

PROJECT MANAGEMENT PLAN

GREAT LAKES AND MISSISSIPPI RIVER BASIN INTERBASIN FEASIBILITY STUDY (GLMRIS)

*A Detailed Study of the Great Lakes and Mississippi River Basins in the States of:
Minnesota, Wisconsin, South Dakota, Iowa, Illinois, Missouri, Indiana, Michigan, Kentucky,
Tennessee, Ohio, West Virginia, Virginia, North Carolina, Maryland, Pennsylvania, and New York*

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November 2010

PMP ACCEPTANCE SHEET

We have reviewed this document and certify that it contains accurate content and is sufficient to guide project execution for the Great Lakes and Mississippi River Interbasin Study.

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The office chiefs of the Chicago, Detroit, Buffalo, Louisville, Rock Island and St. Paul Districts, U.S. Army Corps of Engineers, have reviewed this Project Management Plan for the Aquatic Nuisance Species Interbasin Ecosystem Restoration Feasibility Study, as developed by the Project Delivery Team, and, we hereby approve this document.

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The staff of the Chicago, Detroit, Buffalo, Louisville, Rock Island and St. Paul Districts, U.S. Army Corps of Engineers, have reviewed this Project Management Plan for the Great Lakes and Mississippi River Study, as developed by the Project Delivery Team. As representatives of our individual U.S. Army Corps of Engineers Districts we hereby approve this document.

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PMP ACCEPTANCE SHEET

We have reviewed this document and certify that it contains accurate content and is sufficient to guide project execution for the Great Lakes and Mississippi River Interbasin Study.

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1.0 PURPOSE

A Project Management Plan, herein referred to as a PMP, is defined as a formal, approved, living document, which is utilized to define project requirements, identify expected outcomes, and guide project execution and control. The basic structure and key components of a PMP are defined by the U.S. Army Corps of Engineers (USACE) Engineer Regulation, ER 5-1-11, Nov-2006. Primary uses of a PMP include the facilitation of communication among project participants, the delegation of project delivery team (PDT) responsibilities, the definition of assumptions, and the documentation of the processes toward establishing a baseline plan for scope. The PMP exists as a “living” document which can be adjusted, as necessary and with the appropriate approval process, as a project evolves.

The PMP for the Great Lakes and Mississippi River Interbasin Study (GLMRIS) has been developed by USACE, Chicago District, in collaboration with sister Districts from within the Great Lakes and Ohio River Division (LRD), including Detroit, Buffalo, Louisville, and Huntington Districts, as well as the Mississippi River Valley Division (MVD), including Rock Island and St. Paul Districts. Guidance for development of this PMP has also been received from associated Division Headquarters. The purpose of this PMP is to serve as the roadmap for the feasibility study process of GLMRIS. Specifically, this PMP will:

- a. Establish a framework to define the planning approach, including activities to be accomplished, a working schedule, and estimated associated costs; the PMP will also define project goals and expectations, particularly regarding scope, assumptions, constraints, costs, and schedule
- b. Develop a plan for acquiring and delivering a project that meets stakeholder expectations, objectives, and needs
- c. Establish a robust internal and external communications strategy
- d. Define and control the scope of the project
- e. Define the resources and team structure necessary for project success

2.0 SCOPE OF WORK

In collaboration with Federal, state, local, and non-governmental entities, the U.S. Army Corps of Engineers (USACE) is conducting a Feasibility Study of the options and technologies, collectively referred to as ANS controls, that could be applied to prevent or reduce the risk of aquatic nuisance species transfer between Great Lakes and Mississippi River basins, through aquatic pathways. The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 defines aquatic nuisance species (ANS) as all “...nonindigenous species that threaten the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters”¹.

GLMRIS Authority

The authority for the development of this Feasibility Study addressing ANS in the Great Lakes and Mississippi River basins has been specifically authorized by Congress²:

“The Secretary, in consultation with appropriate Federal, State, local and nongovernmental entities, shall conduct, at Federal expense, a feasibility study of the range of options and technologies available to prevent the spread of aquatic nuisance species between the Great Lakes and Mississippi River Basins through the Chicago Sanitary and Ship Canal and other aquatic pathways.”
(Water Resources Development Act of 2007, Pub. L. 110-114, §3061(d))

GLMRIS is funded entirely through Federal funds; as such, yearly appropriations will be allocated by Congress for the implementation of this study.

GLMRIS Objectives

USACE has developed the following study goals to ensure the prevention or reduction of the risk of ANS transfer between the Mississippi River and Great Lakes basin; it is anticipated that the goals and objectives of the study will be refined as it continues to unfold:

- i. Identify and engage interested stakeholders
- ii. Inventory all potential aquatic pathways for ANS transfer between the Great Lakes and Mississippi River basins
- iii. Identify the realm of current or potential future ANS to be included in the study. “Future ANS” are defined as organisms that currently reside within one basin which may have the potential to threaten the environmental, economic, or social integrity of the other basin.
- iv. Analyze appropriate control or management alternatives in order to protect aquatic ecosystems, fisheries and associated economies, commercial economies, and recreational and social uses of aquatic pathways
- v. Recommend actions or additional studies based on the analysis of the ANS control alternatives and their respective regulations or impacts to users of the aquatic pathways

USACE will develop a Draft Feasibility Study document and a Draft Environmental Impact Statement (EIS) as directed in the study authority. The development of the Feasibility Study will require USACE to incorporate the use of USACE’s 6-Step Planning Process³; this process can be found in detail with objective-specific definitions in Section 3.0 of this report. The 6-Step Planning Process is iterative by design and will aid in delineating both the expansive geography and complex nature of this project. This process will be used to further develop the objectives listed above; it is expected that the process will lead to a refinement of the scope as additional technical factors become elucidated. A Scope Management Plan has been developed for the management, containment, and verification of the GLMRIS scope. This plan is addressed in Sections 2.2 and 2.3, and will be used in coordination with internal Corps Districts and Divisions, as well as external agency support. Special consideration of scope management will provide a mechanism for controlling the scope and verifying scope completion.

GLMRIS Study Area

Located entirely within the United States, the GLMRIS study area includes the Great Lakes and Mississippi River basins, as shown in Plate 1. USACE has defined a *Detailed Study Area* to include the geographic regions where the largest economic, environmental,

and social impacts are anticipated when implementing ANS controls recommended by GLMRIS. The *Detailed Study Area* exists along the border of the Great Lakes and the Mississippi River basins, and encompasses the entire Great Lakes basin, as well as the Upper Mississippi River and Ohio River watersheds. The *Detailed Study Area* includes portions of seventeen U.S. states and borders two Canadian provinces (Plate 1).

USACE acknowledges that the potential migration of aquatic nuisance species is likely not confined by regional borders, and is more accurately delineated by the full extent of watershed boundaries. Such migration has been observed by the spread of the Zebra mussel from the Great Lakes into the larger Mississippi River basin. Therefore, the *General Study Area* expands the boundaries of the project to encompass the lower Mississippi River basin and all of its tributaries. While the majority of GLMRIS tasks will be completed within the *Detailed Study Area*, USACE will consider specific ANS impacts into the larger *General Study Area*.

Although ANS transfer could possibly occur between the United States and Canada, as well as via inter-basin connections such as the St. Lawrence Seaway on the far eastern boundary of the Great Lakes basin, it is not within the authority of this study to address ANS controls for transfer over international boundaries, or beyond the interface of the Great Lakes and Mississippi River basins. Nonetheless, a commensurate level of involvement, coordination, and communication will be pursued with stakeholders outside of the immediate project area – including other state and bi-national agencies – as it is recognized that other studies or initiatives may be able to inform or affect the recommendations presented by GLMRIS.

Due to the size of the GLMRIS *Detailed Study Area*, numerous stakeholders will participate in the development of goals, objectives, scope, and alternatives that have the potential to impact the entire Mississippi River and Great Lakes basins. Projects that result from GLMRIS may be implemented by Federal, state, local, or international agencies, as subject authorities allow. However, any future project that may be recommended for implementation by USACE as a result of GLMRIS will require commensurate Congressional authorization and appropriation prior to any further action by USACE. Future construction authorities may also require qualified non-Federal sponsors to provide required lands, easements, rights-of-way, relocation, and disposal/borrow areas (LERRDs), cost share in any construction activities, and assume full project operation and maintenance responsibilities following construction completion, unless the Corps is directed by Congress to implement, operate, and maintain the facility at full Federal expense. Any additional follow-on studies resulting from GLMRIS will also require a non-Federal sponsor to cost share study costs and assume the responsibilities identified in the previous sentence unless otherwise directed by Congress.

GLMRIS Focus Areas

GLMRIS will ensure that all potential aquatic pathways will be addressed. To maximize the efficiency of the study process, USACE is conducting GLMRIS along two parallel tracks, with scoping and study implementation activities taking place in each concurrently.

Focus Area I

The first track, Focus Area I, addresses the goal of preventing, or reducing the risk of transfer of ANS via the Chicago Area Waterway System (CAWS). The CAWS is the only known continuous connections between the Great Lakes and Mississippi River basins, and therefore poses the highest risk of potential ANS transfer. A detailed map of Focus Area I is shown in Plate 2.

Focus Area II

The second track, Focus Area II, identifies and evaluates all other aquatic pathways, outside of the CAWS, which have the potential to transfer ANS between the basins. The extent of Focus Area II follows the geographic basin divide of the Great Lakes and Mississippi River watersheds (Plate 1).

The Focus Area II study team has generated a risk-characterization report that seeks to identify other potential connections outside of the CAWS, as well as perform a screening-level assessment of potential ANS which may transfer via these connections. In the preliminary report completed in October 2010, 36 potential surface water connections have been identified that may form across the drainage divide that separates the Great Lakes and Mississippi River basins. A total of 18 of these locations have been initially determined to pose significant risk of potential transfer of ANS; the draft report provides detailed recommendations for completing the identification and characterization of ANS transfer risk across each of those locations. Completion of the risk characterization at these locations will be used to finalize the scope of Focus Area II, and will serve as the basis for revising the scope, and prioritizing the schedule and budget of the PMP for Focus Area II. As the PMP is a living document, these elements will be incorporated into the PMP as they are developed.

2.1 PROJECT REQUIREMENTS STATEMENT

New species have been introduced into the Mississippi River and Great Lakes basins during the last half of the 1900's and continue through present as a by-product of international trade. At the same time, environmental laws have changed the way municipalities and industries dispose of their waste products into rivers and streams, resulting in improved water quality in many lotic environments (uniquely characterized by flowing water and a diversity of plant and animal life), which has allowed aquatic organisms to disperse over a greater area. This greater dispersal was seen as positive when it restored native species to their historic range; however, it has been environmentally, economically, and socially problematic when it allowed non-native species to colonize new areas. The commercial and sport fisheries of the Great Lakes, which could be impacted by invasive species from the Mississippi River basin, have been reported to be worth some multi-billion dollars annually⁴. The last comprehensive economic study on the value of the fisheries industry was conducted in 1985⁵, and GLMRIS will address the need for updated economic data. As a point of reference for potential management costs which may be incurred by the spread of ANS, the zebra mussel, which moved from the Great Lakes into the Mississippi River basin, are

estimated to cost between \$100M and \$400M in the Great Lakes per year by the National Oceanic and Atmospheric Administration (NOAA)⁶.

The Chicago and Sanitary Ship Canal (CSSC) is a man-made, continuous hydrologic connection between the Great Lakes and Mississippi River basins that was constructed in the first-quarter of the 20th century. The CSSC is part of a larger make-up of hydrologic connections in the Chicago Area Waterway System (CAWS) (Plate 2); the canal is the main aquatic avenue of transfer for invasive species between the two basins. As it is the only known continuous connection between the basins, it is the primary focus of GLMRIS.

The Chicago District of the U.S. Army Corps of Engineers currently operates an Electrical Dispersal Barrier System, designed to reduce the risk of inter-basin transfer of fish – specifically Asian carp – from the Mississippi River to Great Lakes drainage basins via the CSSC. This system consists of three electrical barriers, Barrier I, IIA and IIB. Barriers I and IIA are constructed and in operation, and the construction of Barrier IIB is scheduled to be completed in late 2010. Although research has demonstrated that the electric barrier system is an effective control against aquatic nuisance fish, like the Asian carp, it will likely not be effective for many other species, which may transfer between the basins via methods other than swimming (i.e floating or vessel transport).

GLMRIS also considers other connections that exist between the Great Lakes and Mississippi River basins, including additional man-made, secondary, or intermittent hydrologic connections, such as episodic floodways or drainage ditches. These connections could allow ANS to transfer between the basins, effectively circumventing any actions taken to prevent ANS transfer through the CAWS.

2.1.1 RELATIONSHIP OF GLMRIS TO OTHER STUDIES

It is important to differentiate between the scope and objectives of GLMRIS in comparison to other concurrent studies relating specifically to Asian carp and the CAWS. These other studies can be broadly differentiated into two categories: *USACE Efficacy Study* and *Studies by Other Organizations*.

USACE Efficacy Study

In addition to GLMRIS, USACE has been directed to conduct a study of a range of options or technologies to address the hazards that may reduce the efficacy of the Electrical Dispersal Barrier System located on the CSSC. The series of reports generated by this study are referred to collectively as the Efficacy Study. The Efficacy Study currently consists of the following interim reports:

Interim I, Dispersal Barrier Bypass Risk Reduction Study and Integrated Environmental Assessment – Details construction of measures to prevent Asian carp from bypassing the electrical barrier system during flood events on the Des Plaines River and through culverts in the Illinois and Michigan (I&M) Canal.

Interim II, Electrical Barrier Optimum Operating Parameters – Discusses the development of Optimum Parameters for Operation of the existing Electrical Dispersal Barrier System.

Interim III, Modified Structures and Operations, Chicago Area Waterways – Evaluates the opportunities for USACE to support local, state, and Federal agency actions as well as the potential for risk reduction that might be achieved through potential changes in the operation of the Chicago-area locks, dams and associated structures.

Interim IIIA, Fish Deterrent Dispersal Deterrents/Barriers, Illinois and Chicago Area Waterways and Environmental Assessment – Investigates and evaluates additional deterrent measures that could be quickly employed to reduce the risk of the Asian carp dispersing into the Great Lakes.

Final Efficacy Report - Includes a summary of all interim reports and will include a summary of the efforts underway by the other agencies that makeup the Asian Carp Regional Coordinating Committee. The report documents the improvements that have been made to increase the efficacy of the Electric Barriers Project. Further, the report contains evaluation of additional risk reduction measures to specifically address the open pathways to Lake Michigan: the Grand Calumet River which outlets at the Indiana Harbor and Canal; and the Little Calumet River, which outlets at Burns Ditch. Near term efforts, including monitoring and population reduction of Asian carp are being carried out in cooperation with other agencies and concerned stakeholders. It is anticipated that USACE may develop addendums to the Final Efficacy Study in the future to document additional recommendations or to provide an update to stakeholders on the efficacy of the system.

Overall, the *Final Efficacy Study* and related *Interim Reports* provide a means to address the current issues with the Asian carp management in the Chicago area. GLMRIS will expand on the scope of the Efficacy Study, by identifying all potential hydrologic connections, including all episodic and anthropogenic links, as well as exploring the greater realm of current and potential future ANS.

Studies by Other Organizations

A number of non-governmental organizations have proposed or released reports intended to address ANS in the Great Lakes. USACE intends to use any such research or reports as inputs to inform GLMRIS. However, GLMRIS differs from these studies in a variety of ways:

- i. GLMRIS covers both the Great Lakes and Mississippi River basins; a broader geographic area than has, or will be addressed, by other studies
- ii. GLMRIS considers all ANS; not just Asian carp
- iii. GLMRIS evaluates all potential ANS controls; other studies often have a singular focus (i.e. basin separation)
- iv. GLMRIS considers impacts of ANS controls on the full realm of current economic, environmental, and social waterway uses, as well as the impacts of ANS controls to significant natural resources

The intent of GLMRIS is to provide long-term solutions that prevent or reduce the risk of ANS transfer between the Great Lakes and Mississippi River basis via aquatic pathways.

2.2 SCOPE MANAGEMENT PLAN

The Scope Management Plan, captured within this section of the PMP, details how the scope will be defined, developed, verified, and safeguarded.

Scope Definition

The scope of GLMRIS will gain definition and focus in the early stages of study development; this process is known as scoping. Study scoping is accomplished through development of a USACE study team, collaboration with other Federal and state agencies, as well as coordination with non-governmental agencies and the public. Public participation opportunities in project scoping are guided by the National Environmental Policy Act, which requires the preparation and implementation of public participation plans to guide the public and stakeholder involvement process when preparing an Environmental Impact Statement (EIS).

The scope for GLMRIS, in its entirety, is defined by the Scope Statement and Goals found in Section 2.0. The scope of Focus Area I (CAWS) is defined in more detail by the Work Breakdown Structure (WBS) found in Appendix 2 of this report. Making some general assumptions, the WBS also estimates costs for Focus Area II. The scope of Focus Area II (Other Pathways) is further defined by the priorities outlined in the Risk Characterization report, included as Appendix 3.

Efforts are currently underway to develop a more detailed schedule and budget WBS for Focus Area II implementation, based on the results of the final Risk Characterization report. Once completed, the Focus Area II WBS will be incorporated into the PMP, by appropriately revising the current WBS.

Scope Verification

The overall scope is verified by matriculating it against the study authorization², USACE Headquarters Implementation Guidance (Appendix 5), as well as USACE Planning and Policy guidance documents. The scope is safeguarded by utilizing the USACE 6-Step Process³ throughout study execution, in order to iteratively manage the scope baseline (project goals). Consideration of necessary modifications to project scope is a critical component of scope management, and follows a defined approval process (below).

Scope Management

Scope management will be the responsibility of the GLMRIS Project Manager, in collaboration with Product Delivery Team managers, with oversight by the USACE Executive Steering Group (ESG). Described in further detail in Section 5.0, the ESG is comprised of Senior USACE Leadership directly responsible for project control. The ESG is primarily responsible for refinement in study direction and ensuring prioritization of resources with respect to all GLMRIS focus areas.

The opportunity for partnering Federal and state governmental agencies to provide input with regard to scope management will be achieved through the agencies' formal participation in the GLMRIS Executive Steering Committee (ESC). Also discussed in further detail in Section 5.0, the ESC is a collaborative body of Federal, state, and

regional governmental authorities assembled to advise the implementation of GLMRIS by informing USACE of relevant partner-agency activities that may pertain to study efforts.

The Project Managers, PDTs, and ESG will utilize this PMP document for establishing project scope. Proposed scope changes may be initiated by any member of the project teams, and these changes shall be submitted to the GLMRIS Project Manager who will evaluate the scope change and provide a recommendation to the ESG. Upon acceptance by the ESG during quarterly or “special call” meetings, the GLMRIS Project Manager will document these changes via a modification to the PMP, and submit them to the appropriate approving officials as defined in the Change Management Plan, discussed in further detail in Section 11.0. Approval of PMP (i.e. scope) changes is the purview of the USACE Executive Steering Group.

The GLMRIS Project Manager and PDTs will work together to control the scope of the project. The PDTs will use the Focus Area-specific WBS as a statement of work and will ensure that each element of their portion of the WBS is fulfilled. If a change to the project scope is needed, the process for recommending changes to the scope must be carried out. The appropriate Project Manager is responsible for administering project scope and generating project deliverables.

2.3 SCOPE VERIFICATION

As this project progresses, the GLMRIS Project Manager will verify interim project deliverables against the original (or modified) scope, as defined in the Scope Management Plan. Once the Project Manager verifies that the scope and deliverables defined in the project plan, the Project Manager will forward deliverables related to the Feasibility Report to the appropriate authority for final acceptance.

3.0 PLANNING PROCESS

The development of a Feasibility Study requires that the study team incorporate the use of USACE’s 6-Step Planning Process³, derived from the [Principles and Guidelines](#) and the USACE Planning Guidance Notebook, [ER 1105-2-100](#). This Planning Process is iterative by design and will:

1. Specify Problems and Opportunities
2. Inventory and Forecast Conditions
3. Formulate Alternative Plans
4. Evaluate Effects of Alternative Plans
5. Compare Alternative Plans
6. Select Recommended Plan

Detailed descriptions of the steps that the GLMRIS Planning Process is following are outlined in the subsequent sections. The process described is applicable to both Focus Area I (CAWS), as well as those connections warranting further study in Focus Area II, which are identified in the *Other Pathways Risk Characterization Report* (Appendix 3). The steps detailed within this section are intended to be comprehensive in nature, and focus on all aspects of economic, environmental, and social uses of an aquatic pathway,

as well as the protection of significant natural resources. Consequently, some tasks which are identified for Focus Area I, such as an inventory and analysis of commercial navigation, may not be applicable to an aquatic pathway – such as a ditch or episodic floodway – identified in Focus Area II. On the other hand, opportunities exist among both Focus Areas to collaboratively share information, such as an inventory of ANS and the identification of significant natural resources, which are applicable throughout the study area. Any opportunities to share information between both Focus Areas will be leveraged.

3.1 PROBLEMS & OPPORTUNITIES

This step provides the foundation for the scoping and planning process. A clear statement of problems and opportunities is critical for the success of the entire planning process. With the objectives found in Section 2.0, USACE has initially identified the following problems and opportunities:

Problems:

- i. ANS have been introduced to the Great Lakes and Mississippi River basins and will likely continue to be introduced.
- ii. ANS dispersion throughout the Great Lakes and Mississippi River basins has, and is projected to, cause economic, environmental, and social impacts.
- iii. The CAWS artificially connects the Great Lakes and Mississippi River basins and provides a means of ANS transfer between the basins
- iv. Additional pathways such as episodic floods, known and unknown connections, and human transport contribute to ANS transfer between the Great Lakes and Mississippi River basins.

Opportunities:

- i. Protect the Great Lakes and Mississippi River aquatic ecosystems from the transfer of ANS between basins.
- ii. Protect the Great Lakes and Mississippi River fisheries and associated economies.
- iii. Protect the Great Lakes and Mississippi River recreational and commercial economies.
- iv. Recommend, where necessary, controls or additional detailed studies to reduce the risk of further transfer of ANS between the Great Lakes and Mississippi River basins via human transport and other non-aquatic pathways.

In consultation with the ESC and Stakeholder groups – including the public – USACE will continue to update the list as additional problems and opportunities are identified.

3.2 INVENTORY AND FORECAST CONDITIONS

USACE will gather data about historic and existing conditions and will use this information to qualify problems and opportunities and to define the most likely future “without project” conditions.

Inventory Historic and Existing Conditions – USACE will gather the following information to inventory existing conditions. The list may grow as the study evolves and other problems or opportunities are identified; additionally some of these inventories may not be inherently applicable to both Focus Areas. As it is considered a living document, the PMP will be updated as appropriate:

Table 1: Inventory of Historic and Existing Conditions by Functional Team

<i>Team Lead</i>	<i>Condition Inventory Task</i>	<i>Supporting Team</i>
Natural Resources	Identify significant natural resources relevant to problems and opportunities.	--
	Quantify significant natural resources through index formulation or other necessary tools.	--
	Identify existing ANS and their potential transport mechanism.	--
	Identify critical habitat where the ANS transfer is possible.	--
	Cultural Resources: <ul style="list-style-type: none"> Identify cultural resources of national, regional, or local importance where plan alternatives may be implemented. 	--
	<ul style="list-style-type: none"> Identify Native American tribes that have a cultural interest in the areas where plan alternatives may be implemented. 	--
Hydrology & Hydraulics	Identify existing potential connections between the Great Lakes and Mississippi River basins using hydrologic and hydraulic analyses.	--
	Develop and analyze models and data to address relevant requirements.	--
	Develop and analyze models and data to address relevant requirements.	--
	For each existing potential connection, determine the frequencies by which the Great Lakes and Mississippi River basins are hydrologically connected to form an aquatic pathway.	--
	Identify flood control issues.	<i>Navigation & Economics</i>
Navigation & Economics	Commercial and Recreational Navigation: <ul style="list-style-type: none"> The number and type of waterway users and the location of travel. 	--
	<ul style="list-style-type: none"> The volume and weight of commodities transported between the subject basins and cost of transport. 	--
	<ul style="list-style-type: none"> The income generated from recreational navigation and tour boats, and average cost per trip. 	--
	Commercial Fisheries: <ul style="list-style-type: none"> Estimate the economic value of Great Lakes and Mississippi River basins' fisheries. 	
	<ul style="list-style-type: none"> Estimate the economic value of related businesses. 	
	Sport Fisheries: <ul style="list-style-type: none"> Estimate the economic value of Great Lakes and Mississippi River basins' sport fisheries. 	--
	<ul style="list-style-type: none"> Estimate the economic value of related businesses. 	--
	Hydropower: <ul style="list-style-type: none"> The power plants in the Great Lakes and Mississippi River basins that use these waterways to generate power and whether plant licensing is current. 	--
<ul style="list-style-type: none"> Amount of power produced by these plants and the economic value of this power. 	--	
Technology	Identify ANS controls for each ANS transport mechanism (active, passive, or assisted).	<i>Natural Resources</i>
	Estimate the cost to construct, operate and maintain each ANS control.	<i>Navigation & Economics</i>
	Gather information on locations where ANS controls could be implemented.	--
	Prepare early detection/response guidelines	

Table 1 (cont'd): Inventory of Historic and Existing Conditions by Functional Team

<i>Team Lead</i>	<i>Condition Inventory Task</i>	<i>Supporting Team</i>
Environmental Resources	Identify the existing water quality for the portion of the Great Lakes and Mississippi River basins where plan alternatives may affect or be affected by water quality.	--
	Identify the existing air quality for the portion of the Great Lakes and Mississippi River basins where plan alternatives may affect or be affected by air quality issues.	--
	Wastewater Treatment Plants and Municipal Drinking Water Treatment Plants – for each treatment plant that may be impacted by ANS control alternatives, identify the following: <ul style="list-style-type: none"> • The capacity of the treatment plants. 	Navigation & Economics
	<ul style="list-style-type: none"> • The volume of treated effluent and discharge locations. 	Navigation & Economics
	<ul style="list-style-type: none"> • The population of the service area. 	Navigation & Economics
	<ul style="list-style-type: none"> • Potential modifications to plant operations. 	Navigation & Economics
	Industrial Water User or Dischargers – This group is defined as i) users that are not drinking water plants and ii) dischargers that are not wastewater treatment plants. For industrial water users and dischargers that may be impacted by ANS control alternatives identify the following: <ul style="list-style-type: none"> • The water users by identifying facilities that have National Pollutant Discharge Elimination Permits. 	Navigation & Economics
	<ul style="list-style-type: none"> • The water dischargers by identifying facilities that have permits to extract water from these water basins. 	Navigation & Economics
	<ul style="list-style-type: none"> • The volume of water these facilities remove from the Great Lakes and Mississippi River basins. 	Navigation & Economics
	<ul style="list-style-type: none"> • The volume of effluent these facilities pump into the Great Lakes and Mississippi River basins. 	Navigation & Economics
<ul style="list-style-type: none"> • The locations of the industrial water users and dischargers. 	Navigation & Economics	
<ul style="list-style-type: none"> • The economic value of each industrial water user and discharger. 	Navigation & Economics	

Forecast Future Without Project Conditions – The “future without project” condition is the most-likely condition expected to exist in the future in the absence of a proposed project. USACE will forecast “without project” conditions and will use this forecast as the benchmark against which the teams will evaluate all alternative plans. The forecast will extend from the base year (the year when the proposed project is expected to be operational) to the end of the period of analysis.

To forecast future without project conditions, USACE initially identified the following tasks that must be completed. As the study progresses, USACE, working in collaboration with the ESC and project Stakeholders may identify additional tasks.

