Appendix A
"Our Troubled Waterways"
Water Spectrum
Winter 1974–75

OUR TROUBLED WATERWAYS

by Maj. Gen. J. W. Morris

The requirement to dredge our navigable waterways to insure proper. channel depths for shipping, and the resultant need to dispose of the dredged materials, has become a problem of great national significance. Unless we can find ways to continue the maintenance of our waterways in the face of environmental, legal and technical constraints, a situation may be precipitated which could adversely affect the entire economy.

For the past 30 years, domestic waterborne commerce, including inland barge and Great Lakes traffic, has moved almost 16 percent of the Nation's ton-miles of intercity cargo.

This inland waterway barge traffic has increased over the past 2 decades at a compound rate of slightly over 5 percent per year.

The amount of tonnage that can be moved in a single tow has increased from 5,000 to 50,000 tons per tow during that period. It is predicted that traffic on various segments of the waterways will increase from 4 to 6 times in the next 50 years. Total waterway commerce presently totals 1.7 billion tons per year-over 350 billion ton-miles-or about 7 tons per capita. This cargo is carried at an average cost of 3 mils per ton-mile.

While the freight traffic of grain, ores, chemicals and construction materials continues to increase it is the energyh-producing commodities, predominantly petroleum and coal, that comprise slightly over 50 percent of the domestic waterborne freight. As the cost of energy materials increases, it becomes more important to move them as economically as possible for the ultimate benefit of the American consumer. As the prime mover of energy supplies, water carriers are also the least consumptive-using less than 500 British Thermal Units of energy per ton-mile.

About 1/3 of total waterway commerce is with foreign countries. Raw materials and manufactured products which move through our waterway system to the export market contribute significantly to our national economic health by bulwarking our balance of payment deficit and helping to keep the dollar strong in foreign markets.

While a national view of waterway economic statistics may demonstrate magnitude, a narrower focus can be more meaningful when applied to a localized situation. At New Orleans, for example, the economic impact of the port to the local area and to the State is tremendous. The chain of economic events that starts when cargo lands at that port finally results in the employment of 37,000 people, $7 million in city taxes, $19 million in State taxes, $256 million in port-related income. and a total economic impact on Louisiana of $1.8 billion a year.

Expansion of port, harbor and associated facilities goes hand-in-hand with continued economic and population growth. In the 27-year period ending with 1972, individual ports in the U.S., Puerto Rico and Canada invested almost $4 billion in marine terminal facilities. The projected rate of annual investment for these purposes during the 1973-77 time frame is $341 million. Development of service facilities for offshore oil terminals may add another $500 million to this investment.

Thus, the viability of our economy is clearly dependent upon our ability to keep the channels of our waterways, ports, and harbors open to navigation. However, our harbors and channels are subject to shoaling and loss of depth from natural deposits of material. In order to maintain navigation we either have to limit vessel draft or remove the material blocking the channels by dredging.

This national decision involves the Corps for the following reason. Since 1824, the Corps has had a congressionally mandated mission to plan, construct, operate and maintain our waterways. During this time, the country has developed 25,000 miles of navigable channels, 107 commercial ports and harbors and 400 small boat harbors. Fifteen thousand miles of these channels are 9 feet or more in depth and, except for the upper Mississippi and Missouri Rivers and the St. Lawrence Seaway, all of the waterways are open to year-round navigation.

In order to maintain this year-round capability, periodic dredging of all channels is required. This, by itself, is a straightforward task, varied only by the methodology involved, and for 150 years dredging has been a daily activity attracting little or no attention from the public or other water resource agencies. All of a sudden, however, dredging became a dirty word and the Corps was placed in the position of being able to take the material from the bottom of our waterway channels-but without any place to put it.

