Project Management Plan

Minnesota River Basin
Integrated Watershed Study

1. Purpose

a. The purpose of this project management plan (PMP) is to define the scope, planning approach, roles and responsibilities, products, schedule and budget for an integrated study of the Minnesota River Basin (MRB). The objective of the study will be to prepare a plan for watershed and water quality management and aquatic ecosystem restoration in the MRB. This document also establishes quality control expectations and procedures to ensure that the study products meet sponsor needs and applicable standards.

b. This PMP will be the working document that will be used to determine the path forward for the project. The PMP will indicate what tasks will be completed by the U.S. Army Corps of Engineers (Corps) and the non-federal Sponsor.

c. This PMP defines the activities to be accomplished, products to be developed, schedule, and associated costs that the Federal Government, the non-federal Sponsor, and other non-federal study partners will be supporting financially. The PMP, therefore, reflects a commitment on the part of all the financial backers, as well as those who will be performing the activities involved in the study.

d. The PMP is a basis for change. Because planning is an iterative process, more or less costs and time and may be required to conduct the study. Changes in scope will occur as the technical picture unfolds. With clear descriptions of the tasks, roles and responsibilities outlined in the PMP, changes are easier to identify. The impact in either time or money is easily assessed and decisions can be made on how to proceed.

e. The PMP prescribes technical review and quality control for the watershed management plan. The PMP reflects mutual agreements between the Corps and the non-federal Sponsor on the scope, critical assumptions, methodologies, and level of detail for the studies that are to be conducted during development of the watershed management plan. Review of the draft report will be done to insure that the study has been developed consistent with these agreements.

f. The PMP is a study management tool. It is a scope of work that will be used for funds allocation by the Corps project manager. It forms the basis for identifying commitments to the non-Federal Sponsor and serves as a basis for performance measurement.

2. Applicability. This PMP covers development of a plan for watershed and water quality management and aquatic ecosystem restoration in the MRB and development and delivery of a decision support system.

3. References

a. St. Paul District, U.S. Army Corps of Engineers 2004. Minnesota River Basin Reconnaissance Study. Section 905(b) Analysis (WRDA of 1986). Minnesota, South Dakota, North Dakota, and Iowa.

4. Background

a. A study to develop a plan for watershed and water quality management and aquatic ecosystem restoration in the MRB was recommended in the Minnesota River Basin Reconnaissance Report (reference above). Congress authorized expenditure of funds on this study in the Consolidated Appropriations Act, 2008, approved 26 December 2007 (Public Law 110-161).

b. The Minnesota Environmental Quality Board (EQB) is sponsoring this study. They are supported by several other state agencies and other non-federal partners (see Study Team below). The sponsor is required to sign the Feasibility Cost Sharing Agreement (FCSA) and provide 50% of all study costs through non-federal cash and in-kind contributions. The PMP defines the contributions expected from the Sponsor and the anticipated contributions of other funding partners toward the Sponsor's shares of the study costs. The Corps will fund the remaining 50% of study costs. The study will be accomplished as described below. No non-federal funds or in-kind services will be creditable until a FCSA is executed. This project and corresponding PMP are intended to be living, working documents. The Corps and EQB have the authority to modify the project tasks, schedules, and costs as the study progresses. Work should not be started until there is formal agreement from the Corps' Project Manager and the EQB that the work is necessary and the costs are reasonable for the study. Requests should be directed to the Project Manager who will then coordinate with the remaining team members.

c. The study objective is to prepare a plan for watershed, aquatic ecosystem, and water quality management and restoration in the MRB. Identification of effective management and restoration actions will be assisted by a decision support system (DSS). The DSS will consist of a family of process-based simulation models, geographic information systems (GIS), topographic data, agricultural and ecological economics valuation models, plan formulation, alternatives analysis, and evaluation models. Because water flow is the central process, this modeling effort will emphasize the hydrology, water quantity, water quality, groundwater and other waterborne material mobilization, transport, and fate processes in the MRB.