- i. Identify future ANS and their potential transport mechanism(s). (“Future ANS” are defined as organisms that currently reside within one basin which may have the potential to threaten the environmental, economic, or social integrity of the other basin.)
- ii. Identify the impact uncontrolled ANS will have on the significant natural resources, within the Great Lakes and Mississippi River basins, using the ecological risk assessment developed for existing conditions.
- iii. Identify long-term changes in commodity movement and recreational navigation between Great Lakes and Mississippi River basins and along the CAWS.
- iv. Identify actions that Federal, state and municipal agencies and non-governmental organizations may take to minimize ANS transfer between the Great Lakes and Mississippi River basins.

- v. Identify changes in the Great Lakes and Mississippi River basins which may be caused by climate change.

3.3 ALTERNATIVE PLAN FORMULATION

Alternative Plan Formulation is the process USACE will use to build alternative plans that meet study objectives, without violating constraints. These alternative plans will also endeavor to solve the study's problems while realizing opportunities.

USACE, in collaboration with the ESC agencies and project Stakeholders, will identify reasonable management measures; a management measure is an option, technology or control that can be used to address one or more of the study objectives. Applicable to both Focus Areas, a management measure will i) prevent or reduce the risk of ANS transfer between the Great Lakes and Mississippi River basins, and ii) mitigate or provide alternative facilities or measures for users of aquatic connections. USACE has initially identified the following management measures or controls that may prevent or reduce the risk of ANS transfer between the basins. However, as the study progresses, management measures may be identified as information is exchanged between USACE and other project Stakeholders, including the public. Note the controls are not listed in any particular order.

- i. *Physical Separation* - Physical separation measures to prevent or reduce the risk of ANS transport between the Great Lakes and Mississippi River basins may include, but are not limited to:
 - Lock Modification
 - Sterilization Barrier
 - Ecological Separation
 - Hydrologic Separation
- ii. *Legal and Political Controls* – Legal and political controls to reduce the risk of ANS transfer between the Great Lakes and Mississippi River basins may include but are not limited to the following:
 - Passage and enforcement of laws with fines for importing ANS.
 - International treaties and agreements.
 - Taxation on the importation of ANS.
 - Subsidies for an over-harvest of ANS.
- iii. *Behavioral Controls* – Behavioral controls refer to deterrents that would influence the behavior of ANS or humans and thereby reduce the risk of ANS transfer between the basins. Possible behavioral controls for ANS and for humans may include but are not limited to the following:
 - *ANS behavioral controls* – Modifications to the aquatic environment so ANS avoid specific areas or basins through methods such as air bubble curtains, thermal barriers, electric barriers, chemical barriers, low dissolved oxygen barriers and predation.
 - *Human behavioral control* – Public education, including international audiences, to increase awareness of ANS and of ways to reduce ANS transfer.

For each ANS control, USACE will identify the following:

- i. Effects each ANS control will have on the users of the CAWS and other aquatic pathways between the basins and significant natural resources.
- ii. Management measure(s) to address users impacted by implementation of ANS controls.
- iii. Costs, outputs, and uncertainties for each ANS control.

3.4 PLAN EVALUATION

USACE will screen the controls and eliminate low-performing measures using established criteria the Study Team selects. USACE initially identified the following tasks the Study Team may complete to establish these criteria; however, the Study Team may revise these criteria as the study continues:

- i. *Output* – Estimate the risk reduction for transfer between the Great Lakes and Mississippi River basins for each mode of ANS transport and estimate the long-term economic impacts each control has on the basin’s users.
- ii. *Cost* – Estimate the cost to construct, operate and maintain each control, and the cost to construct, operate and maintain mitigation or alternative measures and facilities for impacted users.

USACE will combine the screened measures into reasonable alternative plans with the goal of meeting the greatest number of objectives while avoiding constraints.

3.5 PLAN COMPARISON AND SELECTION

After the alternative plans have been screened using the two metrics above, USACE will establish design criteria by which the alternatives can be prepared. The following criteria have been initially developed, though these criteria may expand and evolve over the course of the project: i) Reduced risk of ANS transfer, ii) Potential impact to significant natural resources, iii) Cost, iv) Effectiveness, and v) Environmental suitability.

Based on the selected decision criteria, USACE will use a cost effectiveness/ incremental cost analyses to evaluate the cost and output of each alternative plan over the period of analysis. USACE will evaluate the plans based on their suitability for completeness, effectiveness, efficiency, and acceptability against planning objectives; economic evaluation of alternative plans will assume risk-neutrality⁵.

4.0 FEASIBILITY STUDY PRODUCTS

Feasibility Report and Environmental Impact Statement

For Focus Area I (CAWS), as well as any other aquatic pathways in Focus Area II identified for further USACE feasibility-level study, USACE will construct and prepare a Feasibility Report and integrated Environmental Impact Statement (EIS) with sufficient detail to support a decision for construction authorization. The report will contain relevant appendices, design plates, and quantity estimates that provide backup documentation and support report recommendations. Additionally, the report will document project costs and environmental benefits at a level of design commensurate with the Feasibility Study process.

The Feasibility Report and EIS must undergo both technical and policy compliance review. Technical review will be performed by a combination of independent experts within USACE, other federal agencies, and/or private consultants. Policy compliance review is performed at the USACE Division (LRD) and USACE Headquarters levels, and is intended to identify and resolve policy concerns that might otherwise delay or preclude approval of Feasibility Reports. Prior to preparation of the draft Feasibility Report, a minimum of two compliance reviews including a Feasibility Scoping Meeting (FSM) and Alternative Formulation Briefing (AFB) must be completed. If there are additional requirements for USACE Headquarters involvement in the study that are not met by the FSM or the AFB, an Issue Resolution Conference (IRC) or In-Progress Review (IPR) may be held. Additional quality assurance measures are addressed in further detail in Section 7.0 of this document.

Interim Products

Recognizing the significant Stakeholder and public interest that GLMRIS will generate, in combination with the extended timeline necessary to generate a final Feasibility Report that meets all technical review and policy-compliance standards, the Study Team will endeavor to compile and produce intermediate products, as appropriate. Many of these reports will be generated from the data-gathering phase, and include items such as an ANS Inventory and ANS Control Methodologies; Commercial Cargo, Passenger, and Recreational Boating surveys; as well as the commercial and recreational valuation of the Great Lakes and Mississippi River fisheries. If the study team assesses that effective action to reduce ANS transfer risk may be available before the full study is complete, interim measures may be recommended for further action. All such interim products or reports will be subject to appropriate levels of technical review.

Other Pathways Risk Characterization Report

The Focus Area II study team has generated a risk-characterization report that seeks to identify other potential connections outside of the CAWS, as well as perform a screening-level assessment of potential ANS which may transfer via these connections. The resulting report identified 36 locations in five states where an aquatic pathway could potentially develop. A total of 18 of these locations have been initially determined to pose significant risk of potential transfer of ANS; the remainder are considered to pose insignificant risk. One of the locations identified, the Eagle Marsh in Fort Wayne Indiana, was deemed to pose an imminent risk for the potential for Asian carp to reach Lake Erie. At this location, stakeholder agencies recommended implementation of an immediate interim risk reduction measure, as well as initiation of efforts for a long-term measure to prevent ANS transfer. The interim measure was completed under the lead of the Indiana Department of Natural Resources in September 2010, and USACE initiated a study of options and technologies for long-term risk mitigation that is scheduled to be completed by the end of 2011.

At the other 17 locations, the *Other Pathways Risk Characterization Report* recommends continued collaboration with the local and state resource agencies to finalize the risk characterization and to identify measures that may be implemented by Federal, state or local entities to mitigate existing risk. For some of the aquatic pathways identified in

Focus Area II, USACE may prepare a stand-alone document, subject to authority and Federal or non-Federal funding, similar to a USACE Detailed Project Report. In locations deemed by the *Other Pathways Risk Characterization Report* to pose significant risk of potential ANS transfer between basins, the potential exists that further USACE activities may proceed under one of the Continuing Authority Program (CAP) authorizations that integrates NEPA and decision document requirements. A detailed, scope, schedule, and budget will be developed for Focus Area II upon the finalization of the *Other Pathways Risk Characterization Report*.

5.0 WORK & MANAGEMENT COORDINATION

In order to ensure comprehensive and efficient planning of the GLMRIS project, deliberate consideration has been given to the organizational and management structure of the GLMRIS Study Team. Lessons learned from other regional USACE feasibility studies, as well as regional business process initiatives have been incorporated into the study management and functional organization. The management and coordination of each aspect of GLMRIS will be accomplished following the general hierarchy outlined below. A detailed organizational chart representing the lines of responsibility and communication between the USACE organization and all coordinating entities is, for clarity, attached as Appendix 1.

5.1 PROJECT MANAGEMENT AND COORDINATION

Executive Steering Group

USACE leadership from the Great Lakes and Ohio River Division (LRD) as well as the Mississippi River Valley Division (MVD) will form an executive-level oversight committee known as the Executive Steering Group (ESG). The ESG will be comprised of the Commanding Generals and Senior Executive Service representatives from LRD and MVD, District Commanders and Deputies for Project Management, or their designees, as well as the LRD and MVD Regional Integration Team representatives from Headquarters, USACE. The ESG will meet quarterly, or more often if determined necessary, to receive updates on the progress and direction of GLMRIS, and will provide internal guidance in accordance with USACE policies and directives. In order to gain efficiencies on the implementation of GLMRIS, the ESG will also have a primary role in coordinating with partner Federal and state agencies, via the Executive Steering Committee (outlined below). The ESG body is ultimately responsible for directing successful study implementation.

GLMRIS Project Manager

The GLMRIS Project Manager (PM) is responsible for the staff-level implementation of all aspects of GLMRIS. The GLMRIS PM is primarily responsible for the coordination of efforts among the two primary PDTs – the CAWS and the Other Pathways. The GLMRIS PM is also responsible for synchronizing the resources of the GLMRIS Functional PDTs with the two Focus Area PDTs.

The GLMRIS PM is responsible for developing and executing outreach efforts for GLMRIS, in close coordination with the Communications Functional PDT, the Focus Area PDTs, as well as with the ESG. Lessons learned from previous regional studies

highlight the need for clear strategic communication plans, which identify key messages and target specific audiences. The GLMRIS PM is responsible for working with each of the PDTs, as well as with the ESG to identify and implement the strategic communications requirements.

The GLMRIS PM is also responsible for reporting and coordinating all major GLMRIS efforts with the ESG. In working with the ESG, the GLMRIS PM is also responsible for relaying direction from the ESG and overseeing the implementation of such guidance.

GLMRIS Functional PDTs

The GLMRIS Functional PDTs for the nucleus of the GLMRIS Study Team. These PDTs incorporate expertise from across the USACE organization, including subject-matter experts (SMEs) from USACE Centers of Expertise, District-base Regional Technical Experts, and the USACE Engineering Research and Development Center. The Functional PDTs currently include the following areas of expertise, but may be modified as needed to best further the objectives of GLMRIS as study execution evolves:

- i. Navigation & Economics
- ii. Hydrology & Hydraulics
- iii. Natural Resources
- iv. Communications
- v. Technology
- vi. Environmental Quality
- vii. Plan Formulation

A Technical Manager is responsible for the Functional PDTs to ensure these teams are appropriately resourced and that the work quality is to standard. The GLMRIS Functional PDTs serve as a knowledge base from which to draw specific expertise to facilitate the implementation of GLMRIS.

Focus Area PDTs

To lead study implementation efforts, a Project Delivery Team (PDT) has been created specific to each Focus Area. Each PDT is led by a Project Manager, whose function includes, but is not limited to: developing budgetary data, allocating funds, monitoring overall expenditures and obligations, reviewing work progress in relation to costs, preparing and updating the project management plan, processing requests for additional funds or for revocation of funds, defining issues for consideration by the internal USACE Executive Steering Group (ESG), and reporting project status.

Focus Area PDTs are managed, and initially staffed, from the District that has the geographic responsibility for the pathway in question. Each PDT draws upon the expertise of the larger GLMRIS Functional PDTs as necessitated by required expertise, project workload, or directed by USACE Leadership to overcome resource challenges. USACE Office of Counsel, Resource Management, Information Management, Contracting, and Public Affairs will also play critical, interconnected roles in both Focus Area PDT structures.

Internal USACE PDT meetings will be held at approximate 2 week intervals, but coordination among PDTs and GLMRIS Project Management will be held as necessary – sometimes more frequently. Additionally, larger GLMRIS In-Progress Reviews (IPRs) with the Executive Steering Group may be held at critical decision points.

CAWS PDT

The PDT for the CAWS (Focus Area I) is currently managed out of the Chicago District. Staff from the Chicago District and experts from the GLMRIS Functional PDTs comprise the primary study team.

Other Pathways PDT

Given the regional nature of Focus Area II, the PDT for the Other Pathways is currently being managed out of the Great Lakes and Ohio River Division (LRD) office, located in Cincinnati, Ohio. Once the *Other Pathways Risk Characterization Report* is finalized, and other potential hydrologic connections outside of the CAWS are identified and prioritized with respect to risk of ANS transfer, additional sub-PDTs will be developed. Sub-PDTs will be resourced in the priority of the highest risk of potential ANS transfer between the basins. The sub-PDTs for the aquatic pathways outside of the CAWS will be staffed by USACE District Offices within the appropriate area of responsibility, and draw from the expertise of the Functional PDTs, as necessary.

Sharing of knowledge, skills, and expertise among PDTs is promoted to contribute to efficiencies gained with individual product execution.

5.1.1 EXECUTIVE STEERING COMMITTEE

The purpose of the Executive Steering Committee (ESC) is to provide macro-level study advice and facilitate coordination among various Federal and state agencies with respect to GLMRIS. The ESC is to be comprised of a collaborative body of Federal, state, and regional governmental authorities. Membership to the ESC will be requested of the following Federal Agencies:

- U.S. Army Corps of Engineers (USACE)
- U.S. Environmental Protection Agency (USEPA)
- U.S. Geological Survey (USGS)
- National Oceanic and Atmospheric Administration (NOAA)
- U.S. Department of Agriculture (USDA)
- U.S. Coast Guard (USCG)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Department of Transportation (DOT)

The ESC is also anticipated to include a variety of bi-national commissions, state agencies, and regional governmental authorities. Some examples include:

- International Joint Commission (IJC)
- Great Lakes Fisheries Commission (GLFC)
- State Departments of Natural Resources (State DNRs)

- The Metropolitan Water Reclamation District of Greater Chicago (MWRDGC)

Other governmental agencies may be added to the ESC as deemed appropriate. A Memorandum of Understanding (MOU) has been developed to describe the general purpose of the ESC and formalize the relationship between the partner agencies.

Membership to the ESC will be comprised of Senior Leadership, as designated by each Federal, state, or regional agency. Each agency is expected to provide a single point of contact to represent agency interests on the ESC. It is anticipated that the ESC will meet on a regular basis (i.e. quarterly), collectively or by other means of communication.

The ESC will provide advice to the overall study by i) maintaining a working knowledge of the feasibility study; ii) advising the study management team; and iii) facilitating coordination among partner agencies. The scope of involvement of the ESC will primarily involve macro-level advice and coordination, with the exception of individual sub-products, for which a represented agency may have direct authority or oversight.

5.1.2 OTHER ADVISORY TEAMS

In addition to the ESC other advisory and review teams may be formed as needed to provide input to GLMRIS. Examples would include Stakeholder Participation forums or an Independent External Peer Review (IEPR) Team.

Stakeholder Participation

Stakeholder meetings will be organized for this study in an effort to promote coordination with a variety of non-governmental organizations (NGOs) and other project stakeholders. Initially, public scoping meetings will be held in compliance to the National Environmental Protection Act (NEPA) to gain broad-based public and community input to the Feasibility Study. Stakeholder participation forums, including multi-media outlets such as a web or social media sites will provide a means for interested parties to learn more about GLMRIS, as well as have the opportunity to provide input and advice toward the direction of the Feasibility Study. In-person discussion groups may also be held to allow the transfer of ideas, information, and comments between study team representatives and the interested parties.

Opportunities for interested stakeholders to provide direct input to the feasibility study will be provided via the methods described above. It is important to note that stakeholder input to GLMRIS shall be an identified element of the GLMRIS PMP. Specific products for consideration by GLMRIS must be scoped out by USACE and/or supporting agencies to ensure it meets the needs of the GLMRIS Study. Such products must be reviewed by USACE to ensure consistency with Corps Quality Control/Quality Assurance requirements, and/or potentially updated in response to USACE QA/QC review.

IEPR Team

Pursuant to USACE EC 1165-2-209, Independent External Peer Review (IEPR) is a process that ensures the quality and credibility of feasibility study decision documents. The purpose of the Independent External Peer Review is to provide USACE with an

independent assessment of the project or work product, including an assessment of the adequacy and acceptability of the economic, engineering, and environmental methods, models, data, and analyses used as well as the range of alternatives, and the adequacy of risk and uncertainty analyses. An IEPR Team will be assembled to assess the products generated by GLMRIS. IEPR is discussed in further detail in Section 7.1.

5.2 WORK BREAKDOWN STRUCTURE

A work breakdown structure (WBS) is a tool used to define and categorize a project's discrete work elements (or tasks) in such a manner that it helps to organize and define the total work scope of the project. For GLMRIS, the WBS encompasses the two parallel paths. The first, Focus Area I, focuses on the prevention or reduction of risk of transfer of ANS between the Great Lakes and Mississippi River basins via the CAWS; while the second, Focus Area II, expands the same general scope toward additional identified hydrologic connections between the two basins. The WBS presented in Appendix 2 of this document concentrates primarily on Focus Area I, the CAWS-focused study, in order to present tasks, schedules, and costs in a logical, easily comprehensible manner. Estimates/assumptions are currently included for Focus Area II as a placeholder, and will be appropriately refined upon the completion of the *Other Pathways Risk Characterization Report*. Completion of the risk characterization at these locations will be used to finalize the scope of Focus Area II, and will serve as the basis for revising the scope, schedule and budget of the PMP for Focus Area II. As the PMP is a living document, these elements will be incorporated into the PMP as they are developed.

As data, funding, and staffing resources allow, the same general approach for analysis of additional hydrologic connections between the Great Lakes and Mississippi River basins in Focus Area II may be employed as is described for Focus Area I. The ESG will be responsible for allocating available resources based on the risks/priorities held within either Focus Area.

Inherent to the purpose of a Feasibility Study is the need to gather data and information to more clearly outline the basis for implementation of a recommended alternative. Given the scope and potential implication of the recommendations generated by this Feasibility Study, the inventory of data necessary to select a recommended alternative are immense. Although it is the self-ascribed purpose of the PMP document to establish a clear scope for the execution of the Feasibility Study, it is nearly impossible to precisely identify all variables which may affect the formulation, evaluation, and selection of a recommended alternative(s). Consequently, the tasks, budgets, and schedules which are presented in Appendix 2 become increasingly variable as a function of time. As a general rule, tasks, budgets, and schedules are commensurately accurate over the immediate two-year timeframe, but loose precision as they are forecast further into the future.

5.3 SCHEDULE & MILESTONES

This Feasibility Report will be prepared in accordance with the guidance contained in the Planning Guidance Notebook, ER 1105-2-100, 22 April 2000, and will present study recommendations. Upon approval by Headquarters, USACE and Office of the Assistant

Secretary of the Army for Civil Works, these recommendations will be passed to Congress to support a project authorization decision.

The schedule for GLMRIS Focus Area I activities can be found at the conclusion of the WBS; this schedule may be refined as the scope is either narrowed or broadened, per the established procedures within this PMP. It is important to note that the GLMRIS Focus Area I schedule (Appendix 2) reflects the anticipated USACE capability. Capability is reflected because this preliminary schedule assumes that required funding for this study is provided and required resources are available.

The schedule for further evaluation of other pathways in Focus Area II is currently being evaluated based upon the recommendations of the *Other Pathways Risk Characterization Report* (Appendix 3). As additional data is generated by the Other Pathways Team, this information will be utilized to move forward with further dedicated study or action, as subject authorities allow. As discussed in previous sections, when finalized, individual management plans – similar to this PMP document but on a reduced overall scale – will be drafted for each sub-PDT that is created. These management plans will be added as appendices to this PMP to document the efforts of the sub-PDTs.

Each Focus Area Project Manager will coordinate with their respective PDT to maintain a P2 schedule for the Feasibility Study. The study schedule will include, at a minimum, critical path items, durations for all tasks and well as important project milestones. The ESG will ensure the prioritization of USACE resources and provide broad oversight of costs and schedules for GLMRIS.

6.0 ASSUMPTIONS

6.1 CRITICAL ASSUMPTIONS

A primary assumptions critical to the success and timely completion of this study are the availability of resources and/or funding necessary to implement this work. The table below shows the funding necessary – as described in the Work Breakdown Structure (Appendix 2) – to complete this study in the timeliest manner. The schedule presented in this document assumes a capability funding stream for GLMRIS Focus Area I. The following table outlines the approximate amounts per fiscal year. Focus Area II will be further developed in future revisions of the PMP.

Fiscal Year	2010	2011	2012	2013	2014	2015
Capability	\$900,000	\$5,200,000	\$3,500,000	\$3,000,000	\$1,600,000	\$400,000

Collaboration with other Federal, state, and regional agencies will also be key to the success in arriving at a collaborative solution. In order to execute GLMRIS in the most efficient and expeditious manner, it will be necessary share resources and expertise between USACE and collaborating Federal, state, and local governmental agencies. Information flow between agencies will require significant and dedicated coordination among senior leadership and staff, alike, with the goal of seamless and transparent communication. It is recognized that input from non-governmental organizations or the

public has the potential to shape the outcomes of GLMRIS, and the study team must be attentive and adaptable to such changes.

It is assumed that feasible and constructible solutions to reduce the risk of ANS transfer between the basins either exist, or can be developed. Funding for a recommended solution at the Federal level is likely to be resource-constrained. Certain planning assumptions may need to be invoked at later stages of the study to appropriately screen alternatives for recommendation by GLMRIS.

It is assumed that Congress is able to provide the requisite authorities to appropriately address Federal implementation of recommendations offered by GLMRIS. Otherwise, it is assumed that the requisite authorities exist at the state or local/regional levels of government to implement recommended solutions. Any project evolving from the GLMRIS authority may be subject to USACE Civil Works policy provisions, to include cost-sharing of a construction project, or ownership of the long-term maintenance by a local non-Federal sponsor.

The following section provides constraints which delineate the boundaries within which this study, as a whole, can be executed.

6.2 *CONSTRAINTS*

- i. Authorization – Study authority is limited to aquatic transfer between the Great Lakes and Mississippi River basins.
- ii. Existing Waterway Uses – Recommended alternative plans must mitigate or provide alternative facilities or measures for possible impacts to existing waterway users.
- iii. Legal Requirements – Recommended alternatives are restricted to those that comply with applicable law and policies, such as but not limited to the following:
 - a. The Supreme Court’s Diversion Decree, International Great Lakes treaties, Executive Orders, and laws addressing threatened and endangered species, drinking water, and stormwater control.
 - b. Real estate restrictions such as ownership; historical and cultural property designations; and hazardous, toxic and radioactive waste liabilities.
- iv. Resource limitations – To include funding and manpower, and the ability of collaborating agencies to contribute resources and information to the implementation of GLMRIS.
- v. Alternative plans are affected by data limitations, including but not limited to the following:
 - a. The identity of future ANS;
 - b. The performance of the proposed control alternatives; and
 - c. The unknown impact of climate change.

7.0 **ACQUISITION PLAN**

An Acquisition Plan will be developed for the Feasibility Study by USACE to support the analysis of data needs and requirements, once further scoping is completed for the

technical analyses. During this process, USACE will determine the best method to accomplish specific tasks and will make recommendations as to which work should be pursued by contract or government order. If deemed necessary, the Acquisition Plan will be attached to the PMP when completed.

In general, acquisition of services and technical support outside of the USACE organization will be encouraged to support existing resources. The magnitude of data that will be collected to support GLMRIS is anticipated to be immense; the resources to support and maintain this data, while adhering to a rigorous schedule, may be assembled from specialists outside of the USACE organization. Contract or government-order acquisition of study support will also enhance the diversity of knowledge, encourage the participation of partner Agencies, and lend to the overall credibility of the Final Feasibility products.

8.0 RESOURCE MANAGEMENT

8.1 QUALITY CONTROL PLAN

Quality control is an appropriate risk-based evaluation of planning, engineering and design products to ensure that they fully meet the prescribed requirements and expectations of project stakeholders, as well as comply with laws, regulations, and sound technical practices. The quality process is implemented to monitor and verify that this Feasibility study meets established requirements and standards, and is conducted within appropriate budget and schedule constraints.

The primary method of implementing quality control during a Feasibility Study is to employ a disciplined PDT Quality Control process. In addition, Independent External Peer Review (IEPR) will also be utilized to ensure the highest level of review and compliance with Federal law and Corps Policy. IEPR will involve qualified experts, who are not directly involved with product development, to conduct independent technical reviews of the full Feasibility Study, or Study components. These reviews will ensure that the concepts, assumptions, methods, and analyses are fully coordinated and correct; an appropriate range of feasible alternatives were evaluated; problems, opportunities and constraints are properly identified and defined; analytical methods used are appropriate and yield reliable results; results and recommendations are reasonable, within policy guidelines, and supported; and deviations from policy, guidance and standards are appropriately identified and have been properly documented and approved.

Policies and procedures defining the quality control/independent technical review processes are specified in ER 5-1-11, U.S. Army Corps of Engineers Business Process; ER 1105-2-100, Appendix H, Policy Compliance Review and Approval of Decision Documents; and EC 1165-2-209, Civil Works Review Policy.

The Chicago District – or for the case of the Other Pathways (Focus Area II) the district from which a sub-PDT is staffed – is responsible for ensuring that this study conforms to all current and relevant professional quality practices and standards. Quality control and independent technical reviews will be on-going during study development. Appendix 8

contains the Quality Control Plan that describes the independent and external peer review quality process for GLMRIS.

8.2 FUNDING REQUIREMENTS - PLANNING COST DATA

The GLMRIS is fully funded by the Federal government, so funding will be allocated via the annual USACE budget process. In addition, the scope of GLMRIS allows it to be eligible for funding by the U.S. Environmental Protection Agency's Great Lake Restoration Initiative (GLRI). Significant early-stage financial support for GLMRIS has been received via GLRI funding.

As an executive branch agency, USACE works for the Administration and with the Congress during the budget process. Between the time that the first program and budget development stages are initiated until funds are finally available at the local district, the process takes about 20 months to complete.

Annually, the Project Manager(s), in collaboration with District and Division Programmatic elements, are responsible for developing a Management Plan budget, based on the progress of their respective Feasibility Study Focus Area, as well as input from the PDT and oversight by the ESG. A Congressional Fact Sheet, included in Appendix 4, will be developed to include current-year budgetary data, as well as next-year Management Plan (expressed as a capability) budget data. This Congressional Fact Sheet will be updated in the PMP annually, and does not require additional approval.

Funding requirements beyond current and next-year data can be estimated from updating the WBS, as appropriate, included in Appendix 2 of this document, or through the update of future Focus Area II management plans. It is the responsibility of the respective Project Manager to ensure that funding requirements are expressed in future Fiscal Years.

