

***MEMORANDUM FOR RECORD***

**SUBJECT:** Non Corps Operators and Interagency Managers Meeting –  
Headwater Reservoir Operation Optimization Studies – Headwaters  
Upper Mississippi River

1. On Thursday, 23 May 2002 beginning at 9 am, the subject meeting was conducted in the County Courthouse Board Room in Walker, Minnesota. Participants at this meeting included representatives of Congressman Oberstar's office, the Minnesota Department of Natural Resources, Ottertail Power Company, Minnesota Power Company, the Minnesota Pollution Control Agency, and the St. Paul District Corps of Engineers (see enclosure 1 for the attendance roster sheet for details regarding individuals participating in this meeting).
2. This coordination meeting focused on determining the extent of systemwide Headwater reservoir operations planning that is possible in the next few years. The agenda for this meeting is attached as enclosure 2; the agenda provides an outline of the topics that were discussed during the meeting.
3. Key points and discussions that occurred during this meeting are summarized as follows:
  - The commitment of the Corps and the US Forest Service to prepare, in partnership, a Reservoir Operations Plan Evaluation Report and EIS was briefed (copies of the 23 May version of the Scope of Work/Quality Control Plan were provided as handouts to participants). Therefore, the Corps and Service will be using Federal O&M funding to address their 7 lake chains (inclusive of Cass Lake, Winnibigoshish Lake, Leech Lake, Pokegama Lake, Sandy Lake, Cross Lake, and Gull Lake chains). Note: Andrusia and Wolf Lakes will be addressed as part of the Cass Lake Chain.
  - It was explained that recent Mississippi Headwaters Board attempts to get grants for \$400,000 from non-Governmental foundations were not likely to be fruitful or timely for use on the ROPE study. If these grants had been received, they would have been used to implement a demonstration distributive GIS based model for a sub-basin within the headwaters drainage area and would also would have allowed more comprehensive resource inventories for the non-Federal lake chains.

However, in the absence of these funds, some basic level of resources data would be needed from the non-Federal operators if they were to be a part of a systemwide ROPE long-range planning study.

- The stewardship history and ongoing responsibility of all the headwaters operators and managing regulators was discussed. It was emphasized that each operator needs to take ownership of a systemwide ROPE study and needs to take on a leadership role for their respective lake chain.
- The opportunity to work together to take advantage of the planning process that the Corps and the Forest Service intend to use and the value of systemwide planning was discussed.
- The extent and nature of possible changes that might be made at each of the non-Corps lakes and the data and evaluation needed to be able to integrate non-Corps lakes into a systemwide ROPE was discussed (see table enclosure 3 for details). Based on these discussions it became clear that the greatest potential for changes in operations and integration into a Systemwide Plan were at Mud Lake (MDNR), Stump Lake/Lake Bemidji (Ottetail Power), and Prairie Lake (Minnesota Power).
- Because Mud Lake operations by the MDNR is significantly and directly affected by Federal reservoir Operations, it will be fully evaluated by the Corps and Forest Service as part of the basic O&M funded ROPE.
- Stump Lake/Lake Bemidji is upstream of the Corps operations and will need to address operation plan issues in Stump/Bemidji, Carr, and Irving lakes. Leadership by Ottetail Power Reps is needed at lake meetings and some data collection to make the hydraulic models to be run by the Corps functional is needed.
- Prairie Lake, including Lawrence and Crooked Lakes, is not directly affected by Federal operations but affects the downstream operators. Leadership by Minnesota Power Reps is needed at lake meetings and some data collection to make the hydraulic modeling to be done by the Corps is needed.
- Based on previous discussions and on the inputs received at this meeting, it appears that Ottetail Power and Minnesota Power are very interested in working with the Corps, US Forest Service, and the interagency regulators to realize a systemwide ROPE study.
- Commitment from Ottetail Power reps to take on a leadership role in lake group for the Bemidji chain was strong and they also were commitment to providing the basic hydraulic modeling data needed to integrate them into the systemwide hydraulic models.
- Minnesota Power also felt they would be able to provide the needed hydraulic modeling data required and they conditionally indicated that they would be willing to take on a leadership role with a their citizens in a local lake group. However, some further discussions and blessings

within their company would be needed. Minnesota Power indicated that the internal discussions on this matter could be completed within a few of weeks.

4. Further prompt discussions between the Corps, Ottetail Power, and Minnesota Power were promised to solidify the systemwide commitment of all parties and to get organized for upcoming lake group meetings and task force meeting (to occur in mid-July timeframe).

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Ed McNally  
Project Manager

Encl. 3

Sign-in sheet  
Agenda for meeting  
Table on issues of systemwide headwaters operations

CF:

All Meeting Participants (see Roster list)  
Brenda Glenn, US Forest Service  
Gerald White, Leech Lake Band

**Subject: Non-Corps Operators Meeting - 23 May 2002 – MHB Office, Walker, MN**  
**RE: Upper Mississippi River Headwaters ROPE Studies**

# **A G E N D A**

**Start at 9:00am**

Welcome and Introductions

History of Headwater Reservoir Operations and Planning  
Stewardship Responsibilities

Dam Operators: USFS, MDNR, Ottetail Power, Minnesota Power, Corps

Use Regulators: MHB, FERC (via licensing dams), State of Minnesota

Other Key Players: Congressman Oberstar, Tribals with BIA involvements

Systemwide Management Initiatives

## **Operational** Coordination

Initial annual meetings (started – to broaden to MDNR involvement)

## **Planning** Coordination

Feasibility Studies (option -- but was not pursued via UMR recon study)

O&M now funding from Corps and USFS secured but has limitations

- Focus on Federal resources
- See 20 May version of the QCP (Quality Control Plan) –  
*(See handout)*
- Mobilizing for Lake Groups and Task Force Meeting -- to be held in 9, 10, and 11 July

Grants requests for non-Corps inventories not likely to be awarded

Extent of planning for systemwide optimization needs to be defined

Need to set expectations correctly for agencies and public at initial group meetings

What is needed to do systemwide planning for Headwaters Reservoirs System?

*(See handout for non-Corps operator planning needs)*

Discussion on where changes in operation are possible (flexibility)

Define nature of changes possible at each dam...

