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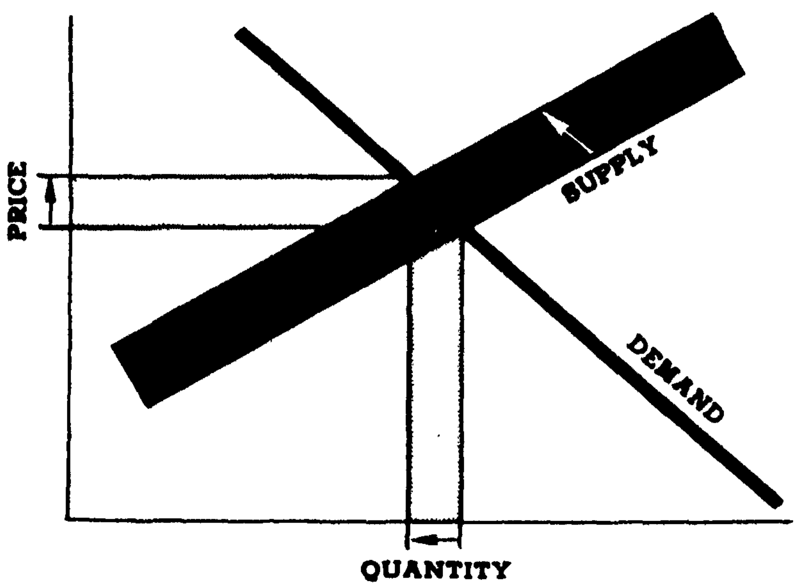
ECONOMIC ANALYSIS OF INTERIM FINAL EFFLUENT GUIDELINES

SEAFOOD PROCESSING INDUSTRY

FISH MEAL, SALMON, BOTTOM FISH, CLAMS, OYSTERS, SARDINES, SCALLOPS, HERRING, ABALONE



U.S. ENVIRONMENTAL PROTECTION AGENCY
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ECONOMIC ANALYSIS OF INTERIM FINAL EFFLUENT GUIDELINES SEAFOODS PROCESSING INDUSTRY

Fish Meal, Salmon, Bottom Fish, Clams
Oysters, Sardines, Scallops, Herring, Abalone

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To
Environmental Protection Agency

Contract No. 68-01-1533
Task Order No. 11
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PREFACE

The attached document is a contractor's study prepared for the Office of Planning and Evaluation of the Environmental Protection Agency ("EPA"). The purpose of the study is to analyze the economic impact which could result from the application of alternative effluent limitation guidelines and standards of performance to be established under sections 304 (b) and 306 of the Federal Water Pollution Control Act, as amended.

The study supplements the technical study ("EPA Development Document") supporting the issuance of international regulations under sections 304(b) and 306. The Development Document surveys existing and potential waste treatment control methods and technology within particular industrial source categories and supports proposal based upon an analysis of the feasibility of these guidelines and standards in accordance with the requirements of sections 304(b) and 306 of the Act. Presented in the Development Document are the investment and operating costs associated with various alternative control and treatment technologies. The attached document supplements this analysis by estimating the broader economic effects which might result from the required applications of various control methods and technologies. This study investigates the effect of alternative approaches in terms of product price increases, effects upon employment and the continued viability of affected plants, effects upon foreign trade and other competitive effects.

The study has been prepared with the supervision and review of the Office of Planning and Evaluation of EPA. This report was submitted in fulfillment of Contract No. BOA 68-01-1533, Task Order No. 11 by Development Planning and Research Associates, Inc., Manhattan, Kansas. Work was completed as of February, 1975.

This report is being released and circulated at approximately the same time as publication in the Federal Register of a notice of proposed rule making under sections 304(b) and 306 of the Act for the subject point source category. The study is not an official EPA publication. It will be considered along with the information contained in the Development Document and any comments received by EPA on either document before or during proposed rule making proceedings necessary to establish final regulations. Prior to final promulgation of regulations, the accompanying study shall have standing in any EPA proceeding or court proceeding only to the extent that it represents the views of the contractor who studied the subject industry. It cannot be cited, referenced, or represented in any respect in any such proceeding as a statement of EPA's views regarding the subject industry.

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I. INDUSTRY SEGMENTS

A. Introduction

Pursuant to the objectives of the Federal Water Pollution Control Act, as amended, the Environmental Protection Agency is establishing industry effluent limitation guidelines. This task encompasses numerous biological, engineering and economic considerations. While it is desirable that all of the above considerations be explored prior to establishing the guidelines, the last consideration, i.e., assessing the economic impact of impending guidelines, is the single objective herein.

In order to further conceptualize this objective, and at a later date, evaluate the success of this report in achieving this objective, it is expedient to briefly highlight the exact nature, purpose and scope of this report.

As mentioned above, the sole objective is to assess the economic impact of effluent limitation guidelines on selected segments of the seafood processing industry. Selecting the waste water treatment strategy, assessing the capital and operating costs associated with the recommended treatment strategy and evaluating the effectiveness of the proposed strategy is included in the objectives of other studies. Likewise, other topics with obvious merit, such as the optimal regional waste treatment strategy or the economic benefits of water quality enhancement are beyond the scope of this report. In summary, the objective of this report is to assess the economic impact of impending national effluent limitation guidelines--based on one recommended "end of pipe" treatment strategy and associated costs as provided by EPA. This therefore precludes assessing the economic impact stemming from state environmental regulations. It further precludes assessing the economic impacts emanating from user fees or hook-up fees for those plants that are utilizing municipal waste treatment facilities.

