



Lower Fox River and Green  
Bay Natural Resource Damage  
Assessment:

Monitoring and Adaptive  
Management Framework

FINAL | 4 April 2018

Prepared for:

The Fox River/Green Bay Natural Resource  
Trustees

Prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

## TABLE OF CONTENTS

<b>CHAPTER 1</b>	<b>RESTORATION IN THE LOWER FOX RIVER AND GREEN BAY</b>	<b>3</b>
	Overview of Fox River NRDA	3
	Summary of Restoration Progress To-Date	4
	Trustee Vision for Completing Restoration	5
	Purpose and Need for Monitoring	6
	Programmatic Requirements	8
	Long-term Project Management	8
	Fox River Restoration Coordinator	9
<b>CHAPTER 2</b>	<b>MONITORING AND ADAPTIVE MANAGEMENT</b>	<b>10</b>
	Purpose of Monitoring Plan	10
	Framework of a Monitoring Plan	10
	Adaptive Management	14
<b>CHAPTER 3</b>	<b>MONITORING IN THE LOWER FOX RIVER AND GREEN BAY</b>	<b>16</b>
	Aquatic, Nearshore, and Riparian Restoration	19
	Fisheries Enhancements	26
	Public Use Improvements	36
	Educational Signage and Exhibits About the Lower Fox River and Green Bay	40
<b>CHAPTER 4</b>	<b>SUMMARY OF MONITORING AND REPORTING REQUIREMENTS</b>	<b>42</b>
	Project Implementation Guidance	42
	Reporting Results	43
	Summary	45
	<b>REFERENCES</b>	<b>48</b>
	<b>APPENDIX A: MONITORING PLAN TEMPLATES</b>	<b>49</b>

## CHAPTER 1 | RESTORATION IN THE LOWER FOX RIVER AND GREEN BAY

### 1.1 OVERVIEW OF FOX RIVER NRDA

For decades, the Lower Fox River and Green Bay in Wisconsin have been contaminated by polychlorinated biphenyls (PCBs) released from paper mills, paper recyclers, public treatment works, and other sources. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 U.S.C. § 9601-9675 (2017); 43 C.F.R. Part 11 (2017)), the Fox River Natural Resource Trustees (Trustees)<sup>1</sup> conducted a natural resource damage assessment (NRDA) to address injuries resulting from this contamination. The Trustees' efforts included evaluating PCB-related losses of ecological and human use services in the Lower Fox River and Green Bay (Stratus 2000) and developing an initial Restoration Plan and Environmental Assessment (RP/EA; FWS et al. 2003) to guide restoration conducted with NRDA settlement funds.<sup>2</sup> Since 2002, the Trustees have initiated 108 projects to restore the Lower Fox River, Green Bay, and associated upland habitats. In the most recent NRDA settlement for this case, the Trustees recovered an additional \$46 million dollars which will be spent on future restoration and related activities over the next decade.<sup>3</sup> Given the scale of the settlement and the expected timeframe for future restoration implementation, the Trustees are increasing their emphasis on monitoring activities to more explicitly document restoration benefits.

The Trustees published an Update to the RP/EA (2016 RP/EA) that establishes priorities for continued restoration using the settlement funds and criteria for project selection (FWS et al. 2016). The 2016 RP/EA also defines a revised approach to restoration, in which the Trustees account for restoration progress to-date, the availability of settlement funds, the changing ecological landscape within northeastern Wisconsin, and the lessons learned in conducting and managing restoration projects.

Along with an updated approach to restoration, the Trustees have also identified a need to clarify expectations for project-related monitoring activities. This will better inform

---

<sup>1</sup> The Fox River NRDA Trustees include the United States Department of the Interior, represented by the Fish and Wildlife Service and Bureau of Indian Affairs; the United States Department of Commerce, represented by the National Oceanic and Atmospheric Administration; the State of Wisconsin, represented by the Wisconsin Department of Natural Resources; the Oneida Nation; and the Menominee Indian Tribe of Wisconsin.

<sup>2</sup> Multiple NRDA settlements have occurred since 2001. For more information, see FWS et al. (2016).

<sup>3</sup> The 2015 settlement includes funding set aside for past assessment costs (approximately \$5 million) and future restoration actions including Trustee administrative costs (approximately \$41 million). Previous NRDA settlements for this site (2001-2014) recovered \$60 million (2016 dollar value) for restoration and related activities. Additional restoration has been achieved through leveraged funds.

conservation partners and the public how project performance will be measured over time and the process by which the Trustees will initiate adaptive management actions if warranted (2016 RP/EA). Therefore, the Trustees are releasing this monitoring and adaptive management framework, which describes expectations and sets guidance for conducting monitoring and adaptive management activities associated with restoring the Lower Fox River and Green Bay watersheds.

The remainder of Chapter 1 describes restoration progress to-date within the Lower Fox River and Green Bay, the Trustees' vision for conducting further restoration, the purpose and need for a monitoring and adaptive management framework, relevant programmatic requirements, and considerations for long-term data management.

## **1.2 SUMMARY OF RESTORATION PROGRESS TO-DATE**

In 2003, the Trustees released a Joint Restoration Plan and Environmental Assessment to plan for restoration of injured natural resources and resource services in the Lower Fox River and Green Bay. The restoration alternative selected in the 2003 RP/EA, "Natural Resource-Based Restoration Within and Beyond the Assessment Area," placed a broad focus on preservation and restoration of natural resources in wetland and associated upland habitats within and around the Lower Fox River and Green Bay. The geographic scope of the 2003 RP/EA encompassed both the PCB-affected environment and surrounding watersheds, including upland areas, acknowledging both the effect of these areas to downstream ecosystem health and the limitations on the number of acres available for certain restoration and/or preservation actions within the smaller injury assessment area.

To satisfy the objective of the selected restoration alternative, the Trustees defined five restoration categories and associated goals. The initial restoration categories and goals, summarized in the 2016 RP/EA (Exhibit 1-1), include three categories dedicated to habitat-related preservation and restoration, one category dedicated to enhancing fishery resources, and one category committed to improvement of public spaces to address injuries to recreational fisheries. Substantial progress has been achieved in all restoration categories. As of 2014, Fox River/Green Bay NRDA settlement funds have preserved, restored, and/or improved approximately 11,793 acres of habitat (Exhibit 1-1). In addition, the Trustees have funded 11 projects focused on enhancing fishery resources and eight projects enhancing public use facilities and outdoor recreation.

The Trustees' collaborative approach to restoration has resulted in a coalition of conservation partners that includes non-Trustee government agencies and municipalities, local non-profit groups, universities, sport fishing and waterfowl hunting groups, and conservationists. This collaboration has increased engagement in landscape-scale conservation across the Lower Fox River and Green Bay, and has resulted in leveraged funds that expanded the scope of restoration beyond what could be achieved through NRDA settlement funding alone.

Additional details related to progress to-date are available in the 2016 RP/EA.

---

**EXHIBIT 1-1 RESTORATION PROGRESS (2002-2014)**

RESTORATION CATEGORY (RP/EA 2003) <sup>1</sup>	INITIAL RESTORATION GOAL (RP/EA 2003)	RESTORATION ACHIEVED (2002-2014) <sup>2</sup>	NUMBER OF PROJECTS FUNDED (2002-2014) <sup>3</sup>
Wetland/upland habitat preservation	9,900 acres preserved	6,085 acres	17
Wetland/upland habitat restoration	3,300 acres restored	3,961 acres	11
Aquatic, nearshore, and riparian habitat improvement	12,000 acres improved	1,747 acres	31
Fishery resource enhancement	Self-sustaining fisheries	\$8.4 million allocated	11
Outdoor public use enhancement	Utilize less than 10 percent of total settlement funds	5.7% of available funds spent	8
<p><b>Notes.</b></p> <p>1. This exhibit is modified from Exhibit 3-2 in the 2016 RP/EA to include the number of funded projects.</p> <p>2. These numbers reflect achievements from NRDA settlement funds directed from 2002 through December 2014. Data are from the Restoration Progress Report (RPR 2013) and progress reports from the United States Fish and Wildlife Service (FWS). Funding was updated to 2016 dollar value.</p> <p>3. A number of projects have been funded since 2014, bringing the total number of projects funded through the Fox River / Green Bay NRDA to 108.</p>			

**1.3 TRUSTEE VISION FOR COMPLETING RESTORATION**

In the 2016 RP/EA, the Trustees considered how the changing landscape of the Lower Fox River and Green Bay watersheds informed an update to the 2003 RP/EA. Restoration priorities were evaluated in the context of the following factors:

- Finality of settlement funds;
- Knowledge gained from more than 14 years of on-the-ground restoration;
- Current Trustee perspectives on conservation priorities, and how NRDA restoration may enhance landscape-scale conservation;
- The type, scale, and success of remedial actions; and,
- The presence of ecological stressors that may influence restoration goals.

As a result of this evaluation, the Trustees updated the restoration alternatives while remaining consistent with information gathered during the public process, maintaining a strong connection to the selected alternative in the 2003 RP/EA, and focusing on resources that continue to be injured by PCBs in the Lower Fox River and Green Bay.

The Trustees assessed the environmental consequences of each restoration alternative and selected an alternative that meets the ten factors listed within the NRDA regulations as considerations when evaluating alternatives (43 C.F.R. § 11.82(d) (FWS 2016)) and ensures a strong connection between the ecological and human use benefits of restoration and PCB-related injuries. The selected alternative, “Updated Natural Resource-Based Restoration,” includes three restoration categories and associated goals (Exhibit 1-2). Within the 2016 RP/EA, the Trustees also updated the project selection criteria to focus the selection of future restoration projects on the geographic area within or adjacent to the affected environment, as well as on projects that most closely align with species-specific and cultural priorities (see Section 7.3.2 of the 2016 RP/EA (FWS 2016)).

**EXHIBIT 1-2 RESTORATION GOALS UNDER THE SELECTED ALTERNATIVE, “UPDATED NATURAL RESOURCE-BASED RESTORATION” (2016 RP/EA)**

RESTORATION CATEGORY (RP/EA 2016)	GOALS <sup>1</sup>
Aquatic, nearshore, and riparian restoration	Improved water quality and aquatic, nearshore, and riparian habitat health
Fisheries enhancements	Enhanced diversity and sustainability of fish populations
Public use improvements	Increased public access to fishery resources
<p><i>Note.</i></p> <p>1. A quantitative goal of 2,100 acres was identified for the aquatic, nearshore, and riparian restoration category, and a quantitative metric (i.e., to utilize no more than ten percent of available funding) was identified for public use improvements.</p>	

Thus, as described in the 2016 RP/EA, the Trustees are moving forward with continued restoration in aquatic, nearshore, and riparian habitats and restoration focused on enhancing fishery resources to improve water quality and fisheries within the restoration area. In addition, the Trustees are addressing public use improvements by increasing opportunities for the public to have access to and benefit from improved fisheries in the Lower Fox River and Green Bay.

#### 1.4 PURPOSE AND NEED FOR MONITORING

As part of the 2016 RP/EA, the Trustees defined a vision for conducting restoration in the Lower Fox River and Green Bay. To assist in achieving this vision and ensuring the long-term success of ongoing and new restoration initiatives, the Trustees outlined the importance of developing a framework for monitoring and adaptive management of restoration projects (see Chapter 8 of the 2016 RP/EA). Such a framework would provide guidance regarding implementation of restoration activities, including expectations for

monitoring data collection and analysis, and better equip the Trustees to evaluate restoration project success and the need for corrective actions to ensure a project meets its goals.

This plan fulfills the Trustees' objective of preparing a publicly-available document that describes a standard monitoring and adaptive management framework for the Lower Fox River and Green Bay NRDA. This framework provides restoration partners with clearly defined monitoring requirements over the lifetime of a proposed project. For example, requirements may include pre-project baseline monitoring data to better inform the need for a particular project and characterize its expected benefits. The framework provides restoration partners with requirements and recommendations for the type of monitoring and relevant monitoring questions each project should answer, as well as guidance on how to set performance standards against which each project's progress will be evaluated and examples of monitoring techniques to utilize over the course of the project. By setting performance standards for each general project type and standardizing reporting, the Trustees will evaluate progress consistently for each individual project and assess the combined impact of multiple projects and project types. This will enable the Trustees to demonstrate progress toward the Fox River NRDA program goals of improved water quality and aquatic, nearshore, and riparian habitat health; enhanced diversity and sustainability of fish populations; and increased public access to fishery resources. Through common goals, performance standards, and metrics across similar project types, the framework allows the Trustees to collect information that not only measures individual project success, but enables an evaluation of the landscape-scale impact of each restoration project type. This consistency of information facilitates assessment and communication of the progress and benefits of restoration projects implemented as part of the Lower Fox River and Green Bay NRDA.

