, and increased understanding by local governments of flood-related issues in the lower watershed.

2.a. Activity

Halfway Creek Sediment loading: Characterize high-sediment discharge events at the Halfway Creek outfall culvert using primarily citizen science. This project element would broadly characterize the duration and spatial scale of the sediment-discharging events at the Halfway Creek outfall during 2023 using measurements of water clarity and tracking the sediment plume.

Method and Data Collected

1. Sedimentation event definition: Following substantial rainfall events where sediment discharge is observed at the Halfway Creek outfall culvert, secchi disk observations, following Wisconsin Citizen Lake Monitoring Network protocol will be taken in the outfall plume from small craft drifting with the current in the small bay below the outfall.
2. Sediment plume path description: Photographically document the plume from two overlooks on high banks east of the fisheries overwintering habitat area. Occasional prior observations indicate the Halfway Creek outfall plume is readily distinguishable from surrounding waters, particularly early in a discharge event, and travels directly over the deepwater fisheries overwintering habitat area. When a visible discharge event plume is observed, natural resource agencies will be requested to search for cloud-free satellite imagery that match the photographed plume observation times. Secchi disk observations will be submitted to WCLMN.

Deliverable and Outcomes

as part of the final Lake District Citizen Science report at the end of the project (Dec 2023), timing and duration of sediment discharge events will be recorded and tabulated. Photographic observations of the plume during discharge events will be published on a project page on the Lake District's website, along with links to satellite observations if available. Secchi disk observations will be submitted to WCLMN.

2.b. Activity

Halfway Creek basic hydrology during high-discharge events at potential future gauging sites: This project element would use citizen science observations of stream flow along with time-lapse photography to capture the duration and magnitude of high-discharge events in the lower watershed, and the impacts of flood waters on the potential gauge placement sites. Ultimately, establishing sites that can effectively capture the upper end of extreme discharge events will be essential to quantify sediment loading during flood events. Recent high discharges have overwhelmed some sites that were gauged two decades ago. Photography will also be used to document floodwater flow at these sites and around dikes and other structures in the lower watershed to help local governments plan for urban floodwater mitigation, particularly in the developed area of Midway in the Town of Onalaska.

Method and Data Collected

Citizen science monitors obtain basic stream flow characteristics following Water Action Volunteers Protocols. Stream cross sections will be estimated and staff gages will be placed near potential gaging sites. Staff gage monitoring will be augmented by inexpensive trail cameras with time-lapse features when high-discharge events are expected. The time lapse photography is both an effective way to increase public understanding of these high-discharge events and a way to more frequently record staff height observations than citizen science monitoring visits. Stream flow observations will be recorded on Water Action Volunteers data sheets and recorded in a database.

Deliverable and Outcomes

as part of the final Lake District Citizen Science report, high-discharge event characteristics will be reported (event duration and staff height observations, and to the extent suitable rating curves can be developed, discharge). Time lapse photography of selected high-discharge events will be published on the Lake District website to increase public understanding of the high-discharge events and shared with stormwater functions of local government (Town of Onalaska and Village of Holmen). Approximate rating curves will be estimated from in-stream observations. When coupled with precipitation information leading to the high-discharge events, these observations will establish approximate watershed basin lag characteristics to downstream sites to be used for future planning.

2.c. Activity

Citizen Science/crowd-sourced rainfall spatial integration over watershed: The project element would capture crowd-sourced "personal weather station" precipitation data over the Halfway Creek watershed area to better spatially integrate total rainfall over the watershed during high-flow generating events. At least six stations report data online in the watershed currently (wunderground.com and other sources). No National Weather Service stations record precipitation in the Halfway Creek watershed. On the spatial scale of the Halfway Creek watershed (36 sq mi), rainfall can vary substantially during storm events and can be quite different from the nearest NWS station (approximately 12 miles from watershed centroid to LSE airport station).

Method and Data Collected

Web data scraping tools will be used to automate retrieval of precipitation data submitted by personal weather stations in the Halfway Creek Watershed to publicly available national databases, logging station ID, date, time, and precipitation. Participating stations typically report at 5 minute intervals and also log approximate latitude and longitude which will be used to spatially integrate precipitation observations.