## **Keys to including Bemidji and Prairie chains into a Systemwide ROPE**

1. Willingness of the **operator to review Operating Plans** at this time -- from a planning perspective (**requires operator leadership** and a public planning process – could parallel Corps proposed Public Involvement and Planning processes)
2. Ability to **obtain and provide the needed inventory data**
3. **Openness to changing** operations

Open Discussion -

Summary and discussion of do outs

**Close Meetings NLT 12:00 noon**

**Subject: Non-Corps Operators Meeting - 23 May 2002 – MHB Office, Walker, MN**  
**RE: Upper Mississippi River Headwaters ROPE Studies**

## Roster

<u>Name</u>	<u>Organization and Address</u>	<u>email/Telephone</u>
John Steward	MN DNR	john.steward@dnr.mn.state.us 218/547-1770
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## ISSUES OF SYSTEMWIDE HEADWATERS OPERATIONS

<b>Lakes at Issue</b>	<b>Operator</b>	<b>Potential for Changes <sup>1</sup></b> <i>e.g., Low flows &amp; rates of flows? Pool levels?</i>	<b>Required Data &amp; Evaluations</b> <i>(some is already available and some is new...)</i>
<b>Bemidji</b> Includes: Carr Irving And lake chain above	<b>Ottertail Power</b>	Limited potential expected. Changes would likely be limited to adjustments in low flow and rate of change with no lake levels adjustments expected. Coordinated changes in their operating plan and amendment to their dam safety permit is desirable, with assistance of DNR, USFS, COE, and other managing agencies.	Limited integration with detailed Corps HEC Hydraulic Models. Need specific data regarding inflows & outflows, Area-Capacity data, outlet rating, downstream target flows, minimum flows, and in-reservoir target elevations. Cross-sections for instream flow below the Stump Lake Dam and at outlets of Carr and Irving. Hydropower generation data. Ottertail Power needs to take lead in lake group meetings and preparation of a revised operating plan...
<b>Cass</b> Includes: Andrusia Wolf and lake chain above	<b>USFS</b>	High potential expected. Alternative changes to releases, pool levels, and the control structure are to be evaluated. Changes in timing of inflow from Lake Bemidji chain are possible.	Full Integration with detailed Corps HEC Hydraulic Models. Lack of adequate historical data could be an issue needing Task Force inputs. Need data on inflows & outflows, Area-Capacity data, outlet rating, downstream target flows, minimum flows, and in-reservoir target elevations. Cross-sections below the outlets of Andrusia and Wolf lakes. Already collected river cross-section and environmental data below dam (2001). Will have significant role as partner in studies and will help fund ROPE. Need a lake group with USFS leadership...
<b>Mud</b>	<b>MDNR</b>	Limited potential due to heavily influenced by Leech operations. Changes in timing of inflow possible. Changes likely limited to adjustments in low flow and rate of change with no lake levels adjustments.	Full Integration with detailed Corps HEC Hydraulic Models. Because this structure is so impacted by our Leech Lake operation it is a part of the Corps costs for inventories and evaluation. Need data on inflows & outflows, Area-Capacity data, outlet rating, downstream target flows, minimum flows, and in-reservoir target elevations. Cross-sections for instream flow below the dam. Inventories around the lake for wild rice and other vegetation...
<b>Prairie</b> Includes: Prairie Lawrence Crooked	<b>Mn Power</b>	Adjustments possible at this dam to adjust flows to regulate water level in Prairie, Lawrence, and Crooked lakes and for low flows and rate of change, consistent with FERC license. Coordinated changes in their operating plan and amendment to their dam safety permit is desirable, with assistance of DNR, USFS, COE, and other managing agencies.	Integration with detailed Corps HEC Hydraulic Models to evaluate flood affects at Aitkin.. Need specific data regarding inflows & outflows, Area-Capacity data, outlet rating, downstream target flows, minimum flows, and in-reservoir target elevations. Cross-sections for instream flow below the Prairie Dam. Hydropower generation data needed. Need a lake group with Minnesota Power leadership... Evaluation of the affects of the gorge upstream of Prairie Lake on upstream and downstream lake levels. Will require cross-sections in the gorge area and at outlets of each of the lakes.
<b>Blandin</b>	<b>Mn Power</b>	Very limited potential. Changes in timing of inflow possible and limited could see changes in low flows and rates of change for releases consistent with FERC license	Limited integration with detailed Corps HEC Hydraulic Models. Need specific data regarding inflows & outflows, Area-Capacity data, outlet rating, downstream target flows, minimum flows, and in-reservoir target elevations. Cross-sections for instream flow below the dam. Hydropower generation data.
<b>Potlatch</b>		Very limited potential. Changes in timing of inflow possible and limited could see changes in low flows and rates of change for releases consistent with FERC license	Limited integration with detailed Corps HEC Hydraulic Models. Need specific data regarding inflows & outflows, Area-Capacity data, outlet rating, downstream target flows, minimum flows, and in-reservoir target elevations. Cross-sections for instream flow below the dam. Hydropower generation data.

<sup>1</sup> Ability to change as affected by authority to make changes, operational flexibility, physical changes to structures.

**QUALITY CONTROL PLAN**  
**Upper Mississippi River (UMR) Headwater Reservoirs Project**

**Study: Operating Plans for UMR Headwaters Reservoirs – O&M Project  
i.e., Headwaters Reservoir Operations Plan Evaluation (ROPE)**

**PURPOSE:**

The purpose of the study is to identify an operating plan for the Corps of Engineers operated Headwaters Reservoirs with consideration given to flood control, environmental concerns, water supply, tribal trust, recreation, navigation, hydropower, water quality, and other purposes to meet the objectives identified in the plan of study. This plan would then replace the existing operations plans which were last formulated about 40 years ago. This ROPE plan should protect the tribal trust relationship and provide the optimum benefit to the many interests affected by the operation of these dams -- for the greater public good.

In addition to the 6 Corps of Engineers Headwaters Reservoirs and the Upper Mississippi River, the operation of United States Forest Service (USFS) Knutson Dam at Cass Lake will be evaluated in this study. Recommended changes in the design and operation of the Knutson Dam will be evaluated in the study and assessed in the NEPA documentation for this ROPE. Partnering with the USFS will be accomplished to realize this purpose.

To the extent that resources permit, a systemwide and comprehensive optimization for operation of all interconnected Headwater Lakes and the Mississippi River will be pursued (i.e., a number of non-Corps dams which are operated by the US Forest Service, Minnesota DNR, Ottertail Power, and Minnesota Power are to be included in this systemwide operations evaluations – to extent possible within resources constraints).

**OBJECTIVE:**

The object of the economic, environmental, and engineering, and tribal interests inventories and analysis done as part of this ROPE is to gather enough data to model the net effect or changes that result from different operating plans on project outputs from a national economic development (NED), an environmental quality (EQ), and regional perspective (including Tribal perspective). Consideration should be given to the fact that some of the outputs are quantitative and some are qualitative, some are of a local or regional focus, some of the outputs may have a higher priority than others, and that there will be tradeoff's involved. To adequately screen and select the systemwide operations plan, a matrix of National Economic Development (NED) and National Ecosystem Restoration (NER) and regional and local concerns will be used.

Alternatives will be developed from the identified list of specific planning objectives. Various impacts of developed alternatives will be identified by comparing the existing and/or base condition with the anticipated condition with any given alternative. The process used to identify alternatives, screen alternatives, and select alternatives will be based on a planning process that seeks to include and involve all stakeholders, managing agencies, and the public (the planning process to be used will seek public, stakeholder, and agency inputs and reviews at numerous strategic points and will seek final recommendations that have consensus and synergy). Ultimately, the St. Paul District Engineer will make a recommendation regarding the Corps operations after weighing the various alternatives. Similarly, the United States Forest Service Forest Director will evaluate alternatives associated with the Knutson Dam.