The DSS will enable examination of existing conditions, forecasting of future conditions, and simulation of alternatives that will be ecologically sustaining and socially desired. The DSS will address watershed, water quality, water quantity, groundwater and ecosystem restoration needs at the small watershed, major watershed, tributary river, and main stem Minnesota River reach levels of spatial scale. The DSS will enable forecasting future conditions. The primary purpose of the DSS will be to assist in the selection, design, implementation, monitoring, and evaluation of watershed, water quality, water quantity, groundwater, and ecosystem management and restoration measures. The DSS will assist decision-makers and the public in identifying optimal investments and the long-term requirements to meet watershed, water quality, water quantity, groundwater, ecosystem, economic and societal planning objectives in the MRB.

d. Development of a watershed management plan for the MRB will be based on a standard planning process of assessing existing conditions, forecasting future conditions, and identifying desired future conditions based on planning objectives. The system needs will be identified through comparison between forecasted future conditions and desired future conditions. Simulations of different alternative management and restoration plans (combinations of measures) will be done using the DSS to evaluate effectiveness. Ecological and agricultural economics models will be used to identify optimal combinations of management and restoration measures to achieve planning objectives to approach sustainability of ecosystems and the agricultural economy. Results of this modeling and planning effort will be synthesized into a GIS-linked DSS that decision-makers can use to allocate investments in watershed and water quality management, and ecosystem restoration in the MRB. The watershed management plan will identify the most effective combination and sequence of management measures to attain the plan objectives.

5. Study Organization

This collaborative study effort includes participants from several local, state, Federal and non-governmental organizations. The Corps and the non-Federal Sponsor, the Minnesota Environmental Quality Board (EQB), will lead the study effort. They will be supported by the Interagency Study Team, various technical teams and other stakeholders. Key study participants are listed in Attachment 1. The list includes names, agency affiliation, contact information and assignments to the Interagency Study Team and/or technical teams.

a. Study Coordination Team

A Study Coordination Team will be established in accordance with the Feasibility Cost Sharing Agreement (FCSA) to oversee the study and make recommendations to the St. Paul District Engineer and the EQB regarding the study. The Study Coordination Team will be co-chaired by the Corps Project Manager and the EQB Strategic Planning Director and include senior staff from the Corps and EQB.

b. Interagency Study Team

An Interagency Study Team will be formed to refine study goals and guide the modeling and DSS development. The participants on this team will be the lead people representing their respective agencies. The Corps and the EQB may add members to the Interagency Study Team at their discretion. Participation on this team by each member agency will be voluntary but creditable toward the non-Federal cost share as an in-kind service. The Interagency Study Team will make recommendations to the Study Coordination Team regarding conduct of the study; the Corps and the EQB are responsible for decision-making under the terms of the Feasibility Cost Sharing Agreement.

The non-Federal participants on the Interagency Study Team will include the Minnesota Environmental Quality Board (EQB), Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Natural Resources (DNR), the Metropolitan Council, the Minnesota Department of Agriculture (MDA), Minnesota Board of Soil and Water Resources (BWSR), Minnesota Department of Health (MDH), the University of Minnesota, and Minnesota State University at Mankato. The Minnesota River Board will represent the counties, cities and local citizens in the Minnesota River Basin and ensure that the study reflects the needs of local decision-makers.

Federal participants will include the Corps, the Natural Resources Conservation Service (NRCS), the U.S. Fish and Wildlife Service (USFWS), the U.S. Geological Survey (USGS), and the U.S. Environmental Protection Agency (EPA).

c. Technical Teams

The Interagency Study Team will establish technical teams as needed to deal with process- and task-specific technical matters. The technical teams will consist of people with special expertise in hydrology, geomorphology, limnology, ecology, agriculture, economics, planning, modeling and other disciplines. U.S. Army Engineer Research and Development Center (ERDC) Environmental Laboratory scientists will actively participate in the study in conjunction with the Corps System-Wide Water Resources Program (SWWRP) research and development program.

d. Additional Partners

It is anticipated that several additional partners will actively participate in the study. U.S. Army Engineer Research and Development Center (ERDC) Environmental Laboratory scientists will participate in conjunction with the Corps System-Wide Water Resources Program (SWWRP) research and development

program. Counties, communities and citizens may participate in study tasks directly, or indirectly through the Minnesota River Board or through public input meetings.