It is also expedient to mention that not all segments of the seafood processing industry will be considered herein. The selection of the specific processes and/or species considered is heavily dependent on the development of effluent treatment cost data which preceded this report. The industry segmentation as presented is further influenced by the form and nature of the effluent treatment cost data as provided by EPA. Therefore, while the objective of the report is to ascertain the economic impact of impending waste water treatment standards, many factors must be considered as external to this report.

The segments delineated are as follows:

1. Oysters, fresh and frozen
2. Oysters, canned
3. Clams, fresh and frozen
4. Clams, canned
5. Fish meal, menhaden and anchovy
6. Salmon, fresh and frozen
7. Slamon, canned
8. Sea herring (sardines), canned and fillets
9. Pacific bottom fish, fresh and frozen
10. Atlantic bottom fish, fresh and frozen
11. Scallops
12. Abalone

Several modifications and revisions in the above taxonomy will be introduced throughout the development of this report. These changes will be introduced and documented as required.

It is also recognized that seafood processing plants are not specialized to the degree indicated by the above specific segments. Although specialization does exist, e.g. menhaden reduction plants, most processors operate multi-species plants and some combine fresh, frozen and canning operations in one plant. However, effluent limitation guidelines were developed on an individual species basis and the segmentation indicated above is a partial list of species used by EPA in developing the technical effluent guidelines.

Multispecies production within a single plant presents considerable difficulties when the effluent treatment cost data is presented on a species by species basis. This problem has been substantially reduced by first considering only those plants that are specialized in the production of the above species. We will consider only those plants where the total value of the above species (considered individually) is greater than 80 percent of the total value of all products produced by the plants. Secondly, the producers of specialty items or reprocessors will not be considered in the analysis.

The remainder of this chapter is devoted to a broad description of the above industry segments. A brief discussion of plant numbers, geographic concentration, economic concentration, volume of domestic production and volume of imports and exports has been included. For the most part, this summary is based on secondary data and is intended only to elucidate broad production and consumption trends.

B. Classification of Firms and Plants

In general, the firms and plants included in this analysis fell under three 1972 Standard Industrial Classification (SIC) codes:

SIC 2091 - Canned and cured fish and seafoods (partial)

Establishments primarily engaged in cooking and/or canning fish or shell fish.

SIC 2092 - Fresh or frozen packaged fish and seafoods (partial)

Establishments primarily engaged in preparing fresh and raw or cooked frozen packaged fish or other seafoods.

SIC 2094 - Animal and marine fats and oils

Establishments primarily engaged in manufacturing animal oils, including fish oil and other marine animal oils, and by-product meal; and those rendering inedible grease and tallow from animal fat, bones and meat scrap.

1. Number and Location of Firms and Plants

The entire emphasis of this report is confined to primary commercial processors of the above products and/or species. It is recognized that in addition to primary commercial processors, there are many wholesalers, reprocessors and specialized custom packers located throughout most seacoast and nonseacoast states. The latter plants will not be considered in this report and have therefore not been included in the plant lists presented below. (All tables and figures have been included as an attachment at the end of the chapter.)

Plant numbers and location data presented in this section were developed from plant lists provided by National Marine Fishery Services. The following summary of plant numbers by species and region have been developed from this data source.

Tables I-1 to I-11 present the total number of plants within each segment as well as the number of plants that meet the 80 percent specialization criteria. It should be noted that some of the segments presented below do not correspond to the segment listed earlier. For example, the bottom fish segment includes both Atlantic and Pacific bottom fish including halibut. Species other than rockfish, flounder, cod, haddock have also been included in the bottom fish segment. The reader is encouraged to review the footnotes at the bottom of each Table for the definitions and coverage of each segment. In general the segmentation as presented in Table I-1 to I-11 is broader and includes more plants than the taxonomy originally presented.

In addition to the plants listed in Tables I-1 to I-11, there are 150 Alaskan seafood processing plants that process salmon, bottom fish or herring. Alaskan plant numbers were constructed from state publications, National canner listings and personal interviews. Some of the processors listed on the Alaskan list are more analogous to wholesalers in that little processing is actually performed.

The largest segment, in terms of number of plants is the fresh and frozen oyster segment. A total of 407 plants are included in this segment. In 338 of these plants, oysters account for more than 80 percent of total plant sales. These plants are located primarily in Gulf and Chesapeake regions. These two regions account for approximately 85 percent of all fresh and frozen oyster plants, 47 and 38 percent respectively.

The second largest segment in terms of number of plants is the bottom fish segment. This segment as presented herein actually contains all bottom fish and selected finfish plants. A total of 224 plants are included, 142 of these are specialized to the extent that bottom fish accounts for greater than 80 percent of total plant sales. These plants (bottom fish) are dispersed in all coastal regions of the U. S. The Northeast region is most important in terms of number of plants.

A summary of number of plants by select species is presented in Table I-12. This table includes both Alaskan and Non-Alaskan segments. A total of 728 plants are listed in Table I-12 and will be considered in this report.

2. Geographical Concentration of Plants

The preceding section presented plant numbers without attempting to express the number of plants on a state or community basis. The form of the plant list is such that it is not possible to express number of plants by specific location, e.g., community. Since, however, community impacts are a very important facet of mandatory pollution abatement standards, additional efforts have been implemented to determine the extent to which adverse community impacts are likely as influenced by geographic concentration or clustering of plants.