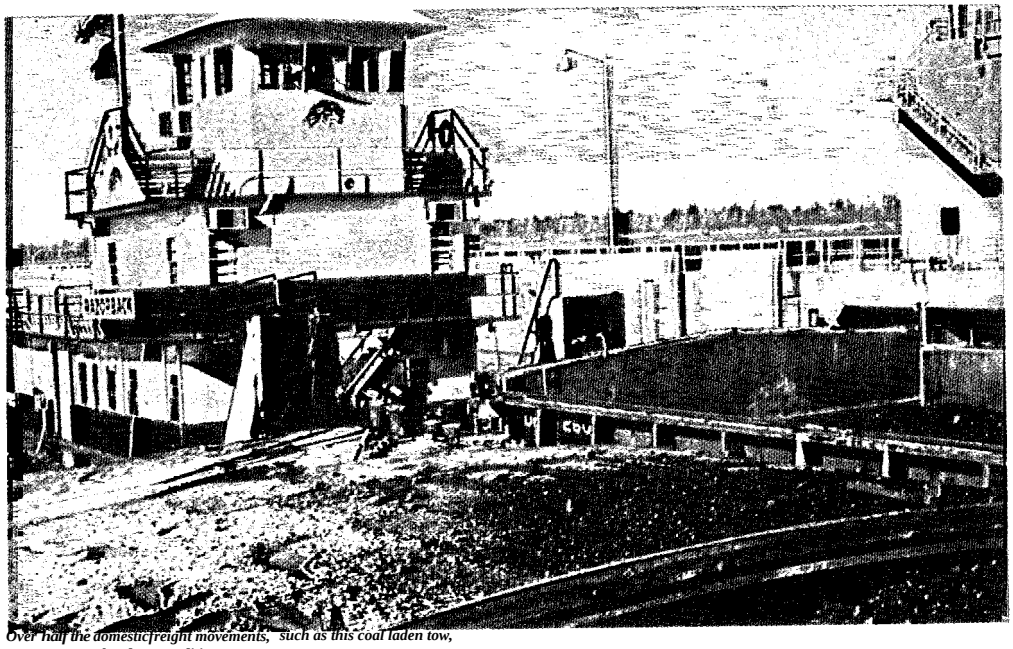
When constraints are placed on the methods of disposal of the dredged material, a classic dilemma is born. Dredging is essential or shipping stops. If there is no place to put the transient real estate blocking the channel-we cannot dredge. We found the sharp horns of this dilemma gouging us more deeply each day.

So the stage was set for the entrance of the first constraint-the environment! Previously, there has been very little understanding of the national dredging program on the part of either the general public or other water resource agencies. Nor has there been any attempt on the part of the Corps to explain what essentially was a routine operation. Consequently, when the environmental alarm bells rang and 'pollution" became a household word, it was understandable that concern would be evidenced when there was talk of wetlands being destroyed by dredged material placement, back channels being blocked to the detriment of fish and wildlife, and deep water areas used for placement of dredged material named "ocean wastelands."

To overcome this communications gap and to develop better public understanding of the problem, it is essential to discuss openly and fully the pros and cons of the dredged material placement program, the constraints under which the Corps operates, and what is being done to rectify the situation.

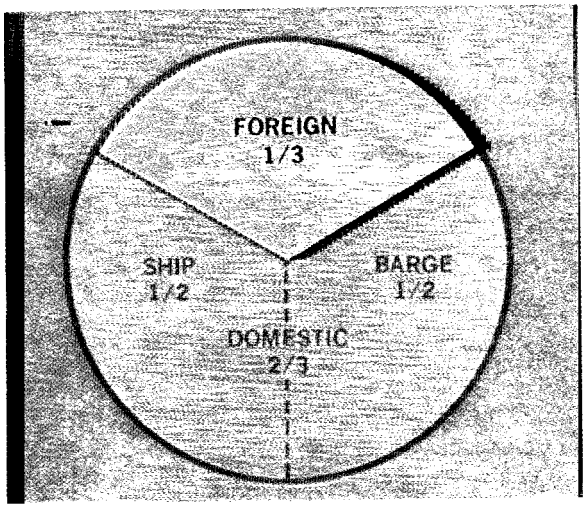
There are only 4 general types of areas that maybe used for placement of the material removed from the channels, These are off-channel, ocean or other open water areas, diked areas, or areas upland from the dredging site. Each has both advantages and disadvantages.

Off-channel discharge, common to our inland waterways, is highly cost effective. This consists merely of a dredge pumping the material from the bottom of the channel and redepositing it in the water far enough away from the pickup point to prevent the material from slipping back into the channel. This method has some positive benefits, in that it can extend wetland areas, create artificial islands and



Over half the domestic freight movements, such as this coal laden tow, carry energy related commodities.