The Trustees envision that, at a minimum, they will be able to convey the following to the public:

- How many stream miles and/or habitat acres have been improved (or preserved)?
- Was there an observable or measurable change in the habitat after the project was completed?
- Is a conservation easement or deed in place, including a long-term maintenance plan if applicable?
- How many fish (and/or how much biomass) were successfully reared to the appropriate size class in a hatchery? How many fish (or amount of biomass) were stocked and in which specific locations? How did the stocking benefit/meet fisheries management goals and objectives?
- How much increased capacity was created by hatchery infrastructure improvements? Are the proposed improvement plans available before construction begins?

- How many barriers to fish passage/migration/spawning were removed or rendered passable (if applicable)?
- What type of habitat was improved, including the fish species and life stage of that species?
- How many public use project sites have been created and/or improved?
- Is the public use project site visited and used? What type of use typically occurs?
- Has visitation at new or improved public use sites changed over time (and by how much)?
- How many educational signage and/or exhibits have been created?
- How many people are reached per year through educational signage and/or exhibits?

#### **1.5 PROGRAMMATIC REQUIREMENTS**

The Trustees, in publishing this monitoring plan, are augmenting the process outlined in the 2016 RP/EA for implementation of a restoration program in the Lower Fox River and Green Bay watershed. In addition to project selection, public participation, and the implementation of restoration in compliance with legal regulations (2016 RP/EA), this plan adds details regarding the required and recommended monitoring and adaptive management actions at various stages of a project, including before and after project activities have occurred.

As detailed in the 2016 RP/EA, the Trustees have followed the NRDA regulations concerning the factors to consider at the beginning of the restoration planning phase (43 C.F.R. § 11.82(d)). Moving forward, the Trustees will ensure that all projects receiving NRDA funding comply with applicable environmental statutes and authorities, including the National Environmental Policy Act (NEPA; 40 C.F.R. § 1500.2 and 1502.25). Additional information and a list of statutes are provided in Chapter 7 of the 2016 RP/EA.

#### **1.6 LONG-TERM PROJECT MANAGEMENT**

The Trustees recognize the importance of long-term management of project-related information and data. This includes information that relates to the administration of a particular project, as well as monitoring data that support assertions about project results and success and/or determine the need for adaptive management actions. As the Federal Lead Administrative Trustee for the Fox River Green Bay NRDA, the United States Fish and Wildlife Service (FWS) will follow all applicable statutes of the Data Quality Act of 2002 (Public Law 106-554) to ensure the quality, objectivity, utility, and integrity of the information and data produced from restoration projects implemented with NRDA funds. In order to meet these requirements, the Trustees will facilitate long-term management of project-related information and data.



Given the range of restoration categories the Trustees outlined in the 2016 RP/EA, project-related information and data may vary based on the goals of a particular project. To manage project *information* collected during the life of a project, the Trustees will streamline the timing of information requests and utilize standard reporting forms to guide the annual collection of parallel information from each project, including a summary narrative from project implementers. The Trustees will share general project progress and corresponding benefits with the public, and will archive the documents and reporting forms for future reference.

Management of project-related *data* is also important. The Trustees will utilize both qualitative and quantitative monitoring techniques to determine if a project is meeting its performance standards, and will require summarized results from project implementers, which will be available to the public upon request. Because project goals may lead to a variable amount and type of monitoring data collected per project, the Trustees will manage more detailed project-related data on a case by case basis.

#### **1.7 FOX RIVER RESTORATION COORDINATOR**

For additional information about this monitoring and adaptive management framework, please contact Trina Soyk, Fox River Restoration Coordinator, at the address below.

**Trina Soyk**  
U.S. Fish and Wildlife Service  
2661 Scott Tower Drive  
New Franken, Wisconsin 54229  
[Trina\\_Soyk@fws.gov](mailto:Trina_Soyk@fws.gov)

## CHAPTER 2 | MONITORING AND ADAPTIVE MANAGEMENT

### 2.1 PURPOSE OF MONITORING PLAN

Monitoring determines whether a restoration project is meeting its stated objectives and provides a mechanism for altering implementation, or even the objectives themselves, as needed. The purpose of a monitoring plan is to clearly define the Trustees' expectations of the scope and types of monitoring actions over the course of the performance period, and outline the manner in which monitoring data may be evaluated to ensure project success and/or determine if corrective actions are necessary. The principal method of evaluation will involve collecting project-specific monitoring data at a set frequency, and comparing these data to previously defined performance standards to assess progress toward individual project goals.

The creation of a monitoring plan also allows the Trustees to evaluate particular restoration techniques and the resulting benefits, compare benefits across projects, more clearly describe the ecological and human use benefits of selected projects to the public, and answer specific questions about the recovery of the ecosystem. The monitoring plan identifies a standard set of parameters for each restoration category and project type. Depending on the type of project, the Trustees may require and/or recommend different types of monitoring throughout the life of the project in order to best assess project benefits and outcomes. Additionally, as part of the monitoring and adaptive management framework, the Trustees may define a period of long-term stewardship in which certain tasks are required to maintain the ecological and/or human use benefits of a project. The terms under which such a stewardship program would operate are usually presented within the monitoring plan, and may vary from no expectation of stewardship to detailed guidance concerning the frequency and timing of maintenance actions during a period of long-term stewardship.<sup>4</sup>

The remainder of Chapter 2 outlines the components of a generic monitoring and adaptive management plan and discusses potential approaches to adaptive management.

### 2.2 FRAMEWORK OF A MONITORING PLAN

As described in Chapter 8 of the 2016 RP/EA, multiple types of monitoring are available to answer different questions. While the most appropriate type of monitoring is decided on a project-specific basis, a monitoring plan defines the types of monitoring that are

---

<sup>4</sup> Recent examples of monitoring plans for restoration funded by NRDA settlements include the Final Portland Harbor Programmatic EIS and Restoration Plan (NOAA 2017) and the Monitoring and Adaptive Management Procedures and Guidelines Manual, Version 1.0 (DWH Trustees 2017).

anticipated. In this case, the Trustees considered four main types of monitoring in developing the monitoring and adaptive management framework for the Lower Fox River and Green Bay NRDA (Exhibit 2-1):

- **Pre-project, or baseline assessment monitoring** documents and characterizes pre-project conditions.<sup>5</sup> This type of monitoring builds on important information gathered in the needs assessment, which is generally conducted as part of a project proposal and provides supporting evidence for the *need* for a particular restoration project and its expected benefits. Pre-project baseline monitoring occurs at the next stage, after a project receives funding, and involves the collection of data and information on the condition of current resources that are targeted for restoration. Pre-project baseline monitoring occurs just prior to the initiation of restoration actions, in order to ensure the information collected provides a relevant starting point from which to evaluate project benefits and progress toward performance standards.
- **Implementation monitoring** documents whether the project is occurring according to plans, and often results in as-built surveys and reports related to site visits. At this stage, the performance standards and project-specific goals that were established at the onset of the project may be revised to better reflect site-specific conditions based on data collected as part of implementation monitoring.
- **Effectiveness monitoring** occurs after project completion, for a period of time determined on a project-specific basis, and involves a number of potential qualitative and quantitative monitoring activities. Data collected during these activities will determine if the main ecological and/or human use outcome was achieved and continues to persist during the period of performance. Effectiveness monitoring may identify the need for adaptive management, or the alteration of project actions and/or goals based on iterative learning from project outcomes.
- **Validation monitoring**, also referred to as long-term stewardship monitoring, documents if the main project outcome persists into the future (i.e., after the period of performance). This may involve writing annual maintenance plans, conducting regular site visits and maintenance activities, continued effectiveness monitoring activities, and adaptive management to ensure long-term success.

A monitoring plan then describes the scale, scope, and timing of each of the relevant monitoring components based on the techniques likely to be employed to achieve the ecological and/or human use benefit, project objectives, and previous experience with particular types of restoration. For example, a monitoring plan clearly indicates the level of effort expected for pre-project monitoring, as that may impact the ability to detect and quantify project benefits relative to baseline conditions. This plan also defines the typical

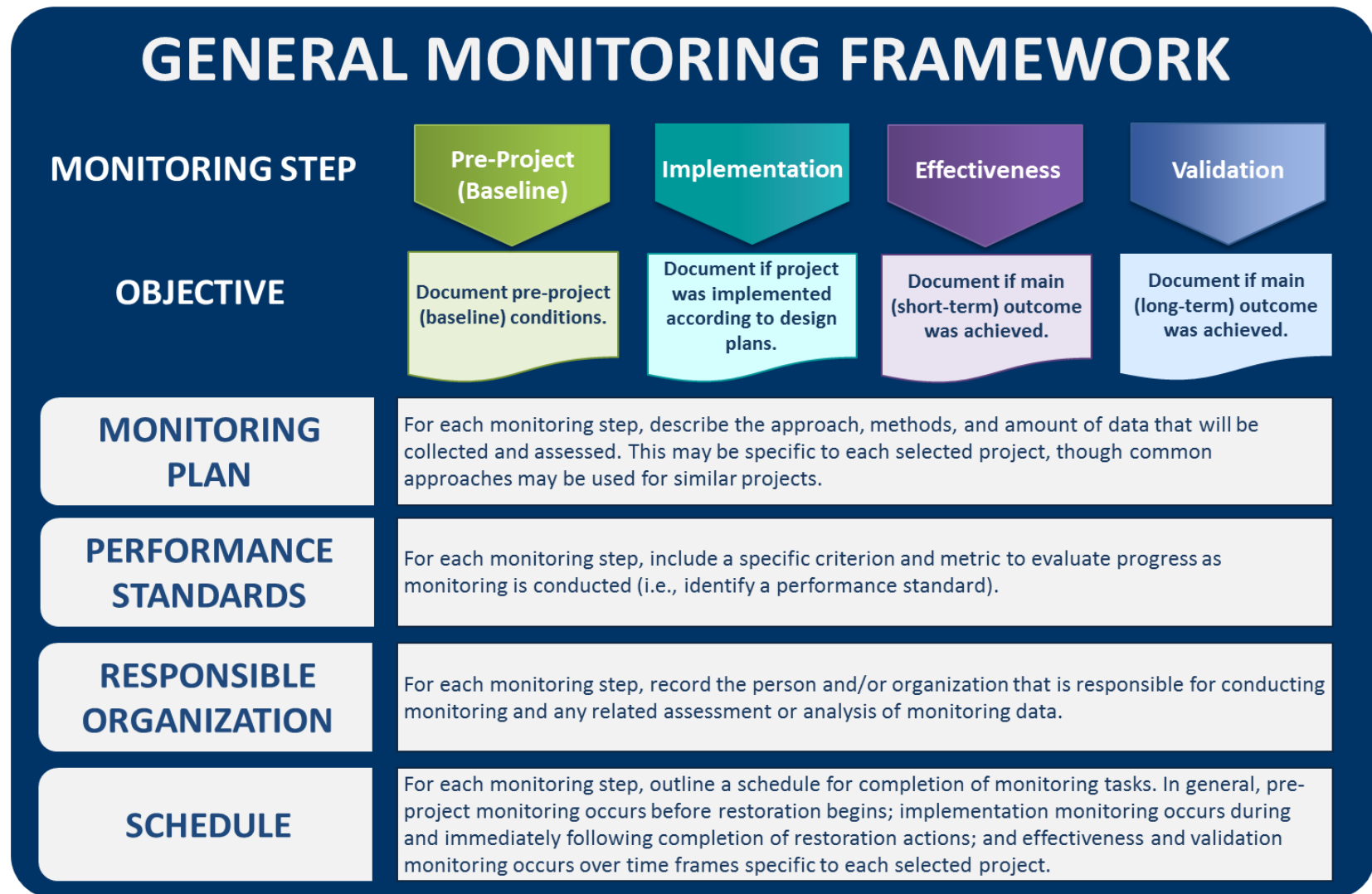
---

<sup>5</sup> Throughout this document, we use the term 'pre-project' to encompass those actions that occur before construction or other on-the-ground restoration activities begin.

period of performance for each type of monitoring, as well as the likelihood that validation or long-term stewardship monitoring will be expected.