Community impacts depend on the number of plants adversely impacted and the economic importance of these plants to the local communities. It is not possible at this early juncture to expound on the number of plant closures but it is possible to briefly explore the geographical clustering of plants which may be an indication of the dependency of the local economy on the respective segments of the seafood processing industry.

The most important region in the 48 contiguous states in terms of number of plants is the Gulf coast region. Considering only those plants that meet the 80 percent criteria Gulf states accounts for approximately 30 percent of all 80 percent plants considered in the 48 contiguous states. The next most important region is the Chesapeake region which accounts for approximately 20 percent. The Northeast region is the next most important followed by the Pacific region. The following summary presents number of 80 percent plants by region.

Region	Number of Plants [1/]
Northeast	108
Mid Atlantic	48
Chesapeake	144
South Atlantic	49
Gulf	179
Pacific	78
Great Lakes	35
Mississippi	7
Total	651

1/ Only 80 percent of the plants in the 48 contiguous states have been included in the above material.

To further illuminate the extent to which local communities depend on various plants, we have further explored geographical clustering by simply tabulating the number of plants at selected locations. The 1970 population estimates for these communities are also presented as a crude indication of the economic base of the respective communities. This information is presented below in Table I-13 and is intended to simply highlight or alert EPA of the extent of geographical clustering and therefore the possibility or potential of adverse community impacts if plant closures are projected.

This table shows that in almost all segments, it is very common to find several plants operating in very small communities. It is also known (but not shown in Table I-13)that there are many situations where a single plant employs a large percent of the total local labor force.

An excellent example of the above would be the Maine sardine industry where several plants are located in small remote locations. The Chesapeake fresh and frozen oyster industry is also dispersed in many rural areas throughout the bay.

It must also be recognized that even when plant numbers are expressed on a community by community basis significant geographic clustering may be obscured. Such a situation arises when several plants located in different but neighboring communities -- separated by only a few miles -- draw from a common labor pool.

In summary, the location data presented, plus other information concerning the regional importance of the seafood processing industry, clearly indicates that the economic fortunes of many communities and regions are directly related to the economic fortunes of the seafood processing industry. If mandatory pollution abatement standards adversely impact selected segments of the seafood processing industry, severe community and regional impacts should be expected. The severity of the community impacts depends on the number of plant closings and the importance of these plants to the respective communities.

The discussion of plant location and clustering as related to community impacts must make special note of the Alaskan seafood processing segment. Limited employment opportunities, high unemployment rates and significant plant clusterings increases the potential for adverse and prolonged community and employment impacts if plant closures result from the guidelines.

C. Economic Concentration in the Fisheries Industry

Data from the 1967 Census of Manufactures indicates the following level of concentration in the canned and cured and the fresh and frozen packaged seafoods segments.

	Percent of total value of shipments accounted for by:			
Product Line	4 largest companies	8 largest companies	20 largest companies	50 largest companies
Canned and cured seafood	44	59	73	85
Fresh or frozen packaged fish	26	38	56	72

The above data indicates that there is some concentration in the seafood processing industry when grouped into broad SIC categories. Much of the concentration is, however, accounted for by segments such as canned tuna or canned salmon that produce a relatively large volume of output, account for a relatively large portion of total industry sales and possess a significant amount of economic or production concentration. These segments tend to overshadow highly fragmented segments such as oyster and bottom fish processing.

One alternative to the census format which has been suggested is to present volume data on a plant by plant basis rather than on an ownership basis. This method clearly shows that most seafood processing plants, considering all segments, are quite small (42 percent of all seafood processing plants had sales less than $100,000 in 1972). One objection is that the latter method is misleading in that it is not the conventional method used to express industrial concentration and therefore should not be used to make industrial concentration comparisons unless comparable data for all industries can be acquired. Since, however, most seafood processing segments can be characterized as consisting of primarily single plant firms the concentration ratio on a plant by plant basis is viewed as representative of or an accurate portrayal of production concentration.

Number and percent of plants by size for 1970 and 1972 is presented in Table I-14. For example, approximately 20 percent of all seafood processing plants had sales of $25,000 or less. Forty-two percent had sales of less than $100,000. Only 14 percent of all plants had sales of $1,000,000 or more. As will be pointed out below many segments of the seafood processing industry have a few larger plants which produce a significant portion of total output while the remainder of the output is produced by numerous small, single family operations.

Additional production concentration data by plant for the seafood processing industry is presented in Table I-15. This table shows that the four largest plants (approximately one-fourth of one percent by number) produce approximately 17 percent of total output. The 1,389 smallest plants (approximately 87 percent by number of plants) produce only 16 percent of total output. Both tables clearly show that the industry may be characterized as possessing many very small plants. Table I-14 also shows that the total number of processing plants in the industry is declining. This trend is accompanied by increasing concentration of larger plants and a reduction in the number and percent of small plants.

Additional concentration measures for selected industry processing segments are presented in Table I-16. This table shows that for many of the segments a very small number of plants produce a significant share of total industry output. The remainder of the industry, however, is comprised of numerous very small plants. Tables I-17 through I-21 present number of plants and percent of plants in various size categories which further illustrate the large number of extremely small plants in selected segments. For example, in Table I-21, the smallest 23 percent of bottom fish plants produce less than 1 percent of total industry output. Another example is that of fresh and frozen oysters. Table I-19, fresh and frozen oysters depicts a situation where the smallest 33 percent of plants produce only 3 percent of the total output.

