

CHANNEL MAINTENANCE MANAGEMENT PLAN

EXECUTIVE SUMMARY

*Upper Mississippi River System
Corps of Engineers, St. Paul District
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INTRODUCTION

The Channel Maintenance Management Plan (CMMP) is a comprehensive long term plan for channel and harbor maintenance related activities on various navigation projects in the Corps of Engineers St. Paul District. It identifies designated dredged material placement sites,

describes a strategy for placement site planning, discusses alternative channel maintenance techniques, and documents policies and procedures. While long term in nature, the plan is designed to accommodate new information and changes.

HISTORICAL PERSPECTIVE

The first navigation improvement and maintenance on the Upper Mississippi River (UMR) was legislated by Congress in 1824 when the Corps was authorized to remove snags and sandbars and confine flows to the main channel. Congressional acts in 1878 and 1907 authorized construction of a 4.5 foot and 6.0 foot channel respectively. These were maintained with the help of wing dams, closing dams, and limited dredging. The Rivers and Harbors Act of 1930 authorized the existing 9-foot channel project which was implemented by constructing a series of locks and dams. However, it was recognized that, even with the navigation dams, supplemental dredging would be necessary, so the construction of two modern dredges including the Dredge WILLIAM A. THOMPSON was authorized. Initially after the lock and dam system was created, dredging volumes were heavy with nearly 5 million cubic yards (CY) dredged in 1938. Average annual dredging has declined steadily to the current average of 690,000 CY.



Prior to the mid-1970's the reach capability of dredging equipment was limited and dredged material was placed conveniently near the dredge cut. This had recognized environmental impacts and natural resource agencies stressed a need for changing channel maintenance practices. In response to the National Environmental Policy Act (NEPA), an Environmental Impact Statement (EIS), was prepared in 1974, for operation and maintenance of the navigation project. The EIS concluded that enhancing dredge equipment capability was needed to improve placement site selection. Also, in 1974, a state and federal agency team was organized to identify and study problems associated with the river and in particular channel maintenance practices. This effort developed into the Great River Environmental Action Team study or GREAT I which was formally authorized by Congress in 1976. The interagency team published a nine volume report in 1980, which included a placement plan for all dredged material anticipated until the year 2025 and various other recommendations. From this study many of the 80 recommendations directed at the Corps were subsequently implemented through incorporation into the operation and maintenance program of the project. A 1992 Implementation Status and Future Program

Report summarized achievements related to the GREAT I recommendations and noted the

development of the CMMP as the Action Item 1, Future Program.

DREDGED MATERIAL MANAGEMENT

A basic objective of the District's dredged material placement site planning is to select environmentally acceptable sites where beneficial use of the material is possible. During the CMMP planning process the District reviewed the GREAT recommended sites and compared them with alternative sites to determine whether use was justified from economic, social, and environmental perspectives and to assure consistency with Federal laws and regulations. The planning process begins with the projection of dredging volumes and beneficial use quantities to determine the area required for a 40 year period. The identification of reasonable alternative placement sites is followed by evaluation and selection. Proposed plans are coordinated with other agencies through the River Resources Forum (RRF). Plans are also coordinated with the public through public meetings.

The CMMP is a composite of GREAT I study recommendations, Corps planning since GREAT, and subsequent changes and modifications. As new plans are developed and coordinated, they will be incorporated into the CMMP. Site specific information sheets and operational maps of placement areas are contained in Part III of the CMMP. Part III also includes a five year placement site action plan that will be updated annually.

Through the District's dredged material placement planning and active management practices, the anticipated acres of land needed for this plan has been reduced by over 25 percent and anticipated wetland impacts have been

reduced by 55 percent from the GREAT study recommendations.

The Corps prefers to place material at permanent federally owned sites which will be managed to extend their longevity by minimizing dredging quantities and promoting beneficial use. Site preparation and care will vary depending on the need to protect the site for aesthetic or social concerns or to prevent erosion. Non federally owned sites are used through real estate arrangements with the landowners. In some cases it is necessary to place dredged material at a temporary site because it is more efficient to do so or because of emergency channel conditions.

The District has provided dredged material for various beneficial uses to other agencies, local communities, and private individuals at no cost. In the 10 year period from 1985 through 1994, 80 percent of all material dredged has been placed at beneficial use locations. The dredged material is primarily medium grain sand that is used as an aggregate in construction products, for winter road ice control, landfill for development, fill for construction projects, environmental enhancement projects, recreational beach maintenance and many other uses. Because these opportunities are sometimes unpredictable, it is necessary to retain flexibility in the placement site selection and approval process. Recreational beaches on islands have long been popular with boaters and the District encourages using dredged material to enhance appropriate beaches. Interagency groups have developed beach plans and will continue to work together on implementing them.

CHANNEL MANAGEMENT

It is the District's objective to optimize the balance between dredging frequency, quantity, and cost without compromising safety and

reliability. To avoid frequent re-dredging and ensure the least overall cost of maintaining the project, advance maintenance dredging to a

specified depth and/or width is practiced. To assure a 9 foot channel is available, dredging is initiated when shoaling results in depths less than 10.5 feet. Dredging is then accomplished to a depth between 11 and 13 feet below low control pool elevation. Authorized depths and widths plus some of the factors and criteria that determine them are explained in Part III of this plan.

