

Strategic and Operational Plan for the Long Term Resource Monitoring Program on the Upper Mississippi River System, Fiscal Years 2010 – 2014

Introduction

“The mission of the Long Term Resource Monitoring Program is to support decision makers with the information and understanding needed to maintain the Upper Mississippi River System as a viable multiple-use large river ecosystem.”

The Long Term Resource Monitoring Program (LTRMP) was created over 20 years ago as part of the Environmental Management Program (EMP). The LTRMP consists of a comprehensive program of monitoring, research, and data management that provides critical information about the status and trends of key resources. LTRMP information is used extensively by resource managers, planners, administrators, scientists, academics, legislators, and the general public for improved understanding, problem solving, and informed decision-making about issues important to the Upper Mississippi River System (UMRS).

This strategic plan identifies a set of broad priorities for 2010-2014 selected from a broader universe of possibilities. It defines a larger program than the current LTRMP, but out of necessity does not identify all potential partnership information needs. In addition to the core elements of monitoring, research, and data management, this plan addresses important new information needs resulting from data gaps that have been identified as our understanding of the ecosystem improves. Implementation of this strategic plan will be accomplished through the development of a companion effort known as an operational plan, which will provide the implementation details.

The actions presented in this plan are essential to addressing those information needs, understanding the river ecosystem, and helping decision makers make informed choices. Many elements of the plan build upon other elements and should be sequenced (e.g., research is needed to define mussel sampling methods before a monitoring procedure can be established) to help inform future budget decisions. In addition, maintaining professional staff, facilities, and equipment is essential to continuing LTRMP's reputation for state of the art science and data delivery.

This plan also provides a link to the newly authorized Navigation and Ecosystem Sustainability Program (NESP), which integrates ecosystem restoration and navigation efficiency on the UMRS. Restoration goals have been established jointly under EMP and NESP and focus on ecosystem process, function, structure, and composition (Galat et al. 2007)¹. The LTRMP is ideally suited to aid in the development and tracking of key indicators that will document progress towards those goals. This will ultimately lead to a better understanding of the ecosystem services provided by the UMRS. In addition, LTRMP data can aid in planning and evaluating habitat restoration projects following an adaptive management framework proposed by NESP.

OPERATIONAL PLAN FOR 2010-2014:

- The Environmental Management Program (EMP) Coordinating Committee endorsed the Strategic Plan for the Long Term Resource Monitoring Program (LTRMP) on August 6, 2008. The Strategic

¹Galat, D. L., J. W. Barko, S. M. Bartell, M. Davis, B. L. Johnson, K. S. Lubinski, J. M. Nestler, and D. B. Wilcox. 2007. Environmental Science Panel Report: Establishing System-wide Goals and Objectives for the Upper Mississippi River System. Upper Mississippi River System Navigation and Ecosystem Sustainability Program Environmental Report 6. U.S. Army Corps of Engineers, Rock Island, St. Louis, and St. Paul Districts. 41 pp.

Output 4.2: Key decision makers are satisfied with LTRMP information and decision support system.

Activities

- 4.2a) Effectively and efficiently deliver LTRMP information and expertise to the key decision makers.
This is a role for all EMP partners
- 4.2b) Create a communications and outreach team/group with at least one new professional communicator at its core
- 4.2c) Improve the delivery of LTRMP information based on decision maker feedback

OPERATIONAL PLAN FOR 2010-2014:

- Outreach Coordinator evaluates satisfaction of decision makers with LTRMP information delivery and recommends changes/enhancements.
- Develop targeted reports to communicate key scientific findings to all decision makers identified in Output 4.1.

Strategic Management of LTRMP Organizational Resources

Strategy 1. Effectively manage LTRMP data and information

Information generated under the LTRMP is only as useful as the quality of data management and delivery. Collecting, organizing, analyzing, storing, and reporting these data are fundamental program elements that cannot be compromised without jeopardizing the value of information and the historic database used by decision-makers and the scientific community.

Technology for data collection has advanced significantly and LTRMP has kept up with these advances, making the program a leader in the ability to manage and deliver data. Electronic data capture used by LTRMP has improved the efficiency, accuracy, and economy of data collection and entry. Geospatial data (land cover, bathymetry, aerial photography) are processed using advanced hardware and software and are used frequently by field managers and biologists to design and evaluate projects and investigate ecological relationships.