D. Level of Integration

Integration within the seafood processing industry varies by product. Broad industry wide measures of integration do not exist and would not be particularly meaningful in that we could again expect that larger plants and firms that possess considerable integration would completely overshadow or bias integration data for smaller segments.

In general, horizontal integration by product is very common and advisable since many production seasons for selected species are very short and horizontal integration provides a means for increasing the length of season and spreading fixed costs. Horizontal integration (multiplant integration) is most common in the salmon and menhaden reduction industries. Vertical integration also exists in some segments, i.e., menhaden reduction. Since, however, the processing units will be treated as separate entities, the profitability and impacts will be estimated on a processing unit basis only, vertical integration will not be considered in great detail. Table I-22 presents a brief summary of concentration (number of plants) and product and plant integration for selected seafood processing companies. This table shows that multiplant companies are common in various segments. This table (I-22) shows that multiplant companies are common in the Alaskan salmon processing segments. Alaskan Packers Association, Bumble Bee Seafood and the New England Fish Company produce a significant portion of the total Alaskan salmon pack. It further shows that species and/or product integration is also common.

E. Technological Status of the Industry

The level of technology of the industry and industry segments influences profits, process and effluent loads and is therefore an important consideration. Technological change is, however, a dynamic and ongoing process. New lines are added, new equipment installed and the concept of plant and equipment is a blend of new and old components. Variations within industry segments appear to be as great as variations between segments. For the most part, however, the large plants and firms within the segments possess a more advanced level of technology than do the numerous small plants. This situation is perhaps one of the reasons why a disproportionately large number of small plants have left the industry in recent years.

For the most part, however, technological differences are obscure and virutally impossible to include in the analysis. Only a few broad generalizations are possible. For example, New England bottom fish segments tend to be more heavily mechanized than West Coast segments. Alaskan salmon segments tend to be almost completely mechanized as opposed to small West Coast salmon plants which in some cases hand butcher salmon. Mechanized oyster and clam operations are increasing in number to partially eliminate critical labor restraints. Again, they tend to be the larger plants within the segments.

Financial profiles will be established for several size categories within each industry segment. Differential rates of return and profit levels for these size categories are in part the result of technological differences.

F. Domestic Production, Imports and Exports

A compendium of domestic landings, domestic production, volume of imports and exports is presented in this section to further assist in characterizing the industry. While only broad coverage of these items is included, there are many intrinsic implications concerning the ability of the industry to withstand the impacts of pollution abatement standards. Most of the material presented is in the form of published fishery statistics and is presented as background data which will be required in the impact analysis section.

Oysters

Domestic oyster landings in 1970 were 53.6 million pounds. Approximately 44 percent of this volume was harvested in the Chesapeake area. Gulf Coast landings accounted for 33 percent of total landings. Pacific Coast states accounted for 14 percent while the remainder was distributed throughout New England, Middle Atlantic and South Atlantic states.

The total value of landings was $29,485,000 in 1970 which was 4.8 percent of the total value of all domestic landings. In terms of value, oysters ranked as the seventh most important species in terms of relative value.

In terms of processed product, fresh shucked oysters are by far the most important oyster product accounting for over 50 percent of the total value of all oyster products. The value of imports in 1972 totaled approximately 16 million dollars while the value of domestic production was approximately four times this amount. Imports of canned oysters account for nearly 80 percent of all oyster imports.

Data on oyster landing, production and imports are presented in Tables I-23 through I-25. It is also significant to note that the number of oyster canning plants has decreased from 28 in 1964, to 19 in 1972 reflecting a continuing decreasing trend in the number of plants in this industry. The above plant numbers do not reflect the 80 percent specialization criteria. Oyster production or oyster products are not the most important seafood in terms of sales. This is very important in terms of number of plants at selected locations (as discussed earlier).

Clams

New England, Chesapeake and Middle Atlantic states harvest approximately 95 percent of total U. S. clam production. The largest single producing region is the Middle Atlantic region, accounting for approximately 63 percent of U. S. landings in 1970. New England states accounted for roughly 10 percent of all landings while the South Atlantic, Gulf and Pacific regions accounted for less than one percent of total landings each.

Imports of clam products amounted to 3.38 million dollars in 1971 while the value of domestic production in 1971 was 63 million dollars.

Landings, production and imports are shown in Tables I-26 through I-28.

Fresh and frozen and canned clams account for approximately 90 percent of domestically produced clam products with specialties accounting for the remainder. During the past seven years the quantity of fresh and frozen and speciality items produced has doubled. The production of canned clam products has declined in absolute terms. The number of clam canning plants has declined from 39 in 1965 to 24 in 1971. Most of those that have discontinued clam canning are assumed to be small plants. Increasing labor costs and diseconomies of scale inherent in smaller plants have gradually forced these smaller clam canners out.

Menhaden Reduction

Menhaden is the singularly most important species in terms of relative volume of landings. Pounds of menhaden landed normally exceed the poundage of the second most important species by a factor of three to five. In terms of relative value of the landings, however, menhaden is exceeded by several other species.

Virtually all menhaden landing are utilized in the production of fish meal, solubles and oil. During the past ten years menhaden meal has accounted for 54 to 75 percent of total U. S. production of dried scrap and fish meal.

Similarly, menhaden solubles have accounted for as much as 90 percent of U. S. production of fish solubles.