Official National Weather Service data will also be recorded from nearby stations for reference, however none of the official NWS stations are in the watershed.

Deliverable and Outcomes

in the project final report, summarize large rainfall events to correlate with high observed discharge events. Reliability of personal weather station data will be evaluated. Preliminary estimates of "basin lag" (relationship between watershed rainfall event and downstream discharge) will be provided.

3. Goals and Objectives

Watershed "Tour" Scoping sessions: Further build out a collaborative network of resource agencies, local governments, NGOs and public with interests in eastern Lake Onalaska fisheries habitat and the Halfway and Sand Lake Creek watersheds by sponsoring additional rural and urban watershed scoping tours. This task builds on an existing "Lake Onalaska Teams" group that includes USFWS, USACE, USGS, Wisconsin DNR, and LOPRD. It also builds on one such tour of the lower Halfway Creek Marsh Project (maintained by USFWS and DU) in October 2022 (see www.LakeOnalaska.org for summary) that in addition to the "Teams" agencies included Trout Unlimited, Brice Prairie Conservation Association, Town of Onalaska officials, and the public. Other partners to be involved include: Village of Holmen, Town of Holland, La Crosse County Conservation and Highway Departments, and a planned friends group for the Halfway Creek watershed.

3.a. Activity

Approximately four watershed tour topics will be selected from a list that includes: upper watershed (Jostad Creek) Class II Trout habitat, winter tour of lower Halfway Creek marsh channels (only accessible in winter), Holmen Sewage Plant, Holmen's Halfway Creek Park, planned and existing stormwater features in the Town of Onalaska, Sand Lake Coulee Creek winter-accessible habitat, farm/barnyard tour of rural stormwater practices in Halfway Creek watershed.

Method and Data Collected

Tours planned as 1 to 1.5 hour field events of key watershed features, with stops for group discussions. Notes are collected by rapporteur/facilitator

Deliverable and Outcomes

Tours will be summarized for the final report and also reported in a more timely fashion on the Lake District's website. (see www.lakeonalaska.org for a sample from the October 22, 2022 wetland tour).

F. Complementary Management

Describe how the project complements other management efforts. Is the project actively engaged with efforts connected to but different from the grantees own? Consider connections to County Land and Water Resources Management Plans, Total Maximum Daily Load (TMDL) implementation plans, 9 key element plans or other prevention or implementation efforts.

Lake Onalaska has a complex management regime with overlapping management jurisdictions of the USFWS, US Army Corps of Engineers, Wisconsin DNR, La Crosse County, and local governments (Towns of Onalaska and Campbell, Cities of La Crosse and Onalaska) as well as the LOPRD. LOPRD has representatives of these agencies attending most of its meetings.

This project integrates with existing planning efforts of the above agencies:

1. Stormwater plans from local units of government
2. USFWS 2006 "Comprehensive Conservation Plan" for the Upper Mississippi River National Wildlife and Fish Refuge (of which Lake Onalaska is a part).
3. US Army Corps of Engineers "Master Plan", "Shoreline Management Plan", and the joint USACE/USFWS "Land Use Allocation Plan"
4. 2004 Environmental Pool Plans for the Upper Mississippi River
5. Port of La Crosse Harbor and Waterfront Plan, 2011
6. USFWS Fishery Management Plan, Lake Onalaska, 1984.
7. Lower Black River Priority Watershed Plan,

All the above plans are referenced on the Lake District's website (www.LakeOnalaska.org) publications page.

A "Lake Onalaska Teams" group was assembled in 2020 representing most of the agencies involved in the above management and planning efforts that have shared, overlapping jurisdictions that involve Lake Onalaska, additionally including research-oriented agencies (USGS, Univ. of Wisconsin-LaCrosse River Studies Center), and the Minnesota DNR. The "Teams" group is tasked with evaluating wildlife and fish habitat specific to Lake Onalaska for future HREP, and other projects, of which the dredged fish channels in eastern Lake Onalaska to be re-evaluated in this study were the very first project.