8.3 PERFORMANCE MEASUREMENT

8.3.1 CCG (CONSOLIDATED COMMAND GUIDANCE) REQUIREMENTS

The Consolidated Command Guidance (CCG) is the Command's blueprint for pursuing USACE vision and strategy. The CCG provides an overview of our strategic management system that facilitates resource guidance as well as specifies command-wide (corporate) metrics and management targets. The USACE Performance Measurement System, known as the Command Management Review (CMR), is a quarterly review by USACE Commanders of select metrics focuses on USACE strategic and operational performance. The FY10 CMR states that the actual amount of obligations divided by the 2101 basic scheduled amount x 100 minus 100 equal the variance from 100%. Similarly, for milestones the actual number of milestones accomplished YTD divided by the number scheduled (basic schedule) YTD x 100 minus 100 equal the variance from 100%. Within the goals of the CMR for LRD, GLMRIS will obligate and expend the funds provided by Congress for the Civil Works Programs and accomplish milestones within an allowable variance from basic schedule of > -5% of actual versus scheduled for obligations and milestones.

9.0 RISK MANAGEMENT

A risk is a potential adverse consequence of uncertain severity. A risk is characterized by forecasting the potential outcomes that are of interest to decision makers considering the range of conditions that might influence that outcome and the probability with which those conditions might occur. The risk and decision analysis procedures outlined in this section are part of a scientific and evidence-based approach to managing the risks associated with ANS and their respective controls. These procedures are designed to provide the PDT with a transparent and defensible basis for evaluating and recommending the most appropriate management strategies. Risk analysis includes the processes of identifying and quantifying the potential losses arising from exposure to a hazard and formulating, analyzing, and selecting risk management alternatives to optimize expected outcomes in response to the hazard. For example, these studies will examine not only the efficacy of applied controls, but also the effectiveness of monitoring efforts and the likelihood of an ANS transfer resulting in viable population development.

The utilization of probabilistic decision models to address the uncertainty faced by the PDT in the risk management process will enable resource managers to integrate information from these studies and other sources to identify an optimal course of action. The probabilistic risk analysis and decision models described in this section will also be used to evaluate the potential benefit of resolving additional uncertainties and prioritize information gathering needs. The Project Manager will be responsible for resourcing the development of risk management and probabilistic decision models, and the PDT will work closely in the development of these models.

The proposed approach is consistent with USACE planning guidelines. The following sections provide an overview of the proposed approach to risk analysis, yet detailed information on individual tasks will be continually updated as the study continues.

Step 1 - Problem Formulation

The problem formulation section is a comprehensive summary of PDT's understanding. It will describe the knowledge base and frame the decision problem by identifying risk management objectives, a preliminary set of management alternatives, a preliminary risk model, and outcome performance measures for evaluating those alternatives. This initial step works synonymously with the USACE 6-Step Process addressed in previous sections; it is through these steps that the baseline for the probabilistic risk analysis and decision models will be developed. Markedly, the following objectives have been identified for this formulation:

- i. *Establish Natural Resources and Hydrologic Baselines* – As addressed in previous sections, the PDT will complete a comprehensive inventory of all current and future potential ANS which pose a risk of inter-basin transfer as well as the potential pathways which could be used for transfer. This inventory also includes an assessment of knowledge regarding the economic and ecological value of goods and services provided through navigation and the sustainability of native species populations.

- ii. *Review controls and objectives* – This will include strategies that are presently in place to prevent ANS transfer, including existing barriers and other efforts to prevent the spread of Asian carp. The objectives of the management effort will be clarified to identify conflicting objectives and understand how various stakeholders may differ in terms of their perspectives with regard to those objectives. The plan formulation team will identify quantitative outcome performance measures to evaluate the current ANS management programs considering the range of ecological services and economic benefits that are provided through the basins.
- iii. *Develop a Detailed Conceptual Model of the Risk Management Problem* – As discussed above, a conceptual model will be of much use to the PDT in developing scientifically sound controls, as such, the PM will seek resources toward the development of a detailed conceptual model. It is anticipated that this model will be refined and updated throughout the course of the project and will serve as the basis for the development of a formal, qualitative decision model that can be used for diagnostic and prognostic reasoning in identifying a preferred management strategy.
- iv. *Develop an Inventory of Alternative Plans* – The PDT will develop a set of alternative plans; these plans will be preliminary, reflecting what the PDT and other stakeholders perceive to be the present set of alternatives based on current knowledge. Additional or modified alternatives are expected to emerge as the result of further study.

Step 2 - Technical Support, Risk Characterization and Decision Modeling

It is currently anticipated that this described analysis of risk will be resourced to a third-party, outside of USACE. Risk analysis support will be utilized to develop a technical team in analyzing the knowledge base for baseline and plan formulation developed by the PDT; this team will use a scientific body of research to assess whether there are gaps in this knowledge base. If necessary, the team will make recommendations for further study in an effort to use fully realized inputs into the probabilistic risk and decision analysis effort. Additionally, scientific information gathered during the problem formulation meetings, technical studies, and other sources will be integrated into a decision model, the uncertainties quantified, and any assumptions or qualifiers identified. The decision model will help the PDT identify a plan that optimizes the decision objectives considering the relevant uncertainties faced by the PDT, including but not limited to uncertainty in the efficacy of control alternatives; uncertainty in ANS parameters; and uncertainty in environmental, navigational, and economic conditions. Results of the various technical studies will be incorporated into the decision model in the form of parameters that are used to forecast the outcomes of alternatives and to refine decision alternatives. Proper coordination with the appropriate Planning Center of Expertise (PCX) will occur at the early stages of model development in order to facilitate model certification and USACE policy compliance.

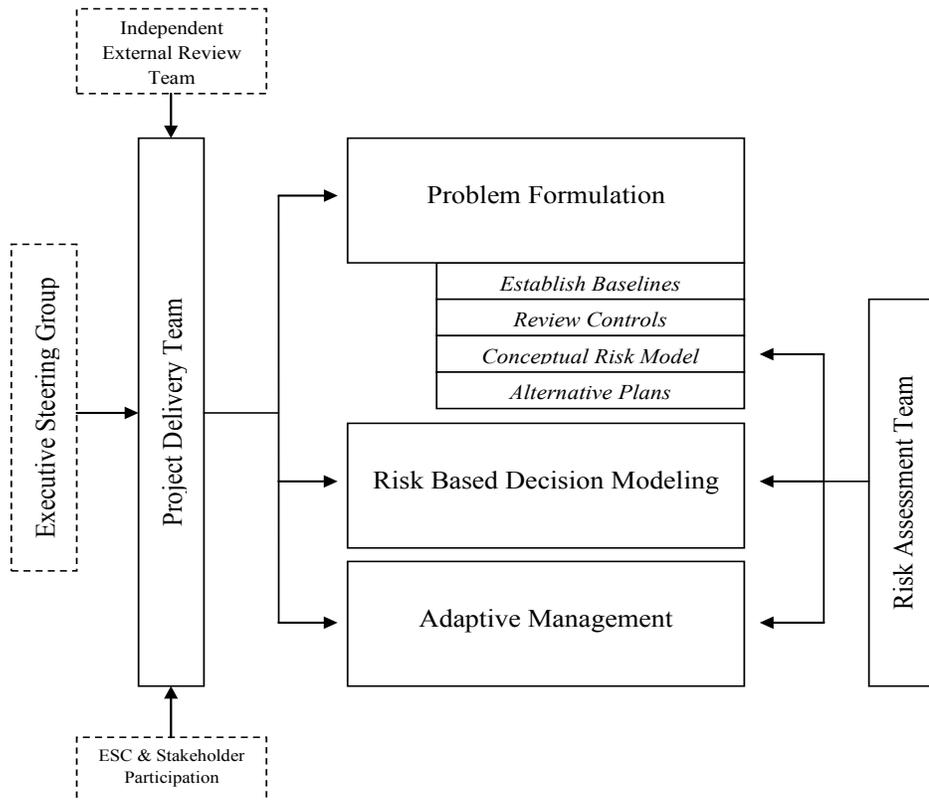
A decision model is a computational tool designed to assist a decision maker in evaluating and exploring the outcomes of decision alternatives quantitatively, while

considering what information is available to decision makers at the time a decision is made, the uncertainty in that information, and the decision maker's preferences with regard to the variety of potential outcomes that may be realized and the tolerance for risk. Two types of uncertainty are commonly identified; aleatory uncertainty, which is attributed to natural variability, and epistemic uncertainty, which is attributed to a lack of knowledge. The risk analysis contractor will use an approach which will recognize aleatory uncertainty and enable the study team to estimate the potential benefit of resolving or reducing epistemic uncertainties before making a decision. Value of information statistics will be calculated to estimate the expected value of perfect information (EVPI) and the expected value of imperfect information (EVII). With this information, an influence diagram will enable the PDT to prioritize information gathering needs, assess the potential benefit of resolving uncertainties before making a remediation decision, and compare the potential benefit of obtaining that information with the cost.

Step 3 - Monitoring and Adaptive Management

A systematic monitoring and adaptive management plan will be developed to reduce or eliminate uncertain information used in modeling the GLMRIS management decision and incorporate information about the effectiveness of implemented alternatives. While monitoring will may be undertaken as part of GLMRIS objectives, monitoring efforts to reduce or eliminate uncertainties in parameters of the decision model may also be undertaken, enabling a re-characterization of uncertainty using adaptive management through Bayesian updating procedures. Adaptive management is a structured process by which updated information is incorporated into the decision model to re-evaluate the management decision considering the costs and risk-benefit tradeoffs involved. This re-evaluation can occur periodically or on an ad-hoc basis as significant new information becomes available. However, this process should be planned in advance so that all stakeholders understand how USACE will go about refining its decisions and sustaining its mission to abate inter-basin transfer. The risk analysis contractor will assist the PDT to identify information gathering needs and develop an adaptive management plan to reduce or eliminate uncertainty with regard to future ANS threats.

Risk Management Diagram for GLMRIS



10.0 SAFETY AND OCCUPATIONAL HEALTH PLAN

A hazard analysis will be performed for all USACE-managed projects and programs. All Safety and Occupational Health Plans will comply with the Corps of Engineers Safety Manual, EM 385-1-1 and with the Army Safety Program, AR 385-10. This plan will also be coordinated with the safety officer of each district as needed.

The SOHP shall consider the hazards associated with all customers throughout the life cycle of the project. Control measures shall provide the appropriate level of protection based on the project goals and the established level of risk acceptance authority. Deviations from USACE publications require waiver approval from the applicable HQUSACE proponent and shall hinge on the determination of the basis for the deviation and the resulting inherent risk. For further information, refer to USACE REF8016G.

11.0 CHANGE MANAGEMENT

Changes during the fiscal year that will affect the overall project schedule, scope, and cost will be coordinated through the appropriate PDT for approval. The change-approving official is determined by the magnitude of the proposed change. If the change has a minimal impact in schedule or budget – defined by less than one month’s deviation

in schedule or less than 5% of product cost – the Project Manager will be responsible for making the decision. Larger-impact changes (i.e. >1 month time; >5% of Product budget) will be submitted to the ESG for review and decision. The Project Manager will document changes either in the main body of the PMP or in an attachment.

Changes to the associated plans (communications, acquisition strategy, risk management) shall be updated as needed, and reviewed on an annual basis. The Project Manager will document all changes either in the main body of the PMP or in an attachment.

12.0 COMMUNICATIONS

Successful implementation of this feasibility study will require close interagency consultation as well as the involvement from an extensive array of government stakeholders and non-governmental organizations. Since it is so broad in geographic area and potential magnitude of impact, key components of GLMRIS will involve public input and feedback as well as stakeholder communication and coordination. Consequently, an internal communications framework as well as a Public Communications Plan (PCP) for GLMRIS must be established to help ensure that pertinent, project-related information can be communicated efficiently and effectively, in a manner which optimizes stakeholder and public engagement, and leverages Federal interagency, state, and local expertise.

Communication Implementation Plan

Information will be disseminated to the public regularly and in accordance with all Army and Federal regulations. The intent of a PCP is to foster public awareness of the project and ensure community and stakeholder outreach regarding GLMRIS. The ultimate goal is to deliver a clear and consistent message regarding GLMRIS goals and activities, and to deliver it in a manner which is transparent, accessible, easy to understand, and visually engaging. A draft of the PCP can be found in Appendix 7 of this report; though the goals, as they are listed in the PCP, are listed below.

- a. Increase the public awareness of USACE activities and initiatives pertaining to GLMRIS, as well as the general USACE planning and development processes.
- b. Build public understanding of the purpose and intent of GLMRIS, as well as encourage input to the planning process regarding project features which are of interest and concern to the community.
- c. Devise and/or support a communications plan that ensures transparency, two-way symmetrical information flow and timely information flow between the public, stakeholders, and USACE.
- d. Establish broader communication networks to reach internal and external audiences.
- e. Attract individuals and organizations that will contribute to the planning and development of the projects.

It is anticipated that the PCP will be developed by the Communication Team, and will be subject to ESG approval. The Team's primary tasks will be to:

- a. Develop Visual and Informational Aids.
- b. Develop Electronic- and Social-Media Detailing Strategies and Guidelines and to elicit discussion and immediate feedback from stakeholders.
- c. Ensure active stakeholder engagement.
- d. Establish Ongoing Communications and Outreach Advice.
- e. Maintain a project web presence.
- f. Develop Continual Evaluation Criteria.
- g. Ensure active stakeholder engagement.

12.1 STAKEHOLDER ENGAGEMENT

USACE will engage stakeholders throughout the study process. This will be done using a variety of methods, including newsletters, presentations, internet presence, social media, etc. The goal of these engagements is to exchange information on study progress and to generate a better understanding of stakeholder perspectives and concerns. The identified GLMRIS stakeholder interest groups are expected to be: Congressional, Tribal, Industry, Municipalities, States, Environmental, Navigation, and other waterway users.

12.2 COMMUNICATION RESPONSIBILITIES

Project Manager

- i. The Project Manager will ensure that the communication of information, and the processes for the flow of this information about the project, is built into the project delivery process to promote transparency and cohesion among all team members.
- ii. The PM will serve as the primary Corps spokesperson for the project.
- iii. The PM will ensure that timely and accurate information about the project is disseminated to the Communication Team, all members of the PDT, and the ESG
- iv. Will keep the team members informed of matters of congressional or media interest.

Project Delivery Team

- i. PDT members will actively support communication efforts by providing timely and accurate responses to public and media inquiries about the project and will keep the Public Affairs office abreast of all media inquiries and will run all communication materials by the Public Affairs Office before public dissemination.
- ii. When requested by the PM or PAO, PDT, members will serve as spokesperson on issues for which they are the subject matter expert.

Chicago District Public Affairs Office

- i. Will appoint a representative to serve on the project delivery team.
- ii. Will provide Public Affairs advice, counsel and support to the PM and the PDT.

- iii. Will coordinate with the PM and PDT to develop specific products to publicize the project to internal and external audiences, including news releases, booklets, brochures, and Web-based materials.
- iv. Will field calls about the project from the media and coordinate with the PM and appropriate PDT members the official district response.
- v. Will provide PA support at public functions, meetings, etc.
- vi. Will monitor media reports about the project and ensure the PM and the PDT members are kept apprised of media activity.

Communication Subcommittee Team

- i. Will develop a communication plan for the project, which may be updated based upon guidance received from the ESG during its quarterly meetings.
- ii. Will serve as central clearinghouse for communications products.
- iii. Will serve as a forum for keeping other project sponsors apprised of project-related communications efforts.
- iv. Will develop key strategic messages about the project.
- v. Will serve as communication advisors to the other subcommittees.

12.3 INTERNAL COORDINATION MECHANISMS

Internal coordination mechanisms will be used to ensure that effective internal command, control, and coordination are maintained during the project. The primary internal coordination mechanisms will be certain electronic information sharing sites, such as SharePoint. In addition, there are the monthly PRB and PDT meetings, quarterly ESG IPRs, and conferences scheduled at critical phases of the project.

Product team members and reviewers are responsible for reading all written documents related to the project. Team meetings will be held at least monthly during the project life, and can be used as a forum for discussing issues related to product quality. Project team members and reviewers are responsible for attending project meetings, as appropriate. Product team and ATR members are responsible for communicating issues, concerns and problems to the team as soon as they are recognized so that appropriate solutions can be developed in a timely fashion.

The team will also develop an annual work plan that will reflect anticipated funding levels and work efforts based on the PMP. The plan will include reports on progress to date, a schedule for the efforts planned for the coming year, specific work tasks required to complete investigations, estimates of costs from each discipline, and other pertinent information to execute the project.

13.0 CLOSE-OUT PLAN

A Close-out Plan shall be developed nearing the completion of the Feasibility Study in an effort to expedite the implementation or construction process. The Close-out Plan shall be developed by the Project Manager and will meet the scheduling requirements of the CCG for project close-out.

REFERENCES

- ¹ Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, As Amended through P.L. 106–580, Dec. 29, 2000.
- ² Water Resources Development Act of 2007, H.R. 1495, 110th Cong. §3061 (2007).
- ³ Planning Guidance Notebook, Section 2-2, ER 1105-2-100, 22 April 2000.
- ⁴ Asian Carp Regional Coordinating Committee website; <http://www.asiancarp.org>
- ⁵ Telhelm, Daniel R. Economies of Great Lakes Fisheries: A 1985 Assessment. East Lansing: Michigan State University, 1985.
- ⁶ National Economic Development Procedures Manual – Overview Manual for Conducting National Economic Development Analysis, IWR Report 91-R-11, October 1991, pages 25-26.

PLATE 1: GLMRIS STUDY AREA

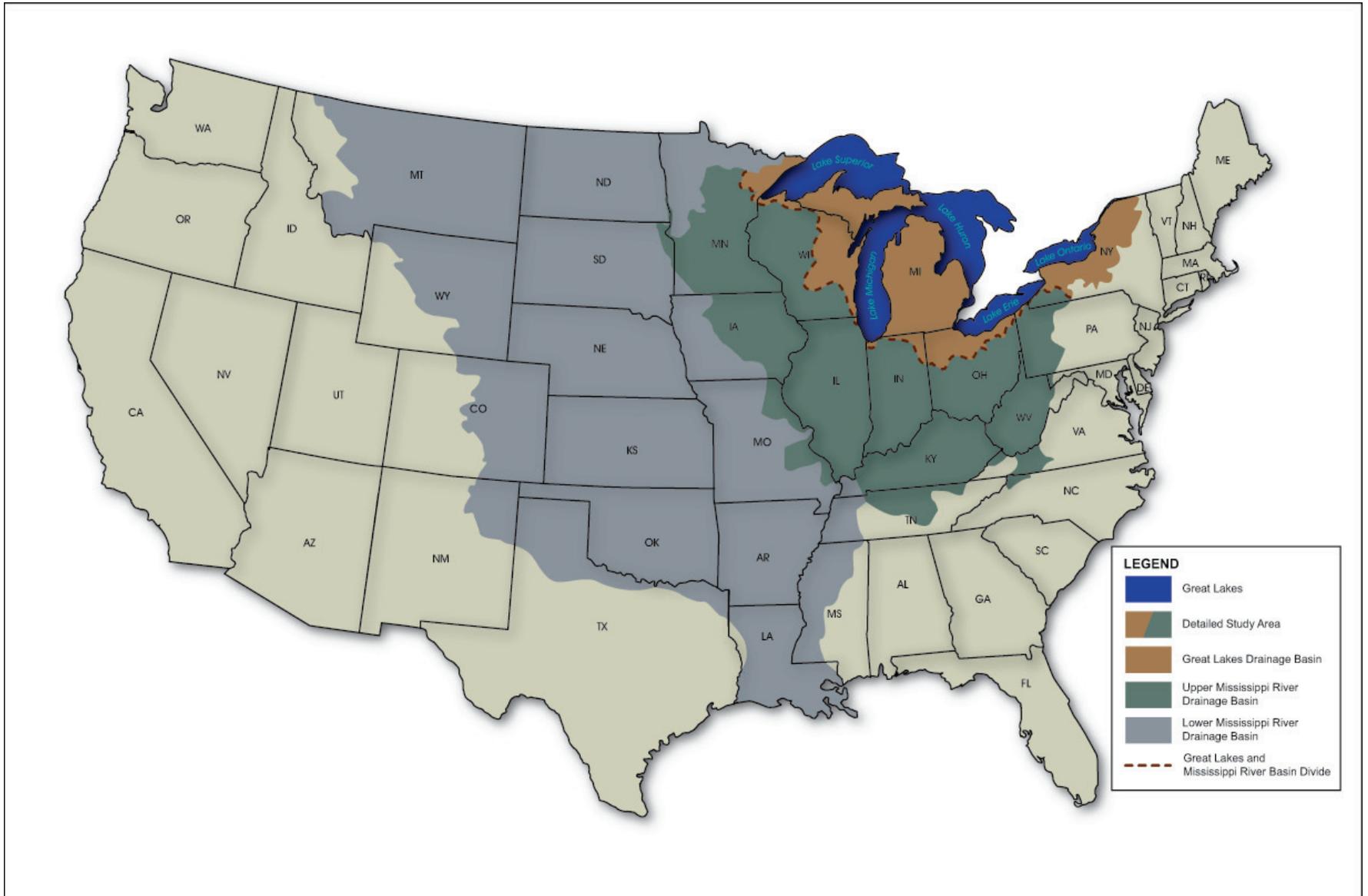


PLATE 2: CHICAGO AREA WATERWAY SYSTEM

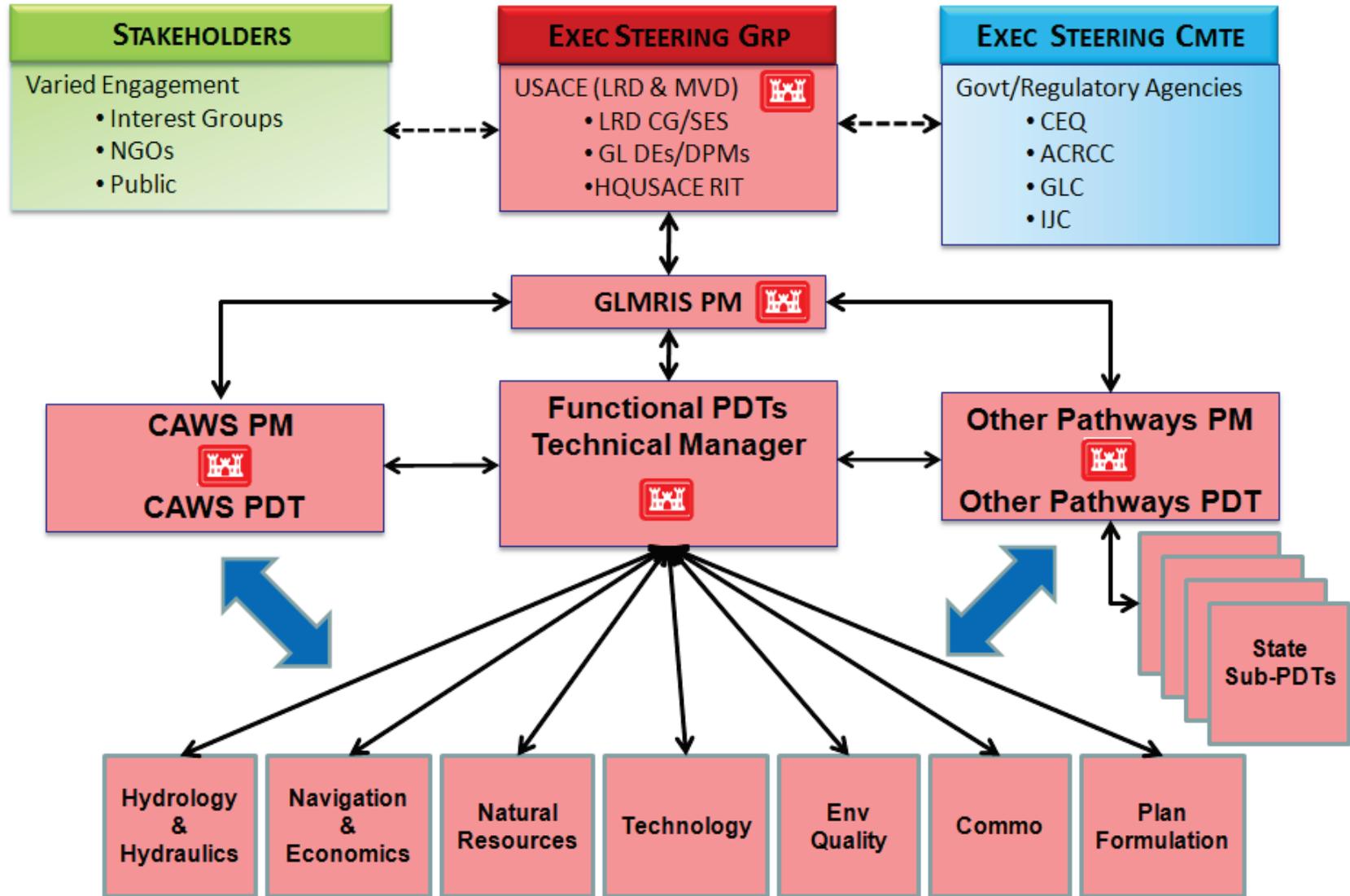


APPENDIX 1

GLMRIS MANAGEMENT TEAM

Great Lakes and Mississippi River Interbasin Study
GLMRIS Management Team

GLMRIS Management Team



APPENDIX 2

FOCUS AREA I (CAWS) AND ESTIMATED FOCUS AREA II (OTHER PATHWAYS) WORK BREAKDOWN STRUCTURE

Great Lakes and Mississippi River Interbasin Study

Work Breakdown Structure

Background

In collaboration with Federal, State and local agencies and nongovernmental entities, U.S. Army Corps of Engineers (USACE) is conducting a Feasibility Study of the options and technologies (controls) that could be applied to prevent or reduce the risk of aquatic nuisance species¹ (ANS) transfer between the Great Lakes (GL) and Mississippi River (MR) basins through aquatic pathways. For the purposes of this study, aquatic pathways are natural and manmade hydraulic connections between the GL and MR basins. ANS are non-native species that threaten existing significant natural resources.

As provided in the Congressional authorization² and USACE Implementation Guidance³, the Great Lakes and Mississippi River Interbasin Study (GLMRIS) will provide a thorough and comprehensive analysis of these ANS controls. Currently, USACE only has authorization to complete a feasibility study regarding this subject. USACE will need additional congressional authorization and funding to design and construct or implement any ANS control technology.

GLMRIS will analyze the affects each alternative plan would have on the current uses of the Chicago Area Waterway System (CAWS), including the Chicago Sanitary Ship Canal (CSSC), and other identified aquatic pathways between the GL and MR basins. Current uses include but are not limited to commercial and recreational navigation, flood control, effluent conveyance, water supply and recreation. This study shall also address the need to mitigate or provide alternative facilities or measures for current uses that may be affected by study recommendations.

USACE Planning Process

By granting USACE the authority to conduct the GLMRIS Feasibility Study, Congress required that GLMRIS be completed in conformance with the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies⁴ (Principles and Guidelines). When completing feasibility studies pertaining to water resources, such as GLMRIS, USACE must comply with Principles and Guidelines. Not only does Principles and Guidelines ensure consistent planning by USACE and other named Federal agencies, it also establishes the following Federal objectives for water resource studies:

to contribute to the national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.

¹ Aquatic nuisance species (ANS) means a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters. See the Aquatic Nuisance Prevention and Control Act, 16 USC 4702.

² Section 3061 of the Water Resources Development Act of 2007.

³ CECW-LRD "Implementation Guidance Section 3061 of the Water Resources Development Act of 2007 (WRDA 2007)", dated March 12, 2009.

⁴ Economic and Environmental Principles for Water and Related Land Resources Implementation Studies, Water Resource Council, March 10, 1983. Principles and Guidelines was signed by President Regan on February 3, 1983.