About 1/3 of our waterway commerce originates or terminates in foreign countries.



develop attractive recreational areas. On the negative side, this method of disposal causes a short-term increase in water turbidity at the discharge point for a short period, temporarily disrupts the local biotic community, and tends to cause shoaling which can interfere with lateral drainage and natural flows. In regard to the affected biotic communities, we are aware that changes do take place, but thestate-of-the-art does not yet permit us to evaluate these changes quantitatively with any degree of accuracy.

This inland disposal problem is in sharp focus in the upper Mississippi River, where off-channel disposal is used extensively. The Corps has maintained navigability of this area since 1922 by congressional direction.

Maintenance dredging in the channel, along with natural accretions, has created a series of small islands which act to reduce the water surface, to narrow existing wetlands and, in some cases, to cause shoaling. This has caused back channel drainage problems. As a result, our disposal techniques have come under sharp criticism from environmental interests in the adjacent States, where court injunctions have prohibited all but emergency dredging.

Ocean and other forms of open-water disposal have always appeared environmentally acceptable and this method has been used for many years. It avoids disruption of all the natural values in the coastal zone, including estuaries and wetlands. Further, the disruptive influence it has in the discharge area is so small in comparison to the vast and dynamic influence of the surrounding waters that the net effect should be minimal. On the other hand, some marine scientists contend that the long-term cumulative effects of ocean water disposal could have serious adverse conse-

Heavy silting following flooding of the lower Mississippi effectively reduced foreign trade at the port of New Orleans by an estimated half billion dollars during the spring of 1974.

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quences. Again, we simply do not know enough about the effects of open-water disposal to determine the degree of risk involved.

One approach to this problem is to dispose of the dredged material in very deep water at great distances from the shore. However, the cost of long-haul disposal increases drastically with distance. The Corps has been faced with this alternative in San Francisco Bay where constraints against traditional open-water disposal have seriously affected maintenance efforts.

This happened when other Federal agencies and the State of California adopted suggested Environmental Protection Agency (EPA) guidelines for pollution. The guidelines for heavy metals, for example, provide that dredged material containing levels in excess of those recommended should not be placed in open water. However, the natural state of certain spots in San Francisco Bay already exceeds EPA guidelines for several heavy metal pollutants. Consequently, if we pick up bottom material from these spots, we cannot put it back in the bay.

The alternative is to take this small percentage of material that exceeds EPA guidelines out to sea for disposal. However, this increases unit dredge costs and the time required for normal maintenance dredging.

Reduced dredging in some vital channels could pose a national security problem as well. Without normal channel depths, that part of the Pacific Fleet home-ported in the bay area would have to be diverted to other refitting and resupply berthing areas along the West Coast.

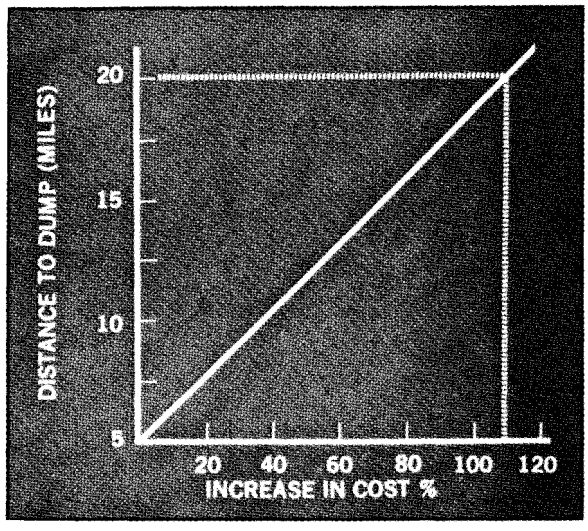
Diked disposal offers major advantages absent in either off-channel or open-water methods. This method can be used to supply land fills for industrial or recreational development. Additionally, by carefully controlling the elevation profile, diked disposal areas can be used as wetlands. One limiting factor is environmental, since diked disposal areas generally lie along a shoreline or are superimposed on natural wetlands and, consequently, are usually controversial. Furthermore, the cost is high. For instance, our diked disposal program in the Great Lakes will cost an estimated $240 million over the next 10 years. Yet this same amount of money would pay for 25 years of open-water disposal in the Great Lakes.