Potential additional partners include:

- Shakopee Mdewakanton Sioux (Dakota) Community
- Lower Sioux Indian Community
- Upper Sioux Community
- Additional Federal agencies
- Agencies of the State of South Dakota
- Agencies of the State of Iowa
- The Nature Conservancy
- Land Stewardship Project
- Clean up the River Environment (CURE)
- Ducks Unlimited

6. Tasks

The following paragraphs describe a set of activities leading to development of a watershed and water quality management plan for the MRB. The tasks described below create a framework for the study. It is anticipated that these tasks will be accomplished in a collaborative fashion; study goals will be set by the Interagency Study Team, and individual partners will develop data, models, and other pertinent information to accomplish each task in cooperation with the other partners. This set of activities is one possible way to prepare a plan for watershed and water quality management and ecosystem restoration in the MRB. It includes aggressive use of technologies and methodologies that are currently being developed. Throughout the study, the Corps and the Sponsor will evaluate the current state of these technologies and methodologies versus the goals of the study and update the plan based on other studies that have been completed or were in progress at the time this study commenced. A detailed breakdown of responsibilities of the various partners needs to be determined and documented in this PMP as the study progresses. The initial estimated cost of the work by task is shown in Attachment 2.

a. Assemble Interagency Study Team and Technical Teams

The Interagency Study Team will meet early in the study process to determine the best way to proceed with the study and to establish appropriate technical teams. The Interagency Study Team will meet periodically throughout the study; technical teams will meet as needed. Initial tasks will be to:

- Refine study goals
- Assemble existing data from various federal, local and state agencies and universities
- Identify data collection needs (LIDAR, stream cross section surveys, discharge, sediment, nutrient, precipitation, hydro-meteorological parameters, soils, subsurface geology, water table, drain tile locations etc.)
- Determine modeling strategies and select appropriate models

b. Small Watershed Modeling

Spatially explicit, process-based hydraulic models using the Corps of Engineers Gridded Surface Subsurface Hydrologic Analysis (GSSHA) or a comparable program will be developed for at least six selected smaller (~23,000-acre) watersheds. The watersheds will be selected to represent geomorphically different parts of the MRB, and for availability of environmental data needed for modeling. The models will simulate surface and groundwater flow and subsurface drainage. The small watershed models will be calibrated using

contemporary monitoring data. Stakeholders at all levels will assist in selecting the representative small watersheds to model and to provide the full set of available environmental data needed for the modeling work. The University of Minnesota, the Metropolitan Council, DNR and the MPCA will work closely with the Corps in providing input on physical processes for the modeling effort and in conducting monitoring needed to provide data for model calibration.

The models will be used to generate a set of annual hydrographs, representing existing conditions in typical dry, normal, and wet years, selected from the hydrologic record.

c. Simulate Existing Materials Transport Processes

The models will be adapted and linked to process-based models of sediment erosion, nitrogen (N) and phosphorus (P) mobilization, and transport. The GSSHA models will be used to simulate annual loading rates of total suspended solids (TSS), total nitrogen (TN), and total phosphorus (TP) under existing conditions.

d. Simulate the Natural Hydrologic Regime

The models will be modified to simulate a set of natural (without agricultural drainage, storm water systems, road ditches, dams, with prairie vegetation, etc.) hydrographs for typical dry, normal, and wet years.

e. Simulate Natural Materials Transport Processes

The models will be adapted and linked to process-based models of sediment erosion, N and P mobilization, and transport for natural conditions (prairie vegetation, no agriculture, no artificial drainage system, etc.). The models will be used to simulate annual loading rates of TSS, TN, and TP.

f. Assess the Effects of Hydrologic Alteration and Land Use

The models adapted to simulate natural conditions will be used to generate a synthetic hydrograph for a selected recent (e.g., 30-year) period of record. The simulated annual hydrographs will be examined and compared to the historic record using selected indicators of hydrologic alteration (Richter et al. 1996) for selected locations in the MRB. Simulated annual yield curves of sediment, N, and P for existing and natural conditions at selected locations will be compared.