**BACKGROUND:**

Construction of the Corps/Federal dams at each of the six Mississippi River headwaters lakes was authorized by the River and Harbor Acts of June 14, 1880 and August 2, 1882. The primary purpose for the operation of these dams is to facilitate low flow augmentation for navigation consistent with Federal Tribal trust responsibilities but other purposes have since been added – including flood reduction, fish and wildlife conservation, recreation, and hydropower. In 1918, J. Neils Lumber Company constructed a small dam at the outlet of Cass Lake. After completion of their lumbering operations, Neils no longer needed the dam. In 1926, Public Law 270 gave the responsibility for operating and maintaining the dam to the US Forest Service. Today Knutson Dam is managed to maintain lake levels that allow for recreational navigation.

The prime goal of the proposed systemwide ROPE Study will be on improving regulation of the Corps of Engineers Headwaters Reservoirs including Leech, Winnibigoshish, Sandy, Pine (Whitefish chain), Pokegama, and Gull (note: Knutson Dam and the associated Cass Lake impoundment will also be included in the evaluation and recommendations documented by this study). The existing Headwaters Corps and Forest Service dams and reservoirs regulations and associated natural resources management plans are to be examined. Targets for reservoir water levels and river discharge would be set for points in the system for different times of year based on consultations with stakeholders. The emphasis will be on meeting current and projected future needs for:

- Navigation (to the very limited extent that it is still a Federal mission)
- Tribal trust resources (including wild ricing, fishing, hunting, and other Tribal interests)
- Flood damage reduction (reductions in flood damages around the lakes and downstream)
- Fish and wildlife habitat enhancement, restoration, and preservation for lake and river related habitats
- Recreation – and related tourism
- Water quality, water supply (flow augmentation), and drought reduction
- Erosion and Sedimentation (attempting to reduce lake and riverine damages)
- Hydropower electrical production
- Sustain hydrologic function on associated lakes and rivers

There is also a strong desire to extend reservoir operational planning to adjacent controlled lakes (Lake Bemidji, Stump Lake Dam - Operated by Ottetail Power Company, Mud/Goose Lake – Mud Lake Dam Operated by the Minnesota DNR, and Prairie River Dam, Prairie Lake - Operated by Minnesota Power and Light) to optimize the lake regulation and make operations more systemwide, comprehensively, and holistically. In order to make the final ROPE study fully supported by the public, stakeholders, and agencies, more inclusive resources inventories evaluations will be accomplished outside the prime geographic focus area to include adjacent non-Corps operated lakes and adjacent lakes affected by the Corps operations. This is also needed because Corps operations can affect adjacent lakes. This inclusive approach will be used to the extent that the Corps can secure cooperation and adequate resources.

The outputs of this plan are most likely to focus on changes in operations for Corps, Forest Service, and other system reservoir plans. Structural/physical and environmental improvements conceptualized and recommended as a result of this study are expected to range in cost from \$4 million to \$20 million of construction and/or associated land acquisition. The nature of such construction and possible land acquisition will be defined and fully coordinated during the study. But, it is anticipated that some physical changes in the design of some of the existing dams may be needed to improve operations and that acquisition of a few small areas where flooding regularly occurs may be needed to fully realize the potential of an optimized operating plan. Accordingly, it is assumed that the outcomes of this plan could have a significant real or perceived affect upon the human or natural environments.

**KEY PRODUCTS AND TASK DESCRIPTIONS:**

The primary output of this QCP will be the completion of a systemwide ROPE study and associated Environmental Impact Statement. This study could recommend specific Federal projects and/or changes in water regulation related to Mississippi River headwaters reservoirs and downstream reaches of the Upper Mississippi River. This study and the associated EIS will be accomplished over a 4-5 year period.

Key intermediate phases to be accomplished as part of this study include:

1. Objective and goals identification and related resources inventories (use Partnering Group, Delivery Team, Task Forces, and Watershed/Lake Forum Groups to help identify, collect, and evaluate).
2. Coordination via EIS scoping, to define existing and future "without project" conditions and to define an array of alternative operating plans phase.
3. Modeling/evaluation and screening of alternatives (using economic, environmental, & cultural/political/legal criteria) – initial screening done with available information and judgments and final screening and plan selection done at a more detailed level of evaluation using new inventories.
4. Defining and coordination of a preliminary recommended plan and related mitigation plan (as needed), and preparing a NEPA assessment as a Draft ROPE Report phase (use USFWS support for endangered species, coordination act requirements, and ecosystems evaluations).
5. Mediation with conflicting interests and Final ROPE Report and associated EIS documentation (with programmatic agreements) phase, as needed.
6. Preparation of fully coordinated Programmatic Agreements to evaluate and protect cultural resources potentially affected by recommended the changes in operations.
7. Complete documentation of the final ROPE report and EIS.

Listing of key evaluations needed to accomplish this work include (Note: It is recognized that other items of work will evolve during the study and will be added to the study scope, as needed):

1. Identify relevant objectives, goals, constraints, and opportunities (utilize the considerable available public and interagency inputs obtained via the Headwaters Scoping Letter Report prepared in 1999 and Upper Mississippi River Reconnaissance Study prepared in 2001).
2. Establish a Partnering Group (via a partnering meeting) to provide policy and vision (with Tribal, MDNR, EQB, MHB, USFS, Audubon, MPCA, and COE members). This group will also come together at the screening alternatives and plan selection timeframes to discuss common ground, tradeoffs, synergy, and consensus. These partnering group meetings are likely to be lead by a trained conflict resolution facilitator and are likely to require 2-3 days each to be effective.
3. Establish resource interagency Task Forces for Cultural, Natural Resources, Flood Control/Erosion Control, Water Supply/Hydropower, Recreation and Tourism, and Public Involvement/Education. These task forces will be heavily relied upon to provide study related inputs regarding inventories and evaluations needed to screen alternatives and assess impacts. They will also provide technical groups for reviewing the intermediate reports and aid in plan formulation evaluations. These groups will meet independently and periodically, as needed, to provide guidance and inputs to the delivery team.
4. Establish diverse stakeholders Lake Groups for each of the watershed lake chains to obtain local inputs and to provide regular status reports on the study progress. These lake groups will meet periodically, as needed, to provide guidance and inputs to the delivery team and to receive project status information.
5. Establish existing condition and without project conditions scenarios. This will involve utilizing existing pre-project data sources and coordinating intensively with cooperating interagency task force groups to establish the foundation for these scenarios. For example, A review of cultural resource survey coverage of the reservoir system to date will be conducted and an