In addition, a monitoring plan sets performance standards. Performance standards, also known as ‘success criteria,’ are defined as a specific condition that indicates or demonstrates that an objective has been obtained (e.g., SER 2005). Performance standards are targets for project success that provide a touchstone during the implementation and effectiveness (post-project) monitoring periods to ensure that the project was constructed according to its design and that the restoration site is providing the expected benefits. Evaluation of a project against an interim performance standard may indicate whether corrective actions should be implemented.

In this case, the Trustees will rely on both practical restoration planning experience and the scientific literature when working with partners to identify and/or approve performance standards. Setting performance standards involves defining an objective and a metric by which to measure progress (e.g., adding 10 acres of top predator nursery habitat in a particular stream). The objective and metric will be set at the project level, and will be consistent with Trustee preferences and priorities and applicable across multiple projects with similar ecological and/or human use goals to facilitate standardized reporting (Exhibit 2-1).



Project-specific details are typically documented in a project-specific execution plan. Details could include level of effort per monitoring component, appropriate performance standards and chosen metrics for assessing progress towards those standards, organization(s) responsible for various components of the project-level monitoring activities, level of anticipated data analysis, and schedule for completion (Exhibit 2-1). The project plan should reference the programmatic monitoring plan as needed to describe the approach to monitoring and the performance standards utilized, and should be revised as necessary as part of the annual reporting cycle.

### 2.3 ADAPTIVE MANAGEMENT

Adaptive management, as considered here, is the systematic improvement of resource management through iterative learning from project outcomes (see, for example, Williams 2011; Williams and Brown 2012). This iterative process utilizes the data collected during monitoring activities to evaluate whether a project is on track to meet performance standards, or whether additional actions should be considered to better manage the project and ensure its desired outcomes are achieved. In this way, the results of monitoring activities may contribute to scientific understanding (e.g., increasing knowledge of the benefits expected from a particular restoration technique) and inform decision-making for future restoration projects. As a project progresses, monitoring data are compared to the project's previously defined performance standards to determine whether ecological and/or human use goals are being met. The results of that exercise will assist the Trustees in developing a clearer understanding of the benefits and limitations of a particular restoration technique in real-world conditions and also in setting updated, realistic performance standards.

The Lower Fox River/Green Bay Natural Resource Trustees understand the value of utilizing monitoring data to evaluate project performance. Data acquired through monitoring efforts may assist in determining when an informed redirection is necessary, and what type of corrective action is appropriate to adaptively manage a restoration project and steer it toward success. The Trustees require annual reports from each restoration project implementer throughout the project's period of performance. These reports describe progress toward performance standards and enable the Trustees to evaluate whether the project is on track to meet final performance standards and project-specific goals. Based on their review, the Trustees may determine that particular types of projects require more frequent or different types of reporting, changes in implementation techniques (e.g., planting methods or species), or adjustments to performance standard metrics (e.g., monitoring should measure a different parameter than initially envisioned). These punctuated checks will also help identify any project that is not on track to meeting its performance standards, triggering a more in-depth review by the Trustees. At that point, the Trustees will review the available monitoring data, the performance of similar projects conducted across northeastern Wisconsin, and whether the cause of under-performance may be reasonably determined. Projects for which the Trustees are able to

determine an appropriate, cost-effective corrective action will implement that action and continue to strive to meet performance standards. In contrast, if a project is not on track to meet performance standards, but for which a corrective action is not suggested by the Trustees, the Trustees will determine whether funds should be redirected, the project should be terminated, or the project should be allowed to continue and partially fulfill its goals.

## CHAPTER 3 | MONITORING IN THE LOWER FOX RIVER AND GREEN BAY

This chapter sets out the monitoring and adaptive management framework for Fox River NRDA restoration projects, and provides guidance to project partners on developing Project-Specific Monitoring Plans consistent with the overall framework.

The Trustees outlined the importance of developing a framework for monitoring and adaptive management in the 2016 RP/EA, which will assist in achieving the Trustees' vision for restoration and ensure the long-term success of NRDA restoration projects in the Lower Fox River and Green Bay (see Chapter 8 of the 2016 RP/EA). The framework will enable the Trustees to collect information that measures project success, identifies corrective actions, and conveys the landscape-scale impact of restoration projects. To develop the monitoring and adaptive framework for Fox River NRDA restoration, the Trustees combined general information on monitoring and adaptive management plans (Chapter 2), with input from local and regional restoration partners about the type and level of information that would assist partners in designing and implementing project monitoring and management. This chapter describes the general types of restoration projects likely to be selected by the Trustees and the monitoring questions and techniques relevant to those projects. The Trustees anticipate the framework will be utilized by project partners in developing Project-Specific Monitoring Plans and setting performance standards. Though each plan may differ according to project-specific goals, the approach defined by the Trustees in this chapter requires a minimum amount of standardized monitoring data to be collected from each project. This standardization enables the Trustees to conduct cross-project comparisons and assess project success.

To assist restoration partners in defining the scope of individual Project-Specific Monitoring Plans, the Trustees defined three tiers of monitoring effort into which each project will be grouped. Each tier is described in more detail below and in Exhibit 3-1.

- Tier 1 projects will meet all corresponding requirements outlined by the Trustees in this monitoring and adaptive management framework. Any type of project (e.g., aquatic, nearshore, and riparian restoration; fisheries enhancements; or public use improvements) could potentially fall into Tier 1.
- Tier 2 projects will meet all corresponding requirements outlined by the Trustees in this document, and will incorporate additional monitoring actions identified as 'recommended' by the Trustees. These projects may also include additional monitoring efforts to meet requirements of matching funds sources, or to align



with historical methods or other ongoing efforts. Any type of project could potentially fall into Tier 2.

- Tier 3 projects will conduct research-level monitoring. The purposes of research-level monitoring are to assess the specific ecological and/or human use benefits of a particular restoration technique and apply the research findings to other projects that utilize that technique, and/or to evaluate the landscape-scale benefits of multiple types of restoration projects in aggregate. Only a small percentage of all projects will fall into Tier 3, and the Trustees do not anticipate that any public use improvement projects will conduct research-level monitoring.

This tiered approach allows the Trustees to set minimum requirements for all projects, while encouraging project implementers to collect additional qualitative and quantitative information to measure project success.

EXHIBIT 3-1 MONITORING TIERS

MONITORING TIERS		TIER 1	TIER 2	TIER 3
LEVEL OF EFFORT	Meet Monitoring Requirements (Monitoring and Adaptive Management Framework)	✓	✓	✓
	Meet Recommendations (Monitoring and Adaptive Management Framework)	--	✓	✓
	Include Actions to: -align with historical methods or other ongoing efforts -comply with matching requirements	--	✓	✓
	Monitor to Answer Research Questions	--	--	✓
PROJECT TYPE	AQUATIC, NEARSHORE, AND RIPARIAN RESTORATION	✓	✓	✓
	FISHERIES ENHANCEMENTS	✓	✓	✓
	PUBLIC USE IMPROVEMENTS	✓	✓	--

The remainder of Chapter 3 provides monitoring guidance for each restoration category, including Aquatic, Nearshore, and Riparian Restoration; Fisheries Enhancements; and Public Use Improvements (2016 RP/EA). The Trustees define general types of restoration projects for each restoration category. A specific restoration proposal may include multiple restoration “projects” as defined below. For example, a project may both preserve and restore a particular area of wetland habitat. For each restoration project described below, the Trustees outline the following: monitoring questions, identifying whether a particular monitoring question is meant to be used as a performance standard; frequency of monitoring events; and monitoring techniques most likely to be utilized (e.g., qualitative or quantitative techniques). Lastly, this chapter provides general guidance for project implementation and reporting.

### 3.1 AQUATIC, NEARSHORE, AND RIPARIAN RESTORATION

In the 2016 RP/EA, the Trustees set revised goals for the aquatic, nearshore, and riparian restoration category to focus on improving water quality and habitat health. To achieve these qualitative goals and the associated quantitative goal of restoring 2,100 acres of habitat, the Trustees are moving forward with a structured monitoring approach that incorporates options at each project site (Exhibit 3-2). Depending on the specific project, the Trustees may determine that qualitative monitoring is sufficient, or require a more rigorous quantitative approach to assess whether resources and/or habitats are improving as well as inform future projects. For example, well-established methodologies may require less monitoring than experimental or pilot projects. In addition, certain projects may require research-level monitoring to more accurately measure the expected benefits of the restoration action(s). The Trustees will work with project implementers to define and scale an appropriate monitoring plan. Note that a research-level monitoring approach may involve multiple years of quantitative monitoring and advanced data analysis based on priority restoration targets and specified analytical approaches. The success of each project will then be measured against its ability to meet project-specific performance standards.

This section describes two general types of aquatic, nearshore, and riparian restoration projects that the Trustees envision could be implemented with Fox River NRDA funds: Enhanced or Restored Aquatic, Nearshore, and Riparian Habitat Projects; and Preserved Aquatic, Nearshore, and Riparian Habitat Projects. The monitoring requirements and recommendations, performance standards, and potential monitoring techniques, including frequency and associated metrics for measuring success toward performance standards for each project type are described below.

#### Enhanced or Restored Aquatic, Nearshore, and Riparian Habitat Projects

Projects that enhance and/or restore degraded aquatic, nearshore, and riparian habitats may take many forms and have different goals related to overall habitat health, water

quality, and/or wildlife and fishery species that utilize the habitat for spawning, rearing, denning, or foraging. In general, the Trustees expect these projects will conduct a minimum amount of monitoring to conform to the following monitoring requirements:

- **Pre-project needs assessment**, conducted before a project is selected for implementation, should answer the following questions as part of the Project Idea Form reviewed by the Trustees:
  - What aquatic, nearshore, or riparian areas would benefit from habitat improvements?
  - What resources/species would be affected by the restoration action?
- **Pre-project monitoring** (i.e., baseline monitoring), conducted before the project begins, should be consistent with the Project Idea Form and the Project-Specific Monitoring Plan and answer the following questions:
  - What are the current conditions within the project area? Baseline monitoring should record the habitat, water quality (if applicable), and/or wildlife parameters that form the basis of performance standards and criteria that will be measured after the project is complete. This may include field assessments.
  - Are the performance standards and criteria set at the beginning of a project able to be sufficiently measured?
- **Implementation and post-project monitoring**, conducted throughout the period of performance for each project, should answer the following questions:
  - How many stream miles and/or aquatic/nearshore/riparian habitat acres have been improved?
  - Was there an observable and/or measurable change in the habitat (and if so, describe the improvement and quantify the benefit)?
  - *Recommended but not required: Was there a measurable change in the habitat use by wildlife or fish species?*<sup>6</sup>

Prior to implementing monitoring actions to answer these questions, project implementers need to set performance standards for all monitoring actions undertaken in the pre- and post-project phases. Performance standards should be identified within the Project-Specific Monitoring Plan, and informed by knowledge of the restoration site, the techniques utilized to restore and/or improve the habitat, and the project's goals. The Trustees will review performance standards to ensure both relevance and appropriateness for the project as well as a level of standardization across projects in similar geographic areas, using similar techniques and aiming to achieve similar goals. Example

---

<sup>6</sup> Because the monitoring question regarding whether there was a measurable change in habitat use by wildlife and fish species is recommended, not required, only the projects that identify this monitoring question as relevant for their project should set a performance standard and will be subsequently evaluated based on performance toward this standard.

performance standards include restoration of a certain number of acres and detection of a certain percent improvement in water quality parameters (e.g., concentration of total suspended solids). Additional information related to monitoring techniques, including both qualitative and quantitative methods as well as the frequency and timing of monitoring actions, are provided in Exhibit 3-2.

In setting the goal, or criterion, for each performance standard, the project implementer will define a metric and a target. The metrics associated with each performance standard may vary based on project type. Each project will be expected to report the number of acres and/or stream miles improved, while Project-Specific Monitoring Plans will define preferred metrics for measuring the relevant habitat change(s). For example, monitoring could include measuring changes in water quality parameters (e.g., pH, total suspended solids, water clarity, nitrogen and/or phosphorus concentrations), changes in habitat structure (e.g., increased native species vegetative cover, decreased abundance of invasive species, number of in-water structures removed), or changes in the manner in which the habitat is utilized by particular species. The target should be informed by the pre-project needs assessment, an understanding of the restoration technique, and the current environmental conditions (i.e., the results of baseline monitoring). For example, the target could be a 15 percent reduction in total suspended solids across the project area, a 30 percent increase in native species vegetative cover, or a statistically significant increase in the diversity of the avian population utilizing a restored marsh.