g. Scaling to Major Watersheds

Hydrologic characteristics of the smaller watersheds will be selected for scaling to the major watersheds in the MRB. The models of a selected set of four to six major MRB watersheds will be developed at lower levels of spatial resolution. The major watershed models will incorporate the available Hydrologic Simulation Program Fortran (HSPF) models to simulate TSS, N, and P loadings to the Minnesota River. The annual hydrographs and loading rate curves will be simulated for existing conditions using the same set of typical dry, normal, and wet hydrologic conditions.

h. Simulate Minnesota River Water Quality

Output from the major watershed models and a numerical hydraulic river flow model (HEC-RAS) will be used as input to CEQUAL-W2 river and reservoir water quality models. The main stem Minnesota River model system will extend from Big Stone Lake to the confluence with the Mississippi River. The focus of attention will be on but not limited to Big Stone Lake, Marsh Lake, Lac qui Parle, and the lower Minnesota River from Shakopee to the Mississippi River. If it is determined necessary additional areas will be

considered such as more of the main stem of the Minnesota River along with other tributaries of the Minnesota River. The annual progression of existing conditions (TSS, Secchi transparency, N, P, Chlorophyll a, Biochemical Oxygen Demand (BOD), Dissolved Oxygen (DO)) will be simulated for typical dry, normal, and wet hydrologic conditions.

For the lower Minnesota River, a model system incorporating NAVEFF and NAVSED (hydraulic effects of commercial navigation traffic) models will be used to simulate the effects of commercial navigation traffic on water quality in the lower Minnesota River.

i. Simulate Future Conditions

The Study Team will make and define a series of assumptions about future land use, urban development, climate, geomorphic processes, the agricultural drainage system, and watershed management in the MRB. These assumptions will be used as input variables in the model system to simulate future (some specified year, e.g., 2025) conditions. The small watershed, large watershed, and river water quality model systems will be used to simulate future (without projects or change in management) conditions of system hydrology, loading rates, and Minnesota River water quality conditions. These simulations will be used to generate a description of future conditions for typical dry, normal, and wet hydrologic conditions.

j. Identify Ecologically Realistic Target Future Conditions; Identify System Needs

The Study Team will examine the simulated future conditions, consider goals for watershed and water quality conditions, and develop a set of target future conditions. The Team will identify system needs (e.g., changes in the hydrologic regime, wetland, lake, reservoir and river restoration, sediment and nutrient loading rates, and river water quality conditions) that will be required to meet the target future conditions.

k. Select Management Measures to Simulate

The Study Team will identify a set of best management practices for watershed management, land cover changes, modifications to the agricultural drainage system, wetland restorations, tributary channel restoration, reservoir water level management, navigation traffic restrictions, and other measures appropriate to the MRB.

l. Simulate Effects of Management Measures Applied at Different Spatial Scales

The Study Team will simulate the effects of watershed and tributary river management actions in the six selected small-scale watersheds using GSSHA or a comparable model and the linked sediment and nutrient transport models. Rules for the spatial effects by number, geographic location, and area (as appropriate) of application of the management measures on the annual hydrograph and nutrient and sediment yield curves will be developed. Using the larger watershed and the river and reservoir water quality models, effects of combinations of management actions on conditions in the Minnesota River will be simulated.

m. Simulate Economic Effects of Management Actions

The Study Team will select appropriate modeling approaches to simulate the effects of management measures on the economy. Effects of management measures on crop acreages, alternative crops, crop yields, and agricultural income will be simulated. Economic effects of applying urban best management practices will also be assessed. Rules for the spatial effects by number, geographic location, and area (as appropriate) of application of the management measures on the local, regional, and national economy will be developed.

n. Simulate Ecological Benefits of Management Actions

The Study Team will select a set of ecosystem services that will be affected by watershed management, aquatic ecosystem, and water quality restoration. The model system will be used to simulate the effects of management measures on the production of ecosystem services. Rules for the spatial effects by number, geographic location, and area (as appropriate) of application of management measures on the production of ecosystem services will be developed. Monetary valuation of selected ecosystem goods and services will be estimated by applying accepted valuation methodologies and information from ecological economics literature sources.