Menhaden are landed throughout the Middle Atlantic, Chesapeake and Gulf fisheries. The Gulf region has been the largest producer in terms of total landings, accounting for as much as 75 percent of all menhaden landings in 1969. U. S. landings of menhaden by state and region from 1963 to 1971 are shown in Table I-29.

The volume of U.S. production of menhaden products and the total value of domestically produced menhaden products since 1947 is presented in Table I-30.

U. S. production of dried scrap and menhaden meal reached a peak of 495,102,000 pounds in 1961. Production has fluctuated between this amount and a low of 238,270,000 pounds since 1961. Using a five year average (1955 - 1959) as a base production period, U. S. production of dried menhaden and scrap has varied from +25 percent to -38 percent of the base production level since 1960, but has remained at nearly double the levels of the late 1940's and early 1950's.

Total U. S. production of all dried fish scrap and meal, solubles and menhaden oil is presented in Table I-31.

Total U. S. supply of meal and solubles including imports is shown in Table I-32. Total supply has grown from 399 million pounds in 1947 to 1,253 million pounds in 1971. Percent meal imported to total supply ranges from 52 to 78 percent over the 26-year period.

In general the outlook for fish meal, oil and solubles is one of relative short supply and high prices as influenced by the above factors. Figures I-1 and I-2 reflect the drastic impacts the Peruvian situation has had on U. S. supplies and prices of fish meal.

The most important single factor currently influencing the domestic supply of fish meal is the anchovy crisis in Peru. While sea water temperatures along the Peruvian coast are near normal, it is expected to be some time until resource stock is replenished.

Very recent data (February 1974) indicates that supply will remain tight as a result of the Peru anchovy situation. [1]

Other factors affecting U.S. supplies and demands of fish meal are substantially higher soybean prices and exports, the disappointing production of menhaden meal during the first part of 1973 and the higher level of broiler replacements during 1973 and 1974.

1/ U. S. Department of Agriculture, Economic Research Service, Feed Situation, February 1974.

Anchovy

The fourth segment included herein is anchovy reduction. This is confined to California and, for the most part, Terminal Island. The segmentation included, i.e., anchovy reduction is somewhat of a misnomer in itself in that most of these plants rely heavily on other fish and/or fish scraps. It must be further recognized that many of these plants would be classified secondary reducers and would not be operating as separate entities and are actually part of a by-product recovery plant associated with large tuna or food fish plants. Effluent from these plants would be only a part of the effluent stream from the overall integrated operation and would be treated as a part of a common effluent stream. Indications are that several of these plants do not have separate waste water streams and may therefore have difficulties with meeting separate standards. Additional discussions will be devoted to this problem in other chapters.

Table I-33 presents anchovy landings in California since 1964. This includes anchovy landings, for all purposes, bait and canned as well as for fish meal and oil reduction.

Salmon

In terms of relative volume and value, salmon is one of the most important species harvested in the U.S. In 1968, salmon was second in terms of volume of catch (exceeded only by menhaden) and also ranked second in terms of value (exceeded only by shrimp).

The segments considered within this report include both canned and fresh and frozen salmon. At the present time, the canning segment is the larger of the two, however, recent price changes are beginning to result in an increase in the amount of salmon entering the noncanned segment relative to the canned segment. In 1971 the noncanned segment handled 36 percent of total domestic production as opposed to only 20 percent in 1963. Additional price shifts may render salmon too valuable for canning purposes.

Domestic landings of salmon were 454,236,000 pounds (round-weight) in 1947. Landings in 1971 and 1972 were 312,071,000 and 216,685,000 pounds respectively. If domestic landings from 1955 through 1959 are averaged and used as a base, recent landings (1963-1972) are found to vary from +31 percent to -20 percent of the base period. No long-term trend, either decreasing or increasing, is evident since 1963.

Alaska is the major salmon producing state, contributing from 64 to 89 percent of domestic landings (1963 to 1970). The next largest producing states were, in order, Washington, Oregon and California contributing 9, 5 and 2 percent respectively in 1970. Table I-34 presents salmon landing by state and total landings from 1963 through 1970.

Table I-35 presents aggregate and per capita consumption of canned and noncanned salmon since 1963. A relative decline in canned consumption is evident. An absolute decline in per capita consumption is also evident.

U. S. supply and disposition of salmon, 1963-1972, is presented in Table I-36. Imports have constituted from 3 to 7 percent of apparent consumption. Over the same time period, exports have varied from 7 to 25 percent of domestic landings.

The volume of imports of salmon (canned and noncanned) by country of origin is presented in Table I-37. Canned salmon imports and exports are shown in Table I-38.

The outlook is, of course, highly dependent on future landings. The short supply situation has placed upward pressure on prices and has dampened exports. Future developments in the export market for fresh and frozen salmon will also influence domestic supplies and prices.

In recent years the reduced landings have resulted in very short processing seasons in some areas. There is additional concern over foreign fishing and the status of the resource stock. While seasonal fluctuations are to be expected the drastic declines in harvests has stimulated additional concern over the stock resource.

Pacific Bottom Fish

Two species of Pacific bottom fish -- flounder and rockfish -- were initially considered in this report. These two species constitute (by volume) 62 percent of all Pacific bottom fish landings. The scope of the project has, however, been expanded to include all major bottom fish.

Pacific bottom fish landings (all species included) have been relatively stable since 1950 with annual landings near 105 million pounds. Table I-39 presents total West Coast landing and value by state since 1963.