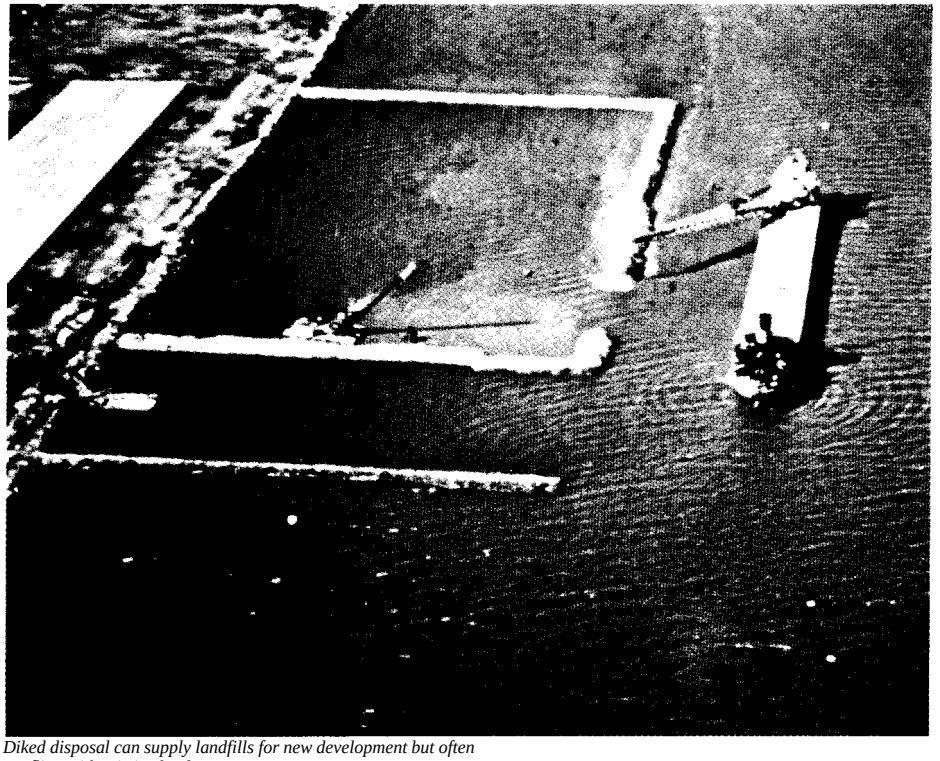
A typical problem with diked disposal can be illustrated by the Cleveland Harbor project. Dredging on the Cuyahoga River outlet is backlogged because the initial diked areas have become filled in the Cleveland area. New diked areas have not yet been completed. The delays are caused by various factors, including environmental objections to the newly selected sites. Only the currently high waters within the Great Lakes, which have increased draft depths, are preventing an immediate problem of serious magnitude.

Upland disposal, the fourth method of disposal, is often suggested as an alternative by those who find the other 3 objectionable. Unfortunately, this method also has its disadvantages because it requires that considerable real estate be taken out of the useful land inventory for a period of time. For example, a small effort such as the river channel at West Haven, Conn., involves only 81,000 cubic yards of dredged material, but it requires over 20 surface acres for placement. In high density population areas, even a parcel that small is difficult to find within economic reach of the dredges and at a reasonable price.

This method also causes some change in land configuration, some disruption of the predisposal biotic community, and almost always some opposition from landowners, communities, developers, conservationists and a host of others who disagree with the site selected for one reason or another.

