

TABLE IV-25

PAYROLLS IN DIRECT WATERBORNE COMMERCE AND RELATED SERVICES FOR 1973

Port & Vicinity	Port Administration and Marine Terminal Facilities	Shipping Companies	Marine Related Services ^{1/}	Customs Brokers and Export Management Firms	Surface Transportation Truck	Rail ^{3/}	Miscellaneous Services ^{2/}	Total ^{4/}
	\$	\$	\$	\$	\$	\$	\$	\$
San Francisco	27,661,908	118,907,328	21,525,216	16,106,076	4,971,167		5,039,352	194,211,047
Oakland	26,425,364	12,685,884	10,882,476	847,872	10,061,820		1,608,108	62,511,524
Redwood City	130,000	47,172	536,160	2,211,840	1,962,012		657,144	5,544,328
Stockton	3,835,000	-	2,601,960	-	1,152,984		-	7,589,944
Sacramento	2,363,000	-	279,372	-	1,313,112		-	3,955,484
Contra Costa	2,712,048	15,487,080	6,280,080	-	2,976,732		558,300	28,014,240
TOTAL	63,127,320	147,127,464	42,105,264	19,165,788	22,437,827	7,656,649	7,862,904	309,483,216

SOURCES: California State Employment Development Department, jobs covered by California State Unemployment Insurance. Interviews with officials of the ports of San Francisco, Oakland, Redwood City, Richmond, Sacramento and Stockton. "Export Services Guide," California Department of Commerce, Division of International Trade. Telephone interviews with a sampling of Bay Area businesses.

^{1/} Includes towing and tugboat companies, ship cleaning and steamship leasing, ship building and repair.

^{2/} Includes freight forwarding, public warehousing, inspection and weighing, packing and crating.

^{3/} Rail transportation not allocated to county or port. Also, this omits a major railroad in the Bay Area.

^{4/} This column does not total to 309,483,216 because the data for rail employment is not allocated to each county or port.

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^{4/} This column does not total to 309,483,216 because the data for rail employment is not allocated to each county or port.

(4) Custom brokers and export management firms.

4.246

Also in this category of employment are customs house brokers and export management firms. Data was collected from the "California Export Services Guide," California Department of Commerce, Division of International Trade.

4.247

(a) Customs house brokers are highly specialized business firms which are licensed to serve the importing public by the Bureau of Customs, U.S. Treasury Department. Customs brokers help U.S. importers select the proper customs tariff classifications as to rates of duty on imported products. They calculate duties and evaluate the way in which the U.S. Customs appraises merchandise. They handle bonding formalities and requirements, arrange for storage, negotiate marine insurance, arrange for inspection services, and handle inland distribution. Many customs brokers also attend to entrance and clearance of vessels, ship registry and vessel documentation.

4.248

(b) Export management companies are independent firms (mainly small) which act in several relationships with more than one company, serving as: The export department or agent (manufacturer retains title) or the principal who takes title to the exporter's goods and services and sells them to a foreign company. The export management companies in the San Francisco Bay Area are specialists, experienced in world trade and capable of performing a variety of functions. They operate on a buy and sell arrangement, working either on a principal to principal basis or on a commission basis.

(5) Surface transportation - trucking and rail services.

4.249

Many trucking carriers are located in the Bay Area. Such carriers range from small van-type delivery services to the mighty tractor and trailer semi-rigs familiar to drivers of Bay Area highways. Two of the nation's largest trucking firms operate in the Bay Area with corporate headquarters in San Francisco, a huge freight terminal in Hayward, and other terminals in San Francisco, Vallejo and San Jose, as well as a truck-line's division terminal in Martinez. Specifically related to waterborne commerce is a bulk commodities terminal in Richmond, the focal point for petroleum and other liquid products' tankers. In addition, there are a host of other carriers in the Bay Area, and all combine to provide the area with transportation of goods which has helped enable the Bay Area to become one of the world's leading shipping centers. The Bay Area is also a center for rail operations coming from all parts of the nation. Indeed, transportation modes are now combined to produce new efficiencies

and whole new services. When cargoes are exchanged between trains, trucks and ships in sealed containers or trailers that do not have to be reloaded, shippers and handlers save on labor, reduce loss and damage, and speed both domestic and international traffic. Such "piggyback" business has grown about fivefold in the past ten years and is expected to continue growing. The Bay Area has adequate facilities to handle such traffic.