#### **Preserved Aquatic, Nearshore, and Riparian Habitat Projects**

Projects that preserve aquatic, nearshore, and riparian habitats may take many forms, but will likely have a similar goal of conserving a parcel of terrestrial and/or aquatic habitat. Some lands set aside for preservation may need minimal restoration actions, while others may need a structured restoration plan to improve habitat health, water quality, and/or wildlife and fishery species. In general, the Trustees expect these projects will conduct a minimum amount of monitoring to conform to the following monitoring requirements:

- **Pre-project needs assessment**, conducted before a project is selected for implementation, should answer the following questions as part of the Project Idea Form reviewed by the Trustees:
  - What aquatic, nearshore, or riparian areas would benefit from habitat preservation?
  - What resources/species would be affected by the restoration action?
  - Are there currently any conservation or preservation restrictions on the property?
  - Are there any reservations of rights?
  - What is the likelihood that the property will be developed or otherwise degraded in the absence of conservation actions?

- **Pre-project monitoring** (i.e., baseline monitoring), conducted before acquisition occurs, should be consistent with the Project Idea Form and the Project-Specific Monitoring Plan and answer the following questions:
  - What are the current conditions within the project area?
  - Are the performance standards and criteria set at the beginning of a project able to be sufficiently measured?
- **Implementation and post-project monitoring**, conducted throughout the period of performance for each project, should answer the following questions:
  - How many stream miles and/or aquatic/nearshore/riparian habitat acres have been preserved?
  - Is a conservation easement or deed in place, including a long-term maintenance plan if applicable?

Prior to implementing monitoring actions to answer these questions, project implementers need to set performance standards for all monitoring actions undertaken in the pre- and post-project phases. Performance standards should be identified within the Project-Specific Monitoring Plan, and informed by knowledge of the site and terms of the conservation easement or other legal documents. The Trustees will review performance standards to ensure both relevance and appropriateness for the project as well as a level of standardization across projects in similar geographic areas, using similar techniques and aiming to achieve similar goals. Example performance standards include preservation of a certain number of acres and finalization of a conservation easement by a certain date. Additional information related to monitoring techniques, including both qualitative and quantitative methods as well as the frequency and timing of monitoring actions, are provided in Exhibit 3-2.

In setting the goal, or criterion, for each performance standard, the project implementer will define a metric and a target. The metrics associated with each performance standard may vary based on project type. Each project will be expected to report the number of acres, stream miles, and/or aquatic shoreline miles preserved, and whether a conservation easement or deed is in place that provides sufficient protection to property resources and habitats and includes a long-term maintenance plan. The target should be informed by the pre-project needs assessment and the current environmental conditions (i.e., the results of baseline monitoring). For example, the target could be to preserve 100 acres of high quality riparian and wetland habitat, or to ensure a conservation easement is in place with a long-term maintenance plan within one year of project implementation.

Projects that may require additional restoration actions should refer to the section above entitled, “Enhanced or Restored Aquatic, Nearshore, and Riparian Habitat Projects” for information about metrics.

EXHIBIT 3-2 EXAMPLE AQUATIC, NEARSHORE, AND RIPARIAN PROJECT TYPES AND MONITORING APPROACHES

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUE <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
ENHANCED OR RESTORED AQUATIC, NEARSHORE, AND RIPARIAN HABITATS	What aquatic, nearshore, or riparian areas would benefit from habitat improvements? *	NO	Evaluation of recent literature and reports relevant to the proposed project site	Pre-project needs assessment
			Field-based monitoring surveys to determine potential benefits to water quality, wildlife, and/or fisheries	
	What resources/species would be affected by the restoration action? *	NO	Site visits with photographs	Pre-project needs assessment
			Field-based monitoring surveys to determine potential resource- or species-specific benefits	
	What are the current conditions within the project area? <sup>5</sup> *	NO	Site visits with photographs	Pre-project (baseline)
			Field-based monitoring surveys to determine current conditions at the site (e.g., parameters related to water quality, habitat coverage, wildlife use, etc.).	
	How many stream miles and/or aquatic/nearshore/riparian habitat acres have been improved? *	YES	Site visits with photographs	Pre-project (baseline) Implementation and post-project Y0, Y1, Y3, Y5
			Estimation of project footprint (e.g., using GIS, aerial imagery)	
	Was there an observable and/or measurable change in the habitat (and if so, describe the improvement and quantify the benefit)? *  For example, for projects that plant vegetation, was there a change in percent coverage or vegetation density in the project area? For projects that remove in-water structures, how many structures were removed?	YES	Site visits with photographs; visual estimations of change	Pre-project (baseline)  Implementation and post-project Y0, Y1, Y3, Y5
			Field-based monitoring surveys (e.g., plot, transect) to measure changes in habitat characteristics over time (e.g., percent cover and species composition of vegetation; number of structures removed)	

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUE <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
ENHANCED OR RESTORED HABITATS (CONTINUED)	<i>Recommended:</i> Was there a measureable change in the habitat use by wildlife or fish species?	YES	Field-based monitoring (qualitative visual observations)	Pre-project (baseline)
			Field-based monitoring (quantitative wildlife or fishery surveys)	Implementation and post-project Y0, Y1, Y3, Y5
PRESERVED AQUATIC, NEARSHORE, AND RIPARIAN HABITATS	What aquatic, nearshore, or riparian areas would benefit from habitat preservation? *	NO	Evaluation of recent literature and reports relevant to the proposed project site	Pre-project needs assessment
			Evaluation of available properties for preservation	
			Evaluation of development pressure and degradation potential	
			Field-based monitoring surveys to determine current condition and potential benefits to water quality, wildlife, and/or fisheries	
	What resources/species would be affected by the restoration action (preservation)? *	NO	Site visits with photographs or documentation of current conditions through use of remote sensing images and databases	Pre-project needs assessment
			Field-based monitoring surveys to determine potential resource- or species-specific benefits	
	Are there currently any conservation or preservation restrictions on the property, or any reservation of rights? *	NO	Evaluation of available properties for preservation	Pre-project needs assessment
	What is the likelihood that the property will be developed or otherwise degraded in the absence of conservation actions? *	NO	Evaluation of development pressure and degradation potential	Pre-project needs assessment
			Evaluation of recent literature and reports relevant to the proposed project site	



PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUE <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
PRESERVED AQUATIC, NEARSHORE, AND RIPARIAN HABITATS (CONTINUED)	What are the current conditions within the project area? <sup>5 *</sup>	NO	Site visits with photographs	Pre-project (baseline)
			Field-based monitoring surveys to determine current conditions at the site (e.g., parameters related to water quality, habitat coverage, wildlife use, etc.).	
	How many stream miles and/or aquatic/nearshore/riparian habitat acres have been preserved? *	YES	Site visits with photographs	Pre-project (baseline)
			Estimation of project footprint (e.g., using GIS, aerial imagery)	Implementation and post-project Y0, Y1, Y3, Y5
	Is a conservation easement or deed in place, including a long-term maintenance plan if applicable? *	YES	Electronic copy of final report assessing project effectiveness, as well as copy of easement or deed	Post-project Y0
<p><i>Notes:</i></p> <ol style="list-style-type: none"> <li>Examples are intended to guide implementation. This table may not include all project types or monitoring questions, and the Trustees may relay to project implementers monitoring questions, performance standards, or monitoring techniques that are not included in this table.</li> <li>A performance standard, also known as a 'success criterion,' is an observable or measureable attribute that can be used to determine if a restoration project meets its objectives. If a performance standard is required, then a project implementer will need to set an objective and a metric by which to evaluate progress.</li> <li>Monitoring techniques, including the frequency and timing of monitoring activities, are suggested guidelines from the Trustees. This list of options is not mandatory or exhaustive, and techniques may change based on project specifics. Here we assume a five-year monitoring period of performance, which may over- or under-estimate the monitoring timeframe for an individual project.</li> <li>Year zero (Y0) is defined as the beginning of the post-project monitoring period.</li> <li>During the pre-project phase, project implementers should also evaluate whether the performance standards are able to be sufficiently measured. If baseline conditions are not able to be documented sufficiently, performance standards should be adjusted accordingly.</li> </ol> <p>* Indicates a particular monitoring question is a Trustee requirement for the project type. All other monitoring questions should be considered Trustee recommendations.</p>				

### 3.2 FISHERIES ENHANCEMENTS

In the 2016 RP/EA Update, the Trustees set revised goals for the fisheries enhancement restoration category to specifically enhance the diversity and sustainability of fish populations. In order to achieve these goals, the Trustees are moving forward with a more structured monitoring approach that incorporates options for quantitative and qualitative monitoring at each project site (Exhibit 3-3). Depending on the specific project, the Trustees may determine that qualitative monitoring is sufficient, or require a more rigorous quantitative approach to inform whether fishery resources are improving. In addition, certain fishery projects may require research-level monitoring in order to more accurately measure the expected benefits of the restoration action. The Trustees will work with the project implementers to define and scale an appropriate monitoring plan. Note that a research-level monitoring approach may involve multiple years of quantitative monitoring and advanced data analysis based on priority restoration targets and specified analytical approaches. The success of each project will then be measured against its ability to meet project-specific performance standards.

This section describes two general types of fisheries enhancement projects that the Trustees envision could be implemented with Fox River NRDA funds: Rearing Fish in Hatcheries to Stock Local Waters, and Enhanced or Restored Fishery Habitats. The monitoring requirements and recommendations, performance standards, and potential monitoring techniques, including frequency and associated metrics for measuring success toward performance standards for each project type are described below.

#### *Rearing Fish in Hatcheries to Stock Local Waters*

Projects that involve the use of hatcheries to rear and then release fish will likely have similar goals that vary in specifics based on the species of focus. In general, the Trustees expect these projects will conduct a minimum amount of monitoring to conform to the following monitoring requirements:

- **Pre-project needs assessment**, conducted before a project is selected for implementation, should answer the following questions as part of the Project Idea Form reviewed by the Trustees:
  - What is the current population status for the species-specific fishery of interest?
  - What are the limiting factors for that fishery's growth/success?
  - Are there specific areas/locations that would benefit from stocking that species?
  - Is there an existing facility at which capacity could be expanded or will a new facility be required?
- **Pre-project monitoring** (i.e., baseline monitoring), applicable for infrastructure type projects and conducted before a project begins, should be consistent with the

Project Idea Form and the Project-Specific Monitoring Plan and answer the following questions:

- What are the current conditions within the project area? Baseline monitoring should document the habitat, water quality, and/or wildlife parameters that form the basis of performance standards and criteria that will be measured after the project is complete.
  - For projects that create improvements to hatchery infrastructure, focus on infrastructure conditions.
- What is the current hatchery capacity and could the hatchery generate these additional fish with current infrastructure?
- Are the performance standards and criteria set at the beginning of a project able to be sufficiently measured?
- **Implementation and post-project monitoring**, conducted throughout the period of performance for each project, should answer the following questions:
  - How many fish (or amount of biomass) were successfully reared to the appropriate size class in the hatchery?
  - How many fish of which size class (or amount of biomass) were stocked and in which specific locations?
  - How did the stocking benefit and/or meet fisheries management goals and objectives?
  - For projects that create improvements to hatchery infrastructure,
    - How much increased capacity was created by the hatchery infrastructure improvement?
    - Are the proposed improvement plans (e.g., engineered designs) available before construction begins?
  - *Recommended but not required: What was the survival of fish to given age classes post-release (e.g., fall young of the year, age one, adult)?*

Prior to implementing monitoring actions to answer these questions, project implementers need to set performance standards for all monitoring actions undertaken in the pre- and post-project phases. Performance standards should be identified within the Project-Specific Monitoring Plan, and informed by knowledge of the hatchery's capabilities, population status of the fishery, predator to prey balance of proposed waterbody, and the project's goals. The Trustees will review performance standards for relevance and appropriateness for the project as well as standardization across projects in similar geographic areas, using similar techniques and aiming to achieve similar goals. Example performance standards include rearing and stocking a certain number of fish at a particular site(s), or rearing and stocking the number of fish that would result in a

specified ratio of predator to prey fish in a particular waterbody. Additional information related to monitoring techniques, including both qualitative and quantitative methods as well as the frequency and timing of monitoring actions, are provided in Exhibit 3-3.