Principles and Guidelines establishes the following four (4) accounts as a means of categorizing information gathered during a study and facilitating the evaluation of project alternatives:

- National Economic Development (NED) account – This account displays changes in the economic value of the national output of goods and services.
- Environmental Quality or National Environmental Restoration (NER) account – This account displays non monetary effects on significant natural and cultural resources.
- Regional Economic Development (RED) account – This account registers changes in the distribution of regional economic activity that results from each alternative plan.
- Other Social Effects (OSE) account – This account registers plan effects from perspectives that are relevant to the planning process, but are not reflected in the NED, NER or RED accounts.

Principles and Guidelines also established the 6-Step planning process by which USACE must complete its planning studies. Generally, the 6-Steps are as follows:

Step 1 – Specify Problems and Opportunities

Step 2 – Inventory and Forecast Conditions

Step 3 – Formulate Alternative plans

Step 4 – Evaluate Effects of Alternative Plans

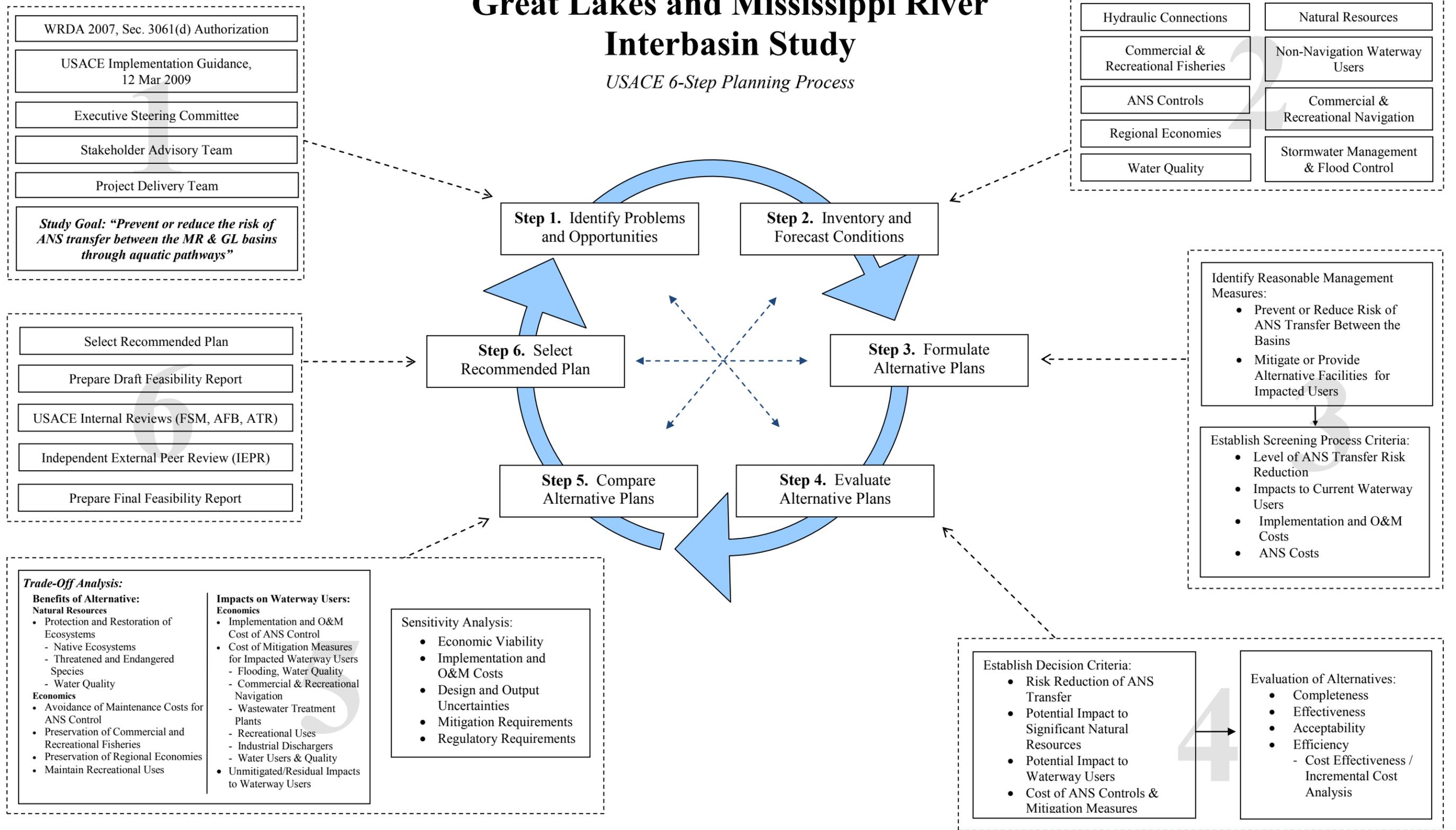
Step 5 – Compare Alternative Plans

Step 6 – Select Recommended Plan

Please see Figure 1 for a diagram of activities required to complete the 6-Step Planning Process for the GLMRIS project. This Work Breakdown Structure explains these activities identified in the diagram and provides estimated costs.

Great Lakes and Mississippi River Interbasin Study

USACE 6-Step Planning Process



Acronyms / Glossary:

USACE 6-Step Process – Iterative Planning Process (ER-1105-2-100)
 AFB – Alternative Formulation Briefing
 ANS – Aquatic Nuisance Species
 ATR – Agency Technical Review

FSM – Feasibility Scoping Meeting
 GL – Great Lakes
 MR – Mississippi River

O&M – Operations and Maintenance, Repair, Rehabilitation and Replacement

Figure 1 – 6-Step Planning Process for GLMRIS

Work Breakdown Structure Introduction

The remaining portion of this attachment includes a description of the tasks to be accomplished; the estimated costs, timing and schedule for each task; the Product Teams responsible for completing the task; and a description of the deliverables. As identified in the PMP, the Study Team is divided into the following product teams:

- Hydrology and Hydraulics
- Natural Resources
- Navigation and Economics
- Technology
- Environmental Quality
- Plan Formulation
- Communications
- Forward Reconnaissance

In some instances, this document repeats information found in the PMP. The repetition serves to link the steps of the USACE planning process with the activities and costs for completing each step.

As mentioned in the PMP, USACE is completing this study in two (2) Focus Areas:

- Focus Area I - the hydraulic connections within the Chicagoland area including the CAWS, and
- Focus Area II - the hydraulic connections outside the Chicagoland area and within the Great Lakes and Upper Mississippi River/Ohio River basin.

Where possible, the Work Breakdown Structure identifies activities and estimated costs for each Focus Area; however, in some instances, activities and costs are for work that is applicable to both areas. Please also note the estimated costs for activities that occur later in the study are more speculative than those for activities that occur within Study year 1 and 2. USACE estimates these later costs using numerous assumptions identified within the document.

Based on information currently available, USACE estimates **\$25,505,000** is required to fund USACE labor and known USACE contracts for Focus Area I and II of the GLRMIS study. The Study may require additional contracts and investigations that USACE will identify during Steps 3-6 of this Study. On an annual basis, or – at a minimum – after Steps 1 and 2 of the Study are complete, USACE will update the PMP to include detailed task descriptions, staffing requirements and cost estimates for the remaining steps (Steps 3-6) of the planning process.

The following chart separates costs per Focus Area and includes a line item identified as “Focus Area I/II,” costs for activities required to complete either Focus Area. The total of these line items equals the cost to complete the entire Study.

GLMRIS Study Costs

Focus Area	USACE	MIPR	A/E Contract	Subtotal Project Costs
Focus Area I/II	\$ 3,385,000.00	\$ 1,105,000.00	\$ (b) (5)	\$ (b) (5)
Focus Area I	\$ 6,952,000.00	\$ 525,000.00	\$ (b) (5)	\$ (b) (5)
Focus Area II	\$ 7,556,000.00	\$ 436,000.00	\$ (b) (5)	\$ (b) (5)
Total	\$ 17,893,000.00	\$ 2,066,000.00	\$ (b) (5)	\$ 25,505,000.00

USACE Accounting For USACE accounting and administrative purposes, all tasks in this Work Breakdown Structure are categorized by cost subaccounts according to USACE standards for estimating costs for general investigation studies (e.g. 22A, 22B, etc.).

GLMRIS Cost Summary by Account

USACE Subacct	Title	Total
22A	Public Involvement	\$ (b) (5)
22C	Social Studies	\$ 183,000
22D	Cultural Resource Studies	\$ (b) (5)
22E	Environmental Studies	\$ (b) (5)
22F	Fish & Wildlife Studies	\$ (b) (5)
22G	Economic Studies	\$ (b) (5)
22H	Real Estate Analyses/Documents	\$ 450,000
22J	Hydrology and Hydraulics Studies	\$ (b) (5)
22K	Geotechnical Studies	\$ 1,050,000
22L	HTRW Studies	\$ (b) (5)
22N	Surveys and Mapping Except Real For Estate	\$ (b) (5)
22P	Engineering Analysis and Design/Project Cost Estimates	\$ 1,200,000
22Q	Feasibility Management	\$ 2,285,000
22R	Plan Formulation and Evaluation	\$ (b) (5)
22S	Feasibility Report Preparation	\$ 600,000
22T	Feasibility Programs and Project Management	\$ 2,080,000
22Y	Washington Level Review	\$ 75,000
22Z	Peer Review	\$ (b) (5)
Total		\$ 25,505,000

The **\$25,505,000** estimate is based on assumptions that impact the work tasks, cost estimate and activity duration. Those assumptions include but are not limited to the following:

Work Breakdown Assumptions

- Focus Area I Project Schedule: – See Attachment 1 of this document. Please note, study duration is directly related to funding. If annual GLMRIS funding is not commensurate with the cost of scheduled work, or if the receipt of yearly funds does not occur near the beginning of each fiscal year, the duration of the Focus Area I Study is likely to increase.
- Seven (7) potential control points for the hydraulic connections between the GL and MR basins are within the Chicagoland area:

- CAWS
 1. Hydraulic connections and control points - Wilmette Pumping Station, Chicago River Lock and Controlling Works and Thomas J O'Brien (O'Brien) Lock,
 2. Control point - Lockport Lock and Dam
- Other Chicagoland hydraulic connections (outside the CAWS)
 1. Hydraulic connections and control points - Grand Calumet River, and Little Calumet River,
 2. Control point - Brandon Road Lock and Dam,
- Although initial investigations have indicated that as many as 30 possible inter-basin connections may exist, for the purposes of this WBS, twelve (12) probable hydrologic connections between the GL and MR basins are assumed to be located outside the Chicagoland area.
 - USACE is currently in the process of identifying and characterizing risk of hydrologic connections outside Chicagoland – these assumptions may change.
- For each identified hydrologic connection and control point, the Study Team will evaluate the possible installation of an ANS control. Hydrologic separation is the use of physical means to separate connected watersheds which prevent, or reduces to the extent feasible, the transfer of water between the watersheds. As the study continues and more information is gathered, the definition of hydrologic separation may be amended.
- The Plan Formulation Team will evaluate hydrologic separation of the GL and the MR basins at each control point, along with other alternatives. At this point in the study
- When establishing current conditions, the Study Team will establish screening process criteria by which to evaluate the impacts of complete hydrologic separation at each control point. Screening criteria will be needed to address impacts to waterway users including but not limited to the following:
 - Commercial and recreational navigation
 - Flooding impacts
 - Water quality of potentially impacted waterways
 - Drinking water and wastewater treatment plants
 - Industrial Water Users and Dischargers
- The following data is collected and publically available:
 - Water quality of waterways in the Study Area;
 - Location of wastewater and drinking water plants in the vicinity of the hydrologic connections; and
 - Identity and location of industrial water users in the vicinity of the hydrologic connections.
- Phase II HTRW Investigations:
 - Focus Area I: Four (4) Phase II Site Assessments are required.
 - It is assumed that four (4) sites will require a Phase II Site Assessment.
 - Focus Area II: Four (4) of assumed twelve (12) sites will require a Phase II assessment.
 - Less is known about the sites outside the Chicago area, but it is assumed some portion of these sites will require additional investigation.
 - General
 - Contract costs for each sampling event equal (b) (5) /event.
 - Some level of environmental investigation has occurred before.
 - Limited sampling scope is completed.

- Risk Assessments:
 - For Focus Area I, risk assessments totaling (b) (5) will be required. During Focus Area I, the Technology Team will be performing a risk assessment when assessing ANS controls.
 - For Focus Area II, risk assessments totaling (b) (5) will be required.
- Study Management Staffing
 - Yearly staffing costs for before and after Plan Formulation Phase of the project are as follows:
 - Project Management - \$200,000/year
 - Planning Section - \$250,000/year
 - Remaining staffing requirements rolled into Plan Formulation Phase to the Completion of the Feasibility Study (Steps 3-6 of Planning Process)
 - For the duration of this Study, \$100,000 per year is needed for public communications.
- Staffing Requirements for the Plan Formulation Phase of the Feasibility Study
 - Annual staffing cost equals \$1.45 million.
 - Focus Area I & II - The Plan Formulation Team have estimated that it will complete Steps 3-6 in 3 years per Focus Area.

Additionally, as identified at the beginning of the main report, a PMP is a living document which can be updated and as necessary, amended as the project evolves. As data is gathered, USACE will revise the work descriptions, schedules and cost estimates and will update the PMP.

Study Management

The following section identifies study management tasks and staffing costs to complete this work:

Project, Program and Feasibility Study Management - This task included macro-level tracking, monitoring and upward reporting of the study progress by the Programs and Project Management Branch. The costs included the preparation of budget justification information and tracking of obligations and expenditures for each fiscal year.

Project management entails oversight of all project activities. Functions include developing budgetary data, allocation of funds, monitoring overall expenditures and obligations, review of work progress in relation to costs, preparing and updating the project management plan, processing requests for additional funds or for revocation of funds, defining issues for consideration by the Executive Steering Committee, and reporting project status. The Project Manager (PM) will coordinate with members of various project teams and will be the main point of contact with the Executive Steering Committee (ESC), the USACE Executive Steering Group (ESG), and other stakeholders. The PM will provide regular progress reports to the ESC and the ESG, as appropriate.

The PM will ensure that all required tasks and coordination are performed in accordance with the PMP. Budget preparation, correspondence, inter-organizational coordination, and point-of-contact responsibilities are part of project management. Duties such as assigning and negotiating study tasks to technical elements, scheduling the study, coordinating between technical elements, monitoring and modifying assigned work items as required, reviewing results and reports

provided by the technical support staff, and preparing and responding to technical correspondence are also the responsibility of the Project Manager.

Feasibility Study Management costs include: daily overall management of work activities on the study, preparing progress reports, preparing budgetary documents, reviewing expenditures, and reviewing the technical reports generated by the various technical elements. Chicago District Planning Division will monitor the progress of technical investigations in accordance with the PMP and will ensure that the Study complies with applicable USACE guidance related to feasibility studies. Additionally, the division will be responsible for drafting all draft reports for review and coordinating the technical review of these reports.

Assumptions:

- For study activities conducted prior to and after the Plan Formulation process for Focus Area I and II, annual programs and project management staffing costs equal \$200,000/year.
- For study activities conducted prior to and after the Plan Formulation process for Focus Area I and II, annual feasibility study management costs equal \$250,000/year.
- USACE staffing cost to complete the project management plan equal \$250,000.

This task requirement is estimated to be:

Project, Programs and Feasibility Study Management

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
<i>Focus Area I</i>							
22T	Programs & Project Management	LRC	\$ 130,000				\$ 130,000
22Q	Feasibility Study Management	LRC	\$ 160,000				\$ 160,000
22T	Project Management Plan	LRC	\$ 250,000				\$ 250,000
<i>Focus Area I & II</i>							
22Q	Feasibility Study Management	LRD	\$ 375,000				\$ 375,000
22T	Programs & Project Management	LRD	\$ 300,000				\$ 300,000
<i>Focus Area II</i>							
22T	Programs & Project Management	LRD	\$ 200,000				\$ 200,000
22Q	Feasibility Study Management	LRD	\$ 250,000				\$ 250,000
<i>Project, Program and Feasibility Study Management</i>						<i>Subtotal:</i>	\$1,665,000

Public Communications- Successful implementation of this Feasibility Study will require involvement from an extensive array of government stakeholders and non-governmental organizations. Being so broad in geographic area and potential magnitude of impact, key components of GLMRIS will involve public awareness and feedback, as well as stakeholder communication and coordination. Consequently, a Public Communications Plan (PCP) will be established for GLMRIS. This plan includes activities required to convey information pertaining to GLMRIS with the intent of transparency, outreach, and education. The basic activities include development of visual and informational aids, electronic- and social-media strategies and guidelines, establishment of ongoing communications and outreach goals. It is assumed that all other costs will be accounted for in the Programs and Project Management tasks.

Assumptions:

- The estimated cost for communication staffing equals \$50,000 per year. Public communications is required throughout the study duration, (8) years.

This task requirement is estimated to be:

Public Outreach

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
22A	Public Communications		\$400,000				\$400,000
Public Communications - Focus Area I & II						Subtotal:	\$400,000

Focus Area II Risk Characterization – The Forward Reconnaissance Team will complete a comprehensive search and inventory for potential surface water connections between the Great Lakes and Mississippi River Basins outside the Chicagoland area. Additionally, the Forward Recon Team will assess and prioritize the identified connections relative to the risks associated with the transfer of ANS. The objective of this assessment is to complete a “Preliminary Interbasin Connections Risk Characterization” report by the end of September 2010. The report will inventory all potentially significant surface water connections between the Great Lakes and Mississippi River Basins; characterize the relative risks at each potential connection in relation to the potential for transfer of ANS; provide a basis for prioritizing the connections according to relative risk; and scope a path forward at each potential connection. The Forward Recon Team is comprised of senior level hydrology and AIS experts within the Federal, state and local agencies surrounding the Great Lakes already familiar with relevant available data and local conditions to perform a collaborative risk characterization.

Interim Product: Preliminary Interbasin Connections Risk Characterization

This task requirement is estimated to be:

Focus Area II Risk Characterization

USACE Subacct	Description	USACE Labor		Misc.	Total
		Div	Amount		
22J	Preliminary Risk Characterization	USACE	\$ 114,800		\$140,000
22J	Travel Expenses	USACE	\$ 10,700		\$ 13,000
22F	Preliminary Risk Characterization	USACE	\$ 23,000		\$ 28,000
22F	Travel Expenses	USACE	\$ 3,500		\$ 4,000
22Z	Agency Technical Review	SAJ	\$ 12,000		\$ 15,000
Focus Area II Preliminary Risk Characterizations				Total	\$200,000

STEP 1: Specify Problems and Opportunities

This step provides the foundation for scoping the planning process. A clear statement of problems and opportunities is critical for the success of the entire planning process. As provided in January 2010, USACE has initially identified the following problems and opportunities in the GLMRIS Plan Formulation Roadmap (Roadmap):

Problems

- ANS have been introduced to the GL and MR basins and will likely continue to be introduced.
- ANS dispersion throughout the GL and MR basins has been and is projected to cause economic, environmental and social impacts.
- The CAWS artificially connects the GL and MR basins and provides a means of ANS transfer between these basins.
- Additional pathways such as episodic floods, known and unknown manmade connections and human transport contribute to ANS transfer between the GL and MR basins.

Opportunities

- Protect the GL and MR aquatic ecosystems from the transfer of ANS between basins.
- Protect the GL and MR fisheries and associated economies.
- Protect the GL and MR recreational and commercial economies.
- Recommend, where necessary, laws or additional detailed studies to reduce the risk of further transfer of ANS between the MR and GL basins via human transport and other non-aquatic pathways.

Next, the team should identify how it intends to solve the problems and achieve the opportunities. Objectives state the intended outcome of the planning process, i.e. what an alternative plan should try to achieve and what constraints limit the extent of the planning process. Initially, USACE identified the following overall study goal, objectives and planning constraints – as with the problems and opportunities, the Study Team will continue to refine this list throughout the study

Overall Study Goal - Prevent or reduce the risk of ANS transfer between the MR and GL basins through aquatic pathways.

Planning Objectives

- Recommend ANS controls to prevent or reduce the risk of ANS transfer via aquatic pathways between the GL and MR basins.
- Minimize impacts to users of i) the CAWS and ii) other aquatic pathways between the GL and MR basins.
- Mitigate or provide alternative facilities or measures for users of i) CAWS and ii) other aquatic pathways between the GL and MR basins.
- Protect riverine and lacustrine biodiversity and food web structure and function in the MR and GL basins.
- Recommend ANS controls or additional detailed studies to reduce the risk of ANS transfer between the GL and MR basins via human transport and other non-aquatic pathways.

Planning Constraints

- Authorization – Study authority is limited to transfer between the MR and GL basins through aquatic pathways.
- Existing Uses – Recommended alternative plans must mitigate or provide alternative facilities or measures for possible impacts to existing users.
- Legal Requirements – Recommended alternatives plans are restricted to those that comply with applicable law and policies, such as but not limited to the following:
 - Supreme Court’s Diversion Decree⁵, International Great Lakes treaties, Executive Orders, and laws addressing threatened and endangered species, drinking water and stormwater control, and
 - Real estate restrictions such as ownership, historical and cultural property designations, and hazardous, toxic and radioactive waste liabilities.
- Timing – As a result of the December 2009 application of rotenone, one bighead carp (*Hypophthalmichthys nobilis*) was found in the CSSC, downstream of the fish barrier and adjacent to the Lockport Lock and Dam. An additional bighead carp was found in Lake Calumet in June, 2010. Lake Calumet is located approximately six (6) miles from Lake Michigan, and is upstream of the fish barrier. To date, this is the only bighead or silver carp found beyond the barrier system. As a result of this one bighead carp's presence and potential threat of continued presence in the CSSC, a timely study is needed.

⁵U.S. Supreme Court Decree in the Wisconsin, et al v. Illinois et al, 388 U.S. 426, 87 S.Ct. 1774 (1967) as modified by 449 U.S. 48, 101 S. Ct. 557 (1980).

- Projections – The success of recommended alternative plans are affected by data limitations, including but not limited to the following:
 - The identity of future ANS;
 - The performance of the proposed control alternatives; and
 - The unknown impact climate change will have on ANS dispersion and existing uses.

As stated in the Roadmap, the Study Team will revise and expand this list as the study progresses. USACE anticipates hosting ten (10) National Environmental Policy Act (NEPA) scoping meetings specifically dedicated to engage stakeholders and refine GLRMIS’s Problems and Opportunities. As the study continues, the Study Team may continue to edit and refine the Problems and Opportunities. This work and the costs required to do so are captured in later steps of this study. The USACE task requirement to host and attend ten (10) NEPA scoping meetings is as follows:

Assumptions:

- Ten (10) stakeholder meetings will be held.
- Assume approximately (b) (5) /meeting for meeting expenses such as stenographer services and room rental expenses.
- Additional NEPA compliance costs are located in Step 4.

This task requirement is estimated to be:

Specify Problems and Opportunities

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
<i>Focus Area I & II</i>							
22A	NEPA Scoping Meetings	USACE	\$ 300,000			\$ (b) (5)	\$ (b) (5)
NEPA Scoping Meetings						Subtotal:	\$ (b) (5)

STEP 2: Inventory and Forecast Conditions

In Step 2, the Study Team will gather data about conditions that are directly related to the study's Problems and Opportunities such as significant natural resources, and physical, demographic, economic and social conditions and will use this information i) to quantify Problems and Opportunities, and ii) to define most likely future without project conditions. The forecast of future without project conditions (FWOP) reflects conditions expected during the life of a project.

Per USACE requirements, the Plan Formulation Team will study the data gathered by the Hydrology and Hydraulics, Natural Resources, Environmental Quality, Technology, Navigation and Economics Teams. The Plan Formulation Team will evaluate the success and cost effectiveness of formulated ANS control measures by comparing 1) the estimated conditions within the MR and GL basins assuming no project is implemented, also known as FWOP, with 2) these estimated conditions assuming ANS controls are implemented through GLMRIS. In sum, the Plan Formulation Team will formulate alternative plans and compare it to the FWOP condition. Additionally, the team will assess the impacts caused by those plans.

In addition to the FWOP being a USACE requirement, the National Environmental Policy Act (NEPA) regulations require federal agencies to forecast FWOP. Federal agencies must discuss the alternative of “doing nothing” i.e. FWOP. Additionally, if a Federal agency does not select the alternative of “no action”, then the agency performing the study must explain the basis of its decision. For information on activities and costs required for the NEPA process, please see Step 4.

The *FWOP condition* is the most-likely condition expected to exist in the future, in the absence of a proposed project. The Study Team will forecast without project conditions and will use this forecast as the benchmark against which the team will evaluate all alternative plans. The forecast will extend from the base year - the year when the proposed project is expected to be operational - to the end of the period of analysis which generally is 50 years for USACE projects.

Inventory Hydraulic Connections and Hydrology and Hydraulic Models – Through hydrologic and hydraulic (H&H) analyses, USACE will inventory aquatic connections between the MR and GL basins. For each existing potential connection, USACE will determine the frequencies by which the MR and GL basins are hydrologically connected to form an aquatic pathway. Each connection has the possibility to involve unique characteristics requiring site specific data needs and/or analysis methods unique to that location. Some may involve standard H&H watershed/stream model studies while others may require minimal analysis to provide the necessary information for determining the required aquatic pathway's hydrologic and hydraulic characteristics and frequency of occurrence.

As an example of the range of connection locations, some connections are located in densely populated urban areas while others are in remote rural areas. Some may involve large scale and complex multipurpose drainage/navigation systems including complex operations of massive hydraulic structures – such as the CAWS – while another may consist of an indistinct drainage divide in a remote wetland area such as one of the connections between the St. Louis River and the Mississippi River in Minnesota. Connections may come in the form of channels, flood plains, pipes, wetlands, sluice gates, overflow weirs, overlands, or locks.

Possible data requirements include, hydrologic and hydraulic studies and/or models, stream and precipitation gage data, as-built plans of applicable hydraulic structures (reservoirs, locks, pump stations, gate structures, overflow weirs, culverts, etc.), operations' manuals for hydraulic structures, land use maps, soil type maps, GIS topographic data, surveyed channel cross sections, surveyed bridge and culvert data, drain tile surveys, storm sewer plans, FEMA flood insurance studies and mapping. Storm sewer system modeling may also be needed. Some data needs will be readily available, while others may be incomplete for study purposes and need modification or additional data or analysis. In other cases, new models may need to be developed where none currently exist.

The prior paragraphs, in part, summarize the work the H&H Team will complete to identify hydrologic connections between the basins, to model overbank flooding conditions and related impacts caused by project alternatives. For Focus Area I the hydrologic connections are known and USACE and other local agencies have worked extensively on modeling overbank flooding along many segments of the Chicagoland area waterways. USACE estimates that overbank modeling to assess current conditions in this area will be completed by July 2011. See Figure 2 for a status of these modeling efforts.

For Focus Area I, USACE believes that some project alternatives may raise the stage of the Chicagoland area waterways. If the stage of the Chicagoland area waterways increases, this increased head would inhibit the drainage of sewer sheds within these waterways. As drainage of sewer sheds is inhibited, the basements of structures within the impacted sewer sheds could be flooded. Consequently, USACE is identifying ways to quantify the impacts of raised stages, in particular basement flooding. The City of Chicago has already developed a model that can quantify basement flooding impacts within the City of Chicago under current conditions, future with project conditions and also under with project conditions for small to moderate rainstorms. USACE will explore whether this model meets the needs of the GLRMIS study. For Focus Area I area outside the City of Chicago, the GLMRIS H&H Team will identify a methodology and develop a model that can quantify the impacts of project alternatives on basement flooding.