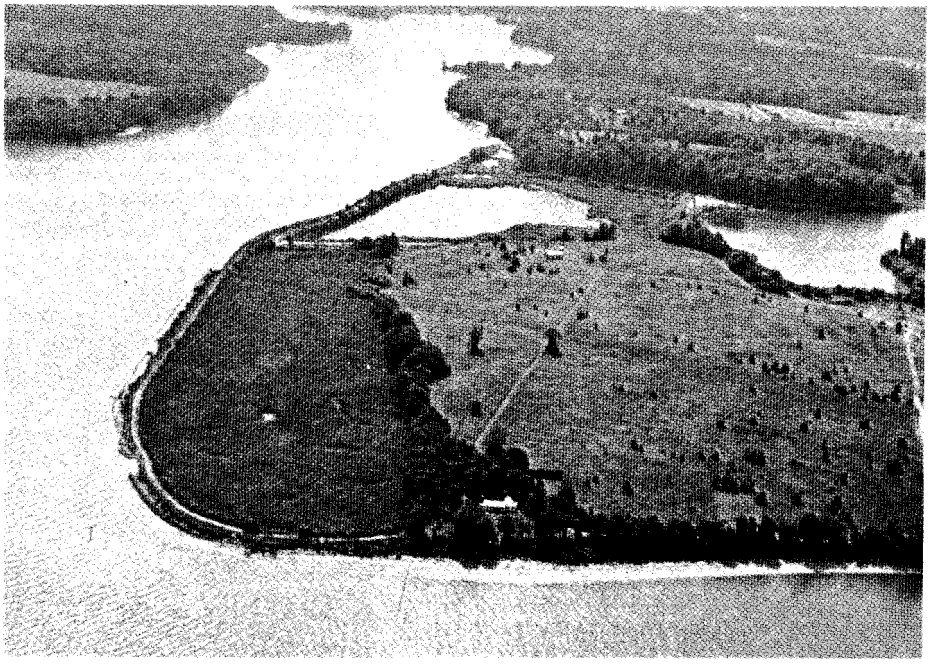
Hopper dredges can dump into open ocean water, but cost of long-haul disposal increases in direct proportion to distance from dredging site.





Diked disposal can supply landfills for new development but often conflicts with existing land uses.

Dredged material placement often enhances an area so much that further use brings environmental protests. The ***fishing*** *hole at Cabin Johns creek on the C&D Canal-is an example.*



Occasionally the Corps does such a good job of material placement that disposal sites are preempted. At Cabin Johns Creek, on the Chesapeake and Delaware Canal, we used up approximately 1/3 of our disposal capacity at that uncontested placement site back in 1969. When we returned this year to reuse the site, we found that the pond created in the upper basin had become a popular fishing place, was abundant with wildlife and enjoyed by many recreational visitors. So that site is now a valuable *natural* resource, environmentally unacceptable to use for further disposal placement.

In the legislative arena there have been several major laws enacted that impact on our maintenance effort, beginning with the Fish and Wildlife Coordination Act of 1958. Only 3 of the laws enacted since then, however, primarily affect dredging. These are the National Environmental Policy Act (NEPA) of 1969, Section 404 of the Federal Water Pollution Control Act Amendments of 1972, and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972. The latter section is referred to separately as the Ocean Dumping Act.

Under NEPA, an Environmental Impact Statement (EIS) is required whenever a major Federal action significantly affects the quality of the human environment. On the date of NEPA's enactment the Corps had over 1,200 navigation maintenance projects, many of great scope and environmental complexity, and we had to consider initiating impact statements on them all. The administrative burden alone was rather staggering.

During the period the Corps was getting underway with NEPA, Congress passed the Federal Water Pollution Control Act Amendments and the Ocean Dumping Act. While both acts designate the Corps as the permit issuing agency responsible for authorizing dredged material discharges, they also give EPA substantial review responsibility and the ultimate decision making power in a contested action.

The key factor in each act is the requirement to provide notice and opportunity for public hearings. While this requirement has existed for construction projects for many years, this is the first time it has been applicable to maintenance work. Although primarily oriented toward permit authorization for dredge disposal by commercial entities, these provisions apply equally to Corps operations. While the Corps does not issue permits to itself, it does apply to itself (by regulation) the same criteria and procedures that are applied to other permit applicants. Of course, Corps actions are also subject to EPA review and potential denial of selected sites.

While the administrative requirements are being met with relative ease, the remaining problems involve 2 principal matters: first, the overwhelming number of impact statements that have had to be prepared; second, it now requires greater effort and time to provide impact statements sufficiently technical and legal to satisfy private organizations and other Federal agencies.

Not being able to prepare these impact statements on short notice, we established a priority for ongoing projects. Even though NEPA did not require an EIS on projects under construction prior to NEPA, the Corps made a conscious decision to include these in the belief that some change might be needed in a given project which would be beneficial to the environment.