o. Develop a Decision Support System

A decision support system (DSS) will be developed, using the results of the MRB model system and other existing watershed DSSs to enable decision-making about investments in watershed management, aquatic ecosystem restoration, water quality, water quantity, and groundwater management measures in the MRB. The DSS will be explicitly designed to meet sponsor needs. The DSS will be linked to the Basin GIS to enable visualization of the spatial arrangement of management measures. The DSS will incorporate incremental analysis techniques to identify the best value sequence of management measures to apply within each major watershed to achieve target future conditions. The DSS will be designed to simulate the costs and benefits (net increase in ecosystem services, net increase in farm income, increased social and human capital of rural communities) of alternative plan combinations.

p. Deliver DSS, Technology Transfer

The DSS will be made available to planners, resource managers, and decision-makers throughout the MRB via the Internet. The MRB watershed management and ecosystem restoration Internet site will include findings of the study, a synthesis of the modeling results, instructions for use of the DSS, and the Watershed Management Plan. The Internet site will be designed to enable tracking implementation of management and restoration measures and system response as revealed by monitoring.

q. Watershed Management Plan

The Watershed Management Plan will document the planning process and development of the DSS. The DSS will be used to identify the combination of management measures needed to attain the planning objectives. The type, geographic distribution, estimated cost, sequence of implementation, and implementing agency for the management measures will be described in the Watershed Management Plan for the MRB.

r. LIDAR and Survey Collections

The study will include collection of topographic information needed for modeling and other purposes. This could include the acquisition of LIDAR data for the entire Minnesota River Basin, approximately 16,770 square miles. The LIDAR needs and specifications will be developed by the Study Team but will at a minimum meet Federal Emergency Management Agency (FEMA) standards. Topographic data collection would optimally be conducted early in the study to enhance modeling accuracy. Any topographic data collected will be made available to the public.

Survey collections will be conducted on an as needed basis to fill in current gaps or to enhance the modeling efforts. These collections will take place at the recommendation of the Interagency Study Team.

s. Implementation of the Watershed Management Plan

Implementation will primarily be the responsibility of the non-Federal partners. It is recommended that the partners use a science based approach for incrementally restoring portions of the basin, monitoring the actual response, and incorporating the knowledge gained into the remainder of the study. If the study finds that Federal construction is warranted, additional feasibility study will be necessary to pursue authorization for the work.

7. Technical Criteria Statement. This study will be conducted in accordance with Corps of Engineers criteria for watershed studies contained in the planning guidance notebook, ER 1105-2-100, and other applicable regulations and guidance. The final product will be a watershed management plan and decision support system as described above.

8. Quality Control

a. This document is intended to serve as the Project Management Plan and the Quality Control Plan. The coordination, preparation and vertical team review of this scope of work assists in maintaining quality control. A separate Peer Review Plan has been developed for this project and is include as attachment 3.

b. An Independent Technical Review (ITR) is an important part of maintaining quality control. Senior technical staff from the Corps and other agencies, with expertise in economics, ecology, hydraulics and hydrology, and planning will conduct the ITR. The ITR team will meet with the Study Team initially, provide review comments on the technical approach to the tasks described above, and review study products as they are developed.

c. Technical representatives of the non-Federal Sponsor will be included on the ITR team and this will be an item of in-kind services that will be credited to the non-Federal cost share. The ITR is the primary method of quality control, but quality control will also be monitored through internal/Corps functional element reviews, Sponsor reviews, and Corps team conferences and reviews.

d. The ITR review will be ongoing through product development, rather than a cumulative review performed at the end of the study. All comments resulting from the ITR will be resolved prior to completing the watershed plan.

e. Documentation of the ITR will be included with the submission of the watershed management plan to the Corps Mississippi Valley Division. Documentation of the ITR will be accompanied by a certification, indicating that the ITR process has been completed and that all technical issues have been resolved.

f. Prior to the beginning of any task associated with the project, the Study Team and the technical teams will ensure that a proper scope of work is developed and that the expectations of the sponsor and all stakeholders are made clear. This will be critical to the success of this project and managing the overall expectations.

9. Risk Assessment

The following issues could lead to delays or increased costs:

a. Local Sponsor Support – The participating non-Federal agencies will need to provide in-kind technical services as described in this PMP.

b. Federal Support - Continued Congressional support will be required to secure Federal funds for the study.

c. This is a large study, and the study team will need to ensure that the expectations of all stakeholders are understood prior to moving forward with each phase or task.