In setting the goal, or criterion, for each performance standard, the project implementer will define a metric and a target. The metrics associated with each performance standard may vary based on project type. Each project will be expected to report the number (or biomass) of fish reared and stocked, as well as the number of sites that have been stocked, while Project-Specific Monitoring Plans will define preferred metrics for measuring progress toward other performance standards. The target should be informed by the pre-project needs assessment, an understanding of the restoration technique, and the current environmental conditions (i.e., the results of baseline monitoring). For example, the target could be to stock five high-priority sites each with 1,000 Great Lakes spotted musky.

#### Enhanced or Restored Fishery Habitats

Projects that enhance and restore habitats to benefit particular fish species will likely have similar overarching goals that vary in specifics based on the species of focus and the geography of the site. In general, the Trustees expect these projects will conduct a minimum amount of monitoring to conform to the following monitoring requirements:

- **Pre-project needs assessment**, conducted before a project is selected for implementation, should answer the following questions as part of the Project Idea Form reviewed by the Trustees:
  - What locations would benefit from improved fish habitat?
  - What factors are currently limiting (a) fish populations within the waterbody or (b) fish use at those locations?
  - How will proposed habitat restoration address limiting factors to increase fish populations or increase fish use of the project area?
- **Pre-project monitoring** (i.e., baseline monitoring), conducted before the project begins, should be consistent with the Project Idea Form and the Project-Specific Monitoring Plan and answer the following questions:
  - What are the current conditions within the project area? Baseline monitoring should document the habitat, water quality (if applicable), and/or species parameters that form the basis of performance standards and criteria that will be measured after the project is complete.
  - Are the performance standards and criteria set at the beginning of a project able to be sufficiently measured?
- **Implementation and post-project monitoring**, conducted throughout the period of performance for each project, should answer the following questions:

- How many stream miles and/or aquatic habitat acres have been improved?
- How many barriers to fish passage/migration/spawning were removed or rendered passable (if applicable)?
- What type of habitat was improved, including the fish species and life stage of that species? (For example, northern pike spawning and rearing habitat.)
- *Recommended but not required: What was the fish population response? (For example, what was the change in fish use, change in spawner use, change in larval fish produced, change in juvenile/rearing use, or change in overall fish populations?)*
- *Recommended but not required: What is the species-specific benefit derived from this project (e.g., what is the expected population growth, biomass gained, etc.)?*

Prior to implementing monitoring actions to answer these questions, project implementers need to set performance standards for all monitoring actions undertaken in the pre- and post-project phases. Performance standards should be identified within the Project-Specific Monitoring Plan, and informed by knowledge of the restoration site and the relevant fish species, the techniques utilized to restore and/or improve the habitat, and the project's goals. The Trustees will review performance standards to ensure both relevance and appropriateness for the project, as well as a level of standardization across projects in similar geographic areas, using similar techniques and aiming to achieve similar goals. Example performance standards include restoration of a certain number of acres and detection of a certain percent increase in spawning at the site. Additional information related to monitoring techniques, including both qualitative and quantitative methods as well as the frequency and timing of monitoring actions, are provided in Exhibit 3-3.

In setting the goal, or criterion, for each performance standard, the project implementer will define a metric and a target. The metrics associated with each performance standard may vary based on project type. Each project will be expected to report the number of acres and/or stream miles improved, while project-specific monitoring plans will define preferred metrics for measuring habitat change. Monitoring certain metrics may be time and labor intensive, and thus the Trustees have defined a range of potential monitoring techniques. Projects success may also be informed by ongoing or historical programs or results of similar restoration projects. For example, monitoring could include measuring changes in habitat structure (e.g., number of in-water structures removed, increased native species vegetative cover), changes in the manner in which the habitat is utilized by a particular fish species, or expected and/or measurable changes in species-specific population density at the project site. The target should be informed by the pre-project needs assessment, an understanding of the restoration technique, and the current environmental conditions (i.e., the results of baseline monitoring). For example, the target

could be restoration of two acres of gravel spawning habitat, or a 50 percent increase in lake sturgeon spawning activity within one stream mile of the restoration activity.

EXHIBIT 3-3 EXAMPLE FISHERIES ENHANCEMENT PROJECT TYPES AND MONITORING APPROACHES

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUES <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
REARING FISH IN HATCHERIES TO STOCK LOCAL WATERS	What is the current population status for the species-specific fishery of interest? *	NO	Pre-project monitoring in the field	Pre-project needs assessment
			Reference to readily available fishery population assessments	
			Evaluation of recent literature and reports relevant to the proposed fishery and project site	
	What are the limiting factors for that fishery's growth and/or success? *	NO	Reference to readily available fishery population or habitat assessments	Pre-project needs assessment
			Evaluation of recent literature and reports relevant to the proposed fishery	
	Are there specific areas/locations that would benefit from stocking that species? *	NO	Pre-project monitoring in the field	Pre-project needs assessment
			Reference to readily available fishery population and habitat assessments	
			Evaluation of recent literature and reports relevant to the proposed fishery and project site	
	Is there an existing facility at which capacity could be expanded or will a new facility be required?	NO	Evaluation of existing capacity at fish hatcheries	Pre-project needs assessment
	What are the current conditions within the project area? <sup>5</sup> * (Projects that create improvements to hatchery infrastructure should focus on infrastructure conditions.)	NO	Site visits with photographs	Pre-project (baseline)
			Field-based monitoring surveys to determine current conditions at the site (e.g., parameters related to water quality, habitat coverage, wildlife use, etc.)	

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUES <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
REARING FISH IN HATCHERIES TO STOCK LOCAL WATERS (CONTINUED)	What is the current hatchery capacity and could the hatchery generate additional fish with current infrastructure? <sup>5*</sup>	NO	Evaluation of existing capacity at fish hatcheries	Pre-project (baseline)
	How many fish (or amount of biomass) were successfully reared to the appropriate size class in the hatchery? *	YES	Implementation monitoring report	Pre-project (baseline) Implementation Y0
	How many fish of which size class (or amount of biomass) were stocked and in which specific locations? *	YES	Implementation monitoring report	Pre-project (baseline) Implementation Y0
	How did the stocking benefit/meet fisheries management goals and objectives? <sup>6*</sup>	YES	Implementation monitoring report	Implementation Y0
	For projects that create improvements to hatchery infrastructure: How much increased capacity was created by this improvement?	YES	Ongoing implementation monitoring reports	Implementation Y0
	For projects that create improvements to hatchery infrastructure: Are the proposed improvement plans (e.g., engineered designs) available before construction begins?	YES	Electronic copy of final report assessing project effectiveness, as well as copy of documentation	Implementation Y0
	<i>Recommended:</i> What was the survival of fish to given age classes post-release (e.g., fall YOY, Age-1, adult)	YES	In-field surveys to estimate presence, absence, and/or abundance (quantitative population estimate) of hatchery-tagged fish	Implementation and post-project Y0, and potentially Y1, Y3, and Y5



PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUES <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
ENHANCED OR RESTORED FISHERY HABITATS	What locations would benefit from improved fish habitat? *	NO	Field-based monitoring surveys to characterize current fish use and/or habitat surveys to assess habitat availability	Pre-project needs assessment
			Review of readily available fishery population and habitat assessments	
			Evaluation of recent literature and reports relevant to the proposed project site and fishery species	
	What factors are currently limiting (a) fish populations within the waterbody or (b) fish use at those locations? *	NO	Review of readily available fishery population and habitat assessments	Pre-project needs assessment
			Evaluation of recent literature and reports relevant to the proposed project site and fishery species	
	How will proposed habitat restoration address limiting factors to increase fish populations or increase fish use of the project area? *	NO	Evaluation of recent literature and reports relevant to the proposed project site and fishery species	Pre-project needs assessment
	What are the current conditions within the project area? <sup>5</sup> *	NO	Site visits with photographs	Pre-project (baseline)
			Field-based monitoring surveys to determine current conditions at the site (e.g., parameters related to water quality, habitat coverage, wildlife use, etc.)	
	How many stream miles and/or aquatic habitat acres have been improved? *	YES	Site visits with photographs	Pre-project (baseline); Implementation and post-project YO, Y1, Y3, Y5
			Estimation of project footprint (i.e., using GIS, aerial imagery)	

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUES <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
ENHANCED OR RESTORED FISHERY HABITATS (CONTINUED)	How many barriers to fish passage/migration/spawning were removed or rendered passable (if applicable)? *	YES	Site visits with photographs	Implementation and post-project Y0, Y1, Y3, Y5
	What type of habitat was improved, including the fish species and life stage of that species? *	YES	Site visits with photographs	Implementation and post-project Y0-Y5
	<i>Recommended:</i> What was the fish population response?	YES	Estimation of the change in fish use; change in spawner use; change in larval fish produced; change in juvenile/rearing use; or change in overall fish populations, using information from similar projects.	Implementation and post-project Y0-Y5
			Field-based monitoring to determine the fish population response.	
	<i>Recommended:</i> What is the species-specific benefit derived from this project (e.g., what is the expected population growth, biomass gained, etc.)?	YES	Estimation of population growth and/or abundance and biomass using information from similar projects.	Implementation and post-project Y0-Y5
			Field-based monitoring to determine the number of spawning native fish (and number of invasive species, if applicable). Statistical comparison to pre-project baseline conditions.	

**Notes:**

1. Examples are intended to guide implementation. This table may not include all project types or monitoring questions, and the Trustees may relay to project implementers monitoring questions, performance standards, or monitoring techniques that are not included in this table.
2. A performance standard, also known as a 'success criterion,' is an observable or measureable attribute that can be used to determine if a restoration project meets its objectives. If a performance standard is required, then a project implementer will need to set an objective and a metric by which to evaluate progress.
3. Monitoring techniques, including the frequency and timing of monitoring activities, are suggested guidelines from the Trustees. This list of options is not mandatory or exhaustive, and techniques may change based on project specifics. Here we assume a five-year monitoring period of performance, which may over- or under-estimate the monitoring time frame for an individual project.
4. Year zero (Y0) is defined as the beginning of the post-project monitoring period.

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUES <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
<p>5. During the pre-project phase, project implementers should also evaluate whether the performance standards are able to be sufficiently measured. If baseline conditions are not able to be documented sufficiently, performance standards should be adjusted accordingly.</p> <p>6. Stocking sport-fish species may also benefit human use of the resource.</p> <p>* Indicates a particular monitoring question is a Trustee requirement for the project type. All other monitoring questions should be considered Trustee recommendations.</p>				

### 3.3 PUBLIC USE IMPROVEMENTS

In the 2016 RP/EA Update, the Trustees set a revised goal for the public use improvement restoration category, to specifically increase public access to fishery resources. In order to achieve this goal within the quantitative limit of using no more than ten percent of available settlement funding for public use improvement projects, the Trustees are moving forward with a more structured monitoring approach that incorporates both quantitative and qualitative monitoring at each project site (Exhibit 3-4). The Trustees have placed a focus on quantitative monitoring for public use improvement projects, taking a more rigorous approach to estimating the benefits of these projects to the public, in particular to recreational fishers and boaters. However, it is not expected that research-level monitoring will be conducted for public use improvement projects. The Trustees will work with the project implementers to define and scale an appropriate monitoring plan. The success of each project will then be measured against its ability to meet project-specific performance standards.

This section describes one general type of public use improvement projects that the Trustees envision could be implemented with Fox River NRDA funds: Improved or Expanded Access to Fishery Resources. These projects may incorporate educational signage and exhibits about the Lower Fox River and Green Bay, though development of signage and exhibits will not be funded as a standalone project. The monitoring requirements and recommendations, performance standards, and potential monitoring techniques, including frequency and associated metrics for measuring success toward performance standards for each project type, are described below.

#### Improved or Expanded Access to Fishery Resources

Projects that improve, enhance, or expand access to fishery resources and aquatic spaces include enhancement or construction of boat ramps, kayak launches, fishing piers, or other sites. These projects will have a similar overarching goal: provide additional access to fishery resources, whether by expanding particular facilities to be more accessible to certain segments of the population, or adding resources to provide additional access in locations that are lacking facilities for on- or off-shore recreation. Under this umbrella, project specifics will vary based on the particular type of access and/or recreational activity. In general, the Trustees expect these projects will conduct a minimum amount of monitoring to conform to the following monitoring requirements:

- **Pre-project needs assessment**, conducted before a project is selected for implementation, should answer the following questions as part of the Project Idea Form reviewed by the Trustees:
  - What is the current fishing/boating pressure at nearby access points?
  - What is the current capacity of existing facilities / access points?
  - Why is additional/improved access needed at the proposed location?

