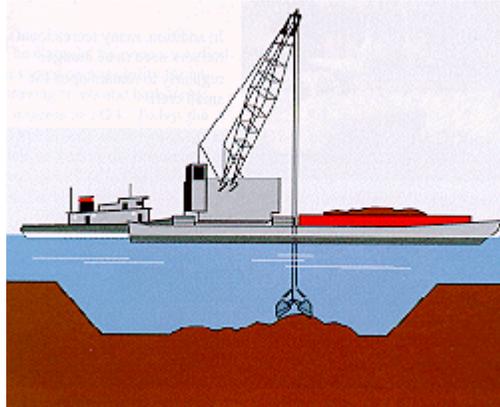

Dredging on the Great Lakes

What is Dredging?

Dredging is the removal of rock, sand, gravel, mud and clay from the bottom of waterways to create or maintain sufficient depth for navigation or other purposes. The material, which appears as wet soil, should not be confused with waste such as sludge or hazardous waste. The sediment is scraped, scooped or pumped by dredging vessels which transfer it to barges, hoppers or on-shore facilities for placement.



Why is Dredging Necessary?

Nearly all Federal harbors on the Great Lakes are located at the mouth of a river or along a coastline, utilizing natural or dredged navigation channels. Lake and river currents transport sand and silt eroded from the coastline and watershed. Some of this material may become deposited in navigation channels. Dredging is necessary to allow for safe commercial navigation and recreational boating. These natural processes would eventually lead to the filling of our harbors and waterways with rock, sand, mud, or clay. Harbors and major rivers, so vital to commercial, recreational and defense activities, would eventually fill in, leading to vessel delays and grounding. Today's ore carriers, container ships, oil tankers and Coast Guard vessels need deep channels and docking facilities to move freely. Dredging is necessary to maintain America's waterborne commerce and defense capability.

In addition, many recreational harbors need to be dredged regularly to remain open for small craft.

Why the U.S. Army Corps of Engineers?

The Corps of Engineers was first assigned responsibility for improving rivers and harbors by Congress in 1824. Today, the Corps is responsible for construction, as well as the maintenance and operation of Federal river and harbor projects.

Within its permit program, the Corps of Engineers has regulatory authority for work on structures in navigable waterways under Section 10 of the Rivers and Harbors Acts of 1899 and regulatory authority over the discharge of dredged or fill material into "waters of the United States", a term which includes wetlands and other valuable aquatic areas.

The Corps more recent activities in this regard have been strengthened by provisions of the Clean Water Act (Section 404) as part of the Corps nationwide program. The Detroit District reviews approximately 500-600 private dredging and dredged material disposal permit applications each year in Michigan and Indiana, and maintains more than 35 congressionally authorized Federal navigation projects annually

serving Michigan, Minnesota and Wisconsin.

Project Evaluation

The Corps efforts are not restricted to purely engineering work. Our responsibility includes ensuring that "unacceptable adverse effects" to the aquatic environment are avoided.

Operation and maintenance dredging projects undergo periodic sediment testing. This activity is carried out in order to evaluate environmental effects on various possible dredged material disposal alternatives.

The Detroit District environmental staff determine if unconfined in-water or upland disposal is suitable. If significantly contaminated, the material from the dredging project would be assessed as requiring confined disposal.

Why Confined Disposal Areas?

Because of past unregulated discharges into waterways, a portion dredging were commonly contaminated with industrial substances. Typically these were PCSs and heavy metals such as lead and mercury. Today, the most common contaminants are associated with agricultural runoff which, among other things, are comprised of nutrients and degraded vegetation. Dredged material containing these components is desirable for upland placement because it is non-toxic and promotes vegetative re-growth.

About 25 of 84 actively maintained Detroit District navigation projects have contaminated sediments in portions of the harbor that are unsuitable for in-water placement. The remaining 59 projects have clean material suitable for placement in-water or upland (unconfined).

Prior to dredging, sediment samples are taken for testing. Chemical analysis testing is conducted by independent laboratories. The results determine how and where the material will be placed. The District must comply with EPA and State Department of Natural Resources requirements when determining method of disposal.

Dredged material should not be confused with hazardous/toxic material. Such materials have significantly higher levels of contaminants than found in practically all dredged material. Soils found throughout the state, including residential front and back yards, and soil adjacent to roadways, have contaminant characteristics similar to dredged material.

Structures known as CDFs (confined disposal facilities) are used to contain moderately contaminated dredged material. These structures may be in-water or upland. A notable in-water example is the Pointe Mouillee CDF, named after the nearby geographical feature consisting of a marshy shore at the mouth of the Huron River in western Lake Erie. Pointe Mouillee CDF is a three mile long crescent shaped diked island serving two important functions: first, to provide 18 million cubic yards of capacity to receive Detroit and Rouge Rivers dredged material, and second, to act as a protective barrier island for the sensitive and ecologically valuable wetland area shoreward. The barrier protects the wetlands against erosive high water and wave action.