10. Acquisition Plan. In-house Corps staff and non-Federal agency staff will conduct the majority of this study. Only limited contracting is anticipated, except for the acquisition of LIDAR data. It is anticipated that LIDAR would either be collected by non-Federal procurement as work in-kind or by contract through the Corps St. Louis District Geospatial Engineering Branch. Corps ERDC SMART Program research funding and effort will augment the tasks and budget described in this PMP.

11. Communication Plan

a. Internal communications (between study partners): Distribution lists will be established that include all Corps team members, Sponsor, and other partners. All general project notifications will be delivered using these distribution lists. The Corps Project Manager (PM) will determine which correspondence is appropriate for each audience. E-mail will be the primary mode of communication within the partnership.

b. External communications: All official news releases will be coordinated with the PM, the EQB and the Corps St. Paul District Public Affairs office. An initial news release will announce the start of the study. Subsequent news releases will announce any public meetings and development of reports or other products. Other official news releases will be considered as the study develops. Postings about the study on the St. Paul District's Website and/or other partners' sites will also be used to communicate to the general public.

c. Public Involvement: Public involvement will include at least two informational meetings; one near the beginning of the study and another when the draft watershed management plan is complete. The Study Team may decide to hold other meetings or workshops with the public in the MRB to gain information or to conduct planning as part of the study process.

12. Change Management Plan

a. All changes to the scope, schedule or budget for this study must be coordinated with the PM. Whenever it becomes apparent that the current budget or schedule is likely to be inadequate, affected Study Team members must notify the PM so appropriate actions can be taken. The PMP is intended to be a living, flexible document, and changes must be coordinated before obligations are incurred by any party.

b. The PM, in consultation with the Sponsor, will decide whether proposed changes are acceptable. The PM will revise the PMP as necessary to reflect approved changes.

13. Customer Involvement and In-Kind Services

a. The non-Federal Sponsor and other stakeholders will be intimately involved in this study. Some of that involvement will qualify for credit against the non-Federal cost share as in-kind services, as detailed below. It is anticipated that the entire non-Federal cost-share will be provided through in-kind services. Initial in-kind activities are described in Attachment 2, but it is anticipated that additional in-kind activities will be added as the study evolves via Interagency Study Team recommendations and Study Coordination Team approval actions.

b. In-kind services (work-in-kind) are locally provided services and/or supplies that the Sponsor may provide to offset a portion of their cost share for the feasibility study. The use of in-kind services in lieu of cash for feasibility (and watershed) studies is authorized by Section 105 of the Water Resources Development Act of 1986, as amended. Work-in-kind is an option for the Sponsor within certain guidelines, and the value of the actual costs of negotiated in-kind services can reduce the Sponsors' cash requirement.

Work-in-kind is allowable when it: 1) provides value added, and/or 2) results in completing necessary work faster, cheaper, or better than the Corps of Engineers could alone or by contract. Work-in kind must be identified and documented clearly in the PMP before the work is begun.

c. In-kind services must be in accordance with federal regulations, including OMB Circular A-87.

d. Work-in-kind may be performed by the Sponsor or by their partners (non-Federal) and all work must be in accordance with the Feasibility Cost Sharing Agreement and be approved by the Corps of Engineers.

e. The process for claiming credit for in-kind services is:

1) negotiate the scope of services and associated costs between the Sponsor and the Corps,
2) document the actual expenditures made to accomplish the work-in-kind,
3) credit the local Sponsor with an in-kind service credit, based on actual expenditures, to reduce their cash contributions.

14. Scope of Work and Budget by Discipline. The scope of work for each task is described in Tasks Section 5 a through s above. Detailed estimates for each discipline will be developed by the Interagency Study Team as the study progresses.

15. Milestone Schedule. The study milestones and schedule are summarized below. This schedule is based upon the assumption that adequate Federal and non-Federal funding will be provided to accomplish the tasks described in this PMP; therefore it represents an optimistic timeline. Milestone dates will be adjusted throughout the study to reflect actual available funding. Non-Federal in-kind efforts will be conducted in parallel to this schedule, and in-kind deliverables will be incorporated as they become available. The Interagency Study Team will prepare and maintain a detailed comprehensive deliverable schedule as the study progresses.