- **Pre-project monitoring** (i.e., baseline monitoring), conducted before a project begins, should be consistent with the Project Idea Form and the Project-Specific Monitoring Plan and answer the following questions:
  - What are the current conditions and characteristics within the project area? Baseline monitoring should document the property ownership, use, habitat, water quality, fishing potential, and/or wildlife parameters that form the basis of performance standards and criteria that will be measured after the project is complete.
  - Are the performance standards and criteria set at the beginning of a project able to be sufficiently measured?
- **Implementation and post-project monitoring**, conducted throughout the period of performance for each project, should answer the following questions:
  - How many sites have been created and/or improved?
  - Is the site visited and used? What type of use typically occurs?
  - Has visitation changed (e.g., increased) over time (and by how much)?

Prior to implementing monitoring actions to answer these questions, project implementers need to set performance standards for all monitoring actions undertaken in the pre- and post-project phases. Performance standards should be identified within the Project-Specific Monitoring Plan, and informed by knowledge of the relative fishing and/or boating pressure at nearby sites, the status of relevant fisheries and water quality (as potential drivers for the public), access to the area where recreational infrastructure would be located, and the project's goals. The Trustees will review performance standards to ensure both relevance and appropriateness for the project as well as a level of standardization across projects in similar geographic areas, using similar techniques and aiming to achieve similar goals. Example performance standards include creation of a certain number of boat ramps and kayak launches, and measurement of an increase in visitation over the course of the first year post-project. Additional information related to monitoring techniques, including both qualitative and quantitative methods as well as the frequency and timing of monitoring actions, are provided in Exhibit 3-4.

In setting the goal, or criterion, for each performance standard, the project implementer will define a metric and a target. The metrics associated with each performance standard may vary based on project type. Each project will be expected to report the number of sites created and/or improved, whether the site is being visited and used as intended, and how visitation has changed over time. The Trustees have specified that, while qualitative techniques and metrics are helpful, all projects should perform quantitative monitoring to estimate visitation over time. The target should be informed by the pre-project needs assessment and conditions/characteristics of the site. For example, a target could be to create two new boat ramps and kayak launches in an area that needs additional access points, or to measure at least 1,000 annual visitors utilizing a new fishing pier.

EXHIBIT 3-4 EXAMPLE PUBLIC USE IMPROVEMENT MONITORING APPROACHES

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUE <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
IMPROVED OR EXPANDED ACCESS TO FISHERY RESOURCES	What is the current fishing/boating pressure at nearby access points? *	NO	Needs assessment based on fishing pressure	Pre-project needs assessment
	What is the current capacity of existing facilities and/or access points? *	NO	Needs assessment based on current usage estimates	Pre-project needs assessment
	Why is additional/improved access needed at the proposed location? *	NO	Needs assessment based on fishing pressure	Pre-project needs assessment
	What are the current conditions and characteristics within the project area? <sup>5</sup> *	NO	Site visits with photographs	Pre-project (baseline)
			Research and/or surveys to determine current conditions at the site (e.g., parameters related to property ownership)	
	How many sites have been created and/or improved? *	YES	Site visits with photographs	Pre-project (baseline); Implementation Y0
			As-built surveys	Implementation Y0
	Is the site visited and used? What type of use typically occurs? *	YES	Visual estimates of site usage	Post-project Y1, Y3, Y5
			In-person surveys	
			Automated counting device	
	Has visitation changed (e.g., increased) over time (and by how much)? *	YES	In-person surveys	Pre-project (baseline); Post-project Y1, Y3, Y5
			Automated counting device	

PROJECT TYPE <sup>1</sup>	MONITORING QUESTION <sup>1</sup>	IS A PERFORMANCE STANDARD REQUIRED? <sup>1,2</sup>	POTENTIAL MONITORING TECHNIQUE <sup>1,3</sup>	FREQUENCY AND TIMING <sup>4,5</sup>
<p>Notes.</p> <ol style="list-style-type: none"> <li>1. Examples are intended to guide implementation. This table may not include all project types or monitoring questions, and the Trustees may relay to project implementers monitoring questions, performance standards, or monitoring techniques that are not included in this table.</li> <li>2. A performance standard, also known as a 'success criterion,' is an observable or measureable attribute that can be used to determine if a restoration project meets its objectives. If a performance standard is required, then a project implementer will need to set an objective and a metric by which to evaluate progress.</li> <li>3. Monitoring techniques, including the frequency and timing of monitoring activities, are suggested guidelines from the Trustees. This list of options is not mandatory or exhaustive, and techniques may change based on project specifics. Here we assume a five-year monitoring period of performance, which may over- or under-estimate the monitoring time frame for an individual project.</li> <li>4. Year zero (Y0) is defined as the beginning of the post-project monitoring period.</li> <li>5. During the pre-project phase, project implementers should also evaluate whether the performance standards are able to be sufficiently measured. If baseline conditions are not able to be documented sufficiently, performance standards should be adjusted accordingly.</li> </ol> <p>* Indicates a particular monitoring question is a Trustee requirement for the project type. All other monitoring questions should be considered Trustee recommendations.</p>				

### 3.4 EDUCATIONAL SIGNAGE AND EXHIBITS ABOUT THE LOWER FOX RIVER AND GREEN BAY

Any restoration project may include development and distribution of signage and exhibits about the history of the Lower Fox River and Green Bay, its industry, contamination, and subsequent remediation and restoration. The Trustees do *not* anticipate funding projects with the singular goal of developing signage or exhibits. Instead, this type of activity would occur as an element of the restoration categories outlined above (e.g., aquatic, nearshore, and riparian restoration; fisheries enhancements; and public use improvements). Though the type of product (e.g., posters, kiosks, traveling exhibit, or stationary exhibit) and location may vary, the Trustees expect the overarching goals will be similar for this type of activity. In general, the Trustees will require a minimum amount of monitoring to ensure that this project element conforms to the following monitoring requirements:

- **Pre-project needs assessment**, conducted before a project is selected for implementation, should answer the following questions as part of the Project Idea Form reviewed by the Trustees:
  - What locations would be strategic for signage or exhibits?
  - Who is the intended audience of the signage or exhibit?
  - What are the other sources of similar information to which the public has access?
- **Implementation and Post-project monitoring**, conducted throughout the period of performance for each project, should answer the following questions:
  - How many installations have been created?
  - How many people are reached per year?

Prior to implementing monitoring actions to answer these questions, project implementers need to set performance standards for all monitoring actions undertaken in the post-project phase. Performance standards should be identified within the project-specific monitoring plan, and informed by knowledge of the target audience, annual visitation at the site (e.g., could be related to fishing and boating pressure and/or museum exhibit attendance), audience access or exposure to other information sources, and the project's goals. The Trustees will review performance standards to ensure both relevance and appropriateness for the project as well as a level of standardization across projects in similar geographic areas, using similar techniques and aiming to achieve similar goals. Example performance standards could be creation of a number of informational kiosks at boat ramps, and counting the people reached over the course of the first year post-project. In setting the goal, or criterion, for each performance standard, the project implementer will define a metric and a target. While the metrics associated with each performance standard may vary based on project type, each project will be expected to report, at a

---



minimum, the number of sites created and people reached each year. The target should be informed by the pre-project needs assessment and current conditions/characteristics of the site. For example, the target could be to create five informational kiosks at five distinct boat ramps, or to reach 1,000 annual visitors at a new museum exhibit.

## CHAPTER 4 | SUMMARY OF MONITORING AND REPORTING REQUIREMENTS

This chapter summarizes requirements for each project implementer and includes a checklist of steps to complete and implement a Project-Specific Monitoring Plan (Exhibit 4-1; Appendix A). Chapter 3 should be reviewed in full to determine what is required and recommended.

### 4.1 PROJECT IMPLEMENTATION GUIDANCE

Project implementers interested in proposing a project to the Fox River Trustees should provide information in their initial Project Idea Form that addresses the questions associated with a pre-project needs assessment relevant to their project type (Exhibits 3-2, 3-3, and 3-4). If the project is significantly different from the project types listed in those exhibits, the project implementer should provide justification for the project, sufficient baseline research to characterize the current condition of and potential improvements at the site, and/or the monitoring activities and associated data necessary to measure changes in environmental conditions resulting from restoration actions.

After the Trustees select a project, the project implementer will review the Fox River monitoring and adaptive management framework (this document) and, using the framework as a guide, develop a Project-Specific Monitoring Plan. This project plan will define parameters such as project goals, period of performance, standards by which project performance will be assessed, and monitoring techniques and metrics proposed to measure progress toward performance standards. The Trustees created a Monitoring Plan Template for each of the project types listed above, to assist project implementers in developing a plan tailored to their project (Appendix A).

Once the project-specific plan has been reviewed and approved by the Trustees, each annual Project Report Form should include an update on the results of completed and ongoing monitoring activities. Annual reporting will continue for the period of performance outlined by the monitoring plan, which means after project activities are complete each project will have a period when monitoring activities are the primary focus. The Trustees will review the annual reports to determine if a project is on target to meet its performance standards. If the project implementer and/or the Trustees determine that a project is unlikely to meet its performance standards, a period of additional review is triggered in which the Trustees will work with the project implementer to review possible causative factors and mitigation actions to adaptively manage the project (refer to Section 2.3). If the Trustees determine that adaptive management actions are necessary, the project implementer would determine the cost of those actions. In contrast, if the Trustees determine that no additional actions are necessary, but a revision to the

project goals is warranted, the project implementer would propose new project goals based on current performance and trends shown by available monitoring data.

Throughout this process, the Trustees anticipate working closely with project partners to provide information about required versus recommended monitoring questions and the level of quantitative or qualitative data collection expected to evaluate progress toward performance standards. To assist with this task, the Trustees developed Exhibits 3-2, 3-3, and 3-4 to guide the implementation of the general project types the Trustees expect to select for implementation. By setting these guidelines, outlining the performance standards against which projects will be evaluated, and providing reporting forms to indicate annual progress, the Trustees aim to receive a consistent level of detail in a standard format across projects that will allow for project-specific evaluations as well as cross-project comparisons and assessment of the restoration program as a whole.

#### **4.2 REPORTING RESULTS**

As discussed in Section 4.1, annual reporting will be completed for each project using the Project Report Form. The project implementer will report information consistent with the Project-Specific Monitoring Plan, including performance standards for the project, the monitoring techniques used and corresponding qualitative or quantitative metrics, results of monitoring activities and progress towards performance standards, and any issues identified.

The Trustees envision that, at a minimum, they will be able to combine information from final project-specific progress reports to convey a number of metrics to the public. The full list is presented in Section 1.4 and is summarized below:

- How many stream miles and/or habitat acres have been improved (or preserved), including an assessment of how many barriers to fish passage/migration/spawning were removed or rendered passable?
- What type of habitat was improved, and was there an observable or measurable change in the habitat after the project was completed?
- How did projects to stock local waters benefit and/or meet fisheries management goals and objectives, and how much increased capacity was created by hatchery infrastructure improvements? How many fish (or amount of biomass) were stocked and in which specific locations?
- How many public use project sites have been created and/or improved, what type of use typically occurs at each site, and how has visitation changed over time?
- How many people are reached per year through educational signage and/or exhibits?

The Trustees will communicate progress towards performance standards to the public through a number of mechanisms. Annual progress may be communicated in press releases or web stories posted to the Fox River Trustees' website, in particular when a project is determined to be complete. The Trustees also plan to periodically release

---

Restoration Progress Reports, which will contain project-specific information as well as a section that describes progress toward restoration goals. The public has played a substantial role throughout the restoration of the Lower Fox River and Green Bay, and the Trustees will continue to inform the public of restoration project plans as well as progress toward ecological and recreational goals.

#### Data Sharing

Due to the breadth of project types anticipated for implementation, and the varied approaches to monitoring that each project could take, monitoring data are expected to vary widely in both content and format. Given the increased emphasis on collecting and interpreting monitoring data, the Trustees will require that each project implementer submit an electronic file that summarizes the monitoring data that were collected. Unsummarized data should be made available upon request; at a minimum, the following should be included in the summarized data file:

- The date and person who collected the data,
- The georeferenced location of each project site,
- Whether a quality assurance project plan (QAPP) was developed for the project,<sup>7</sup>
- Other quality management procedures that were in place,
- Monitoring requirements from matching fund sources,
- Any reason to exclude data that were collected from analyses based on quality concerns, and
- A description of statistical and/or other types of analyses using the collected monitoring data to assess progress toward performance standards.