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- inventory of known cultural resources will be compiled and this data will be incorporated into a Geographic Information System and used together with other data sets to identify cultural resource priorities and assess the effects of reservoir operation on cultural resources.
6. Coordinate with and/or contract with Tribal entities to identify and fully evaluate and integrate the Tribal interest for each of the Headwater lakes. This information will be collected early in the planning process and fully integrated into the formulation and impact assessments. A work group will be established to address cultural resource issues in the headwaters, including Traditional Cultural Properties, and to review and assist in the formulation of cultural resource input for key study products. Prior to the partnering group evaluations screening of alternatives meeting, a meeting will be held with the tribes to define the tribal trust issues and to frame the alternatives from the tribal perspective. A similar tribal meeting will be held prior to the partnering group evaluations to discuss and select a "best plan". The tribal will also work with the delivery team towards development of a programmatic agreement that will lead to a comprehensive historic property management plan for the headwaters project. This group will also be relied upon to provide historical background regarding the Tribal interests and concerns regarding the Headwater Reservoir Projects and this will be included in the final ROPE study for context and better understanding regarding the Tribal issue associated with construction and operation of the project.
  7. Development of detailed hydrologic models for use in simulating the operation and regulation of the dams and reservoirs in the Headwaters region. It is not clear at this juncture what level of detail the analysis of alternatives will require. This deliverable assumes that a reservoir system based model will be used such as HEC-5/HEC-RES (or similar) to model alternatives to the current reservoir regulation plan. It is also assumed that the modeling effort will only extend down to the City of Aitkin and that Cross Lake and Gull Lake reservoirs will not require extensive modeling efforts. The guidelines presented here can be adapted to a more or less detailed model if necessary. Daily flows for a total of fifteen years will be used in the model. The fifteen years will be divided into 3-5 contiguous year periods which represent flood, moderate, and dry periods. Ratios of these periods may be used to represent extreme events. The model will simulate natural conditions, existing conditions, and as many as 100 proposed conditions. Future meetings with stakeholders will define the number of proposed conditions. The geographical extent of the model will be from Cass Lake, Winnibigoshish, and Leech Lakes at the upstream end to Royalton at the downstream end. The model may start at Lake Bemidji if additional funding is found.
  8. Define hydropower power generation capacity, river flow requirements, and desired conditions for downstream hydropower plants and fully consider and integrate into project formulation evaluations and impact assessments.
  9. Prepare economic inventories for lake areas and downstream reaches for all project outputs (including public and commercial recreation/tourism, commercial wild rice, flood reduction, drought economic impact reduction, low flow augmentation and water supply), and generate comparative economics models to simulate benefits associated with a variety of possible operational alternatives. Keep the benefits attributable to alternative actions separated so that all benefit categories can be easily segregated for comparisons. Input screening data/evaluations into a matrix that will be used to compare and screen the alternatives.
  10. Inventory existing Federal land ownership easements for all lakes in the system and determine the level and nature of easement rights. Determine if additional compensation is needed for hot spot areas and to allow for changes in operation. Determine additional acquisitions that may be needed to adequately compensate landowners if there are any impacts to them due to a change in Federal operations.
  11. Conduct an inventory of the water control structures in the UMR Headwaters region upstream of Minneapolis, Minnesota. The inventory should include information on the storage/outlet capacity, condition, operations and other pertinent information about the major water control structures in the basin. The operational condition of these structures will be evaluated to determine if physical improvements are warranted (e.g., At Winnibigoshish Dam, the upstream slope of the embankment is a steep, grouted riprap slope about 800 feet long. Over time, grouted riprap cracks, allowing wave action to remove soil from beneath the riprap resulting in voids. We have performed some maintenance on the slope in the past but it is an

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ongoing problem that will have to be fully addressed some time in the future. Our most likely solution, not considering environmental benefits, would be to break up or remove the grouted riprap and replace it with riprap at a flatter slope. Slope protection is important because the embankment is constructed of very erodible soil. This may be a good project to try to combine environmental enhancement with embankment protection because, while it is not an immediate problem, something will have to be done in the future).

12. Prepare reservoir drawdown and operating bands inventories and evaluations and integrate into an array of alternatives via modeling using the Corps-developed HEC-5/HEC-RES computer hydrologic model. These efforts will be used to compare and optimize regulation of multiple reservoirs systemwide.
13. Determine the channel capacity of the river channels below the dams in the headwaters to determine flood control and fish and wildlife issues. Also, determine the dam discharge capacities. Channel capacity is related to flood control in two ways: 1) What is the non-damaging discharge a river reach can sustain during an actual flood event and thus when should the reservoir store water? 2) What is the available channel capacity available for releasing water from the reservoir to allow the winter drawdown to occur (in preparation for spring flooding). Knowing the channel capacity in various reaches of the river will also help evaluate habitat and other issues related to fish and wildlife. The channel capacity in some reaches is dynamic due to the effect of aquatic plants, floating bogs and ice jams. Also, determine reservoir storage capacity for pool elevations below the present operation limits for use in evaluating the effect of low water levels. Reservoir storage capacity data is available for the Present Operating Limits within each reservoir. However, storage capacity data for extremely low pool elevations may be needed to evaluate the effects of low water on fish and wildlife habitat and other uses both in the reservoir and downstream. Environmental surveys of lake and river reaches will be needed to obtain channel geometry, velocity, depth, substrate, cover, and water quality will be used in combination with other pertinent water and natural resources data. This data, in combination with extensive coordination with resource agencies such as the MDNR, EQB, USFWS, USFS, BWSR and the USFWS, will provide opportunity and constraints information critical to project formulation. It is envisioned that interagency and special interest reps will participate in a natural resource work group. This work group will be relied upon for technical inputs to the project formulations and impact assessments. Data on channel geometry, stage/discharge relationships, substrate, cover, water quality, bathymetry, land use and drainage networks, and soils will need to be integrated into the plan formulation and assessment work.
14. GIS based Watershed Modeling System will be used to the extent that O&M and supplemental funding can be secured to fully inventory and distributively model overland flows to allow evaluation of alternative remedial solutions to water management/water quality problems.
15. A fully coordinated study approach is proposed which will require an extensive Public Involvement and education program that will be defined and coordinated via an interagency task force; Non-federal governmental entities, stakeholder, and the general public will be heavily involved in the cooperative formulation of alternatives and in the evaluation and selection of recommended revised operational plans (largely through lake advisory committees, workshops, and newsletters). To make the outputs more comprehensive and acceptable politically, many agencies will be asked to become actively involved in the inventory, evaluation/formulation of recommended actions (much of this will be accomplished via focus area working task forces and/or through participation on the study delivery team). The entities to be actively included in the formulation process include but are not limited to the Mississippi Headwaters Board, interested watershed management Districts, Lake Associations, the Leech Lake Bands, the Sandy Lake Band, and the Mille Lacs Band, numerous State of Minnesota agencies, the U.S. Forest Service, and special interest and environmental entities such as the McKnight Foundation and Ducks Unlimited, and the U.S. Fish and Wildlife Service.
16. Preparation of Programmatic Agreement for Cultural and Historical Resources. This will be coordinated fully through a cultural resources task force and will involve the State Historical Preservation Office and the State Advisory Committee for cultural resources...