(6) Miscellaneous services.

- 4.250 Freight forwarders undertake the transportation of goods from shippers to receivers for a charge covering the entire transportation and in turn make use of the services of other transportation companies in making delivery. Also included in this sub-category of miscellaneous services are the following:
- 4.251 (a) Inspection, weighing, packing and crating services connected with the shipping of goods by water.
- 4.252 (b) General warehousing, farm products warehousing, refrigerated warehousing and food lockers related to the shipping of goods by water.
- 4.253 Included in direct water-related employment were jobs required to move the cargo to the ultimate users. These jobs are surface freight forwarding and miscellaneous services such as warehousing, packing and food lockers. These employment data, except for railroads, were derived from data of the California Employment Development Department. However, these jobs are not 100 percent dependent upon water-related activity. For example, most trucking businesses handle other than strictly water-related commodities. That is, only some percentage of trucking employment is directly related to water transportation. This is the case also for employment in freight forwarding and miscellaneous services. Thus, a telephone survey was made of a sampling of firms in the above-mentioned categories. This survey sought to determine the percentage of a firm's business which is directly related to waterborne commerce. To illustrate, a trucking firm in the East Bay might have indicated that X percent of its business is related directly to waterborne commerce. Hence, X percent of the firm's employment and payroll was allocated to waterborne commerce. By collecting such answers from a sample of many firms (in all the above-mentioned categories), percentages were derived to be used to estimate direct water-related employment. Thus, the employment and payroll data shown for trucking (surface transportation), freight forwarding, and miscellaneous services is a percent of the total employment in these industries.

As railroad employment data and payroll data are not collected by the State, they were obtained from railroad spokesmen, relying on their own records of employment and tonnages of foreign commodities hauled by rail. The railroad officials took percentages of their total tonnages to their employment base. This provided estimates of total railroad employment affected by waterborne commerce. However, the employment was not allocated to each county in the Bay Area, although it was indicated that the water-related rail employment is concentrated in San Francisco, Oakland, Benicia, Sacramento, Stockton and Richmond.

b. Export-Related Manufacturing Employment.

4.255 Manufacturing employment related to exports for 1973 was estimated to be 7,800. In 1972, the Bureau of the Census conducted a survey titled "Exports of Manufactured Products: 1971 and 1972." Copies of Census Form MA161 were sent to approximately 18,200 manufacturing establishments with 100 employees or more in selected industries, known to have significant export shipments. The particular establishments were drawn from the 1971 Annual Survey of Manufacturers. The employment related to export figures was not directly reported in this survey. However, in addition to export shipments, each establishment reported its total shipments as well as its total employment. For each establishment, the employment related to exports was calculated by multiplying the total employment by the ratio of export shipments to total shipments. These calculated export employment figures were then aggregated by industry and area to produce the reported export employment figures shown below in Table IV-26. The data in the table is displayed geographically by standard metropolitan statistical areas (as defined by the U.S. Census). The total for the year 1972 was estimated to be 7,450 employees in export manufacturing. The overall employment for the area increased 5 percent between 1972 and 1973. On this basis the 1973 figure was increased to the 7,800 figure.

4.256 Manufacturing employment which is related to exports is also related to deepdraft shipping. A very high percentage of exports from Northern California is transported out of the Bay Area by ship. However, this does not mean that all jobs related to export manufacturing will be lost if deepdraft shipping in the Bay is significantly curtailed. Rather, at least in the short run of less than five years, many manufacturers would remain in their present locations. Nevertheless, all manufacturers of exports would be affected to some extent simply because the costs of transporting their exports would be higher than before.