Task	Begin Date
FCSA Signed	September 2008
Begin Project Management and Modeling Meetings	October 2008
Small Watershed Modeling	October 2008
Simulate Existing Materials Transport Processes	May 2009
Simulate Natural Hydrologic Regime	August 2009
Simulate Natural Materials Transport Processes	October 2009
Assess the effects of altered land use	January 2010
Scale information to major watersheds	September 2009
Simulate MN River Water Quality	November 2009
Simulate Future Conditions	March 2010
Identify Future Condition Targets	January 2011
Select Management Measures	March 2011
Simulate Effects of Management Measures	April 2011
Simulate Economic impacts of Measures	April 2011
Simulate Environmental impacts of Measures	April 2011
Develop Decision Support System	April 2011
Publish Draft DSS/Management Plan	December 2011
Deliver Decision Support System – Transfer	March 2012
Publish Final DSS/Management Plan	December 2012

16. Statement of Approval. This PMP has been coordinated with the key Corps staff, the Sponsor and key non-Federal partners. The PMP is approved as a framework for the Minnesota River Integrated Watershed Study.

Craig O. Evans 2-Sep-08

Craig O. Evans Date
Project Manager

9-2-08

Aaron M. Snyder Date
Project Manager

ATTACHMENTS
1. Study Participants
2. Summary Cost Estimate
3. Estimated Non-Federal In-Kind

ATTACHMENT 1

Minnesota River Basin
Integrated Watershed Study
Study Participants

Study Coordination Team	Interagency Study Team	Technical Team(s)	Organization	Name	Phone	e-mail
			State Agencies/Government			
x	x		MN EQB (Sponsor)	John Wells	651-201-2475	john.wells@state.mn.us
		x	MN EQB (Sponsor)	Princesa VanBuren		princesa.vanburen@state.mn.us
	x		MDA	Bob Patton		
	x		MN BWSR			
	x		MDH	Bruce Olsen	651-201-4681	bruce.olsen@state.mn.us
	x		MN DNR	Dave Leuthe		dave.leuthe@dnr.state.mn.us
		x	MN DNR	Greg Eggers		
		x	MN DNR	Todd Kolander		
	x		MPCA	Larry Gunderson		larry.gunderson@state.mn.us
			MPCA			
	x		Metropolitan Council	Judy Sventek		judy.sventek@metc.state.mn.us
		x	Metropolitan Council	Cathy Larson		cathy.larson@metc.state.mn.us
	x		MN River Board	Shannon Fisher		shannon.fisher@mnsu.edu
		x	MN River Board	Susie Carlin		
	x		University of Minnesota			
			St. Paul District, USACE			
x			Deputy District Engineer for Planning, Programs and Project Management	Judy DesHarnais		
x	x		Project Manager	Craig Evans	651-290-5594	craig.o.evans@usace.army.mil
x	x		Project Manager	Aaron Snyder	651-290-5489	aaron.m.snyder@usace.army.mil
	x	x	Coord. Specialist/ Geomorphology	Rebecca Soileau		
	x	x	Environmental	Dan Wilcox		
			Economics	Jeff McGrath		
		x	Hydrology	Ann Banitt		
		x	Water Quality	James Noren		
			Hydraulics	Jon Hendrickson		
			GIS/LiDAR	Keith LeClaire		
			LiDAR Specialist	Aaron Buesing		
			Data Quality Manager	Greg Dasovic		
			Public Affairs Officer	Mark Davidson		
			Tribal Facilitator	Tom Crump		
			Civil/Site Engineer	Edith Pang		
			Small Business Office	Tom Koopmeiners		
			CEFMS/P2 Support	Theresa Thury		
			USACE ERDC SWWRP Program			
		x	Program Manager	Steve Ashby CEERD-EP-P		
			Hydraulics/Hydrology	Billy Johnson CEERD-EP-W		
			Hydraulics/Hydrology	Robert Wallace CEERD-HF-HW		
			Hydraulics/Hydrology	Chuck Downer ERDC-CHL-MS		
			Water Quality	Aaron Byrd CEERD-HF-HW		
			Decision Support	Ken Pathak CEERD-IV-T		
			Decision Support	Richard Cole CEIWR-GI		

NOTE:
Additional Federal, Tribal and NGO partners will be identified early in the study.