The relational database management system has been consistent over the life of the program and currently houses over 1.3 million records. Data from this system, as well as geospatial information and research results, are available in a variety of formats, including scientific manuscripts, program technical reports, completion reports, fact sheets, maps, and raw data. A comprehensive peer review process ensures scientific rigor and integrity. In addition, a web-based access system allows users to search and download information for specific uses.

Maintenance of existing data management tools, and investing in new technologies when appropriate, will improve efficiency and is critical to the continued integrity of this program. For example, new GIS technology allows for the creation of web enabled analytical tools that could previously function only on desktop computers. This allows users to view and access historical data over a much broader spatial scale than previously, which aids in measuring and tracking ecosystem indicators.

With adaptive management an important component of NESP, it is more important than ever to improve access to all forms of data and information pertinent to the Upper Mississippi River ecosystem. Some

information collected by partners external to LTRMP can be accessed through the existing LTRMP database; however, expanding the data clearinghouse to provide “one-stop” access to non-LTRMP data would be a valuable step in implementing adaptive management.

Actions

- S-1a) Maintain data management systems through an information technology refresher planning process

OPERATIONAL PLAN FOR 2010-2014:

- UMESC will develop a plan for maintaining effective and efficient capabilities for electronic data capture in the field and for data storage and management at UMESC.

- S-1b) Enhance the information management software used for data capture and management within the water quality component

OPERATIONAL PLAN FOR 2010-2014:

- UMESC will develop a plan to update the data capture software for the water quality lab to ensure the functionality of the software into the future.

- S-1c) Develop a user-friendly interface with component data for web-based library and query tools

- S-1d) Expand data clearinghouse functions

- S-1e) Extend data catalogue functions

OPERATIONAL PLAN FOR 2010-2014:

- Implement the ESRI Enterprise GIS tools, such as Arc Spatial Database and ArcGIS Server. These tools will allow data to be viewed with an internet browser or through ArcGIS on desktop computers, where they can be combined with other data sets.
- UMESC will develop procedures for ensuring that data collected under focused research efforts are archived and made publicly available (also see Output 2.2.). We will begin with current projects and apply the procedures to past projects as interest, time, and funding permit.

Strategy 2. Effectively manage LTRMP personnel and facilities

Meeting the outcomes in this strategic plan depends upon having appropriate staff and expertise within LTRMP. Staffing levels and expertise should be continuously evaluated to identify program needs, and training or additional staffing should be considered when necessary.

As with all effective organizations, maintaining productive and motivated staff is essential to program success. Within LTRMP there is a wide range of expertise from field station biologists and managers to USGS scientists and administrative personnel. It is important to provide the working environment and opportunities they need to develop professionally and ensure continuity in the program. For example, professional advancement for some positions within USGS is based on publication of peer-reviewed manuscripts. This process can take significant time; consequently some data useful to managers cannot be released prior to publication. Program administrators will develop effective ways to provide professional advancement opportunities for all LTRMP staff while meeting partners' data needs in a timely manner.

LTRMP facilities and equipment (boats, motors, sampling equipment, etc) need to be well maintained and replaced when necessary to maintain a safe and functional work environment.

Actions

- S-2a) Create a workforce plan that provides direction for professional development and advancement for LTRMP staff, and includes or addresses:
- Professional scientists and the support they need
 - Other professional and technical staff
 - Clarity about roles and responsibilities
 - Staffing necessary for the implementation of the strategic plan
 - Enhanced communication among staff in various LTRMP organizations

OPERATIONAL PLAN FOR 2010-2014:

- UMESC and the COE will work with the partnership to develop a workforce plan to describe staffing needed to fully implement the Operational Plan.
- The LTRMP will include support for research and publishing to assist principal investigators, and for training to maintain and improve the technical expertise of staff.
- UMESC and the COE will update descriptions of the roles of each partner agency and key staff for review by the partnership.
- The LTRMP will enhance communication among staff, for example, by supporting a biennial meeting of LTRMP staff and partners.

S-2b) Maintain the facilities

OPERATIONAL PLAN FOR 2010-2014:

- It will be the responsibility of each partner to maintain a safe, secure, and effective facility and working environment for their staff.

S-2c) Replace equipment as needed through the equipment refreshment plan

OPERATIONAL PLAN FOR 2010-2014:

- UMESC and the field stations will develop a list of standard equipment required to execute the program and develop a life cycle schedule for major equipment.
- UMESC will maintain a prioritized list for equipment refreshment and develop guidelines for what items will, and will not, be included on the list.
- The LTRMP budget will include at least 1% of annual funding for equipment refreshment.