To date, over 1,600 environmental statements have been prepared. We now have impact statements prepared and filed on all new construction work. On certain dredging projects in operation before NEPA, some of which have been underway for a century, we still have a substantial backlog. There are environmental assessments available, but no statement or negative determination has as yet been filed with the Council on Environmental Quality.

Under the previously mentioned public notice provision, those in oppostion to a project not covered either by an EIS or negative determination have a basis for legal action. In emergency situations, however, waterway navigation and dredging activities to sustain it must continue-meaning some dredging projects may have to go ahead immediately without either type of statement. Potentially controversial projects, however, have been identified and expedient EIS action is being taken to preclude work stoppage by legal injunction.

Another congressional directive engendered a constraint of an entirely different nature, which also had an impact on the dredging program. Two years ago, the House and Senate Appropriations Committees directed the Corps to undertake a study and make recommendations back to them on the proportionate number of dredging vessels required in both the Federal and private sectors. During the conduct of this study, a moratorium was placed on any additions, modifications or replacements to the Corps-owned dredge fleet.

This moratorium came at a time when decisions were needed to update a dredge fleet that had been in operation an average of 30 years and was getting continuously more expensive to operate and maintain without extensive modifications or replacement. Private contractor-owned dredge equipment was in much the same condition. In view of the moratorium placed on the Federal sector, private contractors were unwilling to make large capital investments until Congress reached some decisions.

While the Federal and private sector dredge-plant equipment has been capable of handling normal maintenance requirements, despite age and condition, emergency situations have played havoc with that capability.

Last spring, for example, because of flooding, high waters and extremely heavy silting in the Mississippi River, the entrance channel to the Port of New Orleans was reduced in depth from 40 to 34 feet. This required ships to sail in and out with less than a full load, holding some $500 million in imports and exports out of the world commerce market. To meet this crisis, the Corps had to shift both federally-owned and contractor plant equipment within the Gulf coast area and from the entire East Coast just to dredge the New Orleans channel back to normal project depth. As a result of this emergency requirement, a dredging backlog was created in other ports and harbors.

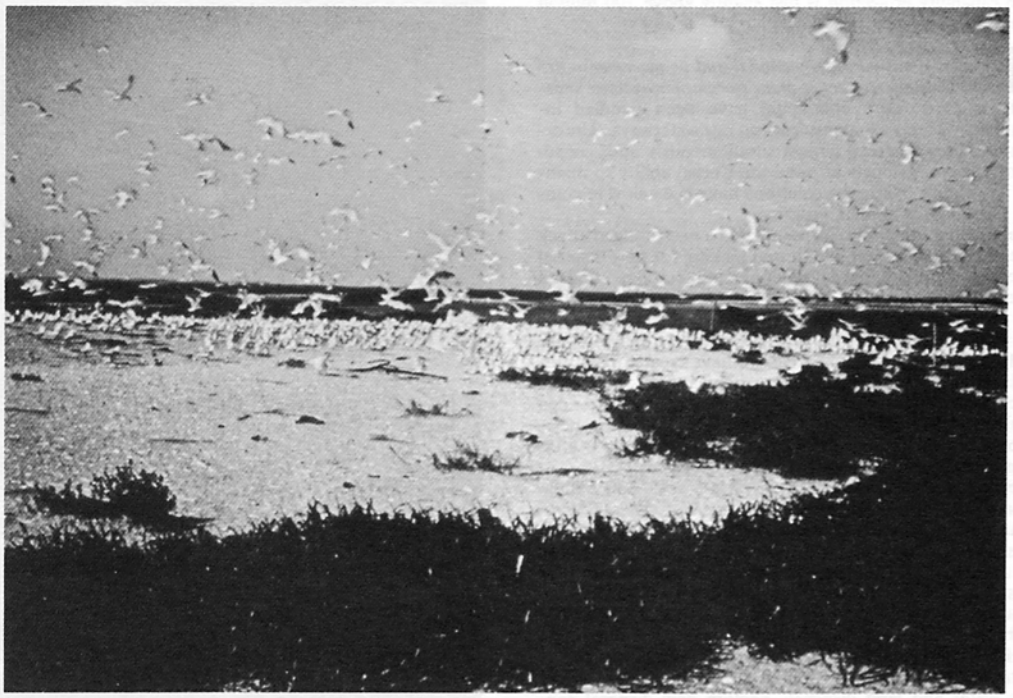
In addition to the inefficiencies of aging plant, and the higher costs of labor and materials, there are increased costs associated with more expensive disposal methods-such as long-haul ocean disposal-in trying to use equipment which is not well adapted to those methods.