This project is intended to lay groundwork towards two long-term State of Wisconsin planning efforts: a comprehensive lake management plan and a 9-key element plan for the Halfway Creek watershed. These can be integrated, if necessary, as "step down" area-specific plans into federal plans (eg USFWS CCP).

G. External Support

Describe collaboration with other organizations that will be providing financial or other support along with the expected benefits of collaboration. Document support with letters and submit with this application. Be sure to highlight support from partners that are critical to implementation.

University of Wisconsin - La Crosse collaborated on the hydroacoustic survey design, will supply student assistants through university stipends independent of this project and contribute professional expertise to future discussions of fish habitat rehabilitation and the role of the Halfway Creek and its wetlands, which it has previously studied (Kreiling et al. 2013).

Results of this study will be reviewed by the multi-agency Lake Onalaska "Teams" group (see above) for integration into future habitat restoration planning from federal and other sources.

H. Appropriateness and Need

Provide reasoning for why the project is appropriate and necessary. Include information on how the project was scaled and scoped to effectively address the management challenge. Make a case for why the work is unique and necessary, especially when there is any duplication of work occurring less than 5 years ago.

The primary fish overwintering habitat for Lake Onalaska is being impacted by sediment discharge from Halfway Creek. This overwintering habitat was created by dredged removals of one million cubic yards of sediment in 1989-90 (costing \$30 million today at \$30/yard), a substantial investment. However, 32 years later, it is obvious that substantial deepwater habitat has already been lost from the project-specified optimal fish habitat depth zones, but no bathymetric surveys have been performed for two decades to evaluate the present habitat loss. Despite substantial investment in 1999 for a sediment-trapping wetland project and in-watershed investments in soil conservation from 1983-1993 as part of a Wisconsin Priority Watershed Project, the muddy discharges from Halfway Creek continue.

This project will evaluate deepwater fish habitat loss using standardized hydroacoustic methods, as well as lay groundwork for future planning to remediate sedimentation problems upstream in the Halfway Creek watershed. Given the enormous public investment in creating this deepwater habitat, it is in the public's interest to make it last as long as possible, while also improving water quality in Halfway Creek and Lake Onalaska.

This project is intended to lay groundwork towards two long-term State of Wisconsin planning efforts: a comprehensive lake management plan and a 9-key element plan for the Halfway Creek watershed.

I. Other

Literature Cited

Claflin, T.O. 1977. Lake Onalaska Rehabilitation Feasibility Study. Report to Lake Onalaska Rehabilitation District, 43 pp.

Fitzpatrick, F.A., J.C. Knox and J.P. Schubauer-Berigan. 2008. Sedimentation History of Halfway Creek Marsh, Upper Mississippi River National Wildlife and Fish Refuge, Wisconsin, 1846-2006. U.S.G.S Scientific Investigations Report 2007-5209. 49pp.

Fitzpatrick, F.A., J.C. Knox and J.P. Schubauer-Berigan. 2009. Channel, floodplain, and wetland responses to floods and overbank sedimentation, 1846-2006, Halfway Creek Marsh, Upper Mississippi Valley, Wisconsin. in James, L.A., Rathburn, S.L. and Whittecar, G.R., eds., Management and Restoration of Fluvial Systems with Broad Historical Changes and Human Impacts. Geological Society of America Special Paper 451, pp 23-42.

Kreiling, R.M., J.P. Schubauer-Berigan, W.B. Richardson, L.A. Bartsch, P.E. Hughes, J.C. Cavanaugh, and E.A. Strauss. 2013. Wetland Management Reduces Sediment and Nutrient Loading to the Upper Mississippi River. *J. Environ. Qual.* 42(2):573-83 doi:10.2134.

Sullivan, John F. 1992. Pre- and Post- Water Quality Evaluation of the Lake Onalaska Dredge Cut, Pool 7, Mississippi River. Contract Report No. LN 1343-0007, U.S. Army Corps of Engineers, St. Paul District.

Vierbicher Associates 1995.. Final Report: Hydraulic and Sedimentation Study, Town of Onalaska, WI. EDA Project No.: 06-06-61051. 144pp.