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17. The headwaters reservoirs are a regionally significant environmental and economic resource. Changes to the operation of these reservoirs has the potential to significantly impact the quality of the human environment. For this reason, an Environmental Impact Statement (EIS) will be prepared to address any recommended changes in reservoir operations as well as any programmatic initiatives identified by the ROPE study. Such initiatives might include structural changes in the dam structures, operational changes that would benefit fish and wildlife or improve human conditions around the lakes and/or downstream of the dams. Other actions to be evaluated and recommended by this ROPE study include environmental restoration projects that can be integrated into the existing Federal project. Because the ROPE study will likely include assessment of the Knutson Dam on Cass Lake, which is owned by the U.S. Forest Service, the Forest Service will be invited to participate in preparation of the EIS as a partner agency. Other groups, including the Minnesota Department of Natural Resources, Mississippi Headwaters Board, U.S. Fish and Wildlife Service, Minnesota Pollution Control Agency, Leech Lake Band of Chippewa Indians, Sandy Lake Band, and the Mille Lacs Lake Band will be invited to participate as cooperating agencies in preparation of the EIS. It is likely that the EIS would be a two-tiered document with the second tier of detail being provided after the ROPE study is completed. A mitigation plan will be prepared and fully coordinated, as needed.
18. If needed, at the Draft Report stage, conduct a mediation session with the affected stakeholders to begin to facilitate resolution of issues and to refine the finalized/recommended operations plans.
19. Need to coordinate with non-Corps lake system operators to collect additional lake structures and Enviro inventories. Specifically, Lake Bemidji, Stump Lake Dam (Operated by Ottetail Power Company), Cass Lake, Knutson Dam (Operated by the U.S. Forest Service), Mud Lake Dam (Operated by the Minnesota Department of Natural Resources), and Prairie River Dam, Prairie Lake (Operated by Minnesota Power and Light). NOTE: Without such information, any systemwide approach will be significantly impaired and may not be undertaken as part of this ROPE and EIS study.
20. Establish and maintain an up-to-date link to ROPE activities on the St. Paul District Web page.

### **Anticipated Spin-off Products from the ROPE:**

There are many secondary spin-off products that will result from this ROPE. These products will take the form of a variety of inventories, undated models, improved coordination mechanisms, and possible Federal and/or State and local projects. A few examples of anticipated or potential study outputs follow:

1. Data and evaluation of existing flood prone structures in the Aitkin, Minnesota area that will be very useful in formulating local flood protection for that community.
2. Potential small flood reduction projects at Sandy Lake and other areas that have periodic flood problems.
3. Potential structural changes at the existing dams to allow for better future operations (e.g. Knutson Dam).
4. Updated hydraulic modeling and environmental data that will allow for future continuing authority environmental restoration projects.
5. Inventories of tribal interests in the study area that will allow for a more comprehensive understanding of tribal trust relationships.
6. Updated and/or more comprehensive natural resource inventories of natural and cultural resources for future use by all levels of Government (e.g., Leech Lake vegetation inventories).
7. Identification/inventory of erosion areas and potential small bank protection projects to protect public resources.
8. Improved interagency network to allow for better and more coordinated management actions at all levels of government.

**STUDY COST AND SCHEDULE:**

In spite of substantial efforts to solidify cost-sharing sponsors to accomplish a cost shared comprehensive study for the Headwaters area, there are no formalized Non-Corps Sponsors for such a study. However, efforts are still underway to see if non-Federal or local Sponsors can be relied on to informally provide staff assistance, financial resources, needed inventories and analysis, or other related cooperation that would benefit this ROPE Study. In that regard, an informal agreement with the Mississippi Headwaters Board (MHB) has been reached to have them assist in the public involvement associated with the ROPE study. Also, an agreement with the U.S. Forest Service is now being formalized that would allow establish a mechanism for cooperative evaluations, planning, and design associated with the Knutson Dam. Efforts to get the MDNR, MPCA, BWSR, and EQB committed to cooperative inventories of the littoral areas of the non-Corps lakes within the system will also be actively pursued with those entities. Participation of these entities and other local government and local interest groups will be sought in establishment of focus work groups.

The inventory, analysis, project plan formulation, and environmental documentations needed for this study to comprehensively optimize the headwaters reservoirs would begin in FY01 and extend through FY04. The scope of work will evolve as the study unfolds and will be re-evaluated each fiscal year with the assistance of cooperating agencies... The total cost of this work is anticipated to be approximately \$2.5 million of Federal/Corps of Engineers O&M funds plus the cost of non-Corps participants. It is now anticipated that an additional \$500,000 to \$1,500,000 of inkind services can be contributed by other entities (e.g., these could be provided formally or informally as money, inkind services, and/or as needed new inventories) to make the study more comprehensive and inclusive of a larger geographic area.

The tentative COE O&M funded portion of these studies is expected to be \$660,000 in FY01, \$300,000 in FY02, \$938,000 in FY03, \$312,000 in FY04, and \$292 in FY05. This is subject to funds availability and potentially changing priorities for District O&M funds.

**Inhouse Delivery Team:**

<i>Name</i>	<i>Function</i>
Ed McNally	Project Manager
John O'Leary	Project Operations Manager
Gregg Struss	Field Rep
Ray Nelson	Field Rep
Jeff Kleinert	Field Rep
Timm Rennecke	Field Rep
Jeff Steere	Field Rep
Dan McGuinness	Audubon Rep
Jane VanHunnik	Mississippi Headwaters Board
Gerald White	Tribal Rep – Leech Lake Band
Brenda Glenn	US Forest Service
Mel Sinn	MDNR Waters Rep
John Wells	State Planning/EQB
Bruce Wilson	MPCA Rep
Kenton Spading	Water Control Manager
Jim Murphy	Hydraulics
Scott Goodfellow	Hydraulics
Dennis Holme	Water Quality
Brad Johnson	Cultural Resources
Steve Clark	Natural Resources Rep
Frank Star	Con/Ops Rep
Greg Eggers	H&H/GIS

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Rick Carlson	Economics/Social
Steve Eggers	Wetland Ecology Advisor
Jim Sentz	Cost/Specs/water quality
Mary Muraski	Real Estate
Dawn Linder	Contracts
Greg Dasovic	Surveys
Tim Grundhoffer	Gen Eng/Struct
Matt Bray	Geotech

Independent Technical Review Team:

As needed, **TBD**

Value Engineering Team:

As needed, **TBD**

**CEFMS Accounting Data:**

FWI: 001T35  
OWI: 4093L0  
WCC: 60110

**Labor Codes:**

Eng. Div. Members Use = L26888  
PM Div. Members Use = L26890  
CON OPs Members Use = L28437  
RE Members Use = L28436

Others to be defined, as needed

**Reference Documents:**

1. Upper Mississippi River Reconnaissance Study, Lake Itasca to Lock and Dam #2 – St. Paul, District Corps of Engineers, December 2001.
2. UMR Letter Report – Corps of Engineers, September 1999 (identified issues, problems, and opportunities associated with water resources in the Headwaters region).
3. U.S. Army Corps of Engineers, St. Paul District, *Low-Flow Review, UMR*, 1990.
4. U.S. Army Corps of Engineers, St. Paul District, *Storage Tables for Reservoirs*, September 1999.
5. U.S. Army Corps of Engineers, St. Paul District, *Undated Map in Water Control Flat Files, Headwaters General*, This map lists channel capacities for each reservoir (except Cross Lake/Pine) to include Aitkin.
6. U.S. Army Corps of Engineers, St. Paul District, Pine River Dam, Cross Lake Minnesota, *Design Memorandum and Environmental Assessment*, (Undated Report), Transmittal Memorandum dated 2 December 1997 for CEMVP-PE-M from Nanette M. Bischoff CEMVP-PE-M.
7. U.S. Army Corps of Engineers, St. Paul District, *Water Control Manual, Mississippi River Headwaters Project, Lake Winnibigoshish Dam and Reservoir*, Mississippi River, Minnesota, Draft, September 1999, Exhibit D, Reference No. 12.c.
8. U.S. Army Corps of Engineers, St. Paul District, Mississippi River Headwaters Lakes in Minnesota, Feasibility Study, Main Report and Appendices, September 1982.