OPERATIONAL PLAN FOR 2010-2014:

Implementation of actions to achieve the Plan during 2010–2014:

The Strategic Planning Team developed ranks for the Plan’s outputs and assigned priorities for activities within each output (Table 2). The Team used this information to develop considerations for how to implement the Plan during the 5-year period covered.

Although achieving the LTRMP mission requires full implementation of this Plan, many elements of the plan build upon other elements and can be sequenced (e.g., research is needed to define mussel sampling methods before a monitoring procedure can be established). Sequencing of activities can help create a smooth transition from the 2005–2009 plan to the 2010–2014 plan and can provide more effective use of effort under variable funding levels. There is also considerable flexibility in the amount of effort that can be applied annually to many of the Plan’s elements. Thus, these elements can be expanded or contracted as required.

Implementing the Plan will still require developing an annual Scope of Work for LTRMP. In developing the Scope, Program managers should reflect the priorities of the partnership and strive to maintain continuity of work between years whenever possible. But, they should also retain flexibility to account for annual budget variations, staffing capabilities, and unanticipated opportunities, including opportunities for cooperative efforts both within and outside the partnership that can enhance our collective capabilities.

The Strategic and Operational Plan can be accomplished under either EMP or NESP. Initial budget estimates indicate that full implementation will require more funding than is currently authorized under EMP. If a transition to NESP occurs, funds within NESP that are designated for LTRMP will be applied to carry out this Plan. However, some aspects of the Plan may be accomplished through other funding sources within NESP (e.g., funds designated for adaptive management or for project monitoring) in ways that leverage needs and capabilities between programs. Thus, some priorities expressed in the Strategic and Operational Plan may change once NESP is adequately funded.

Figure 1. Map of the Upper Mississippi River System showing locations of the study reaches for the Long Term Resource Monitoring Program (Navigation Pools 4, 8, 13, and 26; an Open River Reach on the Mississippi River; and La Grange Pool on the Illinois River).



Table 1. Sampling effort within the Long Term Resource Monitoring Program during fiscal years 2005–2009, with additional sampling to be added for 2010–2014, and data collected by each component.

Component	Study Area						Summary of data collected ¹
	4	8	13	26	La Grange	Open River	
Aquatic Vegetation	450 stratified random sample sites over growing season.	450 stratified random sample sites over growing season.	450 stratified random sample sites over growing season.	— ²	2	2	Species, abundance, frequency, distribution, depth, substrate, detritus
Fisheries	~160 samples; 2 periods: Aug. 1–Oct. 30, 6 sampling gears. Mix of stratified random and fixed sites.	~180 samples; 2 periods: Aug. 1–Oct. 30, 6 sampling gears. Mix of stratified random and fixed sites.	~200 samples; 2 periods: Aug. 1–Oct. 30, 6 sampling gears. Mix of stratified random and fixed sites.	~180 samples; 2 periods: Aug. 1–Oct. 30, 6 sampling gears. Mix of stratified random and fixed sites.	~270 samples; 2 periods: Aug. 1–Oct. 30, 6 sampling gears. Mix of stratified random and fixed sites.	~165 samples; 2 periods: Aug. 1–Oct. 30, 6 sampling gears. Mix of stratified random and fixed sites.	Species; catch-per-effort; length; subsample for weight, age, & diet; secchi; water depth, temperature, velocity, conductivity; vegetation density; substrate; dissolved oxygen
Added fish monitoring for 2010–2014	1 st period, June 15–July 31, 82 samples	1 st period, June 15–July 31, 82 samples	1 st period, June 15–July 31, 100 samples	1 st period, June 15–July 31, 92 samples	1 st period, June 15–July 31, 120 samples	1 st period, June 15–July 31, 82 samples	
Water Quality	135 stratified random sites done in each episode (winter, spring, summer, and fall); 14 fixed sites ³	150 stratified random sites done in each episode (winter, spring, summer, and fall); 13 fixed sites ³	150 stratified random sites done in each episode (winter, spring, summer, and fall); 12 fixed sites ³	121 stratified random sites done in each episode (winter, spring, summer, and fall); 9 fixed sites ³	135 stratified random sites done in each episode (winter, spring, summer, and fall); 11 fixed sites ³	150 stratified random sites done in each episode (winter, spring, summer, and fall); 9 fixed sites ³	Suspended solids, major plant nutrients, chlorophyll a, silica, pH, secchi, temperature, dissolved oxygen, turbidity, conductivity, vegetation type & density, wave height, depth, current velocity, depth of snow/ice, substrate, phaeophytin, phytoplankton (archived),
Added water quality monitoring for 2010–2014	14 fixed sites in Pools 4 biweekly during July and August.	4 historic + 2 new fixed sites, biweekly from April through August.	none	none	none	none	
Land Cover/Land Use	Land Cover/Land Use digital aerial photography will be acquired in 2010 and processed in subsequent years. Systemic land cover data for the Upper Mississippi River System is collected approximately every 10 years. To date, systemic land cover has been mapped twice through the Long Term Resource Monitoring Program, in 1989 and 2000.						