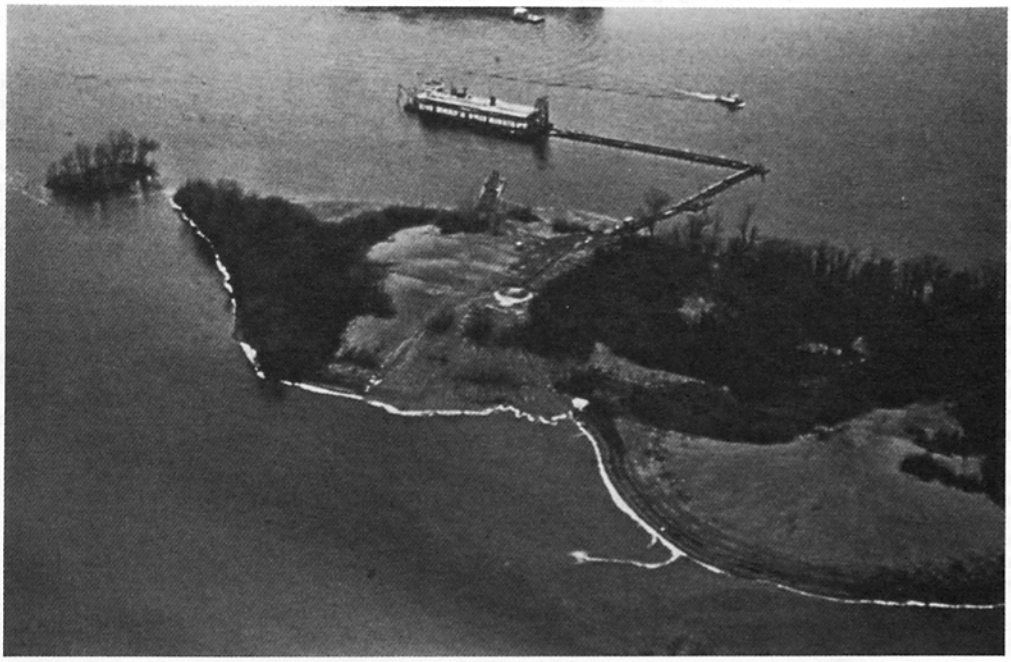
Dredging costs, like the costs of all goods and services, are steadily increasing. In 1967, the cost was less than 30 cents a cubic yard for the removal and disposal of dredged material. By 1976, at the projected rate of increase indicated by all economic factors, this cost will rise to almost 60 cents a cubic yard.

At our peak in maintenance dredging we removed and disposed of 300 million cubic yards of dredged material. Compressed into one-yard cubes covering a mile square area, this amount would grow skyward at the rate of one football field length each year. Spread out, it would give Delaware a new surface, a yard deep, every 20 years.

While our ability has been declining since that peak period, the requirements have continued steadily upward and at this point-in-time we should be at the 400 million

Beneficial uses of dredged material can include recreation areas, nourishment of beaches, creation of wildlife habitats and new islands with multipurpose potential.





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cubic yards a year stage for both maintenance and new construction dredging. With the current constraints our FY 1976 capability projection is just slightly above 200 million cubic yards annually.

Had each *issue-dredged material and its placement- EIS requirements-the dredge plant moratorium-arisen* separately in time, each one could have been handled individually without a major impact on our waterways. Unfortunately, they surfaced almost simultaneously and, consequently, have seriously affected the Corps' ability to maintain navigation. While the solutions have been slow in coming, the Corps is making progress.