Landings by state (1967) show that Washington produced 45 percent of all West Coast bottom fish landings followed by California (32 percent), Oregon (20 percent) and the remainder from Alaska.

Landings by species are presented in Table I-40. Flounder and rockfish are the most important (in terms of quantity landed) followed by ocean perch, lingcod, cod and sablefish.

Recent indications are that substantial bottom fish stocks exist in Alaskan waters. While there is an increasing amount of interest being devoted to this fishery it is expected to be some time until a substantial number of plants are committed to this geographical area.

<u>Atlantic Bottom Fish</u>

The Atlantic bottom fish species to be considered in this report include cod, haddock and flounder. Together these species accounted for 62 percent of all Atlantic bottom fish landings in 1969. The segmentation and scope has been broadened to include all important Atlantic bottom fish.

Atlantic bottom fish landings since 1963 are presented in Table I-41. Landings in recent years have been steadily declining. The value of landings in 1968 was $32,294,000.

Landings and value by species are shown in Table I-42. Flounder accounted for 30 percent of bottom fish landings in 1968, haddock 19 percent and cod 13 percent. Of the species not considered, whiting is the most important in terms of volume of landings (20 percent).

Table I-43 presents bottom fish stocks, landings, imports, exports and total supply. Apparent consumption is also included. Imports of all species of Atlantic bottom fish amounted to 81 percent of apparent consumption in 1968. Consumption and imports have been increasing while domestic landings have been decreasing.

There is great concern in this segment over the encroachment of foreign fishing fleets. Plant utilization is low and many are questioning the continued existence of the industry given existing fish pressures.

In general, it must however be recognized that most of the U.S. supply of Atlantic and Pacific bottom fish is supplied by foreign producers. As can be seen in Table I-44, imports far exceed U.S. production.

In 1968 halibut landings accounted for 0.6 percent of total landings. During the same year the value of halibut landings amounted to only 0.8 percent of the total value of all landings. The 1971 Pacific halibut catch was approximately 43 percent of 1915 record landings of 66,696,000 pounds. Table I-45 presents halibut landings by region since 1963.

Aggregate and per capita consumption of halibut is shown in Table I-46. A large portion of this demand is satisfied through imports of fresh and frozen halibut which were 25,720,000 pounds in 1971 (shown in Table I-47).

Many have expressed the belief that the halibut fishery, while heavily regulated, is overfished by foreign vessels. Even if released after being caught by foreign vessels, the survival rate is believed quite low. Consequently, many believe that this resource stock will continue to decline.

The outlook is for somewhat reduced supplies. High inventories are expected to ameloriate price impacts normally associated with reduced supplies.

Sea Herring

The segmentation presented earlier includes two categories for sea herring--canned and fillets. The canning segment (Maine sardines) is the larger of the two. There are only two plants in New England that process sea herring fillets. In addition, two Alaskan plants process sea herring fillets.

It should be noted that the Maine Sardine Industry has declined from 51 plants in 1951 to 16 in 1974. An estimated pack of 916,800 cases in 1973 should be compared to 3,800,000 cases in 1950. Current pack is about 25 percent of the record pack.

This situation has resulted in great concern over increasing Canadian competition and depletion of the resource.

While the total catch of sea herring constituted only 2.6 percent of the total seafood catch in 1968, this does not adequately reflect the regional importance of the industry; e.g., the Maine sardine industry.

Maine sardine landings and pack in recent years are presented in Table I-48. Yearly pack imports, exports and consumption statistics are presented in Table I-49. As with other fishery products, it is not surprising to find a considerable amount of the total U.S. supply available for consumption is derived from imports. Total imports of canned sardines amounted to 68 percent of total supply available for consumption.

G. Summary

The material presented in the above sections is complex due to the number and diversity of segments considered. In view of this fact there is a need to further summarize selected or key characteristics which are particularly important when considering the impacts of impending waste water treatment standards. This summary is presented below and for the most part is based on data contained in the tables at the end of this chapter. At this point we have not considered the cost of mandatory standards so the summary is confined to key structural or competitive factors which can potentially influence financial or economic considerations. It should be noted that inference can however be gained. Two examples are cited, one, it is known that economies to scale exist in production and in waste water treatment. Therefore, we can expect small plants to be disproportionately impacted. In this regard it should be recalled that the seafood segments have an extremely large number of small plants. Secondly, an industry with declining number of plants, excess capacity, great fluctuations in raw product, may have difficulty acquiring capital or financing waste water treatment equipment. Additionally, those segments in direct competition with foreign producers may be adversely impacted due to the inability to compete or pass prices through to final consumers.

Again it is cautioned that at this point we are not attempting to quantify the magnitude of the expected impacts. The only objective is to further summarize key characteristics which must be considered in the impact analysis.

A brief summary is presented below:

Bottom fish - The bottom fish segment -- West Coast, Alaska, and Atlantic-- consists of an extremely large number of small plants. Many of these plants are single family operations.

Underutilization of plant capacity is the rule rather than the exception. Declining and variable landings, and the large volume of imports are of great concern to industry.

Fish meal - The fish meal industry consists of fewer plants, some of which possess considerable economic concentration and economic integration, i.e., several large menhaden companies control several large plants and produce a significant portion of total output. The financial prospects of this capital-intensive and energy-intensive industry in large part depend on world fish meal and energy prices. Several plants and companies were pushed close to or below the "break-even" point during the energy crisis in early 1974.