TABLE IV-26

EMPLOYMENT RELATED TO EXPORTS 1972

Industry Code	Major Industry Group	San Francisco-Oakland Employment	Sacramento	Stockton	Vallejo-Napa	Total
20	Food and Kindred Products	400	300	200	175	1,075
26	Paper and Allied Products	50	-	50	-	100
27	Printing and Publishing	175	-	-	-	175
28	Chemicals and Allied Products	300	50	-	-	350
29	Petroleum and Coal Products	375	-	-	50	425
30	Rubber and Plastics Products nec.	50	-	-	-	50
32	Stone, Clay and Glass Products	50	-	50	-	100
33	Primary Metal Industries	500	-	-	50	550
34	Fabricated Metal Products	300	-	50	-	350
35	Machinery Except Electrical	1,400	175	175	-	1,750
36	Electrical Equipment and Supplies	1,000	-	50	-	1,050
37	Transportation Equipment	500	375	-	-	925
38	Instruments and Related Products	375	-	-	-	375
39	Miscellaneous Manufacturing Industries (7)	<u>175</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>175</u>
	TOTAL	5,650	900	575	325	7,450

NOTE: Data in table are for manufacturing establishments and represent estimated employment related to exports. Text explains terms used and methodology followed in deriving figures. Industry and industry group totals include data for all component industries and industry groups.

4.257 c. Employment at Military Bases. Military and civilian employees and payrolls at Bay Area military bases are displayed below. These only include bases whose operations depend on water-borne transportation.

TABLE IV-27

EMPLOYMENT AND PAYROLLS AT MILITARY BASES, 1973-1974

	<u>Employment</u>	<u>Payroll Annual</u> \$
Military Ocean Terminal, Bay Area - North (Oakland Army Base)	200 Military 780 Civilian	\$ 12,000,000
Military Ocean Terminal, Bay Area - East (Alameda Facility)	3 Civilian	36,000
Naval Supply Center Oakland	30 Military 1,898 Civilian	22,156,000
Point Molate	28 Civilian	374,000
Alameda Naval Air Station	4,300 Military 9,800 Civilian	22,000,000 120,000,000
Mare Island Naval Shipyard	1,000 Military 9,090 Civilian	5,000,000 112,000,000
Naval Weapon Station - Concord	1,700 Civilian	22,600,000
Government Island	<u>287</u>	<u>5,297,000</u>
Total	29,116	\$321,463,000

SOURCE: Interviews with military and civilian officials at the military facilities.

d. Employment not Included in Estimate.

4.258 (1) Commercial Banks. Commercial banks play a key role for importers and exporters by arranging methods of payment in conjunction with documentation (the paperwork involved in overseas transactions). Documentation has evolved as a mechanism for protecting the interests of exporters and importers during delays

of time and distance. Documentation also serves a key role in establishing credit arrangements. Assistance can be obtained from a local bank, from a branch of one of the domestic banks having international banking departments, or from the local office of a foreign bank which has been chartered in California. Usually an international banking department offers complete facilities for foreign banking transactions including the purchase and collection of bills and the issuance of drafts and travelers' checks and documentary letters of credit negotiable in foreign lands. Banks also provide letters of introduction which can be extremely helpful in establishing credibility overseas. At present, there are approximately 26 banks located in the Bay Area (San Francisco) with international departments. To what extent employees are engaged in the functions described above is not readily discernible.