Regarding this last point, a certain level of data analysis may be required based on the qualitative or quantitative monitoring technique and metric chosen by the project implementer and approved by the Trustees. While sophisticated data analysis may be a component of the research-level monitoring tier, it is anticipated that relatively simple comparisons of baseline and post-project environmental conditions will suffice for the majority of selected projects. The Trustees encourage, but do not require, project implementers to include visualizations of monitoring data over time and space, to better indicate the results of a particular project.

Depending on a particular project's goals, data files may be archived by the FWS.

---

<sup>7</sup> Development of a QAPP or other quality assurance document is not required, but is recommended to enable a clear assessment of data quality that would allow for the exclusion of data points that did not meet data quality objectives from subsequent analyses.

---

#### 4.3 SUMMARY

For each project selected for implementation, project proponents will develop a project-specific monitoring plan, based on the Fox River monitoring and adaptive management framework (this document) and project-specific goals and considerations related to knowledge of the restoration actions, the project site, and the need to monitor a particular parameter over time. Project implementers will refer to Exhibits 3-2, 3-3, and 3-4 of this document to determine which performance standards are required versus recommended, and then define the monitoring technique (and associated metric) and frequency and timing of the monitoring action that will support the evaluation of each relevant performance standard.

All projects will undergo pre-project monitoring actions in order to establish baseline conditions and allow for measurement of subsequent changes in environmental conditions relative to this initial baseline. A pre-project needs assessment may be conducted before the project proponent submits a project idea form to the Trustees, or may involve more structured pre-project baseline assessment activities after the project is selected for implementation.

The type of project and its specific goals will determine the best monitoring techniques and metrics to utilize to evaluate project success (e.g., qualitative versus quantitative metrics). Each project will need to meet the minimum requirements for assessing progress toward the performance standards listed in Exhibits 3-2, 3-3, and 3-4. The Trustees require that all public use projects to collect quantitative measures of project success, which is reflected in the suggested monitoring techniques in Exhibit 3-4. Other project types may use a combination of quantitative and/or qualitative monitoring techniques, depending on project goals.

To facilitate the increased emphasis on monitoring and adaptive management, the Trustees developed standardized reporting forms for annual reporting during the entire period of performance, including pre- and post-project phases (Appendix A). The Trustees may determine, on a case-by-case basis, that certain funded projects may require modifications to the reporting forms and/or the minimum requirements. The Trustees will work with individual project implementers to convey the results of the Trustee review of the project-specific monitoring plan and any potential additional requirements or considerations before the plan is finalized.

If a project is not meeting, or not on target to meet, its performance standards, the project implementer will bring this to the attention of the Trustees. The timing of this communication should occur as soon as possible to avoid delays in the restoration timeline, and is not bound to the annual reporting cycle. The Trustees will review the project, attempt to determine causative factors and mitigation actions, and provide guidance to the project implementer regarding how to proceed.

A final report that details the restoration and monitoring actions, the project results, and whether the project met its performance standards will be due one year after the period of

performance ends. This report will follow the standardized annual Project Report Form provided by the Trustees, and include a summarized data file.

MONITORING CHECKLIST		
MONITORING STEP	OBJECTIVE	ACTIONS
Project Planning (Pre-Project Needs Assessment)	Submit a Project Idea Form <i>Step 1</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Project implementer reviews the Monitoring and Adaptive Management Framework and includes the requested pre-project needs assessment in the Project Idea Form.</li> <li><input type="checkbox"/> Trustees review the Project Idea Form and provide feedback, as needed.</li> <li><input type="checkbox"/> Projects that meet the criteria presented in the RP/EA and are consistent with current Trustee priorities are selected for implementation by the Trustees.</li> </ul>
	Develop a Project-Specific Monitoring Plan <i>Step 2</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Project implementer uses the Framework as a guide to develop a Project-Specific Monitoring Plan that defines methods, performance standards, and the frequency and timing of monitoring actions (see Appendix A).</li> <li><input type="checkbox"/> Trustees work with the implementer to revise, if necessary, then finalize the plan.</li> </ul>
Pre-Project (Baseline)	Conduct Pre-Project (Baseline) Monitoring <i>Step 3</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Project implementer assesses environmental conditions to determine baseline before the project begins.</li> <li><input type="checkbox"/> Project implementer submits pre-project monitoring information to Trustees as part of the annual Project Report Form.</li> <li><input type="checkbox"/> Adjust the Project-Specific Monitoring Plan if warranted based on the Trustees' review of baseline conditions.</li> </ul>
	Conduct Implementation and Effectiveness (Post-Project) Monitoring <i>Step 4</i>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Project implementer submits implementation and effectiveness (post-project) monitoring information to Trustees as part of the annual Project Report Form.</li> <li><input type="checkbox"/> In the final year of post-project monitoring, the project implementer submits a summarized data file.</li> <li><input type="checkbox"/> If a project is not on target to meet its performance standards, the Trustees will determine if corrective actions should be initiated or goals should be revised, and will work with the project implementer to determine a path forward.</li> </ul>
Implementation and Effectiveness (Post-Project)		

## REFERENCES

- Deepwater Horizon (DWH) Natural Resource Damage Assessment Trustees. 2017. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 1.0. Appendix to the Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. December. Available at: <http://gulfspillrestoration.noaa.gov/>
- National Oceanic and Atmospheric Administration (NOAA). 2017. Final Portland Harbor Programmatic EIS and Restoration Plan. Portland, Oregon. May.
- Stratus. 2000. Restoration and Compensation Determination Plan (RCDP), Lower Fox River/Green Bay Natural Resource Damage Assessment. October 25, 2000. 692 p.
- Stratus. 2013. Restoration Progress Report (RPR) for the Lower Fox River and Green Bay Natural Resource Damage Assessment. February 2013. 190 p.
- U.S. Department of Interior, Fish and Wildlife Service (FWS); Wisconsin Department of Natural Resources; Oneida Tribe of Indians of Wisconsin; Michigan Attorney General; Michigan Department of Environmental Quality; Menominee Indian Tribe of Wisconsin; U.S. Department of Interior Bureau of Indian Affairs; U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2003. Joint Restoration Plan and Environmental Assessment (RP/EA) for the Lower Fox River and Green Bay Area. 60 p.
- U.S. Department of Interior (FWS); U.S. Department of Commerce; State of Wisconsin; Oneida Tribe of Indians of Wisconsin; and Menominee Indian Tribe of Wisconsin. 2016. Update to the Restoration Plan and Environmental Assessment (RP/EA) for the Lower Fox River and Green Bay Natural Resource Damage Assessment and Restoration. Prepared by the Fox River / Green Bay Natural Resource Trustee Council, with assistance from Industrial Economics, Inc. 107 p.
- Williams, B.K. 2011. Adaptive management of natural resources--framework and issues. *Journal of Environmental Management* 92(5): 1346-1353.
- Williams, B.K. and Brown, E.D. 2012. Adaptive Management: The U.S. Department of the Interior Applications Guide. Adaptive Management Working Group, U.S. Department of the Interior, Washington, D.C. 136 p.



## APPENDIX A

### MONITORING PLAN TEMPLATES

The following templates are to assist project implementers with structuring and developing a project-specific monitoring plan.

APPENDIX A-1      MONITORING PLAN TEMPLATE FOR PROJECTS THAT ENHANCE  
OR RESTORE AQUATIC, NEARSHORE, AND RIPARIAN HABITAT  
PROJECTS

<b>Project Information</b>	
Project Title	<i>This should be the same as the Project Idea Form.</i>
Name of Organization Name of Project Manager	<i>This should be the same as the Project Idea Form.</i>
Name of Additional Partners	<i>List additional project partners. Include the names of individuals and their affiliated organizations.</i>
Project Goal	<i>Describe the goal of this project, using specific metrics where possible.</i>
Project Summary	<i>Summarize the project. Expand on the method summary text from the Project Idea Form to identify the major pre- and post-project activities, including any necessary permitting and compliance steps as well as short- and long-term maintenance requirements.</i>
<b>Pre-Project Needs Assessment</b>  <i>Answer the following questions related to pre-project monitoring, expanding on information in the Project Idea Form. Describe the techniques you will use to collect monitoring information. Relevant monitoring techniques are described in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may propose different methods to be evaluated by the Trustees. Attach additional supporting materials when applicable (e.g., maps, photographs, survey results, summarized data).</i>  <i>[Note to Trustees: This section provides additional justification for the described project and allows the Trustees to assess how the project will benefit species and habitats.]</i>	
What aquatic, nearshore, or riparian areas would benefit from habitat improvements?	<i>Include the monitoring technique you will use (or have used) to assess which areas would benefit.</i>

What resources/species would be affected by the restoration action?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
<b>Pre-Project Monitoring Information</b>  <i>Answer the following questions related to pre-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).</i>  <i>[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish baseline conditions.]</i>	
What are the current conditions within the project area?	<i>Include the proposed monitoring technique and format and type of results that will be reported.</i>
Are performance standards able to be sufficiently measured?	<i>Provide a description of how this will be determined.</i>
How many stream miles and/or aquatic, nearshore, or riparian habitat acres have been improved?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>
Was there an observable and/or measurable change in the habitat (if so, describe the improvement and quantify the benefit)?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>
<i>Recommended:</i> Was there a measureable change in the habitat <i>use</i> by wildlife or fish species?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>

## Implementation and Post-Project Monitoring Information

*Answer the following questions related to post-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).*

*[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish post-project conditions.]*

How many stream miles and/or aquatic, nearshore, or riparian habitat acres have been improved?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>
Was there an observable and/or measurable change in the habitat (if so, describe the improvement and quantify the benefit)?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>
<i>Recommended:</i> Was there a measureable change in the habitat use by wildlife or fish species?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>

## Data Summary

*Summarize the format and number of expected data files, including maps, photographs, etc.*

## Adaptive Management Summary

*Summarize the approach to adaptive management, particularly for projects that have a higher chance of needing additional management and/or adjustment of performance standards and criteria (e.g., projects that are testing experimental methods, or projects that may be disproportionately affected by weather or shifts in other environmental conditions).*

APPENDIX A-2      MONITORING PLAN TEMPLATE FOR PROJECTS THAT PRESERVE  
AQUATIC, NEARSHORE, AND RIPARIAN HABITAT PROJECTS

<b>Project Information</b>	
Project Title	<i>This should be the same as the Project Idea Form.</i>
Name of Organization Name of Project Manager	<i>This should be the same as the Project Idea Form.</i>
Name of Additional Partners	<i>List additional project partners. Include the names of individuals and their affiliated organizations.</i>
Project Goal	<i>Describe the goal of this project, using specific metrics where possible.</i>
Project Summary	<i>Summarize the project. Expand on the method summary text from the Project Idea Form to identify the major pre- and post-project activities, including any necessary permitting and compliance steps as well as short- and long-term maintenance requirements.</i>
<b>Pre-Project Needs Assessment</b>  <i>Answer the following questions related to pre-project monitoring, expanding on information in the Project Idea Form. Describe the techniques you will use to collect monitoring information. Relevant monitoring techniques are described in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may propose different methods to be evaluated by the Trustees. Attach additional supporting materials when applicable (e.g., maps, photographs, survey results, summarized data).</i>  <i>[Note to Trustees: This section provides additional justification for the described project and allows the Trustees to assess how the project will benefit species and habitats.]</i>	
What aquatic, nearshore, or riparian areas would benefit from habitat preservation?	<i>Include the monitoring technique you will use (or have used) to assess which areas would benefit.</i>

What resources/species would be affected by the restoration action (i.e., preservation)?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
Are there currently any conservation or preservation restrictions on the property, or any reservation of rights?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
What is the likelihood that the property will be developed or otherwise degraded in the absence of conservation actions?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
<b>Pre-Project Monitoring Information</b> <i>Answer the following questions related to pre-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).</i> <i>[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish baseline conditions.]</i>	
What are the current conditions within the project area?	<i>Include the proposed monitoring technique and format and type of results that will be reported.</i>
Are performance standards able to be sufficiently measured?	<i>Provide a description of how this will be determined.</i>
How many stream miles and/or aquatic, nearshore, or riparian habitat acres have been preserved?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>