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9. U.S. Army Corps of Engineers, St. Paul District, Memorandum For the Record, Subject: Public Involvement, Interagency Coordination, and Tribal Coordination Associated with Scoping of Problems and Opportunities – Mississippi River Headwaters Project and tributaries, by Edward L. McNally, 12 February 1999.
10. University of Minnesota, St. Anthony Falls Hydraulic Laboratory, *The Effects of Different Operating Plans for the Six Mississippi River Headwaters Dams*, Part I, Project Report No. 184 and Appendices, Prepared for the U.S. Army Corps of Engineers, St. Paul District, August 1979.
11. Anderson—Nichols & Co., Inc, Palto Alto, CA, Computer *Operations Study of Reservoir Operations for Six Mississippi River Headwaters Dams*, Final Report and Appendices, Prepared for the U.S. Army Corps of Engineers, St. Paul District, June 1982.
12. U.S. Army Corps of Engineers, St. Paul District, *Mississippi River Headwaters Lakes in Minnesota, Feasibility Study*, Main Report and Appendices, September 1982 (See the Appendices, Page A-24 for a discussion of the model used to evaluate various operating plan alternatives).
13. U.S. Army Corps of Engineers, St. Paul District, *Mississippi River Headwaters Lakes in Minnesota, Low Flow Review*, October 1990, (Spreadsheet Software was used to model reservoir operation, see Page 38).
14. *Creativity, Conflict and Controversy, A History of the St. Paul District, U.S. Army Corps of Engineers*, Raymond H. Merritt, undated (approx. late 1970's to early 1980's), This book contains a general discussion of the conditions that existed in the Headwaters Region prior to the construction of the dams (see Chapter 3), Chapter 3, Table 3 contains pre- and post-project surface areas for the lakes.
15. U.S. Army Corps of Engineers, St. Paul District, *Area-Capacity Table Reevaluation for the Mississippi River Headwater Study*, August 1983, This report contains a history of the early attempts to determine the storage in the lakes and which may provide clues to the natural lake levels.
16. U.S. Army Corps of Engineers, St. Paul District, Water Control Section, HEC-5 Computer models used for the Annual Flood Damage Report to Congress, 1998, Point-of-Contact: Kari Layman and/or Kenton Spading, Natural condition rating curves were developed for Winnibigoshish, Leech, Pokegama and Sandy reservoirs based on rating curves found in the Water Control Section's files. The Section's files should be consulted for similar information for Cross Lake and Gull Lake reservoirs (see folders labeled "Natural Flow Conditions" for each reservoir).
17. U.S. Army Corps of Engineers, St. Paul District, Reservoir Modeling for the Mississippi River Flow Frequency Study (the report publication is pending as of September 2000), Point-of-Contact: Greg Eggers, Hydrology Section, Natural rating curves for the dams were used in this study based on information from Water Control's files
18. Consult the U.S. Army Corps of Engineers, St. Paul District's office of Map Files and the Water Control Section's flat files, project log sheets, microfilm and general files for information on pre-project water surface profiles, river stages etc
19. Consult the Annual Reports of the Office of the Chief of Engineers for the periods before and after the construction of the dams. These reports may contain pre-project condition information.
20. *National Dam Safety Program Inspection Reports*, The National Dam Inspection Act, Public Law 92-367, 8 August 1972 authorized U.S. Army Corps of Engineers, St. Paul District, These reports. The reports should be available for a large majority of the water control structures in the Headwaters Region. They contain information on the storage/outlet capacity, condition, operations and other pertinent information.
21. National Dam Safety Program, Minnesota, *Inventory of Federal and Non-Federal Dams*, Volume I – List of Dams Alphabetically by County, June 1975, Prepared by the Minnesota Department of Natural Resources for the U.S. Army Corps of Engineers, St. Paul District.
22. U.S. Army Corps of Engineers, St. Paul District, *Drought Contingency Plans, Mississippi River Headwaters*, Draft, September 1992, Each of the 6 Mississippi River Headwaters reservoirs has a drought contingency plan. Each plan contains a listing of the water control structures and the water uses and users in the reservoir's basin.
23. *System-Wide, Low-Flow Management Plan, Mississippi River above St. Paul, Minnesota*, September 1996, Minnesota Department of Natural Resources, Division of Waters, This document contains the *names and telephone numbers for many water control structures in the basin*.

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24. Birk, 1985, A Phase I Cultural Resources Survey of the Nisswa Lakes, A Part of the Gull Lake Reservoir in Cass and Crow Wing Counties, Minnesota, by Northland Archaeological Services for the U.S. Army Corps of Engineers, St. Paul District.
25. Gibbon and Leistman, 1984, Cultural Resources Reconnaissance Survey of the Shoreline of Big Sandy Reservoir, Aitkin County, Minnesota: 1982. by the University of Minnesota for the U.S. Army Corps of Engineers, St. Paul District.
26. Hudak and Ready, 1979, Cultural Resources Inventory of Lands Adjacent to Big Sandy Lake, by The Science Museum of Minnesota for the U.S. Army Corps of Engineers, St. Paul District.
27. Jalbert and Richards, 1995, Phase I Archaeological Reconnaissance of Five Lake Shores, Pine River Reservoir, Crow Wing County, Minnesota, by the Great Lakes Archaeological Research Center, Inc. for the U.S. Army Corps of Engineers, St. Paul District.
28. Johnson, 1978, Cultural Resources Investigation of the Reservoir Shorelines: Gull Lake, Leech Lake, Pine River and Lake Pokegama. Volumes 1, 2 & 3, by the University of Minnesota for the U.S. Army Corps of Engineers, St. Paul District.
29. Johnson, Harrison and Schaaf, 1977, Cultural Resources Inventory of Lands Adjacent to Lake Winnibigoshish, by University of Minnesota for the U.S. Army Corps of Engineers, St. Paul District.

**STUDY COORDINATION PROCESS / WEB:**

The planned coordination associated with formulation of the ROPE is to be accomplished via a number of "coordination groups" with varying roles and responsibilities and will involve extensive public involvement and a education program. The membership and roles of each group will evolve as the process unfolds. However, a table that summarizes aspects of these coordination groups follows:

<b>Coordination Groups</b>	<b>Key Members of Each Group</b>	<b>Purposes and Roles of Groups</b>	<b>Relationships with other Groups and Remarks</b>
<b>Partnering Group</b>	Upper management Reps from prime local, State, Tribal, Federal Agencies, and other key stakeholders	<b>Provides general study oversight</b> and review, priority for funding, and resolves policy issues	Will provide the Corps District Engineer and US Forest Service Director with common ground recommendations and high level agency and stakeholder positions
<b>Tribal Interests Group</b>	Reps from Leech, Mille Lacs / Sandy Lake Bands of the Ojibwe Tribe/ nation, Dakota Bands, and Corps and Bureau of Indian Affairs representatives	To provide <b>technical inputs regarding tribal interests</b> into evaluation matrix and review comments	Works closely with the Corps PM/ Oper. PM/ District Engineer and USFS reps to establish a constructive nation-to-nation dialog and avoid tribal trust conflicts
<b>Downstream Interest Group</b>	Diverse group of interested citizens and officials from Cities of Aitkin, St. Cloud, Minneapolis, with Corps engineering and Operations Manager leadership.	Provides <b>non-technical inputs regarding downstream effects</b> into the evaluation matrix and for use in the EIS. Review study reports from the downstream publics perspective.	Works closely with the study delivery team through the delivery team downstream interests champion/s.
<b>Task Force Groups</b>			
<b>Environmental /Natural Resources</b>	Reps from variety of natural resources agencies and environmental groups (Key reps will include DNR, COE, and USFS, Tribes, MHB, and Environmental Group representatives, etc).	To <b>provide technical inputs regarding environmental matters</b> into the EIS, evaluation matrix, to help collect relevant environmental inventories and set technical evaluation criteria, review reports, and identify environmental issues and opportunities	Works closely with the study delivery team through the delivery team environmental champion
<b>Flood Control/Erosion Control</b>	Reps to include City of Aitkin, MHB, various lake association reps, USFS reps, MDNR, Fifty Lakes Association, Star Island Association, and Corps engineering and PM	To <b>provide technical flood reduction and erosion protection inputs</b> into the evaluation matrix, and report reviews regarding environmental issues and opportunities	Works closely with the study delivery team through the delivery team environmental champion and with the public involvement and education task force
<b>Public Involvement/Education</b>	Reps include reps from Audubon Society, MHB, Corps PAO, Corps PM and Operations Manager, and USFS reps.	Help the to develop and implement the Public Involvement program . Assist the Delivery Team and associated group champions with logistics of media and public releases/ notices & newsletters.	Works closely with the study delivery team through the delivery team environmental champion Support study awareness and education efforts thru the lake groups and various media.

Continued – Groups Summary Information Table

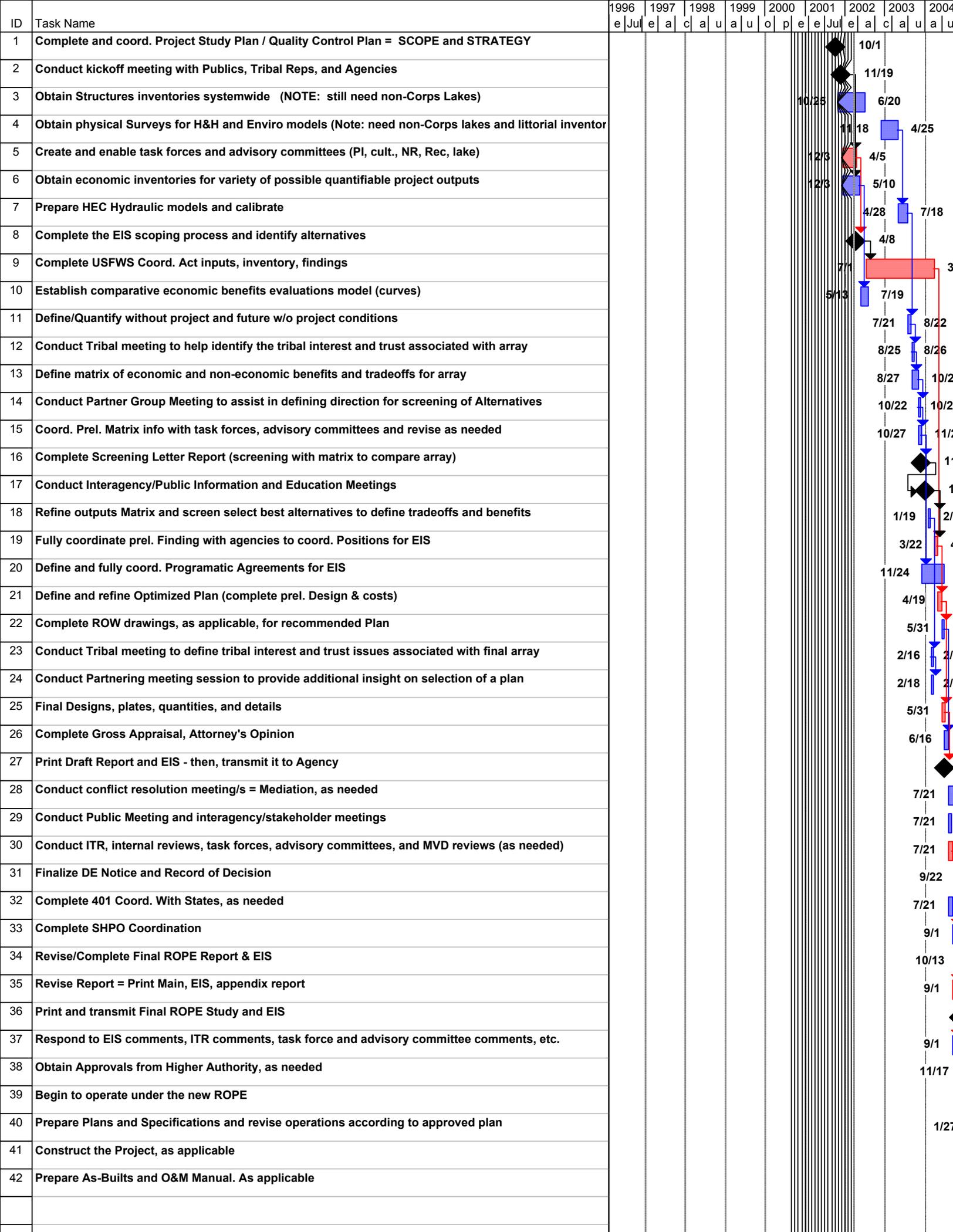
<b>Hydropower &amp; Downstream Uses</b>	Reps include Otter Tail Power, Minnesota Power, MDNR, Aitkin officials, MPCA, MHB, and Corps engineering and operations champions and Forest Service reps	To provide technical inputs into the evaluation matrix and EIS. Review reports from downstream perspective.	Works closely with the study delivery team through the delivery team downstream interests champion and hydropower and water supply representatives. Interfaces with the public involvement task force to education and inform downstream users...
<b>Cultural / Historic Preservation</b>	Reps will include the Minnesota SHPO, tribal preservation officers, and Corps and USFS cultural reps	Develop baseline data for effects cultural evaluation for input into matrix and EIS, review of reports	Works closely with the Tribal interests group and the Corps and USFS cultural reps
<b>Recreation and Tourism</b>	Reps will include Minnesota Planning and DNR, University of Minnesota reps, regional tourism groups, and Corps and USFS reps	Develop baseline data for recreation and tourism effects evaluation for input into matrix and EIS, review of reports	Works closely with the study delivery team through the delivery team recreation champion. Interfaces with the public involvement task force to education and inform downstream users...
<b>Lake Groups</b>			
<b>Leech Lake Chain</b>	Diverse group of local interests representing users of the lake (includes representatives from Lake Association, chambers of commerce, sportsman groups, resorts, lakeshore owners, immediate downstream river users, other local stakeholders, and interested local citizens).	Forum for <b>non-technical inputs regarding lake chain effects</b> into the evaluation matrix and for use in the EIS. Acts as a means of communicating information to public regarding ongoing study progress. Review study reports from the local publics perspective.	Works closely with the study delivery team through the Corps park manager and/or USFS representatives and with the public involvement and education task force to assist with distribution of newsletters and media announcements.
<b>Winnibigoshish / Cass Lake Chain</b>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>
<b>Sandy Lake Chain</b>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>
<b>Pokegama Lake Chain</b>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>
<b>Cross Lake Chain</b>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>
<b>Gull Lake Chain</b>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>	<i>Same as Leech Chain above</i>
<b>Lake Bemidji</b>	<i>Same as Leech Chain above</i>	<b>Same as Leech Chain above except that Otter Tail Power representatives will need to assist in coordination associated with this group.</b>	<b>Same as Leech Chain above except that Otter Tail Power representatives will need to be coordinating much of this effort.</b>
<b>Project Delivery Team</b>	Representatives from a number of functional offices in the St. Paul District Corps will serve on this team (see the complete list of team member in this QCP). In additional non-Corps representatives from the US Forest Service, MDNR, Tribal interests, MHB, the Audubon Society, etc, will serve on this working team.	Is responsible for data collection, evaluation, assessment, plan formulations, and documentation of the ROPE and the associated EIS. This group works together to evaluate, screen, and select alternative operation plans. It then, provides recommendations to the St. Paul District District Engineer and the USFS Forest Director for their approval.	This working group will provide leadership and guidance to the various Lake Groups and Task Forces and will receive inputs from those groups for incorporation into the evaluation matrix and use this in the plan formulations and impact assessments. With the assistance of the Public Involvement Task Force, will maintain an up-to-date webpage for ROPE activities and announcements...