The CDFs in and of themselves commonly provide several different habitats which attract colonies of shore and aquatic birds. These habitats consist of rock, rip rap, sand flats, mudflats, scrub and arborous vegetation, etc., each attracting a specific set of species.

Research and Monitoring

The Corps also maintains several research facilities, including the Waterways Experiment Station (WES) in Vicksburg, Mississippi, where scientists study the various aspects of dredged material and develop and

evaluate different disposal techniques.

In addition, the Corps of Engineers is developing a research program at the Coastal Engineering Research Center at WES, which will address the engineering and mechanical aspects of dredging, stressing cost savings and the development of modern, efficient techniques and equipment which ties in closely with the economics and technical feasibility of beneficial application.

Beneficial Uses of Dredged Material

Dredged material often has significant value if applied for beneficial uses. Disposal alternatives are always examined for possible beneficial applications. Dredged material often has significant value in these applications. These benefits occur through proper planning and coordination between the District and potential users of dredged material. Beneficial uses of dredged material include beach nourishment/shore stabilization, habitat development, parks and recreation, agriculture, construction/industrial and development use, and road sanding in the winter. Each use is tailored to accommodate the particular needs and logistics at each project taking into account the physical and chemical characteristics of the material.

a) Beach Nourishment

Most prominent among beneficial uses of dredged material is beach nourishment. Beach nourishment is a low cost, beneficial option for operation and maintenance of dredging projects in the District. Many of the Districts harbors provide clean, sandy material from the navigation channels; which is then transferred to nearby beaches in order to diminish normal erosive effects wind, waves and weather.

When developing dredging plans for a particular project, areas of erosion are considered. The distance from the dredging areas is also considered, since this directly affects the cost of the operations. Other important factors are locations of parks and public facilities, such as water intakes, and the condition of the shoreline near them.

Beach nourishment is beneficial in several other ways. It returns sediment trapped between breakwaters into the littoral drift process. It also aids in the stabilization of beaches. Beach nourishment also helps to forestall the erosion occurring in the area of depletion.

Beach nourishment will continue to be a routine option for many projects in the Detroit District. Material not suitable for placement on the beach could be evaluated for other uses such as construction and industrial fill and habitat development

b) Habitat Development

One type of beneficial use that is often overlooked is the development of wildlife habitats or nesting meadows in upland disposal areas. The provision of living space for whitetail deer, small mammals, geese, songbirds and other species have been developed by the Corps.

Recreational fishing and hunting are very important elements of the Pointe Mouillee project. This is a CDF built in a state wildlife management area. This project is the result of a partnership between the District, State of Michigan Department of Natural Resources and Ducks Unlimited. The Corps is stressing multi-purpose, long term beneficial use of disposal sites. Twenty-six CDF facilities have been constructed upland, in-water and nearshore in the District. CDFs develop various habitats during the filling process depending on the construction site (aquatic, wetland, or upland), although in most cases the final state of the CDF will be upland habitat. These sites provide additional upland habitat, as well as, recreational

opportunities when completed. In urban areas, upland habitat creation is a unique resource.

c) Island Creation/Enhancement

Prior to the Corps authority to construct CDFs, material was mainly deposited in deep water sites. Several projects were developed to utilize dredged material for island creation and enhancement.

Some sites provided upland habitat and unique waterfowl nesting habitat in heavily developed or industrialized areas. For example, the CDF in Saginaw Bay has become a primary nesting site for birds, including the State endangered Caspian tern.

d) Agriculture

Dredged material, high in nutrients, removed from Frankfort Harbor, Michigan, was utilized to reclaim land for farming purposes. The land owner planned to develop an orchard over the reclaimed 20 acres.

e) Construction and Industrial Use

Several projects in the Detroit District have utilized dredged material in construction or industrial use; these include fill material, dike construction, urban and industrial use parking lots, roads and road sanding. To extend the capacity of the nearly filled CDF, Duluth, Minnesota, a project was developed where dredged material was washed with on-site water to wash away the fine material leaving clean sand, which is used for various construction and industrial applications.

SUMMARY

There is almost unlimited potential for beneficial uses of dredged material. The key to unlocking this potential is increasing public understanding and acceptance of the character of the material. The majority of material is similar in nature to soil found in backyards and gardens of homes and in farm fields. Unfortunately, the public views it as highly undesirable, and exhibits a "not in my backyard" attitude. Unless this attitude is changed, through education and experience, a valuable resource may be wasted.

The Detroit District will continue to work closely with Federal, state and local agencies, as well as communities to obtain acceptable sites for dredged material. We plan to pursue beneficial uses of dredged material, which will insure the continued viability of the Great Lakes commercial and recreational harbors.

For more information on dredging please visit the Detroit District Operations webpage.