- 4.259 (2) Wholesale Trades. Another category not included in the data for waterborne transportation is employment in wholesale trades. Some wholesale trades involve the buying or selling of parts, machinery for foreign goods or equipment. To some extent, these wholesalers are regional distributors, requiring a large market and deepwater access. Unfortunately, this employment has proved difficult to estimate and there are no estimates in this report.
- 4.260 (3) Manufacturing. It has been estimated that approximately 7,800 jobs in export manufacture require deepwater transportation of the finished product. In addition there are other manufacturing jobs requiring deepwater transportation in which goods, raw materials and finished products require importation. Many industries process materials. Many industries require the use of finished goods manufactured abroad. To estimate this employment will require a thorough canvass of the entire area.
- 4.261 (4) Agriculture. Between 1 and 1.5 million tons of agricultural goods are exports from the San Francisco Bay and Delta ports. The major commodities are grains, fresh and frozen vegetables and meat and meat products. An estimate as to the number of agricultural workers would depend on specific knowledge of the types of crops and livestock raised and the labor/output ratios for those crops. Based on very approximate numbers and averages, a rough order of magnitude might be in the 10,000 to 25,000 employment range.
- 4.262 (5) Airlines. Data for air transportation have been included in the analysis because of the nature of the airline industry in the San Francisco Bay Area. In the first place, only the international airlines are related to water transportation. The domestic air carriers around the Bay do not handle commodities which are put on or taken off deepdraft vessels. Moreover, airline employment related to waterborne commerce amounts to only about 120 jobs.

In the second place, the international airlines related to waterborne commerce have indicated that a reduction in shipping activity might lead to an increase in air cargo business. This occurred during the shipping strike in 1972 and was due to the substitutability of air for water transportation where the international air carriers are concerned. Because of the immediate nature of the substitution of air for water transportation, airline employment and payroll data have been excluded.

4.263 e. Indirect Jobs. In addition to the employment directly related to waterborne commerce, many other jobs depend ultimately on waterborne trade. Specifically, there are industries which serve, or are served by, the directly-related industries, and there are industries serving these industries. There are also businesses which may show no apparent relationship to waterborne trade. These are the businesses which derive part of their income from the spending of the directly-related employment.

4.264 In many economic impact studies, the relationship between the direct impact and the total impact is expressed as a "multiplier," a number which when multiplied times the direct impact from a given source will indicate the total impact induced by that source. Such multipliers are by nature only rough estimates. Even if the direct impact is calculated with reasonable accuracy, its ratio to the total depends on a variety of factors, such as area size, economic mix, unemployment rate, etc. Without a regional input-output model to calculate the actual interaction coefficients between the producers and consumers, it is impossible to estimate the appropriate multiplier for the total impact of waterborne commerce. This study does not attempt to estimate a regional multiplier for the Bay Area. This will be left to future input-output studies. Thus, this study does not provide an estimate of the indirect or secondary employment or payrolls generated by waterborne commerce in the Bay Area. It should be pointed out, however, that other port-oriented studies in the United States have estimated that the total effect of water-related employment and payrolls falls in the range of from 2 to 3 times the direct effect. Nevertheless, the emphasis of this particular study is on direct rather than indirect effects.

4.265 6. Qualitative Considerations. The economic impacts of the San Francisco Bay and Delta port system, extend beyond the million tons of cargo handled, the tens of thousands of employees and billions of dollars in direct investment in the port system presented previously in this report. In this section other important economic aspects of the San Francisco Bay and Delta port system - the qualification of which lies outside the scope of this study - will be addressed.