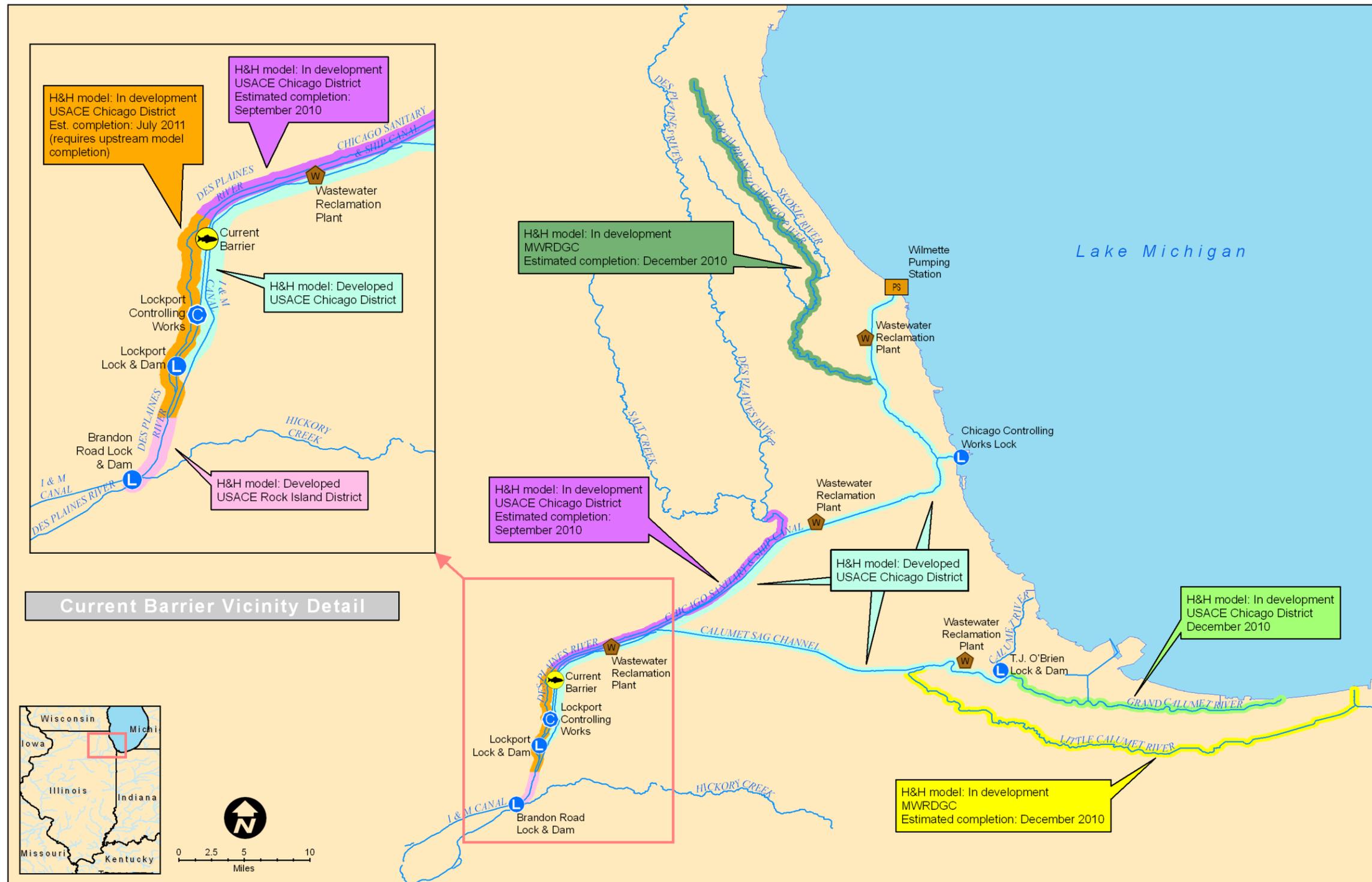


Figure 2. Status of Hydrology and Hydraulics Overbank Flooding Models for the Chicagoland Area Waterways

Assumption for Hydrologic Connections and Control Points - For the purposes of estimating costs to conduct this work, USACE Chicago District has initially identified the following potential hydrologic connections between the MR and GL basins:

- Seven (7) potential control points for the hydrologic connections between the GL and MR basins are within the Chicagoland area:
 - CAWS
 - hydrologic connections and control points - Wilmette Pumping Station, Chicago River Lock and Controlling Works and Thomas J O'Brien (O'Brien) Lock,
 - control point - Lockport Lock and Dam, and
 - Other Chicagoland hydrologic connections (outside the CAWS)
 - Hydrologic connections and control points - Grand Calumet River, and Little Calumet River,
 - Control point - Brandon Road Lock and Dam.
- Although initial investigations have indicated that as many as 30 possible inter-basin connections may exist, for the purposes of this WBS, twelve (12) probable hydrologic connections between the GL and MR basins are assumed to be located outside the Chicagoland area.
 - USACE has begun to investigate the number of hydrologic connections outside Chicagoland. See the "Study Management, Preliminary Risk Assessment" section for more information.
 - USACE based this estimate on an extremely cursory survey that is subject to change.

This task requirement is estimated to be:

Hydrology & Hydraulics – Inventory and Forecast Conditions

USACE Subacct	Description	USACE	Labor	MIPR	Amount	A/E Contract	Total
		Div	Amount	Agency			
<i>Overbank Flooding - Focus Area I - CAWS</i>							
22J	Inventory Hydraulic Models, Develop Baseline and Future Condition Models, Calibrate Models, Develop Synthetic Event Models	LRC	\$ 170,000				\$ 170,000
<i>Overbank Flooding - Focus Area I – Other Chicagoland Connections</i>							
22J	Inventory Hydraulic Models, Develop Baseline and Future Condition Models, Calibrate Models, Develop Synthetic Event Models	LRC	\$ 170,000				\$ 170,000
22N	Survey Costs					\$ (b) (5)	\$ (b) (5)
<i>Basement Flooding - Focus Area I – CAWS & Other Chicagoland Connections</i>							
22J	Inventory Basement Flooding Models, Coordinate With City of Chicago (A/E) to develop baseline and future condition models, Develop other basement models (PLACEHOLDER)	LRC	\$ 50,000			\$ (b) (5)	\$ (b) (5)
<i>Overbank Flooding - Focus Area II</i>							
22J	Inventory Hydrologic Connections	USACE	\$ 200,000				\$ 200,000
22J	Inventory existing models, develop new baseline and future condition models, calibrate models, develop synthetic event models	USACE	\$ 955,000				\$ 955,000
22N	Survey Costs					\$ (b) (5)	\$ (b) (5)
Hydrology & Hydraulics						Subtotal:	\$ (b) (5)

Inventory Natural Resources – The Natural Resources Team (NRT) will produce a report documenting current conditions. The team will incorporate all specific natural resource inventories and studies into the report, along with consideration and analysis of prior biological investigations and will thoroughly assess the two (2) basins of the study area and determine how they influence each other. In addition, the team will describe and evaluate the regional and national significance of natural resources within the study area, based on threatened and endangered species, rare, unusual, or scenic habitat types, fisheries, landforms, and/or rivers and lakes. As listed below, the team will identify current ANS and where these ANS are expected to distribute if no project is implemented (FWOP conditions). The specific inventories that will be completed include but are not limited to the following:

Identify significant aquatic natural resources relevant to problems and opportunities

- Native Riverine Communities
- Native Lacustrine Communities
- Current Aquatic Nonnative Species Lists & Distributions
 - Transport mechanisms
 - Accommodating habitats
 - Future Without Distributions

Study area characterizations

- Physical Resources
- Ecological Resources
- Natural History and Human Influences

Study area characterizations

- Physical Resources
- Ecological Resources
- Natural History and Human Influences

In addition to the inventory of natural resources, the team will conduct an inventory of the cultural and social resources in the area surrounding the project site. Cultural resources include but are not limited to archeological sites and places or buildings on local, state or national historic registries, and social resources include but are not limited to data concerning medium income, population, home ownership, and recreational features within the project area.

For Focus Area I, the Natural Resource Team will conduct an inventory of the Chicagoland Area Waterways for GLMRIS. This inventory will consist of a literature search of the City of Chicago Landmarks Commission records, as well as both the Illinois and Indiana state records for historic preservation. The team will consult online databases of State and Federal agencies for information on social resources and will review commercial databases for such information as real estate and census data.

Once the hydraulic connections are identified for Focus Area II, the Natural Resource Team will coordinate the gathering of similarly applicable cultural and social resource data for each connection locale with the local USACE Districts.

Interim Product: Aquatic Invasive Species Inventory

This task requirement is estimated to be:

Natural Resources Team – Inventory of Current Conditions

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
Focus Area I & II							
22E	Inventory Natural Resources	LRC	\$ 200,000			(b) (5)	\$ (b) (5)
22E	Develop ANS Inventory	LRC	\$ 130,000				\$ 130,000
Focus Area I							
22D	Inventory Cultural Resources	LRC	\$ 20,000				\$ 20,000
22C	Inventory Social Resources	LRC	\$ 80,000				\$ 80,000
Focus Area II							
22D	Inventory Cultural Resources	LRC	\$ 20,000				\$ 20,000
22C	Inventory Social Resources	LRC	\$ 80,000				\$ 80,000
NRT - Inventory Current Conditions						Subtotal:	\$ (b) (5)

Ecological Risk Assessment – The Natural Resource Team will quantify significant aquatic natural resources for future without project conditions and to perform the with-project conditions for project alternatives.

- Alien & Invasive Species
- Native Fisheries
- Native Aquatic Ecosystem Function
- Endangered Species
- Native Aquatic Biota
- Other Natural Resources

Alternatives will be developed to prevent the aquatic dispersal of ANS transport between the GL and MR basins. Design elements will include engineered features, technologies, changes in operations, or other elements that would effectively meet the goals and objectives of this study. The Ecological Risk Assessment task for this type of project will need to be risk based. This will entail identifying invasive species of concern, their preferred habitats, and then employing a risk based assessment as to how intense of an effect they could have on an invaded system. The risk assessment techniques adopted for the specific ecosystems, habitats or indicator communities will be employed to establish existing conditions in the study area, assist in the formulation of alternatives, and quantify the preservation of native ecological units associated with plans and plan scales. The result of the United States Geological Survey study pertaining to the sustainability of Asian carps in the Great Lakes has the potential to inform the risk assessment. NRT members will participate in the formulation of alternatives by assisting in the following tasks: (1) selection of protection objectives, (2) determination of appropriate structure and function to be protected; and (3) identification of technologies/methods.

After the initial screening process, project ecologists will quantify the expected adverse effects and biodiversity loss associated with no action, and the amount of protection provided by each alternative (and scale of alternative) for use in conducting a cost / benefit analysis. At this point, the Ecological Risk Assessment could be comprised of a simple professional judgment index, or could be a complex academic model.

This task requirement is estimated to be:

Natural Resources Team – Ecological Risk Assessment

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
<i>Focus Area I & II</i>							
22E	Ecological Risk Assessment	LRC	\$ 375,000			\$(b) (5)	\$ (b) (5)
22Z	Certification	LRC	\$ 300,000				\$ 300,000
NRT - Habitat Evaluation Procedure						Subtotal:	\$ (b) (5)

Identify ANS Controls - ANS controls will be identified and categorized based on their ability to reduce ANS transport mechanisms via aquatic pathways. Successful implementation of effective controls would reduce the risk of ANS transfer between basins via aquatic pathways. Using the ANS pathway information identified by the Natural Resource Team’s literature review, the Technology Team will conduct a literature review of all available ANS controls that can be implemented to prevent or reduce the risk of ANS transfer via these ANS transport mechanisms. The Technology Team will perform a risk assessment in order to rank the effectiveness of various ANS control technologies.

In light of the significant hydraulic connections within the CAWS, the Technology Team will investigate whether waterway conditions within the CAWS can be modified to control ANS transfer. This effort will seek to identify processes and methods that can be used to modify the water quality of a strategic portion of the CAWS in an effort to prevent or reduce the risk of ANS transfer between the GL and MR basins via the CAWS.

Using information gathered by the Natural Resource Team, the Technology Team will formulate early detection and rapid response plans or templates that can be used to develop an overall early detection and response program. Preventing ANS transfer via every potential pathway such as terrestrial or human means is impossible; however with successful early detection and response programs, governmental agencies can address ANS introductions prior to successful establishment. Lastly, early detection programs are also a means of monitoring the effectiveness of selected ANS control technologies.

Lastly, the Technology Team will investigate ANS transfer via ballast water. This investigation will include identification of the laws that regulate ballast water and an estimate of ballast water volume that is transferred between the GL and MR basins.

Interim Product: ANS Control Inventory

This task requirement is estimated to be:

Technology Team

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
<i>Focus Area I & II</i>							
22E	Ballast Water Issues	LRC	\$ 20,000				\$ 37,000
		MVR	\$ 5,000				
		SAJ	\$ 7,000				
		ERDC-EL-MS	\$ 5,000				
22E	ANS Controls	LRC	\$ 34,000	(b) (5)	(b) (5)		(b) (5)
		MVR	\$ 20,000				
		SAJ	\$ 24,000				
		ERDC-EL-MS	\$ 20,000				
22E	Risk Assessment				(b) (5)		(b) (5)
22E	Early Detection and Rapid Response	LRC	\$ 20,000		(b) (5)		(b) (5)
		MRV	\$ 7,500				
		SAJ	\$ 7,500				
		ERDC-EL-MS	\$ 15,000				
Technology						Subtotal:	(b) (5)

Inventory the Water Quality of Waterways – After the Study Team identifies the locations where ANS controls may be constructed, the Environmental Quality Team will inventory the quality of the potentially impacted waterways. The H&H Team will use this information to 1) model the water quality for Focus Area I, and 2) inventory the water quality for Focus Area II and that may have an ANS control constructed that may impact water quality. The Environmental Quality Team will also identify which water quality parameters are relevant.

In Focus Area I, the Plan Formulation Team will evaluate complete hydrologic separation of the GL and MR basins in the Chicagoland area. Consequently, the Study Team must be able to quantify the current water quality of the CAWS and quantify the impacts complete hydrologic separation between the GL and MR basins would have on the CAWS, as well as other ANS control alternatives. As such, the Study Team must formulate or update an existing water quality and hydrology model for the CAWS using the DUFLOW model. This model must be able to quantify water quality impacts to the CAWS assuming the system is a closed system.

Assumptions:

- Each hydraulic connection and control point will require a control that may affect the quality of the waterway; consequently, water quality data is needed to establish current conditions.
- In Focus Area I, the Plan Formulation Team will evaluate complete hydraulic separation of the GL and MR basins in the Chicagoland area.
- The DUFLOW model will be used to model water quality impacts to the CAWS.
- Water quality data is collected by public agencies.
- This data is publicly available.

If this information is not publically available, the Environmental Quality Team must then sample the waterways and analyze the samples. Please note, this task estimate does not include costs for sampling or laboratory analysis.

This task requirement is estimated to be:

H&H and Environmental Quality Team

USACE Subacct	Description	USACE Labor (\$)	MIPR		A/E Contract	Total
			Agency	Amount		
<i>Focus Area I</i>						
22E	Current Conditions of Waterway Quality	\$13,000				\$13,000
22J	DUFLOW Modeling		(b) (5)	(b) (5)		(b) (5)
<i>Focus Area II</i>						
22E	Current Conditions of Waterway Quality	\$11,000				\$11,000
<i>H&H & Environmental Quality Team - Water Quality</i>					Subtotal:	(b) (5)

Phase I HTRW Investigations – At this point in the study, the H&H Team has identified seven (7) control points within the Chicagoland area; however, the Study Team has not determined where ANS controls will be constructed within the Chicagoland waterway.

Engineer Regulation (ER) 1165-2-132, Hazardous, Toxic, and Radioactive Waste Guidance for Civil Works projects, requires USACE to conduct a site investigation as early as possible to identify and evaluate potential HTRW problems. According to this directive, non-HTRW environmental issues that do not comply with federal, state, and local regulations should also be investigation and discussed in the report.

After the Study Team has indentified possible installation location(s) for ANS control(s) [site(s)], the Environmental Quality Team will complete an HTRW investigation for each site and prepare a report documenting its findings. The Environmental Quality Team will evaluate the potential for HTRW sites, located outside of the installation location, to impact the possible installation locations. The report will include the team’s findings from the following tasks: a site reconnaissance; review of facility and regulatory agency records and databases; review of available mapping and aerial photography; and interviews with landowners, knowledgeable individuals, and regulatory agencies. This team will document the location of all known, reported, or suspected HTRW sites in the Phase I HTRW report and will document the recognized environmental conditions of each site and also indicate when a site has the potential for upland HTRW contamination.

For each HTRW investigation, the Environmental Resources Team must contract for environmental database searches.

Assumptions:

- Seven (7) control points are within the Chicagoland area.

- Seven (7) hydraulic connections are outside the Chicagoland area.
- The Plan Formulation Team will investigate installing an ANS control for each identified hydraulic connection.

USACE guidance would require an HTRW investigation at each installation location. The Study Team would select a location upon review of collected data. Based on these assumptions, this task requirement is:

Environmental Quality Team – Hazardous, Toxic, Radioactive Waste Investigations

USACE Subacct	Description	USACE Labor (\$)	MIPR		A/E Contract	Total
			Agency	Amount		
<i>Focus Area I</i>						
22L	Current Conditions	\$150,000			(b) (5)	(b) (5)
<i>Focus Area II</i>						
22L	Current Conditions	\$150,000			(b) (5)	(b) (5)
<i>Environmental Quality Team - HTRW Investigations</i>					Subtotal:	(b) (5)

Economic Evaluation of Current Conditions - As identified at the beginning of this attachment, USACE must comply with guidance found in Principles and Guidelines when completing its planning studies. ER 1105-2-100, based on Principles and Guidelines, provides specific guidance on the determination of economic valuation of proposed projects. This economic analysis as outlined in this work breakdown structure identifies the tasks the Navigation and Economics Team (Nav/Econ Team) must accomplish to meet these requirements.

The economic analysis involves the development of an inventory and forecast of economic valuation of critical resources (e.g., physical, demographic, economic, social, etc.) relevant to the Problems and Opportunities in the planning area. The Study Team will use this information to complete an impact assessment of with project conditions. This assessment is the basis for plan evaluation, comparison and selection; consequently, the Study Team must clearly determine and fully document the without-project condition. Forecasts will be made for selected years over the period of analysis to indicate how changes in economic and other conditions are likely to have an impact on problems and opportunities.

During this step of the planning process, the Navigation and Economics Team will establish the current economic valuation of the following:

- Commercial cargo, commercial passenger, and recreational navigation;
- Fisheries;
- Water users;
- Dischargers;
- Flood control, and
- Regional economies.

The following sections outline the tasks or activities that the Nav/Econ Team will complete to establish current conditions for each of the above-listed areas. In some instances, these sections identify work required to establish FWOP and complete an impacts analysis later in the planning

process. Selecting models, conducting surveys and gathering data reflecting current conditions to input into the model, in some cases, is the majority of the cost for that applicable task.

The work outlined below assumes that hydraulic separation of the MR and GL basins within the Chicagoland area will be evaluated. As such, economic models and conditions must be established so this alternative can be evaluated.

Assumption for Economic Evaluation:

- During the plan formulation process for Focus Area I, the Plan Formulation Team will evaluate hydraulic separation of the GL from the MR basin in the Chicagoland area.

Navigation

Commercial Cargo Navigation - Generally, this task involves the collection and reporting of historic traffic, transportation rate update, projected traffic and valuation, the creation and collection of shipper response survey, and the impacts of alternatives that would require overland alternative routes. The Nav/Econ Team will estimate CSSC use over time, both with and without the project, though with project conditions will be tabulated in Step 4 of this document. Applicable data obtained for the establishment of existing conditions will be used as the foundation for this analysis. Required data include determining the use of the CSSC in terms of fleet composition, commodity flows, and transportation costs for with- and without-project conditions.

An analysis of existing, as well as potential, commodity flows into and out of the study area will be conducted over the life of the project. This section will include a description of the economic study area in terms of commodities, current and prospective, existing development and infrastructure, local municipalities, the local economy, and competing modes of transport. Data sources will include Waterborne Commerce of the United States, survey results, interviews with facility representatives as well as any other relevant publications or knowledgeable industry personnel. Subtasks include the following:

- *Historic Traffic Determination* - This task will determine the origins and destinations of past and current commodity shipments, commodity trade routes, the transportation mode or modes by which commodities are carried to and/or from the vessels and the sizes and types of vessels used for transportation. Additional components of Historic Traffic Determination include:
 - *Vessel Fleet Composition* - Historical, present and future vessel/fleet size and composition will be established, comparison of which will result in determination of anticipated fleet changes over the period of analysis. Fleet composition will be considered according to trade route, type of commodity, volume of traffic, capacity utilization, and any port or canal restrictions; and
 - *Vessel Operating Costs* - Waterborne commerce transportation costs will be based on vessel operating costs obtained from discussions with Great Lakes' fleet operators and survey results.

- *Transportation Rate Update* - Transportation rates for vessels and alternative transportation modes will be updated to reflect current rates via surveys and rate research and/or appropriate indices. Additional components of Transportation Rate Update include:
 - *Current Cost of Commodity Movement* - The total origin-to-destination transportation costs for commodity movement will be estimated for both the without and with project conditions. Estimated costs will include necessary handling, transfer, and storage, as well as any other accessory charges; and
 - *Future Cost of Commodity Movements* - This task will result in an estimate of the relevant shipping costs during the period of analysis and future changes in fleet composition, transportation delays, and capacity issues for all transportation modes.
- *Projected Commercial Cargo Traffic Valuation* - This task will forecast prospective commodity shipments, trade routes and the transportation mode or modes by which commodities will be carried for with- and without-project conditions.
- *Shipper response survey* - A survey will be prepared and submitted to shippers to provide information regarding shipping costs and vessel usage.

Commercial Passenger Navigation - This task involves the identification of, and interviews with, tour boat operators to establish current condition revenues and economic linkages. The operation of tour boats in and around the Chicagoland area may experience a substantial impact. The Nav/Econ Team can quantify the impacts to tour boat by surveying the current operators and by establishing this industry's current condition revenues and economic linkages within the region.

Recreational Navigation - The Chicagoland area is home to many recreational boaters. The Nav/Econ Team can quantify the impacts to these boaters by surveying them to determine an economic current condition value. The benefits of recreation navigation are typically: 1) reduced cost of recreation, and 2) willingness to pay for recreation experiences. The base value of recreation navigation is determined by the value added associated with trip related (e.g., gas, food, lodging) and recreation equipment related (e.g., boats, campers, tents, fishing gear) expenditures.

Protection of native species or, conversely, the prevention or reduction of risk of ANS transfer between the GL and MR basins, contributes to base recreational navigation benefits and is likely necessary to maintain the continued viability of recreational navigation. Though not a reduction in the cost of recreational benefits, preventing or reducing the risk of ANS transfer between the basins is most likely needed to maintain this benefit stream. Increases in ANS are expected to decrease the appeal of recreational navigation, resulting in decreases in trip and equipment related expenditures and their corresponding value added.

Assumptions:

- Only the Chicagoland area will have commercial passenger navigation and recreational navigation that may be impacted by project alternatives.

Interim Products: Fact sheet/fact booklet summaries of baseline data gathered from primary sources for the following subjects:

- commercial navigation,
- recreational navigation, and
- commercial passenger navigation.

This task requirement is estimated to be:

Navigation and Economics Team - Navigation

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
Commercial Cargo							
22G	Historic Traffic	LRH	\$ 10,000				\$ 10,000
22G	Transportation Rate Update	LRH	\$ 90,000				\$ 90,000
22G	Projected Traffic Valuation	LRH				(b) (5)	\$ (b) (5)
22G	Shipper Response Survey	LRH				(b) (5)	\$ (b) (5)
22Z	Model Certification			((b) (5)		(
Commercial Passenger							
22G	Identify & Interview tourboat operators, establish baseline revenues and economic linkages	LRC/LRB				(b) (5)	\$ (b) (5)
Recreational Navigation							
22G	Survey Recreational Users, Establish Current Condition Values	LRB	\$ 50,000		(b) (5)		(
Navigation and Economics - Navigation - Focus Area I & II						Subtotal:	\$ (b) (5)

Fisheries

Currently, the National Oceanic and Atmospheric Administration (NOAA) maintains records on the quantity and type of fish harvested in and around the Great Lakes. The Nav/Econ Team must estimate the current economic value of the commercial and recreational fishing industry in the GL and MR basins.

Interim Product: Fisheries Survey of the Great Lakes and Mississippi River Basins

This task requirement is estimated to be:

Navigation and Economics Team – Fisheries

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
22G	Establish Commercial Fisheries Current Conditions	LRC	\$ 40,000	(b) (5)	(b) (5)		(b) (5)
22G	Establish Recreational Fisheries Current Conditions	LRC	\$ 50,000			\$(b) (5)	\$(b) (5)
Navigation and Economics - Fisheries - Focus Area I & II						Subtotal:	\$(b) (5)

Industrial Dischargers and Water Users – This category includes wastewater treatment plants, water supply plants, other industrial water users and discharges and hydropower plants. It is assumed that at least one study alternative, hydraulic separation of the GL and MR basins within Chicagoland area, will impact industrial water users and dischargers located in this area. The Environmental Quality Team will inventory the industrial water users and dischargers within the Chicagoland waterways. As for the connections outside of the Chicagoland area, the Environmental Quality Team will gather this information after the hydraulic connections are identified.

The Environmental Quality Team will identify dischargers as industries having National Pollutant Discharge Elimination Permits and users as industries having permits to withdraw water from relevant waterways. This team will also identify the locations of these industries; the volume of water withdrawn; and the volume and water quality standards for discharges.

Assumptions:

- Data is collected by public agencies.
- Data is publicly available.
- Focus Area I
 - Wastewater and drinking water plants will be impacted by study alternatives.
 - Other industrial water users and dischargers will be impacted by study alternatives.
- Focus Area II
 - Wastewater or drinking water plants will not be impacted by study alternatives.
 - Other industrial water users and dischargers will be impacted by study alternatives.

If this information is not publically available, this team must then survey relevant industries; and consequently, this task estimate does not include the costs to conduct these surveys.

Economic Valuation of Water Supply – For purposes of this PMP, industrial waterway users are drinking water plants and industries that use water from the waterways in their process and as coolant. For purposes of this PMP, hydropower plants are also being categorized in this group. The Study Team must be prepared to assess potential impacts project alternatives on these industrial users. Using information gathered by the Environmental

Quality Team, the Navigation and Economics Team will conduct the analysis of the without-project conditions by time period and will include the following six elements:

- Existing water supplies
- Institutional arrangements
- Additional water supplies
- Probability of water supply
- Water quality
- Non-structural measures

Existing and expected future water systems and water monument contracts and operating criteria are considered part of the without-project condition, unless revision of these systems, contracts, or criteria is one of the alternative plans being studied. The without-project condition also includes water supplies that are under construction, or authorized and likely to be constructed during the forecast period, and includes a specification and calculation of the probability of delivery for each source of water supply in the analysis.

Economic Valuation of Industrial Dischargers – Industrial waterway dischargers include wastewater treatment plants and industries that discharge effluent into the waterways. These dischargers are waterway users. For Focus Area I, the Chicagoland area, four (4) wastewater treatment plants discharge treated effluent into the CAWS. It is assumed that at least one study alternative - hydraulic separation of the GL and MR basins within the Chicagoland area - would impact the wastewater and also industrial dischargers in this area. The Study Team must be prepared to assess potential impacts project alternatives may have on these industries. Analysis of potential impacts for these users will focus on treatment options and discharge locations.