ATTACHMENT 2
Summary Cost Estimate
27-Aug-08

Task No.	Task	Estimated Cost
1	Project Management Team	$482,400
2	Technical and Modeling Teams	$813,600
3	Small Watershed Modeling	$380,400
4	Simulate Existing Hydrology and Materials Transport Processes for Small Watersheds	$430,500
5	Simulate Natural Hydrology and Materials Transport Processes for Small Watersheds	$126,000
6	Assess the Effects of Hydrologic Alteration and Land Use	$67,100
7	Scaling to Major Watersheds	$266,000
8	Simulate Minnesota River Water Quality	$1,134,000
9	Simulate Future Conditions	$142,000
10	Identify Ecologically Realistic Target Future Conditions, Identify System Needs	$16,000
11	Select Management Measures to Simulate	$13,000
12	Simulate Effects of Management Measures Applied at Different Spatial Scales	$272,000
13	Simulate Economic Effects of Management Actions	$259,200
14	Simulate Ecological Benefits of Management Actions	$208,800
15	Develop DSS	$744,000
16	Deliver DSS, Technology Transfer	$288,000
17	LiDAR Collection Contract	$2,385,000
18	LiDAR Collection Admin	$382,000
	Total Estimated Study Cost	$8,410,000

ATTACHMENT 3
ESTIMATED NON-FEDERAL IN-KIND SERVICES

27-Aug-08

In-kind efforts on this list that are performed after execution of a Feasibility Cost Share Agreement and are consistent with the requirements of the FCSA will be credited toward the non-Federal cost share.

It is anticipated that additional items will be added to this list as the study progresses.

Item	Responsible Organization	Estimated Value	Pertinent PMP Task(s)	Description
Shakopee Creek GSSHA Modeling	MN DNR	$150,000	3-6, 8, 9, 12	MN DNR Drainage Engineer will develop a GSSHA model for Shakopee Creek watershed in Chippewa River basin. Model will assess effects of wetland and depressional lake drainage and simulate effects of proposed management measures.
MN River Water Quality and TMDL Assessment	MN DNR	$70,000	3-6, 8, 9, 12	MN DNR Drainage Engineer and river ecologists will provide information on hydrology and stream geomorphology necessary for the small watershed modeling efforts.
LeSueur River Watershed Sediment Budget Study	MPCA & U of M	$500,000	4, 5	MPCA funded research by National Center for Earth Surface Dynamics. Developing an integrated sediment budget for the LeSueur River Watershed and a model that can be applied to other watersheds.
Lake Pepin Watershed Full Cost Accounting Project	MPCA & U of M	$235,000	13	MPCA funded research by U of M Department of Applied Economics. Project applies a full-cost accounting framework to evaluating alternative measures to reduce sediment and phosphorus loading.
Evaluation of Best Management Practices (BMPs) in Impaired Watersheds using the SWAT Model	MDA	$100,000	11, 12	MDA staff are using the SWAT model to identify the type and extent of BMPs needed to reduce agricultural pollutant loads from impaired watersheds.
Interagency Study Team Participation				
	MN EQB	$50,000	1	
	MN DNR	$40,000	1	
	MPCA	$40,000	1	
	BWSR	$40,000	1	
	MDA	$40,000	1	
	Met Council	$40,000	1	
	U of M	$40,000	1	
	MRB	$40,000	1	
Technical Team Participation				
	MN EQB	$50,000	2	
	MN DNR	$100,000	2	
	MPCA	$100,000	2	
	BWSR	$50,000	2	
	MDA	$50,000	2	
	Met Council	$50,000	2	
	U of M	$50,000	2	
	MRB	$50,000	2	
	Total of listed tasks	$1,885,000		
Other non-Federal Credits				
Study Coordination Team	MN EQB	$50,000	FCSA	Article III of the Feasibilty Cost Sharing Agreement requires Sponsor participation on the Study Coordination Team. This also includes adminstrative costs of accounting for non-Federal cost-share and coordinating the non-Federal efforts.