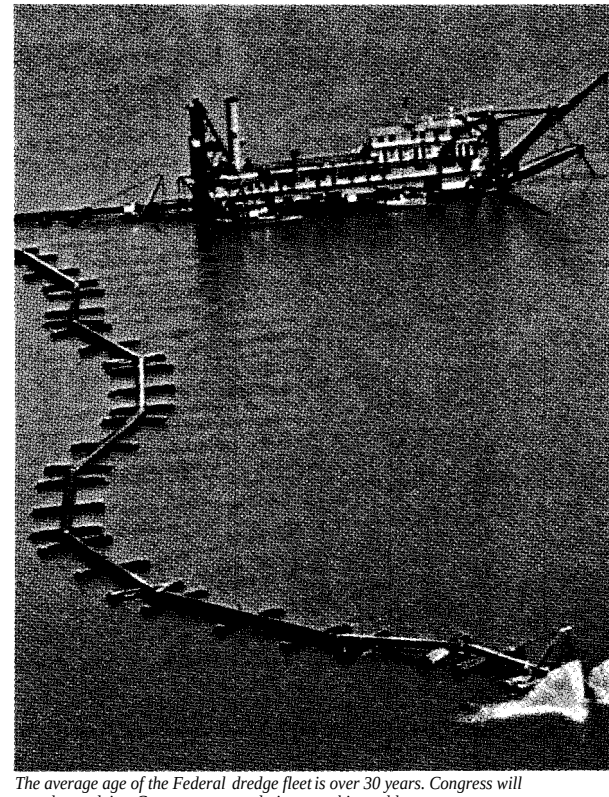
On the first issue, the Corps initiated a two-pronged attack several years ago. First, we started looking for new disposal concepts and techniques which would convert dredged material from a vexing problem into a valuable resource. Our environmental and recreational staffs have been working with our engineers to develop beneficial ways to use dredged material. In some areas we have created new wetlands, created water-based recreational areas, nourished beaches, created wildlife habitat, and created or extended highly attractive islands. (As the public and other agencies become convinced that dredged material can serve useful, beneficial purposes, the task will become easier.)

Second, we embarked last year on a 5-year, $30 million research program being managed at the Waterways Experiment Station located in Vicksburg, Miss., by a staff of experts selected from the governmental, scientific, industrial and academic communities. The object of this research is to consider dredged material as a renewable, recyclable resource and find ways to use it beneficially-develop methods of on-site testing of dredged material to determine quickly its degree of pollution, if any, and the origin of any contaminates-determine the environmental impacts of both water and land disposal-explore new disposal concepts-and to make use of improved dredging and disposal equipment and techniques.

Out of all this we should learn where dredged material is harmful and where it is not. We should learn what additional costs are justified in the interests of environmental protection. And, equally as important, we must learn enough to answer the kinds of questions that will make impact statements not only technically viable, but sufficiently authoritative to satisfy the public; a public that wants the assurance that not only will there be an absolute minimum of environmental impact, but that any change required to maintain navigation will also be mitigated as much as possible.

As to the second issue- the legal requirements- we have taken the position that with the passage of NEPA, Congress did not intend to halt all ongoing major Federal actions which might significantly affect the quality of the human environment. Had this been the case, our entire transportation network, from a maintenance viewpoint, would have become a nightmare of economic chaos. Rather, the intent was to comply as quickly as humanly possible while making the necessary adjustments to maintain navigability of our waterways in the interim. This is what the Corps is doing. We have an intensive effort underway to insure full compliance by no later than January 1976.

Our third issue-the status of the aging dredge fleet-has now passed the study stage and the final report has been forwarded to the Secretary of the Army for subsequent transmittal to the Congress. This study and our recommendations should greatly assist Congress in determining the total plant required in both the Federal and private sectors and in deciding under what conditions to lift the moratorium on Federal plant improvement. Both the Federal Government and private industry should then be able to move forward in confidence with a modernization of the national dredge fleet *and* with improvements in the operating characteristics of dredging, which are just as badly needed.



The average age of the Federal dredge fleet is over 30 years. Congress will soon be studying Corps recommendations on this problem.

The Corps' experience and organization make it well suited to continue its job of maintaining the country's navigable waterways. During this period of constraints on dredging, however, the adjustments being made will depend upon the good will of the public and the cooperation of other agencies.

The Nation needs our waterways; they are more vital to our economic well-being now than perhaps ever before. The Corps is convinced, however, that the challenge presented by dredging constraints can be successfully resolved without sacrificing environmental quality of life, in compliance with public laws, and in a technological manner superior to methods and equipment used in the past. The Corps is dedicated to pursuit of that challenge.=