- 4.266 a. Transportation Savings. One advantage of a deepwater port system is that it provides a cheap means of transportation for commerce. That is, the system provides a savings in transportation cost. In order to determine the extent of the savings it is necessary to determine present transportation costs and the least cost (excluding the present) alternative. In this case the alternatives to be considered must include routings through other ports, land transportation and combinations of the two, as well as in some instances the cessation of certain shipments.
- 4.267 While the benefits are not known at the present time, the costs for Corps dredging in the Bay-Delta Area is currently placed at approximately \$8 million per year. This would place the cost per ton of cargo moved at \$.14.
- 4.268 b. Income Generated. The one primary goal of an economic study of this type should ultimately be a determination of the amount of income generated (and to whom) because of the activity. However, this is a highly complex task.
- 4.269 This income comes from many sources and is distributed amongst many recipients. There may be over \$100 million in payrolls (including multiplier effects.) There is the income from the tourists, merchant marine and sailors who patronize the goods and services of the various ports and the nation. Over 4,000 ships pass through the Golden Gate with typically 30 to 40 personnel on board, plus passengers. Estimates of average daily spending varies from \$10 (for tourists) to \$50 (for ships' crew).
- 4.270 Assuming that on the average all crew members go ashore one day translates, at \$50 per day, to $50 \times 4321 \times 35 = 7.5$ million dollars. With a "multiplier" of 2 this equals 15 million dollars from crew expenditures. Approximately 27,000 passengers could generate another million dollars.
- 4.271 In addition to these readily-apparent, tangible expenditures, income is generated because the available transportation induces and makes possible production (both agricultural and manufacturing) that would be economically not possible without low-cost transportation. The magnitude of this induced production is difficult to estimate and would require considerable speculation.
- 4.272 c. Induced Investment. Finally there is the consideration of the fact that billions of dollars have been directly invested in the port system. In addition billions more have been invested because of the existence of the waterway system. Some industries obviously require deepwater transportation for either their raw materials or the shipping of their finished production. For example, the replacement cost for the oil refineries would run into the billions of dollars.

4.273 Other examples may be more subtle. A thorough analysis would require an investigation of firms near the Bay and Delta Area to determine their dependence on the waterway and their associated investment. In this regard the investigation should explore what the industry might do, i.e. their adjustment, in the event there was no deepwater transportation available in the Bay-Delta Area.

4.274 d. Tax Revenue. Local governments receive revenue from retail sales and use taxes, local property taxes, and city business, license or franchise taxes. The county and city sales taxes apply to retail sales of tangible personal property. The property taxes are levied against real and personal property. Local city or county governments would suffer losses from such sales and property taxes if there is a reduction of employment and payrolls within their jurisdiction, as might be the case should dredging be suspended and port activity decline or cease. No attempt has been made to investigate the magnitude of these potential losses. To an extent the tax revenue losses will depend upon a greater knowledge of induced effects.

D. IMPACTS ON SOCIAL CHARACTERISTICS

4.275 1. Impact on Historical and Archaeological Sites. An examination of the twenty project areas and their proposed disposal sites reveals two facts that must be considered in the determination of impacts on cultural resources:

- a. All twenty projects involve maintenance dredging of channels and harbors previously dredged. (No new channels, harbors, or new depths will be dredged or impacted.)
- b. Fifteen of the twenty projects involve only aquatic disposal of dredged material. (No new aquatic disposal sites will be used or impacted.)

The remaining five projects will most likely involve land disposal of dredged material. These are: Redwood City Harbor, San Rafael Creek, San Leandro Marina, New York Slough, and Suisun Slough. It is essential in this Environmental Statement to evaluate the potential impacts on cultural resources at each of the land disposal sites in order to comply with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470 (F)), and Executive Order 11593. It should be noted that this evaluation may be subject to change or revision.

4.276 Exact location of disposal sites for four of the five projects has not yet been determined. When the locations are determined, the Corps will address the management of cultural resources. The following guidelines will be adhered to:

- a. A supplement to the Composite Environmental Statement will be written to cover each specific project. At that time other Federal agencies, State agencies, local agencies, interested groups and individuals will have an opportunity to comment on the supplement.
- b. For each project a competent archaeologist will be contracted to survey all land disposal sites. The archaeologist will be required to follow the "Recommendations for the Preparation of Environmental Impact Reports Pertaining to California Archaeological Resources" and "Recommended Procedures for Archaeological Impact Evaluation" published by the Society for California Archaeology. In addition, the archaeologist is to inventory and evaluate cultural resources that may have archaeological significance and utilize the "National Register Criteria," as published in the Federal Register of 25 January 1974 (39 FR 3366), and codified in 36 CFR, Chapter 8, Part 800.10.

4.277 At this time, only the preferred land disposal site for Redwood City Harbor dredging has been examined with regard to cultural resources. The Port of Redwood City is presently considering four land disposal sites in the general area of the project (See Plate I-14).