**PRODUCT SCHEDULES / MILESTONES:**

The milestone schedule for completing all aspects of this QCP are shown as follows (**note:** these milestone dates are tentative and are likely to change as the study evolves and as funding available each year is solidified):

Complete the initial series of agency and public workshops	Nov 2001
Complete Delivery Team Prel. scoping work	Dec 2001
Coordinate Revised QCP within District and with Steering Com.	Jan 2002
Conduct initial Partnering Charter Meetings	Feb 2002
Conduct the initial Task Force Meetings	May 2002
Conduct the initial Lake Forum Meetings	June 2002
Complete EIS Scoping	Aug 2002
Coordinate and identify resource/data inventory needs	Sept 2002
Initiate required surveys/inventories	Nov 2002
Complete Hydraulic baseline models	May 2003
Conduct Partnering Group Evaluations Meeting/Screening	June 2003
Complete Preliminary Screening Report and EIS	Aug 2003
Conduct Public/interagency Meetings RE: Screening Report	Sept 2003
Integrate review comments & refine evaluations of best alternatives	Nov 2003
Define a selected plan and fully coordinate with task force and Lake Forums and Partner Charter Committee	May 2004
Conduct Partnering Group Evaluations to define "best plans"	June 2004
Complete Draft ROPE, EIS, and Programmatic Agreements	July 2004
Conduct Public Meetings and mediation session/s RE: Draft	Aug 2004
Integrate review inputs into formulation and report documents	May 2005
Complete Final ROPE, EIS, PA (mitigation and record of decision)	June 2005

For a more detailed description of this ROPE Study tasks and schedules, see the Project Gantt Chart attached to this QCP as attachment 1.



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<b><u>ITEMS OF WORK</u></b>	<b><u>FY 2001</u></b>	<b><u>FY 2002</u></b>	<b><u>FY2003</u></b>	<b><u>FY2004</u></b>	<b><u>FY2005</u></b>
<b>Special Studies / Contracts:</b>					
QCP Coord. by selected team members	180,000				
Contract for structures inventory & databases	480,000				
H&H and Environmental Surveys Contract		145,000			
Tribal Interest Identification Contract			65,000		
WMS hydraulic models support		5,000			
<b>Team Labor Charges <sup>1</sup></b>					
Management/PM and report prep/printing		25,000	40,000	40,000	40,000
General Eng (and other Design Br. Players)		3,000	5,000	7,000	10,000
Real Estate		7,000	10,000	10,000	8,000
Environmental (Natural Resources Eval)		25,000	260,000	40,000	40,000
Economics/Public Inv./Social Analysis		18,000	110,000	25,000	35,000
Cultural Resources		12,000	85,000	29,000	29,000
Specs/Estimating		2,000	5,000	12,000	24,000
Geotech		2,000	5,000	10,000	16,000
Water Quality		7,000	37,000	38,000	30,000
Hydrology & Hydraulics		25,000	250,000	50,000	25,000
Water Control		8,000	20,000	10,000	7,000
Const. Operations		7,000	15,000	15,000	7,000
Surveys		8,000	5,000	0	0
Contracts Services Support		1,000	1,000	1,000	1,000
<b>Sub Total</b>	660,000	300,000	913,000	287,000	272,000
Contingencies		50,000			20,000
<b>Sum Total</b>	<b>660,000</b>	<b>350,000</b>	<b>913,000</b>	<b>287,000</b>	<b>292,000</b>

**1 Note:** Key assumptions that affect the magnitude of the above study estimate include:

1. These costs only apply to the Corps operated lake chains. Additional costs will be associated with the Knutson Dam evaluations and by adding other non-Corps lakes/dams to a systemwide reservoir operation plan -- This requires non-Corps funding to support such efforts...
2. A Section 205 Initial Review Study is in place for Aitkin
3. No Sandy Lake Initial Review Study done
4. No Financial Analysis or institutional analysis is required
5. River substrate and cover inventories will take three weeks and two people for fieldwork at \$2000/day and \$3000 for subsequent data entry and GIS layer generation.
6. River species suitability curves to be obtained through the DNR or developed using existing literature and agency consensus.
7. River discharge evaluation done by gathering existing data from available sources and summarize – cost included in EIS preparation.

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8. Floodplain vegetation survey to be collected via aerial photography in FY02. Scan, rectify, digitize, and classify photos in FY03.
9. Reservoir bathymetric evaluations assume most existing bathymetry data will be suitable for environmental analyses. Also assume additional bathymetry data will be required in "key" locations in FY03 as determined by the Environmental Task Force – cost not to exceed \$75K.
10. Reservoir substrate data collection needed only for limited key areas as identified by the Environmental Task Force, would be collected in conjunction with bathymetry data.
11. Reservoir vegetation to be collected via aerial photography in FY02. Scan, rectify, digitize, and classify photos in FY03.
12. Reservoir species suitability curve to be obtained through the DNR or developed using existing literature and agency consensus.
13. Reservoir stage data to be gathered using existing data from available sources and summarize – cost included in EIS preparation.

**Concurrence and Approval:**

I have reviewed and concur with this quality control plan.

*FUNCTION / DIVISION CHIEFS REVIEWS:*

Chief, Constr. Oper. Div.	_____	dated: _____
Chief, Real Estate Div.	_____	dated: _____
Chief, Engineering Div	_____	dated: _____
Chief, Design Branch	_____	dated: _____
Chief, H&H Branch	_____	dated: _____
Chief, PM-A	_____	dated: _____
Chief, PM-ER	_____	dated: _____

*APPROVAL:*

Project Manager	_____	dated: _____
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