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UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D C 20548

COMMUNITY AND ECONOMIC  
DEVELOPMENT DIVISION

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MAR 18 1977

Lieutenant General J W Morris  
Chief of Engineers  
Corps of Engineers  
Department of the Army 285  
Washington, D.C.

Dear General Morris

We recently completed a survey of the Corps of Engineers' operation and maintenance activities on the intracoastal waterways (Code 08007). The survey was performed at the Corps' district offices in Norfolk, Virginia, Wilmington, North Carolina, and New Orleans, Louisiana. We also had discussions with Corps headquarters officials in Washington, D.C.

We identified the following three areas in the survey which offer potential savings to the Corps:

- consolidation of small dredging jobs to obtain less costly contract rates,
- more extensive dredging, where feasible, to reduce both long term costs and dredging frequency, and
- more efficient scheduling of Corps-owned sidelaying dredges

These areas are not included in our follow-on review of the operation of Corps facilities on the Atlantic Intracoastal Waterway (Code 08016). Although we have not attempted to validate the expected savings, this letter summarizes our observations on these matters bringing them to your attention for any action or follow-up you feel is warranted.

BACKGROUND

In carrying out its responsibility for constructing, operating, and maintaining Federal river and harbor projects, the Corps each year determines the capabilities of active projects to serve current navigation requirements. Following such determinations, requests are made for authorization

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and funds to perform maintenance dredging. The actual volume of waterway traffic and the availability of funds govern the extent of maintenance work undertaken. According to Corps headquarters officials, Corps-wide expenditures for maintenance dredging amounted to \$167 million for fiscal year 1976.

#### CONSOLIDATION OF SMALL DREDGING JOBS

Corps' policies require that dredging be done in the most economical manner. One method available to the Corps, which may afford savings, is the consolidation of small dredging jobs into larger contracts. Corps district personnel stated that larger dredging contracts usually result in less costly rates per cubic yard. The contractors view the larger contracts as being more attractive because they can better schedule and plan their work, and can avoid idle time and expensive set up costs.

The districts we visited seemed to place different emphases on consolidation of contracts. For instance, the Wilmington District let only two contracts for under 300,000 cubic yards from June 1968 through 1975, whereas the Norfolk District let 29 contracts under 300,000 cubic yards during the same period. We noted that some districts are making efforts to consolidate small jobs. For example, the Wilmington District recently completed dredging 12 locations along a 43-mile stretch of the Atlantic Intracoastal Waterway under one contract. The contract provided for dredging 763,000 cubic yards at a cost of \$581,000. The \$ .76 per cubic yard rate for this contract is substantially less than the per cubic yard rate would have been had the contracts not been combined.

An example of the cheaper rates obtainable by consolidating contracts occurred on a waterway along the coast of Virginia. The Norfolk District has dredged or is planning to dredge 12 different shoaling areas on the waterway. One of these areas, Fisherman's Inlet, was dredged in October 1976 at a total cost of \$63,629 for 23,195 cubic yards or \$2.74 per cubic yard. Another area is Bradford Bay and the dredging contract was let in February 1977. On the basis of the Corps estimated volume of 61,700 cubic yards, the total cost will be \$122,930 or \$1.99 per cubic yard. Finally, the Norfolk District intends to let one contract for the other 10 areas sometime around July 1977. The Corps estimates the total volume to be 450,000 cubic yards and the total cost to be \$510,000 for a cost per cubic yard of \$1.13. Thus, larger contracts offer a lower cubic yard rate and result in monetary savings.

We analyzed Norfolk's 50 dredging contracts which were let during the 1968 through 1975 period. To depict the magnitude of potential savings, we arbitrarily selected as an ideal cubic yard rate the average rate for

Norfolk's 21 contracts which exceeded 300,000 cubic yards. The analysis, on page 4, illustrates (1) the decreased per cubic yard rate of the larger contracts and (2) the potential for a decrease in costs of \$1.3 million for the other 29 contracts. Similar savings may be possible if contracts are combined in the future.

District officials agreed that the principle of consolidation has merit but stated it is not always feasible because of emergencies or funding constraints. Moreover, it is not always economical to combine dredging contracts at sites which require different types of dredging equipment or which are not in close proximity. These officials also told us that consolidating contracts would not exclude any contractor because of size and that the contractors prefer the larger contracts.