Site 1, which has been used in the past and is owned by the Port of Redwood City, is the preferred land disposal site. However, for environmental reasons, the U.S. Fish and Wildlife Service prefers that one of the alternate sites be used. Before the U.S. Fish and Wildlife Service objected, Site 1 had been surveyed by a professional archaeologist. The results of this survey were included in a draft environmental statement prepared by Madrone Associates for the Port of Redwood City levee repair project (105). The results indicated no archaeological resources existed at Site 1. Sites 2, 3, and 4 have not been surveyed. Site 2 is a marshy area owned by Henshaw Investment Company. Site 3 is mostly covered by a mountain of salt which is being depleted by Leslie Salt Company and will soon be gone. Site 4 is a salt evaporation pond which is being phased out of production.

4.278

Communication with the State Historic Preservation Office, and an examination of the California History Plan, Volume Two - Inventory of Historic Features (27), has indicated the existence of four historical features, all within the city limits of Redwood City:

- a. Union Cemetery, Redwood City, California, Historical Landmark Number 816, San Mateo County historical point of interest and on the county historical inventory.
- b. John Offermann House, Redwood City, San Mateo County point of historical interest and on the county historical inventory.
- c. Shipyard (Schooner "Redwood") Site, Redwood City, on the San Mateo County historical inventory.
- d. Lathrop House, Redwood City, point of historical interest, on the county historical inventory and on the National Register of Historic Places.

4.279

An examination of the National Register of Historic Places, Volume 39, Number 34, 19 February 1974, up to and including Volume 40, Number 107, 3 June 1975, indicates only the Lathrop House as being listed on the National Register of Historic Places. The project area and its proposed land disposal sites are, at their closest point, 1.6 miles from the city limits of Redwood City. There will be no impact on any of the above cultural resources.

4.280

An examination of archaeological site records and maps on file at the Society for California Archaeology Clearinghouse Number Four at San Francisco State University and the California State Department of Parks and Recreation, Cultural Resource Section (State Archaeologist) indicated that no archaeological resources exist on any of the proposed land disposal sites at Redwood City. This does not preclude the possibility of buried archaeological remains under salt deposits or existing dredged material. When a suitable land disposal site is selected, the area will be surveyed using the aforementioned guidelines and criteria for compliance.

- 4.281 2. Impact on Demography and Land Use. While shipping during the early 1800's allowed the Bay Area metropolis to stake out the limits of its ultimate site, present-day waterborne commerce provides a stable socio-economic base for the urban core. Recent demographic and land use trends, as described in the environmental setting, indicate increasing social and economic polarization between inner city and suburb in the Bay Area. Residential growth has occurred primarily in outlying, sparsely populated areas. By contrast, the majority of the 20,400 port-related jobs identified in the economic impacts portion of this report are based in inner city areas such as San Francisco, Oakland, Richmond, Vallejo, Stockton and Sacramento. These "close-to-the-water" jobs help sustain the economic health of these core urban areas. The indirect effect of maintenance dredging is to allow the ports to continue to operate, strengthening the inner city economy and counteracting to some extent the already rapid exodus to the suburbs.
- 4.282 3. Impact on Government. Most port authorities in the Bay Area are financially independent of local governments; that is, most governments do not subsidize the ports nor receive revenue from them. The socio-economic benefits to local governments accrue from sales and property taxes stemming from port-related employment and payrolls within their jurisdiction. San Francisco, Oakland, Alameda, Richmond, Vallejo, Stockton, Sacramento and several smaller city governments benefit substantially in this way. Section III of this report, discussing land use plans, indicates that local governments have, without exception, planned on continued port activity as an integral part of their socio-economic structuring.
- 4.283 4. Impact on Transportation Systems. Over the past 125 years, the San Francisco Bay Area has evolved as a transfer point between waterborne freight and land transportation systems. Today, shipping lines such as Matson and Sea-Land connect directly with trucking routes. Other shipping firms connect directly with belt line and transcontinental railroads. Major trucking and rail lines are dependent on waterborne commerce as an irreplaceable link in this freight transport sequence which has proven to be economical and efficient. Maintenance dredging serves to continue this land-water freight system.
- 4.284 5. Impact on Community Cohesion, Recreation and Culture. Maintenance dredging at San Rafael Creek and San Leandro Marina directly benefits recreational boaters. Dredging of deepwater channels in other parts of the Bay Area, however, has little effect on recreational boating. It is difficult to correlate a little-known, relatively unpublicized activity such as dredging with the tenuous concept of community cohesion, but, should dredging cease, the subsequent economic decline would definitely have a negative effect on community attitudes. With regard to community structure and culture, once again dredging and the waterborne commerce which is dependent on it help sustain the social and economic vitality of the Bay Area.