## Implementation and Post-Project Monitoring Information

*Answer the following questions related to post-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).*

*[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish post-project conditions.]*

How many stream miles and/or aquatic, nearshore, or riparian habitat acres have been preserved?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>
Is a conservation easement or deed in place, including a long-term maintenance plan if applicable?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>

## Data Summary

*Summarize the format and number of expected data files, including maps, photographs, etc.*

## Adaptive Management Summary

*Summarize the approach to adaptive management, particularly for projects that have a higher chance of needing additional management and/or adjustment of performance standards and criteria (e.g., projects that are testing experimental methods, or projects that may be disproportionately affected by weather or shifts in other environmental conditions).*

APPENDIX A-3      MONITORING PLAN TEMPLATE FOR PROJECTS THAT REAR FISH  
IN HATCHERIES TO STOCK LOCAL WATERS

<b>Project Information</b>	
Project Title	<i>This should be the same as the Project Idea Form.</i>
Name of Organization Name of Project Manager	<i>This should be the same as the Project Idea Form.</i>
Name of Additional Partners	<i>List additional project partners. Include the names of individuals and their affiliated organizations.</i>
Project Goal	<i>Describe the goal of this project, using specific metrics where possible.</i>
Project Summary	<i>Summarize the project. Expand on the method summary text from the Project Idea Form to identify the major pre- and post-project activities, including any necessary permitting and compliance steps as well as short- and long-term maintenance requirements.</i>
<b>Pre-Project Needs Assessment</b>  <i>Answer the following questions related to pre-project monitoring, expanding on information in the Project Idea Form. Describe the techniques you will use to collect monitoring information. Relevant monitoring techniques are described in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may propose different methods to be evaluated by the Trustees. Attach additional supporting materials when applicable (e.g., maps, photographs, survey results, summarized data).</i>  <i>[Note to Trustees: This section provides additional justification for the described project and allows the Trustees to assess how the project will benefit species and habitats.]</i>	
What is the current population status for the species-specific fishery of interest?	<i>Include the monitoring technique you will use (or have used) to assess which areas would benefit.</i>



What are the limiting factors for that fishery's growth and/or success?	<i>Include the monitoring technique you will use (or have used) to assess which areas would benefit.</i>
Are there specific areas/locations that would benefit from stocking that species?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
Is there an existing facility at which capacity could be expanded or will a new facility be required?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
<b>Pre-Project Monitoring Information</b> <i>Answer the following questions related to pre-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).</i> <i>[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish baseline conditions.]</i>	
What are the current conditions within the project area?	<i>Include the proposed monitoring technique and format and type of results that will be reported.</i> <i>For projects that create improvements to hatchery infrastructure, focus on the infrastructure conditions.</i>
What is the current hatchery capacity and could the hatchery generate additional fish with current infrastructure?	<i>Include the proposed monitoring technique and format and type of results that will be reported.</i>
Are performance standards able to be sufficiently measured?	<i>Provide a description of how this will be determined.</i>
How many fish (or amount of biomass) were successfully reared to the appropriate size class in the hatchery?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>

How many fish of which size class (or amount of biomass) were stocked and in which specific locations?	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>-format and type of results that will be reported</li> </ul>
<p><b>Implementation and Post-Project Monitoring Information</b></p> <p><i>Answer the following questions related to post-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).</i></p> <p><i>[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish post-project conditions.]</i></p>	
How many fish (or amount of biomass) were successfully reared to the appropriate size class in the hatchery?	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>-format and type of results that will be reported</li> </ul>
How many fish of which size class (or amount of biomass) were stocked and in which specific locations?	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>-format and type of results that will be reported</li> </ul>
How did the stocking benefit/meet fisheries management goals and objectives?	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>-format and type of results that will be reported</li> </ul>

<p>For projects that create improvements to hatchery infrastructure: How much increased capacity was created by this improvement?</p>	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>-format and type of results that will be reported</li> </ul>
<p>For projects that create improvements to hatchery infrastructure: Are proposed improvement plans (e.g., engineered designs) available before construction begins?</p>	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>-format and type of results that will be reported</li> </ul>
<p><i>Recommended:</i> What was the survival of fish to given age classes post-release (e.g., fall YOY, Age-1, adult)?</p>	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>-format and type of results that will be reported</li> </ul>
<p><b>Data Summary</b></p> <p><i>Summarize the format and number of expected data files, including maps, photographs, etc.</i></p>	
<p><b>Adaptive Management Summary</b></p> <p><i>Summarize the approach to adaptive management, particularly for projects that have a higher chance of needing additional management and/or adjustment of performance standards and criteria (e.g., projects that are testing experimental methods, or projects that may be disproportionately affected by weather or shifts in other environmental conditions).</i></p>	

APPENDIX A-4      MONITORING PLAN TEMPLATE FOR PROJECTS THAT ENHANCE  
OR RESTORE FISHERY HABITATS

<b>Project Information</b>	
Project Title	<i>This should be the same as the Project Idea Form.</i>
Name of Organization Name of Project Manager	<i>This should be the same as the Project Idea Form.</i>
Name of Additional Partners	<i>List additional project partners. Include the names of individuals and their affiliated organizations.</i>
Project Goal	<i>Describe the goal of this project, using specific metrics where possible.</i>
Project Summary	<i>Summarize the project. Expand on the method summary text from the Project Idea Form to identify the major pre- and post-project activities, including any necessary permitting and compliance steps as well as short- and long-term maintenance requirements.</i>
<b>Pre-Project Needs Assessment</b>  <i>Answer the following questions related to pre-project monitoring, expanding on information in the Project Idea Form. Describe the techniques you will use to collect monitoring information. Relevant monitoring techniques are described in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may propose different methods to be evaluated by the Trustees. Attach additional supporting materials when applicable (e.g., maps, photographs, survey results, summarized data).</i>  <i>[Note to Trustees: This section provides additional justification for the described project and allows the Trustees to assess how the project will benefit species and habitats.]</i>	
What locations would benefit from improved fish habitat?	<i>Include the monitoring technique you will use (or have used) to assess which areas would benefit.</i>

What factors are currently limiting (a) fish populations within the waterbody or (b) fish use at those locations?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
How will proposed habitat restoration address limiting factors to increase fish populations or increase fish use of the project area?	<i>Include the monitoring technique you will use (or have used) to assess which species would be affected.</i>
<b>Pre-Project Monitoring Information</b>  <i>Answer the following questions related to pre-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).</i>  <i>[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish baseline conditions.]</i>	
What are the current conditions within the project area?	<i>Include the proposed monitoring technique and format and type of results that will be reported.</i>
Are performance standards able to be sufficiently measured?	<i>Provide a description of how this will be determined.</i>
How many stream miles and/or aquatic, nearshore, or riparian habitat acres have been improved?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>

### Implementation and Post-Project Monitoring Information

*Answer the following questions related to post-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).*

*[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish post-project conditions.]*

How many stream miles and/or aquatic, nearshore, or riparian habitat acres have been improved?	<i>Include the following:</i> <ul style="list-style-type: none"><li>-monitoring technique</li><li>-frequency and timing of monitoring actions</li><li>-performance standard (goal and metric)</li><li>-format and type of results that will be reported</li></ul>
How many barriers to fish passage, migration, and/or spawning were removed or rendered passable (if applicable)?	<i>Include the following:</i> <ul style="list-style-type: none"><li>-monitoring technique</li><li>-frequency and timing of monitoring actions</li><li>-performance standard (goal and metric)</li><li>- format and type of results that will be reported</li></ul>
What type of habitat was improved, including the fish species and life stage of that species?	<i>Include the following:</i> <ul style="list-style-type: none"><li>-monitoring technique</li><li>-frequency and timing of monitoring actions</li><li>-performance standard (goal and metric)</li><li>- format and type of results that will be reported</li></ul>
<i>Recommended:</i> What was the fish population response?	<i>Include the following:</i> <ul style="list-style-type: none"><li>-monitoring technique</li><li>-frequency and timing of monitoring actions</li><li>-performance standard (goal and metric)</li><li>- format and type of results that will be reported</li></ul>

<p><i>Recommended:</i> What is the species-specific benefit derived from the project (e.g., what is the expected population growth, biomass gained, etc.)?</p>	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li>-monitoring technique</li> <li>-frequency and timing of monitoring actions</li> <li>-performance standard (goal and metric)</li> <li>- format and type of results that will be reported</li> </ul>
<p><b>Data Summary</b></p> <p><i>Summarize the format and number of expected data files, including maps, photographs, etc.</i></p>	
<p><b>Adaptive Management Summary</b></p> <p><i>Summarize the approach to adaptive management, particularly for projects that have a higher chance of needing additional management and/or adjustment of performance standards and criteria (e.g., projects that are testing experimental methods, or projects that may be disproportionately affected by weather or shifts in other environmental conditions).</i></p>	

APPENDIX A-5      MONITORING PLAN TEMPLATE FOR IMPROVED OR EXPANDED  
ACCESS TO FISHERY RESOURCES

<b>Project Information</b>	
Project Title	<i>This should be the same as the Project Idea Form.</i>
Name of Organization Name of Project Manager	<i>This should be the same as the Project Idea Form.</i>
Name of Additional Partners	<i>List additional project partners. Include the names of individuals and their affiliated organizations.</i>
Project Goal	<i>Describe the goal of this project, using specific metrics where possible.</i>
Project Summary	<i>Summarize the project. Expand on the method summary text from the Project Idea Form to identify the major pre- and post-project activities, including any necessary permitting and compliance steps as well as short- and long-term maintenance requirements.</i>
<b>Pre-Project Needs Assessment</b>  <i>Answer the following questions related to pre-project monitoring, expanding on information in the Project Idea Form. Describe the techniques you will use to collect monitoring information. Relevant monitoring techniques are described in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may propose different methods to be evaluated by the Trustees. Attach additional supporting materials when applicable (e.g., maps, photographs, survey results, summarized data).</i>  <i>[Note to Trustees: This section provides additional justification for the described project and allows the Trustees to assess how the project will benefit species and habitats.]</i>	
What is the current fishing/boating pressure at nearby access points?	<i>Answer should include the monitoring technique you used to assess which areas would benefit.</i>



What is the current capacity of existing facilities and/or access points?	<i>Answer should include the monitoring technique you used to assess which areas would benefit.</i>
Why is additional/improved access needed at the proposed location?	<i>Answer should include the monitoring technique you used to assess which species would be affected.</i>
<p><b>Pre-Project Monitoring Information</b></p> <p><i>Answer the following questions related to pre-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).</i></p> <p><i>[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish baseline conditions.]</i></p>	
What are the current conditions within the project area?	<i>Include the proposed monitoring technique and format and type of results that will be reported.</i>
Are performance standards able to be sufficiently measured?	<i>Provide a description of how this will be determined.</i>
How many sites have been created and/or improved?	<p><i>Include the following:</i></p> <ul style="list-style-type: none"> <li><i>-monitoring technique</i></li> <li><i>-frequency and timing of monitoring actions</i></li> <li><i>-performance standard (goal and metric)</i></li> <li><i>-format and type of results that will be reported</i></li> </ul>

## Implementation and Post-Project Monitoring Information

*Answer the following questions related to post-project monitoring. Describe the techniques you will use to collect this information. Relevant monitoring techniques are presented in the FR/GB Monitoring and Adaptive Management Plan, though project implementers may choose different methods to be evaluated by the Trustees. Where indicated, describe the frequency and timing of planned monitoring actions and define a performance standard (i.e., set a goal by which progress can be measured, including both the target and metric). Describe what information will be collected and in what format, as well as how you expect to report it (e.g., maps, photographs, survey results, summarized data).*

*[Note to Trustees: This information outlines how monitoring data will be collected and if that is sufficient to establish post-project conditions.]*

How many sites have been created and/or improved?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>
Is the site visited and used? What type of use typically occurs?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>
Has visitation changed (e.g., increased) over time (and by how much)?	<i>Include the following:</i> <i>-monitoring technique</i> <i>-frequency and timing of monitoring actions</i> <i>-performance standard (goal and metric)</i> <i>-format and type of results that will be reported</i>

## Data Summary

*Summarize the format and number of expected data files, including maps, photographs, etc.*

## Adaptive Management Summary

*Summarize the approach to adaptive management, particularly for projects that have a higher chance of needing additional management and/or adjustment of performance standards and criteria (e.g., projects that are testing experimental methods, or projects that may be disproportionately affected by weather or shifts in other environmental conditions).*