Oysters - An extremely large number of very small plants exist in the oyster segment. Many of these plants are marginal family type operations that produce only a very minute portion of total industry output. Underutilization of plant capacity, little influence on prices and limited capital acquiring ability accurately characterize many plants within this segment.

Clams - Large, mechanized clam processors coexist with numerous small family operated fresh and frozen clam processors. Underutilization of plant capacity, increasing production costs and numerous regulations concerning clam harvesting methods are cited by industry as key factors influencing profits. Labor constraints have also produced a trend toward increased mechanization.

Sea herring - While 1972 was a good year in terms of landings, production and profits, the canned sardine industry can be accurately characterized as an industry with a declining number of plants and production over the long run. The lack of raw product availability and foreign competition (Canada, Venezuela, South Africa, Denmark, Spain and Brazil) is and has been the reported cause of declining plant numbers and profits.

Salmon - Plant utilization in selected segments of the salmon processing segment has been as low as 15 to 20 percent in recent years. In fact, it is not difficult to isolate various processing plants that have operated only one out of three years during production seasons. This situation has produced additional concern over the resource stock. Foreign competition in the fishery, demand shifts, raw product availability and increased production are factors influencing industry profitability.

Estimated earnings, financial characteristics and profitability by industry segment are presented in Chapter II. The segmentation for the most part is comparable to that presented in Chapter I. Selected modifications will however be introduced as required. The emphasis will be on presenting general profitability measures for selected segments.

Table I-1. Distribution of plants by region: Bottom fish[1/]

REGION [4/]	PLANTS[2/] LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS[3/] LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	40	17.86	11	4.91	51	22.77
2. MID ATLANTIC...	24	10.71	1	0.45	25	11.16
3. CHESAPEAKE.....	5	2.23	1	0.45	6	2.68
4. S. ATLANTIC....	4	1.79	10	4.46	14	6.25
5. GULF...........	6	2.68	11	4.91	17	7.59
6. PACIFIC........	24	10.71	15	6.70	39	17.41
7. GREAT LAKES....	34	15.18	16	7.14	50	22.32
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	5	2.23	17	7.59	22	9.82
TOTAL	142		82		224	

1/ Includes Atlantic and Pacific bottom and selected finfish.

2/ Includes all plants where the value of bottom fish constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of bottom fish is less than 80% of total plant sales.

4/ Does not include Alaska

Data compiled from:
Source: National Marine Fisheries Service.

Table I-2. Distribution of plants by region: Fresh & frozen salmon

REGION 1/	PLANTS 2/ LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS 3/ LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	0	0.00	0	0.00	0	0.00
2. MID ATLANTIC...	0	0.00	0	0.00	0	0.00
3. CHESAPEAKE.....	0	0.00	0	0.00	0	0.00
4. S. ATLANTIC....	0	0.00	0	0.00	0	0.00
5. GULF...........	0	0.00	0	0.00	0	0.00
6. PACIFIC........	1	11.11	8	88.89	9	100.00
7. GREAT LAKES....	0	0.00	0	0.00	0	0.00
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	0	0.00	0	0.00	0	0.00
TOTAL	1		8		9	

1/ Does not include Alaska

2/ Includes all plants where the value of fresh and frozen salmon constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of fresh and frozen salmon is less than 80% of total plant sales.

Data compiled from:
Source: National Marine Fisheries Service.

Table I-3. Distribution of plants by region: Canned salmon

Region[1]	Plants[2] Larger Than 80%	Percent of Total Plants	Plants[3] Less Than 80%	Percent of Total Plants	Total Plants This Region	Percent of Total Plants
1. Pacific	9	40.90	13	59.10	22	100.00
TOTAL	9		13		22	

1/ Does not include Alaska

2/ Includes all plants where the value of canned salmon constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of canned salmon is less than 80% of total plant sales.

Data compiled from:
Source: National Marine Fisheries Service

Table I-4. Distribution of plants by region: Oysters Pacific, fresh and frozen

REGION 1/	PLANTS 2/ LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS 3/ LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	0	0.00	0	0.00	0	0.00
2. MID ATLANTIC...	0	0.00	0	0.00	0	0.00
3. CHESAPEAKE.....	0	0.00	0	0.00	0	0.00
4. S. ATLANTIC....	0	0.00	0	0.00	0	0.00
5. GULF...........	0	0.00	0	0.00	0	0.00
6. PACIFIC........	32	84.21	6	15.79	38	100.00
7. GREAT LAKES....	0	0.00	0	0.00	0	0.00
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	0	0.00	0	0.00	0	0.00
TOTAL	32		6		38	

1/ Does not include Alaska.

2/ Includes all plants where the value of fresh and frozen oysters constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of fresh and frozen oyster is less then 80% of total plant sales.

Data compiled from:

Source: National Marine Fisheries Service.

Table I-5. Distribution of plants by region: Eastern oysters, fresh and frozen

REGION[1]	PLANTS[2] LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS[3] LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	1	0.25	0	0.00	1	0.25
2. MID ATLANTIC...	13	3.19	1	0.25	14	3.44
3. CHESAPEAKE.....	126	30.96	28	6.88	154	37.84
4. S. ATLANTIC....	36	8.85	5	1.23	41	10.07
5. GULF...........	159	39.07	35	8.60	194	47.67
6. PACIFIC........	1	0.25	0	0.00	1	0.25
7. GREAT LAKES....	0	0.00	0	0.00	0	0.00
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	2	0.49	0	0.00	2	0.49
TOTAL	338		69		407	

1/ Does not include Alaska

2/ Includes all plants where the value of fresh and frozen oyster constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of fresh and frozen oyster is less than 80% of total plant sales.