The Mississippi River is a complex and dynamic system for sediment movement. As data collection and evaluation capability improve, the magnitude of these changes is becoming more



quantifiable. Some major factors which influence shoaling in the navigation channel are hydrologic events and related flow conditions, river geomorphology, and channel control structures.

Part III of this plan contains a summary of all dredging since 1970. The District has been very successful in reducing dredging quantities

through active management practices. Since 1975 yearly dredging quantities have averaged about 690,000 CY down from 1.5 million CY for the years 1956-74. The twenty mile reach below the mouth of the Chippewa River accounts for about 45% of the District's dredged material. While bank protection on the Chippewa has been studied, experts have concluded that it would not be economically feasible and would not substantially reduce sediment load.

Channel control structures like wing dams still perform a valuable role. Rehabilitating, restructuring, or supplementing these features can help reduce dredging requirements. The District identifies problem reaches that might be improved through structural measures and evaluates alternatives with other agencies and local organizations.

Adjusting channel dimensions, accurate channel marking, and information sharing are a few nonstructural techniques that can reduce dredging requirements. A technique used to dredge material before it becomes a navigation problem is a sediment trap like the one that has been effective at the mouth of the Chippewa River. Snag removal is also accomplished at some locations when there is a safety concern.

HYDROGRAPHIC SURVEYS

Hydrographic surveys are used to monitor channel conditions, gather and share information, position navigation buoys, determine dredging requirements, calculate quantities, and assess scour. The District has two 36' launches that can survey a 50' swath with their retractable booms. A typical survey of 60 acres may take several hours. An on-board computer inputs data onto a disk which is transferred to the project office for processing and plotting onto a map of the river. Channel

condition surveys usually begin on those reaches that have historically heavy shoaling, frequent dredging requirements, or other related problems. These surveys are the basic foundation for channel maintenance monitoring and are relied upon throughout the season to track channel conditions. Pre- and post-dredging surveys are performed to determine quantities and assure that dredging has been accomplished as specified.

DREDGING

The timing of dredging depends on the urgency of the situation, other dredging requirements, and location of dredging equipment. A

comprehensive dredging schedule/summary is maintained, and is routinely updated as new information becomes available. The dredging

schedule is distributed to other agencies through the On Site Inspection Team. A site specific dredging notice is distributed when plans have been finalized. Placement site requirements are reviewed to assure that evaluations, documentation, permits, and other actions are completed.

Where there are acceptable placement sites, the hydraulic pipeline cutterhead dredge is the best equipment suited for the UMR because it is the most efficient and cost effective. It does not work as well for small jobs or cuts with distant or small placement sites that cannot be reached with slurry pipes. Mechanical dredging with a backhoe or crane and transport barges is well suited for smaller jobs where placement sites are further than one mile from the dredge cut.

Mechanical equipment is easier and faster to set up, but it is usually over twice as costly and not effective for extensive jobs.

The District's primary piece of dredging equipment is the 20" cutterhead dredge William A. Thompson, which is used regularly on 1000 miles of the Mississippi and other navigable waters in the St. Paul, Rock Island, and St. Louis Districts. With booster pumps the maximum effective reach is 6500' of floating pontoon pipeline and 3700' of shoreline pipe. It operates 24 hours a day and production rates usually vary from 10,000 to 13,000 CY per day. The District also has a two crane barges that are used for some dredging jobs or emergencies, but most mechanical dredging is done by contract.

PROGRAM COORDINATION

To assure other interests are informed of channel maintenance activities and have an opportunity to provide input, the District coordinates the program primarily through two interagency groups, the On Site Inspection Team (OSIT) and the River Resources Forum (RRF). Appendix A of the plan provides details of interagency notification and coordination procedures. The OSIT was organized during GREAT I for coordination of dredging events and channel maintenance activities. The GREAT study also led to the formation of the RRF which is made up of six federal and seven state agencies. In 1991 the participating agencies entered into a partnership agreement with a commitment "... to work together as a trusting, cooperative team to manage the river from a resource-balanced approach in the best interest of the public." Through communication, cooperation and compromise the district has been attaining RRF consensus and will continue to pursue that support. Close communication with the navigation industry also is necessary to assure that channel maintenance is

consistent with their needs. Procedures are established so towing operators can immediately report groundings or problems to the District.

The UMR projects have been authorized by Congress to provide economical transportation for the region and the country and to provide harbors for safety and recreational opportunities. It is the Corp's responsibility to maintain the benefits in the public's best interest. The public relies on the river for more than navigation including recreational boating, fishing, hunting, camping, residential development, commercial activities, sightseeing, and the enjoyment of nature. The District strives to conduct channel maintenance activities in harmony with those interests and will continue to keep the public informed of proposed actions or significant changes through written notifications and public information meetings.