Although we do not advocate any particular volume as ideal and we realize that some dredging contracts may not be feasibly combined, our survey indicates that the practice of combining dredging contracts, whenever possible, could be cost-beneficial to the Government and should be considered in preparing contract bid packages.

#### MORE EXTENSIVE DREDGING

While Corps' policy provides for "advance maintenance" dredging, particularly in fast shoaling areas, our survey indicated that some districts might not be optimizing this practice to achieve savings. The principle of more extensive dredging (deeper, wider, and for longer distances) in some areas requiring repetitive dredging could increase the time intervals between dredgings. We realize, however, that some areas refill quickly regardless of the extensiveness of the dredging. Nevertheless, Corps district officials stated that, where feasible, "advance maintenance" dredging offers the following types of benefits and savings:

- reduce mobilization and demobilization costs for dredges,
- encourage better contract prices because of larger dredging volume, as discussed previously, and
- decrease Corps' efforts in locating and acquiring disposal sites, and costs for studies associated with dredging and disposing of dredged materials.

Equipment mobilization and demobilization costs may be quite extensive. These expenses included moving, setting up, and dismantling equipment. Between 1968 and 1976, the Norfolk District administered 51

<u>Cubic yards dredged</u>	<u>Con-tracts</u>	<u>Actual</u>			<u>Ideal cu yds rate (note a)</u>	<u>Ideal cost</u>	<u>Potential decrease in costs</u>
		<u>Volume (cu yds )</u>	<u>Contract costs</u>	<u>Cost per cu yd</u>			
50,000 or less	9	247,361	\$ 405,526	\$1 60	\$ 63	\$ 155, 837	\$ 249,689
50,001 - 100,000	7	558,306	715,219	1 41	63	351,733	363,486
100,001 - 150,000	6	700,934	601,206	92	63	441,588	159,618
150,001 - 300,000	<u>7</u>	<u>1,477,902</u>	<u>1,499,954</u>	86	63	<u>931,078</u>	<u>568,876</u>
Totals	<u>29</u>	<u>2,984,503</u>	<u>\$3,221,905</u>	\$1 08	\$ 63	<u>\$1,880,236</u>	<u>\$1,341,669</u>

a/Based on average cost of Norfolk's 21 contracts which exceeded 300,000 cubic yards during the period

contracts with equipment mobilization and demobilization costs totaling \$1,283,000. Theoretically each dredging interval which could be avoided could result in savings of about \$25,000 (based on Norfolk's average cost for mobilization and demobilization)

Environmental costs associated with dredging is another area in which savings may be realized. In the past, the Corps has frequently dredged many waterway sections to the required depth without extensive advance maintenance dredging. This practice minimized the quantity of material requiring disposal and limited the amount of research efforts needed to satisfy environmental requirements. Corps district officials told us that the costs for research to comply with environmental requirements are currently about the same for small as well as large dredging jobs. Increasing the interval between dredging jobs through more extensive dredging may reduce some of the costs. The environmental costs for the Corps' South Atlantic Division totaled about \$3 million for fiscal years 1974-76 for operation and maintenance projects.

The Norfolk District currently has a project underway which may serve as an example of this principle. This project involves extensive advance maintenance dredging for several shoaling areas on the Rappahannock River. The river has many isolated shoaling areas along its length which have different fill rates. Some of these areas have required dredging about once every 3 years. In the current project Norfolk is studying whether the more extensive dredging could prolong the dredging interval to 6 or 7 years and thus result in long-term savings.

We noted many areas that require frequent repetitive dredging. Within the Norfolk District, there are 12 areas which are dredged every 1 to 5 years. The following table summarizes the number of frequently dredged areas on the intracoastal waterway for the Wilmington District.

<u>Areas requiring repetitive dredging</u>	<u>Dredging intervals (months)</u>
4	6
9	12
10	24
11	36
10	48
<u>1</u>	60
<u>45</u>	

In addition, the Wilmington District dredges 28 other areas not on the intracoastal waterway as frequently as every 6 months. If the Wilmington District were able to perform advance maintenance dredging on some of the above areas requiring repetitive dredging, long-term savings may result.