This task requirement is estimated to be:

Nav/Econ and Environmental Quality Teams – Industrial Dischargers and Water Users

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
<i>Environmental Quality Team</i>							
<i>Focus Area I</i>							
22E	Current Conditions of Industrial Water Users and Dischargers	LRC	\$ 46,000				\$ 46,000
22C	Current Conditions of Wastewater Treatment and Supply Plants	LRC	\$ 23,000				\$ 23,000
<i>Focus Area II</i>							
22E	Current Conditions of Industrial Water Users and Dischargers	LRC	\$ 30,000		(b) (5)		(b) (5)
<i>Nav/Econ Team - Focus Area I & II</i>							
<i>Water Users (Drinking water Plants, Industrial Water Users & Hydropower)</i>							
22E	Baseline Survey of Intakes and Outflows, Location, Elevation, Capacity and Utilization	LRB	\$ 25,000				\$ 25,000
22E	Integrate Hydrologic Information	LRB	\$ 25,000				\$ 25,000
22G	Develop Valuation Procedures	LRB	\$ 15,000				\$ 15,000
22G	Identification of Users (Municipal and Industrial) and Alternative Supply Costs	LRB	\$ 25,000				\$25,000
<i>Waterways Dischargers (Wastewater Treatment Plants & Industrial Dischargers) - Focus Area I</i>							
22G	Coordination with dischargers to estimate current treatment and process costs	LRB				\$(b) (5)	\$(b) (5)
22G	Coordination with dischargers to estimate alternative costs for treatment and discharge	LRB	\$ 15,000				\$ 15,000
<i>Waterways Dischargers (Wastewater Treatment Plants & Industrial Dischargers) - Focus Area II</i>							
22G	Coordination with dischargers to estimate current treatment and process costs	LRB	\$ 25,000				\$ 25,000
22G	Coordination with dischargers to estimate alternative costs for treatment and discharge	LRB	\$ 10,000				\$ 10,000
Nav/Econ and Environmental Quality Team - Water Supply and Discharge						Subtotal:	\$(b) (5)

Regional Economic Development

The Nav/Econ Team will select the most appropriate Regional Economic Development (RED) model and will establish current conditions and provide the basis for analyzing the impacts of project alternatives. An economic impact assessment traces spending through an economy and measures the cumulative effects of that spending. The impact region is determined by the nature of the project alternatives and can be the entire country, individual state(s), counties or some combination of these. Defining the area of influence is an important first step in the process. Potential models, in alphabetical order, include, but are not limited to:

- EIFS (Economic Impact Forecast System)
- IMPLAN (Impact Planning & Analysis, Minnesota IMPLAN Group, Inc.)
- MARAD Portkit (Maritime Administration)
- REDYN (Regional Dynamics - Economic Analysis Model)
- REMI (Regional Economic Models, Inc.)
- RIMS II (Regional Input-Output Modeling System II – Bureau of Economic Analysis)
- Other MRVIO (Multi-Regional Variable Input-Output Model)

The current condition will be presented using one or more of the following measures, though other measures may ultimately be included as well:

- Employment levels (jobs)
- Value Added (or gross regional product)
- Aggregate Wages and Salaries
- Wealth (including property values)
- Business Output (sales volume or spending)

Each of these measures reflects a particular dimension of economic well-being of area residents.

This task requirement is estimated to be:

Navigation and Economics – Regional Economic Development

USACE Subacct	Description	USACE Labor*		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
<i>Focus Area I & II</i>							
22G	Select Model, Define Area	LRE/IWR	\$ 40,000				\$ 40,000
<i>Establish Current Condition RED, Develop Direct Effect / Run Model - Interim I/II</i>							
22G	Recreational Boating	LRE	\$ 50,000			\$ (b) (5)	\$ (b) (5)
22G	Commercial Fishery	LRE	\$ 50,000			\$ (b) (5)	\$ (b) (5)
22G	Recreation Fishing	LRE	\$ 50,000			\$ (b) (5)	\$ (b) (5)
22G	Flood Damage	LRE	\$ 50,000			\$ (b) (5)	\$ (b) (5)
Navigation and Economics - Regional Impacts - Focus Area I & II						Subtotal:	\$ (b) (5)

Flood Risk Management

The geographic scope of this project may be extensive. The H&H Team will identify an area of concern for potential flooding impacts in response to various ANS controls. The Nav/Econ Team will collect data including structure data, damage relative to depth of flooding, population at risk, and traffic information within this area of concern. Additionally, to determine the first floor elevation of each structure, the Nav/Econ Team will contract to have industrial and commercial structures within this area of concern surveyed. Additionally, a traffic study will be completed to identify traffic patterns in the area of concern and economic impacts due to flooding of area roads.

Assumption:

- The Plan Formulation Team will evaluate hydraulic separation of the GL and the MR basins at each hydraulic connection.

This task requirement is estimated to be:

Navigation and Economics – Flood Control

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
<i>Flood Control Impact - Chicagoland Area - Focus Area I</i>							
22J	Define Areas of Concern	LRC	\$ 25,000				\$ 25,000
22J	Integrate Hydrologic Information	LRC	\$ 50,000				\$ 50,000
22N	Survey Structures / Values (possible GIS)	LRC	\$ 150,000				\$ 150,000
22G	Estimate Population at Risk	LRC	\$ 50,000				\$ 50,000
22G	Traffic Analysis	LRC	\$ 100,000				\$ 100,000
<i>Flood Control Impact - Outside Chicagoland Area - Focus Area II</i>							
22J	Define Areas of Concern	LRC	\$ 25,000				\$ 25,000
22J	Integrate Hydrologic Information	LRC	\$ 50,000				\$ 50,000
22N	Survey Structures / Values (possible GIS)	LRC	\$ 150,000				\$ 150,000
22G	Estimate Population at Risk	LRC	\$ 50,000				\$ 50,000
Navigation and Economics - Flood Risk Management						Subtotal:	\$ 650,000

STEPS 3 – 6: Background

To complete the work for the remaining portion of the study, USACE staffing will be needed in at least the following areas: biology, ecology, economics, civil, mechanical, structural, environmental, geotechnical, hydraulic and cost engineering, mapping and GIS support, real estate, project management and planning. At this point, data collection has begun; however, much data is needed before USACE can estimate its future staffing and contract costs with any level of specificity. For the purposes of providing a scoping level cost estimate for Steps 3-6, USACE estimates its staffing costs will equal \$1.425 million dollars annually, and this work will take 3 years to complete the Chicagoland area and 3 years to complete outside the Chicagoland area.

The Chicago District will prepare a detailed task description, staffing requirements and cost estimate for the Plan Formulation phase of this study, once the without project conditions are quantified. A Plan Formulation Team will be formed using members of the various teams that participating in the first part of this study.

Assumptions:

- Annual staffing cost equals \$1.45 million. This annual staffing costs are divided between the following disciplines:
 - Environmental Engineering – \$125,000
 - Hydrology and Hydraulics – \$175,000
 - Geotechnical Engineering – \$175,000
 - Civil Design, Surveys and Mapping – \$100,000
 - Real Estate – \$75,000
 - Civil Design, Engineering Design/Project Cost Estimates – \$200,000
 - Feasibility Management – \$250,000
 - Plan Formulation and Evaluation – \$150,000
 - Feasibility Programs and Project Management – \$200,000

- Labor costs to quantify economic impacts of project alternatives are indentified in Planning Step 3.2.

- For the Chicagoland area:
 - The Plan Formulation Team will complete Steps 3-6 in 3 years; and

- For the Study Area outside of the Chicagoland area:
 - The Plan Formulation Team will complete Steps 3-6 in 3 years.

This task requirement is estimated to be:

USACE Staffing

USACE Subacct	Description	USACE Labor			MIPR		A/E Contract	Total
		Div	Yrs	Unit Cost/Yr	Agency	Amount		
<i>Focus Area I</i>								
22E	Environmental Studies	LRC	3	\$ 125,000				\$ 375,000
22H	Real Estate	LRC	3	\$ 75,000				\$ 225,000
22J	Hydrology & Hydraulics Studies	USACE	3	\$ 175,000				\$ 525,000
22K	Geotechnical Studies	LRC	3	\$ 175,000				\$ 525,000
22N	Surveys and Mapping	LRC	3	\$ 100,000				\$ 300,000
22P	Engineering Analysis & Design / Project Cost Estimates	LRC	3	\$ 200,000				\$ 600,000
22Q	Feasibility Management	LRC	3	\$ 250,000				\$ 750,000
22R	Plan Formulation and Evaluation	LRC	3	\$ 150,000				\$ 450,000
22T	Feasibility Programs and Project Management	LRC	3	\$ 200,000				\$ 600,000
<i>Focus Area I</i>							Subtotal:	\$4,350,000
<i>Focus Area II</i>								
22E	Environmental Studies	LRC	3	\$ 125,000				\$ 375,000
22H	Real Estate	LRC	3	\$ 75,000				\$ 225,000
22J	Hydrology & Hydraulics Studies	USACE	3	\$ 175,000				\$ 525,000
22K	Geotechnical Studies	LRC	3	\$ 175,000				\$ 525,000
22N	Surveys and Mapping	LRC	3	\$ 100,000				\$ 300,000
22P	Engineering Analysis & Design / Project Cost Estimates	LRC	3	\$ 200,000				\$ 600,000
22Q	Feasibility Management	LRC	3	\$ 250,000				\$ 750,000
22R	Plan Formulation and Evaluation	LRC	3	\$ 150,000				\$ 450,000
22T	Feasibility Programs and Project Management	LRC	3	\$ 200,000				\$ 600,000
<i>Focus Area II</i>							Subtotal:	\$4,350,000
USACE Staffing							Subtotal:	\$ 8,700,000

STEP 3: Formulate Alternative Plans

Plan Formulation is the process the Plan Formulation Team will use to build alternative plans that i) meet objectives without violating constraints, and ii) solve the study’s problems while realizing opportunities.

Step 3.1. *Identify Reasonable Management Measures* – A management measure is an option, technology or control that can be used to address one or more of the study objectives. For this study, in particular, a management measure will i) prevent or reduce the risk of ANS transfer between the MR and GL, and ii) mitigate or provide alternative facilities or measures for users of the CAWS and other aquatic connections.

For each ANS control, the Study Team will identify the following:

1. Affects each ANS control will have on i) users of the CAWS and other aquatic pathways between the basins and ii) significant natural resources;
2. Management measure(s) to address users impacted by implementation of ANS controls; and
3. Costs, outputs and uncertainties for each ANS control.

Risk Assessment - A risk assessment is a useful tool for defining a problem in an organized manner and can provide the Plan Formulation Team with a transparent and defensible basis for selecting project alternatives and mitigation measures. To assess areas or aspects of the study that require a risk assessment, the Plan Formulation Team will likely reach out beyond the USACE organization for such services. For example, the result of the United States Geological Survey’s study pertaining to the sustainability of Asian carps in Lake Michigan has the potential to inform the risk assessment for that particular ANS’ transfer to the Great Lakes. Areas that may require risk assessments include but are not limited to the following: the risk of ANS transfer, and quantification of the reduction in risk if an ANS control is installed at a control point.

Assumptions:

- Focus Area I – Risk assessments totaling (b) (5) will be required.
- Focus Area II - Risk assessments totaling (b) (5) will be required.

This task requirement is estimated to be:

Risk Assessments

USACE Subacct	Description	USACE Labor		MIPR			A/E Contract	Total
		Div	Cost	Agency	#	Unit Cost		
<i>Focus Area I</i>								
22R	Risk Assessments	LRC			((b) (5)		(b) (5)
<i>Focus Area II</i>								
22R	Risk Assessments	LRC			(
Risk Assessments							Subtotal:	(b) (5)

Step 3.2. *Screening Process Criteria* – The Study Team will screen the controls and eliminate low-performing measures using established criteria the team selects. USACE initially identified the following tasks the Study Team may complete to establish these criteria; however, the Study Team may revise these criteria as the study continues:

- Output – Estimate the following:
 - The prevention or reduced risk of transfer between the MR and GL basins for each mode of ANS transport; and
 - The long-term economic impacts each control has on the basin’s users. A description of the economic impacts analysis is found below.
- Cost – Estimate the following:
 - The cost to construct, operate and maintain each control; and
 - The cost to construct, operate and maintain mitigating or alternative measures and facilities for impacted users.

Environmental Sampling and Analysis – If the Plan Formulation team identifies proposed project locations where the Phase I HTRW investigation indicates a potential for an HTRW, limited environmental sampling and analyses will be performed. This investigation includes sampling of media such as soil, sediment, and groundwater to confirm or deny the presence of HTRW in, or adjacent to, project areas where no previous sampling has been conducted. The Plan Formulation Team will use this information to estimate construction costs and also ensure compliance with USACE policy regarding HTRW sites. The results of the investigation will be documented in a report.

Sampling on privately owned land requires a right-of-entry agreement from the landowner. If a landowner is not willing to grant a right-of-entry, the Plan Formulation Team will either remove the project locations from consideration when formulating the recommended plan based upon the potential for HTRW, or the team will note the property for a follow-up HTRW investigations prior to construction.

The USACE staffing requirements for this effort have been accounted for; however, the Environmental Quality Team estimated the contract costs for sampling and analysis using the following assumptions:

- Focus Area I - Chicagoland Area
 - Four (4) sites will need environmental sampling and analysis
- Focus Area II - Outside Chicagoland Area
 - Four (4) of the twelve (12) sites will need Phase II site assessment
- General
 - Contract costs equal (b) (5) /sampling event.
 - Some level of environmental investigation has occurred before.
 - Limited sampling scope is completed.

NOTE – Actual costs will vary widely depending on 1) site conditions, 2) historic property uses and 3) the scope of the sampling and analysis.

This task requirement is estimated to be:

Environmental Sampling and Analysis

USACE Subacct	Description	USACE Labor	MIPR		A/E Contract	Total
			Agency	Amount		
<i>Focus Area I</i>						
22L	Environmental Sampling and Analyses				\$(b) (5)	\$(b) (5)
<i>Focus Area II</i>						
22L	Environmental Sampling and Analyses				\$(b) (5)	\$(b) (5)
Environmental Quality Team - Environmental Sampling & Analyses					Subtotal:	\$(b) (5)

General Conformity Analysis (Air Quality) - A General Conformity Analysis will be conducted to ensure alternatives do not cause or contribute to a violation of National Ambient Air Quality Standards in any non-attainment area. This analysis is necessary for the Chicago region, as it is designated as a non-attainment area for ozone and PM-2.5. It is anticipated that indirect air pollutant emissions will result from alternatives that restrict navigation in the Chicago waterways, as commodity transport patterns will shift from barge to less efficient modes (truck and train). The team will utilize commodity transport data provided by the Nav/Econ Team and existing air emissions models to determine whether air emissions created by impacts from project alternatives are below federal conformity emission rate thresholds. It is assumed air quality impacts for Phase II alternatives will be *de minimis*, and a formal General Conformity analysis will not be required. The funding identified in spreadsheet entitled “USACE Staffing” found in Steps 3-6 includes labor required to complete this analysis.

Economic Impacts Analysis - In Step 2, the Nav/Econ Team will be gathering data; conducting surveys; and selecting and setting up economic models. In this step, this team will use these models to quantify impacts from proposed project alternatives. Project alternatives may impact the following economies:

- Commercial Cargo Navigation
 - Cost of Alternative Modes of Commodity Transport - Alternative modes of commodity transport will be analyzed and the impacts of taking these alternative modes. The essence of this task is to identify and evaluate navigation substitutes. Such options may include alternative routes or use of other modes of transportation. Information will be obtained through a search of appropriate literature reviews and interviews with waterway users. The literature reviews and interviews will occur in Step 2 of the Study.
 - Cost of Commodity Movement – The total origin-to-destination transportation costs for commodity movement will be estimated for each project alternative. Estimated costs include handling, transfer, storage and other accessory charges.

- Using information gathered during Step 2, the Nav/Econ Team will quantify the impact project alternatives have on the following industries:
 - Commercial Passenger Navigation
 - Recreational Navigation Impacts
 - Fisheries
 - Waste Water Treatment Plants, Drinking Water Plants, Industrial Water Dischargers and Users and Hydropower Plants
- RED – Using the data and the RED model as described in Step 2, the Nav/Econ Team will evaluate the RED impacts of each project alternative.
- Flood Risk Management – After the H&H Team identifies the “areas of concern,” meaning the areas that may be flooded due to impacts from project alternatives, the Nav/Econ Team will qualify the economic impacts due to flooding from project alternatives. Additionally, the Nav/Econ Team will conduct a traffic impact analysis. This analysis will quantify the impacts to traffic delays caused by flooding due to project alternatives.

This task requirement is estimated to be:

Navigation and Economics – Impacts of Alternatives

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
Commercial Cargo - Focus Area I & II							
22G	Impacts of Overland Diversion Analysis	LRH	\$ 75,000				\$ 75,000
Commercial Passenger - Focus Area I & II							
22G	Impacts of Alternatives on Operations	LRC	\$ 25,000				\$ 25,000
22G	Estimated Revenue Impact and NED Losses	LRC	\$ 25,000				\$ 25,000
Fisheries - Focus Area I & II							
22G	Commercial Fisheries Impact	LRC			(b) (5)	\$(b) (5)	\$(b) (5)
22G	Recreation Fisheries Impact	LRC		(b) (5)		(b) (5)	(b) (5)
Water Users (Drinkingwater Plants, Industrial Water Users & Hydropower) - Focus Area I							
22G	Industrial Water Users	LRC				(b) (5)	(b) (5)
22G	Industrial Dischargers	LRC				(b) (5)	(b) (5)
Regional Economic Development Impacts - Focus Area I & II							
22G	Recreational Boating Impact	LRE	\$ 25,000				\$ 25,000
22G	Commercial Fishery Impacts	LRE	\$ 25,000				\$ 25,000
22G	Recreational Fishery Impacts	LRE	\$ 25,000				\$ 25,000
22G	Flood Damage Impacts	LRE	\$ 25,000				\$ 25,000
Flood Risk Management - Focus Area I							
22G	Estimate Impacts for Each Alternative	LRC	\$ 100,000			(b) (5)	(b) (5)
22G	Traffic Impacts	LRC	\$ 100,000			(b) (5)	(b) (5)
Flood Risk Management - Focus Area II							
22G	Estimate Impacts for Each Alternative	LRC	\$ 100,000			(b) (5)	
Navigation and Economics - Impacts of Alternatives						Sub-total:	(b) (5)

Step 3.3. *Alternative Plan Formulation* – The Study Team will combine the screened measures into reasonable alternative plans with the goal of meeting the greatest number of objectives while avoiding constraints.

STEP 4: Evaluate the Effects of Alternative Plans

The Study Team will evaluate alternative plans using the four planning criteria: completeness, effectiveness, efficiency and acceptability. Economic evaluation of alternative plans will assume risk-neutrality⁶.

Step 4.1. *Establish Decision Criteria* – The Study Team will establish decision criteria by which the team will evaluate the alternatives. These criteria include but are not limited to reduced risk of ANS transfer, potential impact to significant natural resources, potential impact to waterway users, and cost of ANS controls and mitigation measures.

NEPA Compliance – One of the criteria the Study Team will use is whether an alternative complies with applicable laws. The following tasks outline tasks required to comply with the Fish and Wildlife Coordination Act and NEPA.

Fish and Wildlife Coordination Act Report - As required by the Fish and Wildlife Coordination Act, as amended, Public Law 85-624; 16 U.S.C. 661, et seq., the Chicago District will coordinate with the U.S. Fish and Wildlife Service (USFWS) to ensure that fish and wildlife resource conservation is given equal consideration with other purposes in project selection. The NRT ecologists will coordinate with the USFWS in providing and reviewing information necessary to assist the USFWS in rendering a draft and final opinion under the Coordination Act. The Chicago District would coordinate with the USFWS and respond to the Coordination Act Report.

An inter-agency transfer of funds will be provided to the USFWS to compensate them for their involvement in the study and preparation of the Coordination Act Report. The USFWS will participate in the study scoping, identification of fish and wildlife concerns, identification of available information, determination of the significance of fish and wildlife resources, and quantification of anticipated impacts. The Coordination Act Report and all coordination documentation will accompany the Feasibility Report and NEPA document.

NEPA – One required goal of this project is a successful Environmental Impact Statement (EIS) as required by NEPA. Although data collection and analysis will be done by a number of different entities, the actual drafting of the EIS will likely be performed by a resource outside of the USACE organization, who will integrate the various data sets and analytical results into a final document. Steps in this process include: publishing a Notice of Intent in the Federal Register, issuing scoping letters to inform interested parties, development of a scope of work for the contractor, the development of alternatives, a analysis of the impacts of each alternative, public scoping of the alternatives including public notice, the writing of a draft EIS, the addressing of public and agency comments, and finally the writing of a final EIS. This final document (the EIS) will serve as the basis for the signed Record of Decision (ROD) that finalizes the NEPA process of the project.

As a part of the NEPA process, USACE will be hosting public scoping meetings. The cost for hosting these meetings is found in Step 1 of this WBS.

⁶ See National Economic Development Procedures Manual – Overview Manual for Conducting National Economic Development Analysis, IWR Report 91-R-11, October 1991, pages 25-26.

This task requirement is estimated to be:

NEPA Compliance – Focus Area I/II

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Amount	Agency	Amount		
22F	Fish and Wildlife Coordination Act Report			(b) (5)	██████		██████
22D	NEPA Compliance			(b) (5)	██████		██████
NEPA Compliance – Focus Area I/II						Subtotal:	(b) (5)

Step 4.2. *Evaluation of Alternatives* – Based on the selected decision criteria, the Study Team will use a cost effectiveness/incremental cost analyses to evaluate the cost and output of each alternative plan over the period of analysis. The Study Team will evaluate the alternative plans based on their suitability for completeness, effectiveness, efficiency and acceptability against planning objectives.

STEP 5: Compare Alternative Plans

The Study Team will perform a tradeoff analysis between each alternative by evaluating the residual risk reduction for each ANS with the cost of each control plus the cost of associated mitigation measures. Through tradeoff analysis, the study team will seek to find balance between potentially competing interests including significant natural resources, existing users and economic interests. Comparison of alternative plans will utilize both monetary and non-monetary metrics. Figure 3 identifies the possible interests, benefits and costs USACE may be analyzing during the tradeoff analysis, and as the Study continues, the components of such a tradeoff analysis may be revised.

Potential Trade-off Analysis for Each Alternative...

Benefits

Natural Resources

- Protection of Significant Natural Resources:
 - Native Ecosystems
 - Threatened and Endangered Species
 - Water Quality

Economics

- Avoidance of Induced Maintenance Costs Caused by ANS
- Preservation of Commercial & Recreational Fisheries
- Maintenance of Current Recreational Uses

Costs

Economics

- Implementation and O&M Cost of ANS Control
- Cost of Mitigation Measures for Impacted Waterway Users
 - Flooding
 - Commercial & Recreational Navigation
 - Wastewater Treatment Plants
 - Water Quality
 - Recreational Uses
 - Industrial Dischargers
 - Water Users
- Unmitigated/Residual Impacts to Waterway Users

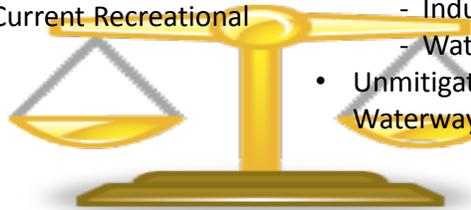


Figure 3. Possible Tradeoff Analysis for Evaluating Project Alternatives

To further explain the components of the possible tradeoff analysis as pictured in Figure 3, the following is provided:

Protection of Significant Natural Resources – A wide array of natural resources could be impacted by the introduction of a sustained ANS population. The prevention or reduced risk of ANS transfer due to the implementation of ANS controls will, at minimum, be evaluated for the following:

- Native ecosystems,
- Threatened and endangered species, and
- Water quality.

Avoidance of Induced ANS Maintenance Costs – An ANS infestation could pose substantial maintenance costs for an assortment of commercial, industrial and governmental stakeholders; zebra mussels, for example, are estimated by the NOAA to cost between \$100M and \$400M dollars annually⁷. The cost of controlling ANS populations and reducing impacts will be considered during the trade-off analysis.

Maintenance of Recreational Uses – Without ANS control, there is a potential for significant loss of recreational uses. Current regional recreational uses will be surveyed and the impacts of ANS infestation will be forecasted to be used in the trade-off analysis.

The implementation of ANS controls could pose various impacts to an assortment of waterway users and stakeholders. The cost of mitigating these impacts will be taken into account during the trade-off analysis. These impacts are initially identified as:

Cost of ANS Control Implementation – The cost to implement each alternative along with the necessary operation, maintenance, repair, rehabilitation and replacement (O&M) will be taken into account for the trade-off analysis.

Cost of Mitigation Measures for Impacted Waterway Users – ANS controls could have undesirable impacts to various waterway users which may require mitigation. The cost of mitigating these impacts will be considered for each alternative. Initially, the Study Team has identified the following waterway users that may need to be addressed:

- *Flooding* – Waterways are generally used as a storage facility and conduit for stormwater runoff. Alternative plans could potentially impact current management practices for storm water in areas where alternatives are considered⁸. The Nav/Econ Team will quantify these flooding impacts.
- *Commercial and Recreational Navigation* – Alternative plans could potentially impact commercial and/or recreational navigation users, which will be monetarily quantified and incorporated into the evaluation procedure.

⁷ Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990: Hearing before the Subcommittee on Environment, Technology and Standards of the House Committee on Science, 108th Cong. (2001).

⁸ For example, in the Chicagoland area, the CAWS is an essential component of the area's stormwater management practices. During storm events, the CAWS may receive flows from the following: 1) stormwater runoff, numerous storm sewers discharge to the CAWS from several municipalities and the Illinois Department of Transportation facilities; 2) 255 combined sewer overflows (CSOs) discharge into the CAWS from about 40 municipalities and MWRDGC; and 3) out of the 255 (CSOs), five (5) are major pumping stations. Metropolitan Water Reclamation District of Greater Chicago, Description of the Chicago Waterway System for the Use Attainability Analysis, Report No. 08-15R, page 6, March 2008.

- *Wastewater Treatment Plants* – Alternative plans could affect conveyance of effluent from wastewater treatment, which would be addressed in the trade-off analysis⁹.
- *Water Quality* – Diversion from certain sources could be used to improve water quality in various regions¹⁰. There is a potential that ANS control alternatives could impact water quality or the ability to divert water for water quality purposes; this will be considered during the trade-off analysis.
- *Recreational Uses* – The effects of alternative plans could impact recreational uses for nature or sport enthusiasts who utilize the waterway or the areas of control implementation; these effects will be taken into account for the trade-off analysis.
- *Industrial Users and Dischargers* – Alternative plans may impact industrial users or industrial dischargers.
- *Water Supply Impacts* – The impacts to water supply users will be monetarily quantified and incorporated into the evaluation procedure.
- *Unmitigated/Residual Impacts to Waterway Users* – ANS controls which have undesirable impacts to waterway users that cannot be mitigated. These impacts will be identified and used in the comparison.

Additionally, in Step 5, the Study Team will evaluate the sensitivity of each alternative plan to changes, including but not limited to economic viability, implementation costs, design uncertainties, mitigation requirements and regulatory requirements.