¹A full list and explanation of data collected by each component is available through the LTRMP data web site at http://www.umesc.usgs.gov/data_library/other/ltrmp_monitoring.html.

²Aquatic vegetation is not sampled in Pool 26 and La Grange because previous sampling revealed very low abundance, or in Open River due to a lack of suitable habitat.

³Frequency of fixed site sampling is bi-weekly in April, May, and June, and monthly in all other months, with no sampling in December and February (i.e., winter sampling in January only).

Table 2. Outcomes, Outputs, and Activities identified in the Long Term Resource Monitoring Program Strategic and Operational Plan, with ranks as assigned to Outputs and priorities as assigned to Activities within each Output. See the text of the Plan for a more complete description of each table element. Activities under “Regional Program Support & Management” are support elements provided by the Corps of Engineers and are not listed within the text of the Plan.

Rank for Outputs	Priorities for Activities	Outputs	Activities
Outcome 1			
1		1.1	Status and Trends
	1 1 1 1 1 1	Existing	Aquatic Vegetation Fisheries Water Quality LU/LC (Staff Support) Bathymetry (Staff Support) 2010 LU/LC (Data Interpretation)
	4 4 3 3 3 5	New	Bathymetry (acquisition) Bathymetry processing & serving LiDAR (acquisition) LiDAR processing & serving LiDAR (staff support) Status and Trends Report
4		1.2	Indicators
	1 2		Development Track status and trends
5		1.3	Added Info for Status & Trends
	1 1 1 1 2 2 3 3		Bathymetry Plan (Pending) LiDAR Plan (Adopted) Mussel Monitoring Plan + testing Mussel Monitoring Forests Plan + testing Forest Monitoring Macroinvertebrate Plan + testing Macroinvertebrate Monitoring
8	1	1.4	Sampling at Various Spatial Scales
Outcome 2			
2.5	1	2.0	Overarching Science Coordination Plan
2.5		2.1	Data Insights/Analysis
	1 1 1 2		Conduct analyses of LTRMP and other data sets Statistical Evaluation Data management Science management Analysis of existing data
2.5		2.2	Focused Research
	1 2 3 4 5 1		Provide data analysis (see output 2.1) Aquatic Vegetation Mussels Connectivity Landscape Special APE/science Mgmt.
7		2.3	Decision Support Tools
	2 1		Develop or improve model of sediment and flow dynamics Decision Support Systems

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9		2.4	Adaptive Management
	2 4 1 3		Clarify relationships Participate and provide... Participate in restoration and planning efforts Develop an approach to documenting and delivering lessons learned
Outcome 3			
6		3.1	LTRMP-HREP
	1 3 2		Restoration team and LTRMP meetings PDT involvement Science liaison Project evaluation/ecological monitoring
Outcome 4			
3	1	4.1	Outreach coordinator: communication strategy
	2 1 1 3		Informed Decisions (Who) Outreach Plan Public/officials Program Managers Project Managers Scientific/technical
3		4.2	LTRMP Info Satisfaction
	1 1 2		Deliver information Outreach team Improve delivery
Strategies			
1a		S1	Data serving
	1 2		Data Visualization Data management
1a		S2	Infrastructure
	1 4 3 1 2		Workforce plan Staff support & training Field Station Meetings Facilities Field Equipment
1a			Regional Program Support & Management
	4 2 3 1 1		2015-2019 planning Strategic/Operational Plan Updates UMESC (Report to Congress) USACE management USACE Technical Support