Corps officials at the districts we visited agreed that more extensive dredging should prolong the dredging interval and would result in reduced maintenance costs. However, they pointed out that further implementation of this principle would necessitate a higher initial outlay of funds. This initial outlay should be compared to the long-term savings possible when considering more extensive dredging.

#### UTILIZATION OF CORPS DREDGES

We reported to the Congress in May 1972 on selected aspects of the Corps' dredging activities and problems. One issue in the report was the low utilization of nonhopper dredges owned and operated by the Corps. The report noted that the sidecasting dredge Schweizer was transferred to the Wilmington District from New Orleans to improve its utilization. Our survey at Wilmington showed that this dredge is still not being used extensively. The Wilmington District operates another sidecasting dredge, the Merritt. Both dredges are generally operated on a one-shift, 40-hour week basis and cost over \$700,000 annually. The following summarizes their productive use.

<u>Fiscal year</u>	<u>Percentage of time used productively for dredging (note a)</u>	
	<u>Schweizer</u>	<u>Merritt</u>
1973	-	14.0
1974	8.8	17.2
1975	7.6	14.6

a/Based on 24-hour day, 365 days per year. Non-productive time for the dredges consists primarily of lay time (non-work hours), loss due to natural elements, transferring between jobs, traveling to and from wharf or anchorage, and minor operating repairs.

During fiscal years 1973-75, the Merritt spent about 1,100 hours traveling between North Carolina, Florida, South Carolina and New Jersey. While the Merritt spends some time dredging emergency shoals, improved scheduling might reduce transit time if areas could be dredged in geographical sequence. A typical dredging operational pattern for the Merritt is shown below.

<u>Dredging period</u>	<u>Location</u>	<u>Approximate distance traveled</u>
Sept 3-30, 1972	New River Inlet, N.C.	Start
Oct. 1-29	Barden Inlet, N.C.	North-65 miles
Oct. 30 - Nov 4	Wilmington, N.C.	South-120 miles
Nov. 5 - Dec 12	St Lucie Inlet, Fla	South-625 miles
Dec 13 - Jan 6	Core Creek, N C.	North-715 miles
Jan 7 - Feb 1	Oregon Inlet, N.C.	North-125 miles
Feb 2 - Mar 10	New River Inlet, N.C.	South-175 miles
Mar 11-27	Ponce de Leon Inlet, Fla	South-525 miles
Mar 28 - May 12	Murrells Inlet, S.C.	North-400 miles
May 13 - June 10, 1973	New Bern, N.C.	<u>North-215 miles</u>
TOTAL MILES		<u>2,965</u>

From the above table, it appears that opportunities may exist to plan dredging patterns more systematically. Although these sites and others have a predictable need for dredging, we recognize that some sites have to be dredged at different times than scheduled because of emergencies.

A Corps official stated that the Schweizer is primarily used to dredge only two areas annually because its deeper draft restricts its efficient usage to fewer areas. This contributes to the Schweizer's lower utilization. The areas the Schweizer dredges are more subject to storms which also causes lower utilization.

Despite the apparent low productivity of these dredges, we were told that they are required for sites which can only be dredged by sidecasters, and that private contractors do not have this type of dredge. Nevertheless, more efficient dredging patterns might increase the productive time of these dredges. Increased operating hours (beyond 40 hours a week) offers another possibility for increasing the productive time.


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In summary, we believe that potential may exist for reducing operation and maintenance costs through consolidating dredging jobs into fewer and larger contracts, making more extensive use of advance maintenance dredging, and improving utilization of Corps-owned dredges. We would appreciate any comments you may have on these areas in particular regard to (1) whether you believe they offer potential for savings, (2) an estimate of the amount of Corps-wide savings, if any, and (3) any actions or plans you may have to pursue these matters further.

We are sending copies of this report to the Secretary of Defense, Secretary of the Army, and the Chief, U.S. Army Audit Agency.

We appreciate the cooperation received during our survey and we will be glad to meet with you or your representatives to discuss these matters. If you have any questions, please call Mr. Carl Bannerman of my office at 693-8287.

Sincerely yours,

  
for Lloyd L. Gregory  
Assistant Director