4.285 6. Impact on Scenic Resources. Other than turbidity, there are no visible effects of dredging and aquatic disposal. Land disposal of dredged material, however, could cover several hundred acres of grasslands and wetlands under the present program, or up to several thousand acres if the land disposal alternative is extensively applied at the Petaluma River, Montezuma or Sherman Island areas. Again, the psychological effect is impossible to quantify. If we use the broadest definition of aesthetics, then these scenic resources may be appreciated as natural habitat which should be respected and preserved if possible, regardless of their direct recreational value to humans. Dredge disposal which irretrievably destroys a species-supporting saltmarsh or other wetland is clearly detrimental. On the other hand, dredge disposal could help preserve an upland area as open space or agricultural land. In any case, it is essential to establish the aesthetic attributes of each potential land disposal site in terms of habitat value, scenic beauty and recreational possibilities. The four potential sites at Redwood City are discussed elsewhere in this report. Other land disposal sites will be evaluated in a supplement to the Composite Environmental Statement, to be written and publicly issued when sufficient environmental data on these sites becomes available.

E. SUMMARY OF IMPACTS

4.286 In the following table, impacts discussed in this section (Section IV) and in part Section VI are summarized. Impacts are organized under categories of major physical factors (such as water quality), major biological factors (such as subtidal communities), and major socioeconomic factors (such as archaeological resources). Since a change in a biological or physical factor may have socio-economic ramifications or vice-versa, there are unavoidable overlaps in the impacts table.

4.287 Impact ratings (on a scale of +3 to -3) are, of course, value judgements, but nevertheless, the judgement is based on the latest data and studies that we know of. Since the rating is subjective, the table should not be used in lieu of the text for purposes of full evaluation of impacts. A rating system such as this serves the purpose of focusing the decision maker's attention upon areas of concern, as well as provides an overview of the total impact. Those impacts considered to be of major (or a potential of being major) significance are indicated.

4.288 It should be emphasized that the table is not quantitative. Physical impact ratings cannot be equated to biological impact ratings. A rating of -1 for the physical impact of suspension of toxicants indicates that the level of toxicants released is low. The impact of these toxicants upon the biota, however, is unknown and could possibly be given a biological impact rating of -2 over the long-term. The section in which the potential impact is discussed is indicated in parentheses.

4.289 Impacts are considered cumulative if, upon repetition of the activity either in the same location over periods of time, pollutants accumulate, species populations are repeatedly assaulted, breeding activities threatened, or the impact is irretrievable. Socioeconomic impacts from maintenance dredging are long-term and beneficial, such as maintaining port services and navigation commerce, and are also considered to be cumulative.

Legend for Table IV-28 is as follows:

Chart Symbols

✓ = impact of significance
1° = primary
2° = secondary
X = cumulative impact
P = physical impact
B = biological impact
S = sociological impact

Degrees of Impact

+3 = extremely beneficial
+2 = significantly beneficial
+1 = moderately beneficial
0 = no impact
-1 = moderately adverse
-2 = significantly adverse
-3 = extremely adverse
+U = degree of impact unknown