⁹ As an example, over 70% of the annual flow in the CAWS is effluent of wastewater treatment plants (WRP) operated by the Metropolitan Water Reclamation District of Greater Chicago. During the winter months, virtually all the flow is from the WRP, and during summer months, approximately 50% of the flow is from the WRP. *Id.* at pages 4-5.

¹⁰ Water from Lake Michigan is diverted into the CAWS to maintain adequate water quality in the CAWS. This diversion is known as “discretionary division.” Discretionary diversion is seasonal. The most flow occurs during warm weather months. *Id.* at pg. 5.

STEP 6: Selecting the Recommended Plan

The Study Team will select a recommended plan based on the results of the trade-off analysis for both GLMRIS Focus Area I – Chicagoland Area and GLRMIS Focus Area II – Outside the Chicagoland Area. The work required to complete a Feasibility Report are described below.

Feasibility Report Preparation - As the Feasibility Report is a direct by-product of selecting a recommended plan and represents the final stages of documentation for the study, all costs associated with the preparation of the Feasibility Report shall be included in this stage of the planning process. Feasibility report preparation activities will include generating the draft and final Feasibility Report and NEPA documentation, Agency Technical Review (ATR), Independent External Peer Review (IEPR), District Quality Control (DQC), policy compliance reviews, and reproducing reports for agency and public distribution. Technical reports, described in other task elements in this PMP, will be included as appendices to the Feasibility Report.

A draft Feasibility Report and draft NEPA document will be prepared following the guidance contained in ER 1105-2-100. Preparation of the draft Feasibility Report includes assembling, writing, editing, typing, drafting, reviewing, reproducing, and distributing the draft report, draft NEPA document and other related documentation required for transmittal by USACE for approval by higher authorities. The draft Feasibility Report will be used as a decision document that supports authorization for implementation of a candidate project. The contents of the draft Feasibility Report are summarized below:

- A concise main report that includes the study's technical findings, conclusions, and recommendation that confirms or denies the interest in the Corps of Engineers' implementation of a candidate project.
- A draft NEPA document.
- Technical appendices presenting the detailed backup and results of individual tasks.
- Microcomputer Aided Cost Estimating System (MCACES / MII) estimate for the recommended plan.
- Other supporting documentation.

Prior to preparation of the draft Feasibility Report, a minimum of two policy compliance reviews, including a Feasibility Scoping meeting (FSM) and an Alternative Formulation Briefing (AFB) must be completed. The FSM and AFB are required interim checkpoint conferences attended by the study team, the Great Lakes and Ohio River Division (LRD), the Mississippi River Valley Division (MVD), and Headquarters (HQUSACE). The purpose of the FSM is to review study findings concerning goals and objectives; problem and opportunities; and current and future without project conditions. The purpose of the AFB is to review study findings concerning measures formulated to address problems and opportunities; to evaluate the array of alternatives and determine their consistency with the Federal interest; and to review the preliminary analysis of the environmental, economic, social and regional impacts of alternatives. The AFB will be scheduled when technical studies have progressed to the point where the tentatively selected plan is identified for implementation.

The Final Feasibility Report will incorporate comments from the Study Team, the public, supporting agencies, stakeholders, and higher authority USACE reviews. The steps in producing a Final Feasibility Report include the following:

- Finalize draft Feasibility Report for internal/sponsor PDT Team review.
- Revise and reproduce draft report for submission to LRD and HQUSACE.
- Revise draft report in response to LRD and HQUSACE comments.
- Modify draft report in response to comments during agency and public comment review.
- Develop a preliminary project design as a basis for preparing a Design Documentation Report (DDR), if necessary, and plans and specifications.
- Reproduce Final Feasibility Report for distribution.

The study team will perform reviews of the draft and Final Feasibility Report in accordance with established Quality Control Plans (QCPs). Each sub-team is responsible for producing quality services and/or products. Methodology, concurrence, technical adequacy, and product quality are obtained through periodic internal reviews by team members and technical supervisors. Appropriate review documentation, including checklists and/or comments, will be provided to the Project Manager subsequent to the team review.

Agency Technical Review (ATR) is an in-depth review, managed within USACE, and conducted by a qualified team of USACE staff outside of the home district that is not involved in the day-to-day production of a project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team reviews the various work products and assures that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel, and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home Division.

The Independent External Peer Review should be conducted by appropriate subject matter experts who are external to the Corps and not integrally involved in the production of the technical product under review. A peer review plan will be developed, coordinated with the appropriate Corps Planning Center of Expertise and posted for public comment

The Chicago District Planning Branch will prepare an announcement of the completion of the Division Commander's Report, based on his endorsement of the findings and recommendations of the District Commander, and indicate that the report has been submitted for Washington Level Review.

This task requirement is estimated to be:

Report Preparation & Review

USACE Subacct	Description	USACE Labor		MIPR		A/E Contract	Total
		Div	Cost	Agency	Cost		
<i>Focus Area I</i>							
22S	Report Preparation	LRC	\$ 300,000				\$ 300,000
22Z	Reviews	USACE	\$ 400,000				\$ 400,000
22Z	IEPR	LRC				(b) (5)	(b) (5)
<i>Focus Area II</i>							
22S	Report Preparation	LRC	\$ 300,000				\$300,000
22Z	Reviews	USACE	\$ 400,000				\$ 400,000
22Z	IEPR	LRC				(b) (5)	(b) (5)
<i>Focus Area I & II</i>							
22Y	Washington Level Review	LRC	\$ 75,000				\$ 75,000
Report Preparation & Review						Sub-total:	(b) (5)

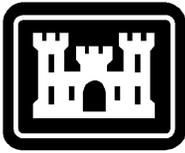
APPENDIX 3

FOCUS AREA II (OTHER PATHWAYS) OTHER PATHWAYS RISK CHARACTERIZATION REPORT



Please see accompanying file

APPENDIX 4
STUDY FACT SHEET



FACT SHEET

September 2010

PROJECT: Inter Basin Control of Great Lakes & Mississippi River Aquatic Nuisance Species

TYPE: Environmental Improvement -Investigations

AUTHORITY: Section 3061, Water Resources Development Act 2007.

DESCRIPTION: The Chicago Area Waterway System (CAWS) is a series of man-made and natural waterways that connect the Great Lakes and Mississippi River basins. The CAWS provides a potential pathway for aquatic nuisance species (ANS) to spread through 30 states and two (2) Canadian provinces. Since 2002, a temporary electric demonstration dispersal barrier has been operating in the Chicago Sanitary Ship Canal (CSSC), one of the man-made waterways within the CAWS. A second more permanent electric barrier, with a design life of 20 years, is currently being constructed. These barriers are designed to stop the movement of fish, but do not protect against the full range of potential ANS that could transfer between the two basins. The implementation of this study is anticipated to 1) identify potential hydraulic connections, in addition to the CSSC, that may exist between the Great Lakes and Mississippi River basins; 2) explore potential future invasive species; 3) analyze possible options and technologies to prevent or reduce the risk of ANS transfer; and 4) complete a thorough and comprehensive analysis of the gathered data and recommend alternatives to prevent or reduce the risk of ANS transfer between the basins. An initial focus of GLMRIS will converge on the potential threat of ANS transiting between the basins using Chicagoland waterways, and will include the evaluation of long-term measures, including potential hydraulic separation, to reduce the risk or prevent the spread of aquatic nuisance species via this system. A second focus area will identify and evaluate other potential aquatic pathways between the basins through which ANS may transfer. A risk-based screening process will be employed to identify, prioritize, and categorically evaluate other potential aquatic pathways.

CURRENT STATUS: A basic PDT, as well as a study support team structure has been established. A strategy to identify and recruit Stakeholders is being implemented. Scoping for the Project Management Plan is complete and includes input from participating Corps Districts/Divisions; as well as Federal and regional agencies. Initial studies are being implemented to collect baseline economic, social, environmental, and hydraulic data.

FY 2010 WORK: (Allocation - \$269,000, Total Avail for Obl - \$479,062; Additional GLRI - \$500,000)

- FY10 amount is being used finalize the PMP, release Public Notice of Feasibility Study, initiate NEPA Scoping Process, develop scopes of work, and facilitate inter-agency and stakeholder communication.

FY 2011 WORK: (Budget Amount -\$400,000; Capability Amount - \$5,200,000)

- The FY11 budget amount would be used toward developing a list of species of concern, a survey of potential inter-basin connections, and a survey of commercial and recreational waterway users.
- Additional amount in FY11 could be used to implement and evaluate fisheries and recreational surveys, enumerate the economic values of key navigation and recreation activities, perform hydraulic modeling, initiate preparation of the EIS, and review potential technologies that can be used to prevent the spread of invasive species.

COST:

Total Project Cost	\$ 25,500,000
Federal Cost	\$ 25,500,000
Non-Federal Cost	\$ 0

SCHEDULED COMPLETION DATE: Final recommendation of ANS controls and mitigation in the Chicagoland waterways: 2015; Comprehensive Study: 2018

BENEFITS: The ecologic and economic impacts of aquatic invasive species are significant, affecting the sport and commercial fisheries, tourism, as well as commercial navigation in both the Great Lakes and Mississippi River.

NON-FEDERAL SPONSOR: This study is 100% Federal

ISSUES AND CONCERNS: Adequate funding at the Management Plan amount is necessary for this study to achieve anticipated timelines.

PROJECT MANAGER: Dave Wethington

APPENDIX 5

IMPLEMENTATION GUIDANCE



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
WASHINGTON, D.C. 20314-1000

MAR 12 2009

CECW-LRD

MEMORANDUM FOR COMMANDER, GREAT LAKES AND OHIO RIVER DIVISION

SUBJECT: Implementation Guidance Section 3061 of the Water Resources Development Act of 2007 (WRDA 2007) – Chicago Sanitary and Ship Canal Dispersal Barriers Project, Illinois

1. Section 3061 provides that the existing Barrier I project and the Barrier II project in the Chicago Sanitary and Ship Canal (CSSC) shall be considered as a single dispersal barrier project. The barriers are designed to prevent the interbasin transfer of aquatic nuisance species between the Great Lakes and the Mississippi River. In addition, it directs that the Secretary, at full Federal expense, upgrade and make permanent the existing Barrier I demonstration project; construct Barrier II notwithstanding the existing project cooperation agreement with the State of Illinois; operate and maintain Barriers I and II as a system to optimize effectiveness; and conduct a study of the options and technologies for reducing the impacts of hazards that may reduce the efficacy of the barriers. Further, Section 3061 directs that the Secretary shall provide each State a credit for the funds contributed by that State for Barrier II. The credit may be applied to any cost sharing responsibility for an existing or future Federal project carried out by the Secretary in that State. In addition, Section 3061 authorizes a study at full Federal expense, on the range of options and technologies to prevent the spread of aquatic nuisance species between the Great Lakes and the Mississippi River by aquatic pathways. A copy of Section 3061 is enclosed.

2. The Chicago District will reallocate existing program funds from both accounts into a new single funding account, "Chicago Sanitary and Ship Canal Dispersal Barriers Project" and within available funds operate and maintain (O&M) the existing Barrier I until Barrier II has been constructed and is fully operational. As additional funds become available Chicago District will accomplish the following tasks at 100 percent Federal cost in accordance with Section 3061:

a. In order to insure effectiveness of the barrier system and recognizing the technical constraints of the existing demonstration project, Chicago District will upgrade and make permanent Barrier I.

b. Complete necessary design and construction activities for completion of Barrier II.

c. Draft an amendment to the existing PCA to reflect the changes directed by Section 3061(b): that construction costs will be at Federal expense rather than shared with the non-Federal sponsor; that O&M as well as repair, replacement and rehabilitation will be the responsibility of the Government at Federal expense; and that each State may be afforded

credit in an amount equal to the amount of funds (cash payments) contributed by that State for the Barrier II project toward an existing or future Federal project carried out by the Secretary in that State. Acquisition of additional lands, easements, rights-of-way, relocations, or dredged material disposal areas necessary for the project shall be at Federal expense. All other responsibilities in the existing PCA will remain unchanged. Approval and execution of the PCA amendment will be in accordance with standard policy and procedures regarding review and approval of PCAs.

d. Initiate the Hazards Study authorized in Section 3061(b) (1) (D). The study should address hazards that threaten the effectiveness of the barriers, including the potential bypassing of the barriers during high water events, and identify practical measures that can be used to eliminate or minimize such hazards. The study shall be conducted in consultation with appropriate Federal, state, local and nongovernmental entities.

3. In accordance with Section 3061 (b) (2), credit in an amount equal to the amount of funds (cash payments) contributed by a State toward Barrier II may be applied to any cost sharing responsibility for an existing or future Federal project carried out by the Secretary in that State. The amount of funds contributed by each State is as follows: State of Illinois \$1,799,073; and, States of Minnesota, Wisconsin, Indiana, Michigan, Ohio, Pennsylvania, and New York, \$67,857.15 each. A state should request credit from the appropriate geographic district. However, the Chicago District will maintain records to track the use of credit on an existing or future project for each State. Because applying the credit will reduce the amount of non-Federal funding for an existing or future project, additional funds must be appropriated to cover the amount of such credit.

4. Upon completion, all elements of the Barriers project shall be operated as a system to optimize effectiveness in preventing the inter-basin transfer of aquatic nuisance species. Future OMRR&R will be budgeted in accordance with existing budgetary policies and procedures and will be dependent upon appropriations for those activities.

5. The feasibility study authorized by Section 3061(d) shall provide a thorough and comprehensive analysis of the options and technologies that could be applied to prevent the inter-basin transfer of aquatic nuisance species between the Great Lakes and Mississippi River through aquatic pathways. The impacts associated with the implementation of any of the final alternative plans shall include an impact analysis on all current uses of the CSSC. The analysis shall address the need to mitigate or provide alternative facilities or measures for the other users including commercial navigation, recreational navigation, storm water management and recreation. The study will be at 100% Federal expense and will be budgeted in accordance with the annual budget EC.

CECW-LRD

SUBJECT: Implementation Guidance Section 3061 of the Water Resources Development Act of 2007 (WRDA 2007) – Chicago Sanitary and Ship Canal Dispersal Barriers Project, Illinois

The study shall be conducted in consultation with appropriate Federal, state, local and nongovernmental entities. No work may be initiated on this study until funds are specifically appropriated by Congress for the study.

FOR THE COMMANDER:

A handwritten signature in black ink, appearing to read 'S. L. Stockton', with a long horizontal flourish extending to the right.

STEVEN L. STOCKTON, P.E.
Director of Civil Works

Encl

SEC. 3061. CHICAGO SANITARY AND SHIP CANAL DISPERSAL BARRIERS PROJECT, ILLINOIS.

(a) **TREATMENT AS SINGLE PROJECT.**—The Chicago Sanitary and Ship Canal Dispersal Barrier Project (in this section referred to as “Barrier I”), as in existence on the date of enactment of this Act and constructed as a demonstration project under section 1202(i)(3) of the Nonindigenous

Aquatic Nuisance Prevention and Control Act of 1990 (16 U.S.C. 4722(i)(3)), and the project relating to the Chicago Sanitary and Ship Canal Dispersal Barrier, authorized by section 345 of the District of Columbia Appropriations Act, 2005 (Public Law 108–335; 118 Stat. 1352) (in this section referred to as “Barrier II”) shall be considered to constitute a single project.

(b) **AUTHORIZATION.**—

(1) **IN GENERAL.**—The Secretary, at Federal expense, shall—

(A) upgrade and make permanent Barrier I;

(B) construct Barrier II, notwithstanding the project cooperation agreement with the State of Illinois dated June 14, 2005;

(C) operate and maintain Barrier I and Barrier II as a system to optimize effectiveness;

(D) conduct, in consultation with appropriate Federal, State, local, and nongovernmental entities, a study of a range of options and technologies for reducing impacts of hazards that may reduce the efficacy of the Barriers; and

(E) provide to each State a credit in an amount equal to the amount of funds contributed by the State toward Barrier II.

(2) **USE OF CREDIT.**—A State may apply a credit provided to the State under paragraph (1)(E) to any cost sharing responsibility for an existing or future Federal project carried out by the Secretary in the State.

(c) **CONFORMING AMENDMENT.**—Section 345 of the District of Columbia Appropriations Act, 2005 (Public Law 108–335; 118 Stat. 1352) is amended to read as follows:

“SEC. 345. CHICAGO SANITARY AND SHIP CANAL DISPERSAL BARRIER, ILLINOIS.

“There are authorized to be appropriated such sums as may be necessary to carry out the Barrier II element of the project for the Chicago Sanitary and Ship Canal Dispersal Barrier, Illinois, initiated pursuant to section 1135 of the Water Resources Development Act of 1986 (33 U.S.C. 2294 note; 100 Stat. 4251).”.

(d) **FEASIBILITY STUDY.**—The Secretary, in consultation with appropriate Federal, State, local, and nongovernmental entities, shall conduct, at Federal expense, a feasibility study of the range of options and technologies available to prevent the spread of aquatic nuisance species between the Great Lakes and Mississippi River Basins through the Chicago Sanitary and Ship Canal and other aquatic pathways.

APPENDIX 6

DOCUMENT HISTORY

	<u>DATE</u>	<u>DESCRIPTION & LOCATION WITHIN PMP OF REVISION</u>	<u>DATE APPROVED</u>	<u>APPROVED BY</u>
Original PMP	20Aug09			
Revision # 2	20Apr10	Whole PMP Revision – Original was only a skeleton structure		
Revision #3	10Jun10	WBS Revision; Updates in Communication Plan; Addition of Interim Products		
Revision #4	10Aug10	Revision of ‘Interims’ to ‘Focus Areas’ & related descriptions; WBS Revision; Updates to Communication Plan;		
Revision #5	18Oct10	Revision of PMP to include two PDTs (CAWS; Other Pathways); additional description of ESG responsibilities; Other Pathways Report		
Revision #6	30Oct10	Reorganization of PMP to add clarity, reduce redundancies, and respond to LRD CG guidance.		
Revision #7	08Oct10	Miscellaneous editorial fixes per LRD CG guidance.		

APPENDIX 7
PROJECT COMMUNICATIONS PLAN

PUBLIC COMMUNICATIONS PLAN
FOR THE
GREAT LAKES & MISSISSIPPI RIVER INTERBASIN STUDY (GLMRIS)
CHICAGO DISTRICT
Work Statement

1.) Background and Scope of Project

The Great Lakes and Mississippi River Interbasin Study (GLMRIS) is a feasibility study determining the full range of options and technologies toward reducing the risk of Aquatic Nuisance Species (ANS) transfer between the Great Lakes and Mississippi River basins. The study area covers 25 states and includes international borders with two Canadian provinces. Successful implementation of this feasibility study will necessitate the involvement from an extensive array of government stakeholders and non-governmental organizations. Being so broad in geographic area and potential magnitude of impact, key components of GLMRIS will involve public awareness and feedback, as well as stakeholder communication and coordination. Consequently, it is imperative that a Public Communications Plan (PCP) for GLMRIS be established to help ensure that pertinent, project-related information can be communicated efficiently and effectively, in a manner which optimizes the public engagement experience. Elements of the PCP will also ensure that information for public dissemination is coordinated in a consistent manner and in accordance with all Army and Federal regulations. Development of the PCP is expected to create and heighten public awareness of the project and will be used for all elements of community and stakeholder outreach regarding GLMRIS. The ultimate goal of the PCP is to deliver a clear and consistent message regarding GLMRIS goals and activities, and to deliver it in a manner which is transparent, accessible, easy to understand, and visually engaging. By attaining these goals, it is anticipated that the PCP will evoke a constructive response as public engagement advances.

2.) Purpose of Work

The GLMRIS PDT will develop an outreach program that will:

- a. Through proactive communication, increase the public awareness of activities and initiatives pertaining to GLMRIS, as well as the general USACE planning and development processes.
- b. Build public understanding of the purpose and intent of GLMRIS, as well as encourage input to the planning process regarding project features which are of interest and concern to the community.
- c. Devise and/or support a communications plan that ensures transparency, two-way symmetrical information flow, and timely information flow between the public, stakeholders, and USACE.
- d. Establish broader communication networks to reach internal and external audiences.
- e. Attract individuals and organizations that will contribute to the planning and development of the projects.

3.) Project Deliverables

This Plan includes appropriate deliverables for conveyance of GLMRIS project information with the intent of transparency, outreach, and education. The basic elements of the PCP deliverables include:

- a. Develop a comprehensive strategy to ensure active stakeholder engagement.
- b. Develop Visual and Informational Aids.
- c. Develop Electronic- and Social-Media Detailing Strategies and Guidelines which will elicit discussion and immediate feedback from stakeholders.
- d. Establish Ongoing Communications and Outreach Advice.
- e. Develop Continual Evaluation Criteria.

Stakeholder Engagement:

USACE will engage stakeholders throughout the study process. This will be done using a variety of methods, including newsletters, presentations, internet presence, social media, etc. The goal of these engagements is to exchange information on study progress and to generate a better understanding of stakeholder perspectives and concerns. The identified GLMRIS stakeholder interest groups are expected to be: Congressional, Tribal, Industry, Municipalities, States, Environmental, Navigation, and other waterway users.

Develop Visual and Informational Aids:

The communication team shall incorporate the GLMRIS vision, objectives, research, and investigation into a variety of presentation and display materials that will be used to educate and inform the public and stakeholders in a consistent and easily understandable message. Examples as follows: Large and small format informational aids, as well as PowerPoint (or compatible) presentations are to be developed for use in public and internal meetings. Three-Dimensional, forecast-type models shall be created, as appropriate, and included in a PowerPoint (or compatible) presentation format. These models shall provide a unique visualization of potential alternatives, technologies, or project-related conditions. Examples of such visualizations include a range of deliverables from simple computer-aided design and drafting (CADD) schematics of control technologies, to complex flow modeling of hydraulic systems such as the Chicago Area Waterway System.

Develop Electronic and Social Media Detailing Strategies and Guidelines:

The communication team shall consider electronic and social media tools as a method of uniting a diverse and geographically dispersed audience and to elicit discussion and feedback following a two-way symmetrical flow. At a minimum, the team shall develop an updated Web site for GLMRIS detailing strategies and guidelines for ANS controls; providing access to recent research, news, and highlights; and sharing USACE communication messages and materials. The communication team shall also ensure compliance with all government regulations regarding Web page design, layout, and the release of information to the public.

Ongoing Communications Advice:

Throughout the project, communication representatives will advise the PDT regarding communication efforts and develop outreach materials that clearly communicate the project's focus and opportunities for public involvement. The communication team will ensure that all

public information is consistent, targeted, and efficient. Attention to aesthetically pleasing design and audience-appropriate content will be emphasized.

Develop Continual Evaluation Criteria:

In order to ensure that GLMRIS objectives and guidelines are being effectively disseminated to key segments of the public in a timely manner, the communication team shall develop evaluation criteria that establish metrics for the PCP's efficacy and success. These metrics will be a basis for continued public outreach as the projects within the feasibility study near implementation, and they will also be a basis for future outreach efforts.

4.) Roles and Responsibilities for USACE

- a.) Provide and update (as necessary) basic technical information regarding GLMRIS.
- b.) Provide the basis for development of the project vision, mission, and/or guiding principles.
- c.) Provide final review and approval of work products.
- d.) Provide ongoing GLMRIS research results and analysis to the Project Team, Executive Committees, and all designated Stakeholders when a preferred alternative or policy direction has been made, or after key decisions regarding ANS transfer scenarios have been established.

5.) Roles and Responsibilities for the Communication Team

- a.) Attend regular GLMRIS team meetings, as appropriate, to gain an understanding of the Feasibility Study, assess need for community outreach, and attain involvement with the program
- b.) Identify and commit qualified representatives who will support the PCP.
- c.) Submit (through the appropriate media) deliverables, products, receipts, and/or any relevant documentation for this project.
- d.) Establish evaluation criteria for the efficacy of the PCP.

6.) Release of Information

The communication team will not release work products to the public or any government agencies without authorization from USACE and the Executive Steering Group.

The communication team will be in compliance with USACE guidance, policy and regulations regarding the development of Web pages as well as the release of information to the public through all other media.

7.) Timing

A large portion of the initial focus of the communication effort will be on Public Scoping meetings. These meetings are required by the National Environmental Protection Act and afford the public the opportunity to comment on the proposed study process. USACE will be holding a series of meetings throughout the study area from December 2010 – February 2011. At these meetings, interested members of the public can receive information about the study and have the

opportunity to provide oral or written comments. Comments can also be submitted via postal mail, electronic mail or the GLMRIS website.

Concurrently USACE has also developed several general communication products, including a study brochure, a comprehensive project web site, social media sites on Facebook and Twitter and has established a subscription list for interested stakeholders to request future communication materials regarding GLMRIS.

Subsequent communication efforts will focus on providing periodic updates on study progress and the release of interim products to various stakeholder groups and the public.

APPENDIX 8

QUALITY CONTROL PLAN

GREAT LAKES AND MISSISSIPPI RIVER INTERBASIN STUDY

QUALITY CONTROL PLAN

The purpose of the Great Lakes and Mississippi River Interbasin Study – which is located in portions of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin – is to conduct a Feasibility Study the options and technologies that could be applied in preventing or reducing the risk of aquatic nuisance species transfer between Great Lakes and Mississippi River basins through aquatic pathways. The purpose of this document is to describe a unified quality control and review plan such that a unified method of District Quality Control (DQC), Agency Technical Review (ATR), and Independent External Peer Review (IEPR) can be adopted to ensure the quality and credibility of the government’s scientific information.

1.0 CONTROL AND REVIEW PROCESSES

1.1 External Peer Review of Decision Documents

All U.S. Army Corps of Engineers (Corps) feasibility-level decision documents requiring authorization by the U.S. Congress must consider Independent External Peer Review in conjunction with the Corps’ existing review process in order to comply with the Final Information Quality Bulletin for Peer Review issued by the Office of Management and Budget (referred to as the “OMB Bulletin”). Independent External Peer Review is conducted in special cases where the risk and magnitude of a proposed project are such that an external critical examination is warranted. The final decision to conduct an IEPR will be a collaborative process involving the District and Division Corps offices and the appropriate Planning Center(s) of Expertise. Due to the breadth and magnitude of study area, potential project implications, visibility to the general public, and the obligation inherent with the development of an Environmental Impact Statement (EIS), it is likely that GLMRIS is will be subject to the rigors of an IEPR.

Independent External Peer Review will be conducted by appropriate subject matter experts who are external to the Corps and not integrally involved in the production of the technical product under review. Draft peer review plans will be developed, coordinated with the appropriate Corps Planning Center of Expertise and posted for public comment. IEPR is generally for feasibility and reevaluation studies and modification reports with an Environmental Impact Statement (EIS). IEPR is managed by an outside eligible organization (OEO) that is described in Internal Revenue Code Section 501(c) (3), is exempt from Federal tax under section 501(a), of the Internal Revenue Code of 1986; is independent; is free from conflicts of interest; does not carry out or advocate for or against Federal water resources projects; and has experience in establishing and administering IEPR panels. The scope of review will address all the underlying planning, engineering, including safety assurance, economics, and environmental analyses performed, not just one aspect of the project. An IEPR Team will be created, and its team members identified, prior to the release of the Feasibility Study.

Guidelines for External Peer Review are set forth in the Engineering Circular (EC) 1165-2-209: Water Resources Policies and Authorities, Civil Works Review Policy, 31 Jan 2010; and the Corps of Engineers Directorate of Civil Works Planning and Policy (CECW-P) Memorandum for Peer Review Process (30 March 2007).

1.2 District Quality Control and Agency Technical Review of Decision Documents

All Corps feasibility-level decision documents requiring authorization by the U.S. Congress will be subject to Quality Control. This includes both District Quality Control (DQC), and Agency Technical Review (ATR), as set forth in Engineering Circular (EC) 1105-2-410.

DQC is the review of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The PDT and technical supervisors shall obtain technical adequacy and quality through periodic internal reviews and documented through certification of Quality Control (QC) checklists. Section specific checklists for technical products can be found at \\155.79.111.149\Intra-ED-D\TSD_LEAD-Engineer.htm on the Chicago District's intranet site.

Agency Technical Review (ATR) (which replaces the level of review formerly known as Independent Technical Review [ITR]) is an in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of a project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles and professional practices. The ATR team review the various work products and assure that all the parts fit together in a coherent whole. ATR teams will be comprised of senior USACE personnel, and may be supplemented by outside experts as appropriate. To assure independence, the leader of the ATR team shall be from outside the home District.

The ATR tasks and related resource, funding and schedule needs will be addressed in the Quality Control Plan before the Feasibility Report is released. The ATR efforts should be integrated into the report development schedule to avoid and minimize impacts on the schedule as much as possible; and to avoid rework and delays that would likely occur if reviews are deferred to the end of the study. The ATR should be a relatively continuous process with reviews synchronized with the PDT's production of products and supporting analyses.

1.2.1 Roles and Responsibilities

A work breakdown structure for each team involved in the product development – as well as their respective outside agency or other Corps office contributors – can be found in the main body of the GLMRIS PMP. The corporate intent is for an ATR to not only ensure technical analyses are correct, but to also ensure compliance with all pertinent USACE guidance in order to achieve adequate quality early in studies and help shift HQUSACE policy compliance review to a more confirmatory role. As they are developed, the multiple components of GLMRIS will be subject to ATR, as applicable. Each reporting officer is responsible for assuring that the decision document complies with all applicable statutory and policy guidance prior to forwarding the document to higher authority. DQC and ATR roles and responsibilities include, but are not limited to:

Engineering & Construction Division -

- Responsible for the development of and adherence to QC/QA Plans for all engineering product deliverables.

Chief, Engineering & Construction Division -

- Responsible for the quality of engineering services and products produced within Engineering & Construction Division or as the result of contractors.
- Responsible for resolving impasses between the Branch's.
- Final responsible for resolving impasses between the design team and the Agency Technical Review Team (ATRT).

Engineering & Construction Division Branch Chiefs –

- Responsible for resolving impasses between the design team and the ATRT, within their areas of responsibility.

Design Team Members -

- Responsible for total product quality.
- Responsible and accountable for project design.
- Ensures District Quality Control (DQC): quality production and internal quality checks and reviews.
- Assists the Lead Engineer Project Manager in identifying the disciplines required for the ATRT.
- Responds to all ATRT comments in DrChecks.
- Make all agreed upon changes to the design documents.
- Participates in ATR Conferences, if required.

Agency Technical Review Team (ATRT) Members -

- Responsible for reviewing the product for proper application of clearly established criteria, regulations, laws, codes, principals and professional procedures.
- Participate in the development of the specific tasks to be performed as part of the QCP.
- Participate in in-progress, and end-product reviews with the Design Team.
- Review the product deliverables for conformity to previously approved plans and reports, technical product accuracy and adequacy, functionality of unproved and unique design features or assumptions, assumptions and criteria.
- Enters comments into Dr Checks in accordance with WI 3.2.3 DrChecks (ProjNet).
- Participates in ATR Conferences, if required.

Project Manager (PM) -

- Responsible for product development and ensuring overall product quality.
- Develops a draft Quality Control Plan (QCP) early in the project design.
- Recommends the appropriate disciplines needed for the ATRT and requests the assignment of team members.
- Ensures quality product through internal quality checks and reviews.
- Initiates in-progress and end-product agency technical reviews.
- Serves as POC for the ATRT leader.
- Keeps the ATRT abreast of project schedules.
- Assigns design team member action for each ATRT comment.

- Determines if an ATR Conference is required.
- Schedules and leads ATR Conference when required.
- Documents all meetings between the Project Development Team and the ATRT and will keep a record of issues, concerns, and decisions.
- Verifies that all ATRT comments have been resolved and incorporated into the product
- Responsible for obtaining all required Statements of Technical Review.

ATRT Leader -

- Coordinates all activities associated with the agency technical review.
- Determines the need for attendance of ATRT members at meetings during development of a technical product.
- Coordinates review activities with the PM.
- Responsible for an overall comprehensive macro review of the product ensuring that all disciplines intertwine into a complete total project.
- Participates if an ATR Conference is required.

1.2.2 Review Criteria

The ATR will examine the Feasibility Scoping Meeting (FSM) and Alternative Formulation Briefing (AFB) submittal materials, draft and final decision documents, supporting documents, final report submittal, and other supporting analyses to ensure the adequacy of the presented methods, assumptions, criteria, decision factors, applications, and explanations.

As an initial guide, the ATR team should consider the Project Study Issue Checklist in Exhibit H-2, Appendix H, ER 1105-2-100, which includes many of the more frequent and sensitive policy areas encountered in studies, this checklist is included in the Attachment F of this document. Additionally, other key considerations include, but are not necessarily limited to:

- a. Are the existing and future without-plan conditions reasonable and appropriate?
- b. Are the planning objectives, constraints and assumptions consistent with the without-plan conditions?
- c. Do the alternative plans provide a reasonably complete array of solutions, make sense relative to the planning objectives and the without-plan conditions, and are they complete, effective, efficient and acceptable?
- d. Are sufficient plans formulated to determine the optimum combination of measures and the optimum scale the selected plan (the National Economic Development (NED), National Ecosystem Restoration (NER) or NED/NER Plan)?
- e. Are the required plans included, such as nonstructural flood risk management plans?
- f. Are alternatives safe, functional, constructible, economical, reasonable and sustainable?
- g. Are calculations and results of analyses essentially correct?

- h. Is the engineering content at a feasibility level-of-detail, and is it sufficiently complete, to provide an adequate basis for the baseline cost estimate (ER 1110-2-1150)?
- i. Are comparable cost estimates used for comparing, screening and selecting alternative plans, and has a reasonable cost estimate been developed for the recommended plan?
- j. Are analyses for the engineering, economic, environmental, real estate and other disciplines fully described, technically correct, and do they comply with established policy requirements and accepted practices within USACE?
- k. Is the appropriate plan selected based on the National Objectives and evaluation criteria expressed in Principles and Guidelines and USACE policy?
- l. Does the implementation plan have an appropriate division of responsibilities?

2.0 DOCUMENTATION AND CERTIFICATION

Conclusions and agreements reached during the ATR process shall be documented per the requirements set forth in Engineering Circular (EC) 1165-2-209. Documentation shall be prepared for all Agency Technical Review efforts. The use of the comment tracking system, Dr. Checks, is mandatory for decision documents requiring Congressional authorization.

ATR documentation and the draft and final feasibility reports shall be accompanied by a certification indicating that the ATR process has been completed and that all issues have been resolved. Both the District Commander and the Chief of Planning Branch shall sign the certification for the final feasibility report. The planning function chief shall certify other submittals and the certification may be included within the transmittal letter for the product and review documentation. Documentation and certification of legal review will accompany reports submitted to Corps Headquarters for policy compliance review.

The cover memorandum to the MCACES cost estimate that is submitted with a final feasibility report shall include a certification statement by the Chief of Engineering Branch that the estimate has been prepared in accordance with current guidance, that the estimate has undergone an independent technical review and that all issues that may have been identified in the independent technical review have been resolved. Cost estimates must be certified at this stage by the Walla Walla Center for Cost Engineering.

3.0 GLMRIS PRODUCTS TO UNDERGO ATR/IEPR

GLMRIS will undergo a formal ATR at the Feasibility Scoping Meeting (FSM) and Alternative Formulation Briefing (AFB) milestones.

An IEPR will be conducted once an alternative has been selected in each Interim phase of the GLMRIS study. The IEPR will assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analyses, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in evaluation of economic or environmental impacts of proposed projects, and any biological opinions of the project study. Details on the IEPR Team will be developed as GLMRIS evolves.

4.0 DEVIATIONS FROM THE APPROVED QUALITY CONTROL PLAN

It is not anticipated that any deviations from the approved QCP will occur. Deviations will be subject to superseding Corps policy, or by approval by the Executive Steering Committee as long as the resulting quality process falls in line with approved Corps guidance.

5.0 ATR TEAM ROSTER

The ATR team will be established early in the Feasibility Phase and be led by a District other than Chicago. The composition of the ATR team may include team members from multiple districts (including districts outside the Great Lakes and Ohio River Division), centers of specialized planning expertise, and from other qualified sources such as non-Federal sponsors and other Federal and State agencies. The anticipated disciplines to be included on the ATR team are shown below:

Discipline	Name	Organization	Relevant Experience
Water Resources Planning			
Planning Compliance			
Biology/Ecology			
Cultural Resources			
Economics			
Hydrology / Hydraulics			
Environmental / HTRW Compliance			
Geotechnical			
Civil Engineering			
Cost Engineering			
GIS			

6.0 SCHEDULE

For the Draft and Final Feasibility Reports, ATR will be initiated approximately eight weeks prior to the submittal date. ATR comments shall be due within two weeks of initiating the ATR efforts. Responses to comments shall generally be due within two weeks of final comment submittal. Final back check, documentation, and, if applicable, certification of the ATR shall be due within one week of the resolution of all comments. The feasibility milestone schedule shall be included in the Great Lakes and Mississippi River Interbasin Feasibility Study PMP.

7.0 COST ESTIMATE

Costs for conducting ATR and IEPR are included in the detailed scopes of work and in the cost estimate summary table located in the PMP. Quality management activities of Section Chiefs are included in the cost estimate for each task. Quality management activities of Branch and Division Chiefs are included in the Supervision and Administration cost estimate.

8.0 POINT OF CONTACT

Inquiries regarding the Quality Control Plan should be forwarded to the Chicago District Project Manager of GLMRIS, Dave Wethington, at 312-846-5522.

9.0 PUBLIC REVIEW

The Project Manager shall make the draft decision document available to the public for comment at the same time it is submitted for review (or during the review process) and sponsor a public meeting where oral presentations on scientific issues can be made to the reviewers by interested members of the public. When employing a public comment process, the reviewers shall, whenever practical, provide reviewers with access to public comments that address significant scientific or technical issues. To ensure that public participation does not unduly delay USACE activities, the reviewers shall clearly specify time limits for public participation throughout the review process.

ATTACHMENT A

GREAT LAKES AND MISSISSIPPI RIVER INTERBASIN STUDY

COMPLETION OF AGENCY TECHNICAL REVIEW

The Chicago District has completed the Interim Feasibility Report and the accompanying Agency Technical Review for the Great Lakes and Mississippi River Interbasin Feasibility Study. Notice is hereby given that an Agency Technical Review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the Agency Technical Review, compliance with established policy, principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions, methods, procedures and material used in analyses; evaluation of all the alternatives; appropriateness of the data level obtained and used; and the reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy. The Agency Review Team performed the independent review.

Technical Review Team Leader

Date

ATTACHMENT B

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are provided in the attached documents. As noted in the attached documents, all concerns resulting from independent technical review of the project have been considered. The report and associated documents required by the National Environmental Policy Act have been fully reviewed.

Chief, Planning Division

Date

ATTACHMENT C

**MODEL
DISTRICT COMMANDER'S QUALITY CONTROL CERTIFICATION**

COMPLETION OF QUALITY CONTROL ACTIVITIES

The Chicago District has completed the feasibility study of the Great Lakes and Mississippi River Interbasin Feasibility Study. Certification is hereby given that all quality control activities defined in the Quality Control Plan appropriate to the level of risk and complexity inherent in the product have been completed. Documentation of the quality control process is enclosed.

GENERAL FINDINGS

Compliance with clearly established policy principles and procedures, utilizing clearly justified and valid assumptions, has been verified. This includes assumptions; methods, procedures and materials used in analyses; alternatives evaluated; the appropriateness of data used and level of data used and level of data obtained; and the reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy. The undersigned recommends certification of the quality control progress for this product.

Chief, Planning Division

Date

QUALITY CONTROL CERTIFICATION

As noted above, all issues and concerns resulting from technical review of the product have been resolved. This project may proceed to the (indicate next phase of product development).

District Commander

Date

ATTACHMENT D

CERTIFICATION OF LEGAL REVIEW

The report for the Great Lakes and Mississippi River Interbasin Feasibility Study, including all associated documents required by the National Environmental Policy Act, has been fully reviewed by the Office of Counsel, Chicago District, and is approved as legally sufficient.

District Counsel

Date

ATTACHEMENT E

QUALITY CONTROL/QUALITY ASSURANCE CERTIFICATION

FOR THE

GREAT LAKES AND MISSISSIPPI RIVER INTERBASIN FEASIBILITY STUDY

All required Value Engineering action has been completed as appropriate for the phase of the project.

Approved: _____
Chief, Planning Division

Date: _____

Approved: _____
Chief, Project Management Division

Date: _____

Approved: _____
Chief, Engineering Division

Date: _____

Approved: _____
Chief, Construction-Operations Division

Date: _____

Approved: _____
Chief, Real Estate Division

Date: _____

ATTACHMENT F

PROJECT STUDY ISSUE CHECKLIST

This list includes sensitive policy areas that require vertical team coordination. The list should be filled out based on knowledge available at the time about the selected or most likely selected plan. Any items that will not be known or addressed until later in the study should be marked as "Pending." For items that are not applicable, such as questions about existing project aspects when there is no existing Federal project, enter "NA" for not applicable. Any non-pending response with an asterisk (*) requires coordination and issue resolution through the vertical team using an issue paper as outlined in paragraph H-2.f. All issues need to be resolved before requesting approval of the decision document.

1. Will the report clearly articulate how the selected plan will be consistent with each of the Chief of Engineers Actions for Change for Applying Lessons Learned during Hurricanes Katrina and Rita issued 24 August 2006? YES ___ NO ___ *.
2. Will the report clearly articulate how the selected plan will be consistent with each of the USACE Environmental Operating Principles? YES ___ NO ___ *.
3. Has a NEPA document been completed? YES ___ NO ___ *.
4. Will the NEPA Documentation be more than 5 years old at the time of PCA signing or construction initiation? YES ___ * NO ___ .
5. Will the ESA Findings be more than 3 years old at the time of PCA signing or construction initiation? [Note: Findings refers to Corps documentation and/or US Fish and Wildlife Service's opinions and recommendations] YES ___ * NO ___ .
6. Is ESA coordination complete? YES ___ NO ___ *.
7. If an EIS/EA was completed for the selected plan, will anything prevent signing the Record of Decision (ROD) or Finding of No Significant Impact (FONSI)? YES ___ * NO ___ .
8. Is the selected plan consistent with the ROD/FONSI? YES ___ NO ___ *.
9. Have there been any changes in Federal environmental laws or Administration or Corps policy since original project authorization that make updating necessary; e.g., change to the Clean Air Act status for the project area...going from attainment to non-attainment? YES ___ * NO ___ .
10. Are the feasibility-level planning, selection and justification of mitigation plans for fish and wildlife, induced flood damages, cultural or historic preservation, or recreation incomplete or deferred to the PED Phase? YES ___ * NO ___ .
[Issue papers must describe what is being mitigated, the likely mitigation plan, the likely cost of mitigation, and why the analyses are being deferred.]
11. For reevaluations that conclude further authorization is unnecessary, are the proposed mitigation plan(s) for fish and wildlife, induced flood damages, cultural or historic preservation, or recreation the same as the previously authorized plan? YES ___ NO ___ *.
12. Is there an incremental analysis/cost effectiveness analysis of proposed fish and wildlife mitigation features based on an approved method and using an accepted model?
YES ___ NO ___ *.

13. Were cost risk analysis methods applied to develop contingencies for the estimated total project costs (see Engineering and Construction Bulletin issued 10Sep07)? YES ___ NO ___ *
14. Was the peer (technical) review of the cost estimates duly coordinated with the cost estimate center of expertise and addressed in the review documentation and certification? YES ___ NO ___ *
15. Would the selected plan cause the previously authorized project's fully funded cost to exceed the cost limit of Section 902 of WRDA 1986? [Note: for coastal storm damage reduction projects there are two separate 902 limits, one for initial project construction and one for periodic renourishment] YES ___ * NO ___ [Issue paper must provide the authorized project cost, price level, and current and fully funded project cost estimates and price levels].
16. Does the selected plan involve HTRW clean-up? YES ___ * NO ___ .
17. Does the selected plan involve CERCLA covered materials? YES ___ * NO ___ .
18. Are the proposed project purposes different than the previously authorized project? [Note: different than specifically noted in authorization or noted in Chief's report and is it measured by project outputs] YES ___ * NO ___ .
19. Are there any scope changes proposed for the previously authorized project? YES ___ * NO ___ . [Issue paper must describe the authority that would enable the project to proceed without additional Congressional modification].
20. If the selected plan includes crediting a non-Federal entity for in-kind services provided either before or after authorization, has a request for a Secretary determination of credit eligibility been forwarded to HQUSACE? [Note: In order to credit a non-Federal sponsor for in-kind services, the credit must be based upon a particular Congressional authority and ASA(CW) must approve a credit eligibility request before the services are provided. The issue paper must describe the scope of the in-kind services, the schedule for providing the services, the authority for providing credit, the status of the request for ASA(CW) approval, and the resulting elements of the non-Federal cost-share (LERRD, cash and credit). If the credit is based on an existing authority, the issue paper must include a copy of the authority if it is not a general authority such as Sec 215. If there is no existing authority to credit the in-kind services, as determined by Counsel, the issue paper should present the rationale for recommending such credit in the decision document for specific Congressional authorization.] YES ___ NO ___ *.
21. Would the project cost sharing involve reimbursement to the sponsor? [Note: The issue paper must identify the circumstances and authority for recommending reimbursement.] YES ___ * NO ___ .
22. Is an Ability to Pay cost sharing reduction included in the selected plan? [If yes, fully describe the proposal in the issue paper, citing how this authority is applicable. Include a table showing the cost sharing by project purpose and expected Ability to Pay reductions.] YES ___ * NO ___ .
23. Is a Locally Preferred Plan recommended without an exception granted by ASA(CW) to recommend plan different from the NED, NER or NED/NER Plan prior to the release of the draft decision document for public review? [Note: if this answer is yes, then a series of questions arise that will need to be addressed in the issue paper...is plan less costly than NED plan, is the plan more costly with the same cost sharing the same as NED plan (exception), is plan more costly with all costs exceeding the cost of the NED plan at 100% non-Federal cost, or has ASA(CW) already granted an exception] YES ___ * NO ___ . Remarks:

24. Was a standard accepted Corps methodology/model used to calculate NED benefits?
YES ___ NO ___ *.

25. Are non-standard benefit categories used to select or justify the recommended plan?
YES ___ * NO ___ .

26. Was the planning effort conducted in a systems/watershed context and was this reflected in the presentation of the without-project conditions, problem and opportunity statements, and the plan formulation, evaluation and selection? YES ___ NO ___ *.

27. Were the alternatives formulated, evaluated, and selected using the four P&G evaluation accounts – NED, EQ, RED, and Other Social Effects? YES ___ NO ___ *.

28. Did the planning effort collaborate with other Federal, state, Tribal, and local entities to develop solutions that integrate expertise, policies, programs, and projects across public entities? YES ___ NO ___ *.

29. Were the types and degrees of risk and uncertainty clearly characterized for the selected plan and were the various adjustments included in the selected plan to reduce risk and uncertainty also described clearly? YES ___ NO ___ *.

Navigation Component (Inland or Harbor)

30. Is there a navigation component (inland or harbor) in the selected plan? YES ___ NO ___ . If Yes, answer each of the following questions for the selected plan:

31. Is there land creation? YES ___ * NO ___ .

32. Is there a single owner and/or beneficiary which are not a public body? [Public body as defined by Section 221 of WRDA 1970] YES ___ * NO ___ .

33. Are there proposals for Federal cost sharing of Local Service Facilities [e.g., dredging of non-Federal berthing areas] work? YES ___ * NO ___ .

34. Is there sediment remediation proposed under Sec. 312 authority? [i.e., Section 312 of WRDA 1990 as amended by Section 205 of WRDA 1996] YES ___ * NO ___ .

35. Is there dredged material placement on beaches where the use is not the least costly environmentally acceptable plan? YES ___ * NO ___ .

36. Will the dredged material be used for ecosystem restoration where the recommended plan is not the least costly environmentally acceptable plan? YES ___ * NO ___ .

37. Are there recreation navigation benefits? YES ___ * NO ___ .

38. Does the selected plan involve inland navigation harbor development? YES ___ * NO ___ .

39. Can the resale or lease of lands used for disposal of excavated material recover the cost of the selected improvements? YES ___ * NO ___ .

40. Will acquisition of land outside the navigation servitude be necessary for construction of the proposed improvements (either the project or non-Federal facilities that will use or benefit from the project) and will this permit local entities to control access to the project? [The latter case is assumed to exist where the proposed improvement consists of a new channel cut into lands.] YES ___ * NO ___ .

Flood Damage Reduction Component

41. Is there a flood damage reduction component in the selected plan? YES ____ NO ____ . If Yes, answer each of the following questions for the selected plan:
42. Is the selected plan for protection of a single property or beneficiary? YES ____ * NO ____ .
43. Would the selected plan produce land development opportunities/benefits? [Issue paper must describe whether special cost sharing should apply.] YES ____ * NO ____ .
44. Is there any recommendation to cost share any interior drainage facilities? YES ____ * NO ____ .
45. Are there any windfall benefits that would accrue to the project sponsor or other parties? [Issue paper must describe whether special cost sharing should apply.] YES ____ * NO ____ .
46. Are there non-structural buyout or relocation recommendations? YES ____ * NO ____ .
47. Is the selected plan likely to change the existing allocated storage in lake projects? YES ____ * NO ____ .
48. Do the proposed changes to the project include any significant risks to public safety related to uncontrolled flooding? YES ____ * NO ____ .
49. Have all the public safety issues related to uncontrolled flooding been fully resolved with the district/MSD Dam Safety Officers? YES ____ NO ____ *.
50. Have all the changes in residual public safety risks related to uncontrolled flooding been communicated to the public and incorporated into their emergency response plan? YES ____ NO ____ *.

Coastal Storm Damage Reduction Component

51. Is there a coastal storm damage reduction component in the selected plan? YES ____ NO ____ . If Yes, answer each of the following questions for the selected plan:
52. Does the selected plan protect privately owned shores? YES ____ * NO ____ .
53. Does the selected plan protect undeveloped lands? YES ____ * NO ____ .
54. Does the selected plan protect Federally owned shoreline at Federal cost? [If yes, describe what is to be protected and who bears the Federal cost.] YES ____ * NO ____ .
55. Does the selected plan involve tidal or fluvial flooding; i.e., is it clear what the project purpose is and has the project been formulated as a coastal storm damage reduction project or flood damage reduction project? YES ____ * NO ____ .
56. Is there any recommendation to cost share any interior drainage facilities?
YES ____ * NO ____ .
57. Is recreation more than 50% of total project benefits needed to justify the project?
YES ____ * NO ____ .
58. Are there any parking or public access issues [no public access or none provided within 1/2 mile increments]? YES ____ * NO ____ .
59. Are easements being provided to ensure public use and access? YES ____ NO ____ *.
60. Are there any Sec. 111 of Rivers and Harbors Act of 1958, as amended proposals?

YES ____ * NO ____ .

61. Do the proposed changes to the project include any significant risks to public safety related to uncontrolled flooding? YES ____ * NO ____ .

62. Have all the public safety issues related to uncontrolled flooding been fully resolved with the district/MSD Dam Safety Officers? YES ____ NO ____ *.

63. Have all the changes in residual public safety risks related to uncontrolled flooding been communicated to the public and incorporated into their emergency response plan? YES ____ NO ____ *.

Aquatic Ecosystem Restoration Component

64. Is there an aquatic ecosystem restoration component of the selected plan? YES ____ NO ____ . If Yes, answer each of the following questions for the selected plan:

65. Has the selected plan been formulated using cost effectiveness and incremental analysis techniques? YES ____ NO ____ *.

66. Was "IWR Plan" used to do cost effectiveness/incremental analysis? YES ____ NO ____ *.

67. Are the restoration features justified by aquatic habitat restoration benefits (exclude preservation and enhancement benefits, and terrestrial habitat benefits)? YES ____ NO ____ *.

68. Is the project purpose for restoration of cultural or historic resources as opposed to ecosystem restoration? YES ____ * NO ____ .

69. Is mitigation authorized or recommended? YES ____ * NO ____ .

70. Are there recommendations for other than restoring a degraded aquatic ecosystem [e.g., creating new habitat where it has never been]? YES ____ * NO ____ .

71. Is the significance of the habitat clearly identified using the categories and criteria defined in Section 3.4.3 of Principles and Guidelines and in paragraph 16.b of EP 1165-2-502? YES ____ NO ____ *.

72. Has the restoration project been formulated for biological/habitat values as opposed to, for example, water quality? YES ____ NO ____ *.

73. Is the selected plan on non-public lands? YES ____ * NO ____ .

74. Does the selected plan involve land acquisition where the value exceeds 25% of total project cost? YES ____ * NO ____ .

75. Are all the proposed recreation features in accord with ER 1105-2-100, Appendix E, Exhibit E-3? YES ____ NO ____ *.

76. Are there recommendations to include water quality improvement? YES ____ * NO ____ .

77. Is the monitoring & adaptive management period proposal beyond 5 years after completion of construction? YES ____ * NO ____ .

78. Does the selected plan involve land acquisition in other than fee title? YES ____ * NO ____ .

74. Are there recommendations for non-native species? YES ____ * NO ____ .

79. Does the selected plan propose the use of navigation servitude? YES ____ * NO ____ .

80. Does the recommendation include monitoring costs greater than 1% of the total first cost of aquatic ecosystem restoration? YES ___ * NO ___ .

81. Does the recommendation include adaptive management costs greater than 3% of the total first cost of aquatic ecosystem restoration, excluding monitoring costs? YES ___ * NO ___ .

Recreation Component

82. Is there a recreation component of the selected plan? YES ___ NO ___ . If Yes, answer each of the following questions for the selected plan:

83. Is the cost of proposed recreation development more than 10 % of the Federal project cost without recreation [except for nonstructural flood damage reduction and coastal storm damage projects]? YES ___ * NO ___ . [Issue paper must describe the proposal and whether ASA(CW) approval has been granted.]

84. Are there recreation features located on other than project lands? YES ___ * NO ___ .

85. Does the selected plan involve/provide for waterfront development? YES ___ * NO ___ .

86. Does the selected plan involve the need to reallocate authorized storage (see Section III, Appendix E, ER 1105-2-100)? YES ___ * NO ___ .

87. Does the selected plan include non-standard recreation facilities (refer to ER 1105-2-100, Appendix E, Exhibit E-2)? YES ___ * NO ___ .

Water Supply Component

88. Is there a water supply component of the selected plan? YES ___ NO ___ . If Yes, answer each of the following questions for the selected plan:

89. Does the component include features other than Corps reservoir storage space for M&I water supply? YES ___ * NO ___ .

90. Do the outputs meet other needs other than M&I water supply, such as agricultural water supply? YES ___ * NO ___ .

91. Does the selected plan use non-standard pricing for reallocated storage? YES ___ * NO ___ .

92. Are there exceptions to model contract/agreement language? YES ___ * NO ___ .

Concurrences

Project Manager _____ Date: _____

District Planning and Policy CoP leader _____ Date: _____

District Counsel _____ Date: _____

DDE (PM) _____ Date: _____

MSC Planning and Policy CoP Leader _____ Date: _____

MSC Counsel _____ Date: _____

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