Data compiled from:
Source: National Marine Fisheries Service.

Table I-6. Distribution of plants by region: Oysters Pacific, canned

Region[1]	Plants Larger Than 80%[2]	Percent of Total Plants	Plants Less Than 80%[3]	Percent of Total Plants	Total Plants This Region	Percent of Total Plants
1. North East	0	0.00	0	0.00	0	0.00
2. Mid Atlantic						
3. Chesapeake						
4. S. Atlantic						
5. Gulf						
6. Pacific	1	33.33	2	66.67	3	100.0
7. Great Lakes						
8. Hawaii						
9. Am. S. & PR.						
10. Mississippi	0	0.00	0	0.00	0	0.00
TOTAL	1		2		3	

1/ Does not include Alaska

2/ Includes all plants where the value of canned oyster constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of canned oyster is less than 80% of total plant sales.

Data compiled from:

Source: National Marine Fisheries Service.

Table I-7. Distribution of plants by region: Oysters Eastern, Canned

REGION 1/	PLANTS 2/ LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS 3/ LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	0	0.00	0	0.00	0	0.00
2. MID ATLANTIC...	0	0.00	0	0.00	0	0.00
3. CHESAPEAKE.....	0	0.00	0	0.00	0	0.00
4. S. ATLANTIC....	1	6.25	1	6.25	2	12.50
5. GULF...........	3	18.75	11	68.75	14	87.50
6. PACIFIC........	0	0.00	0	0.00	0	0.00
7. GREAT LAKES....	0	0.00	0	0.00	0	0.00
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	0	0.00	0	0.00	0	0.00
TOTAL	4		12		16	

1/ Does not include Alaska

2/ Includes all plants where the value of canned oyster constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of canned oyster is less than 80% of total plant sales.

Data compiled from:
Source: National Marine Fisheries Service.

Table I-8. Distribution of plants by region: Clams, Frozen and fresh

REGION[1]	PLANTS[2] LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS[3] LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	47	41.59	8	7.08	55	48.67
2. MID ATLANTIC...	9	7.96	10	8.85	19	16.81
3. CHESAPEAKE.....	11	9.73	20	17.70	31	27.43
4. S. ATLANTIC....	0	0.00	5	4.42	5	4.42
5. GULF...........	0	0.00	1	0.88	1	0.88
6. PACIFIC........	0	0.00	2	1.77	2	1.77
7. GREAT LAKES....	0	0.00	0	0.00	0	0.00
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	0	0.00	0	0.00	0	0.00
TOTAL	67		46		113	

1/ Does not include Alaska

2/ Includes all plants where the value of fresh and frozen clam constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of fresh and frozen clam is less than 80% of total plant sales.

Data compiled from:
Source: National Marine Fisheries Service.

Table I-9. Distribution of plants by region: Clams canned

REGION 1/	PLANTS 2/ LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS 3/ LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	0	0.00	2	15.38	2	15.38
2. MID ATLANTIC...	1	7.69	6	46.15	7	53.85
3. CHESAPEAKE.....	0	0.00	2	15.38	2	15.38
4. S. ATLANTIC....	0	0.00	0	0.00	0	0.00
5. GULF...........	0	0.00	0	0.00	0	0.00
6. PACIFIC........	0	0.00	2	15.38	2	15.38
7. GREAT LAKES....	0	0.00	0	0.00	0	0.00
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	0	0.00	0	0.00	0	0.00
TOTAL	1		12		13	

1/ Does not include Alaska

2/ Includes all plants where the value of canned clam constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of canned clam is less than 80% of total plant sales.

Data compiled from:

Source: National Marine Fisheries Service.

Table I-10. Distribution of plants by region: Fish Meal [1]

REGION [2]	PLANTS [3] LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS [4] LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	2	5.26	2	5.26	4	10.53
2. MID ATLANTIC...	0	0.00	1	2.63	1	2.63
3. CHESAPEAKE.....	0	0.00	2	5.26	2	5.26
4. S. ATLANTIC....	4	10.53	4	10.53	8	21.05
5. GULF...........	0	0.00	11	28.95	11	28.95
6. PACIFIC........	3	7.89	7	18.42	10	26.32
7. GREAT LAKES....	1	2.63	0	0.00	1	2.63
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	0	0.00	1	2.63	1	2.63
TOTAL	10		28		38	

1/ Includes both Menhaden and Anchovy plants.

2/ Does not include Alaska

3/ Includes all plants where the value of fish meal constitutes greater than 80% of total plant sales.

4/ Includes all plants where the value of fish meal is less than 80% of total plant sales.

Data compiled from:

Source: National Marine Fisheries Service.

Table I-11. Distribution of plants by region: Sea Herring, canned (Maine Sardines)

REGION 1/	PLANTS 2/ LARGER THAN 80%	PERCENT OF TOTAL PLANTS	PLANTS 3/ LESS THAN 80%	PERCENT OF TOTAL PLANTS	TOTAL PLANTS THIS REGION	PERCENT OF TOTAL PLANTS
1. NORTH EAST.....	16	88.89	2	11.11	18	*****
2. MID ATLANTIC...	0	0.00	0	0.00	0	0.00
3. CHESAPEAKE.....	0	0.00	0	0.00	0	0.00
4. S. ATLANTIC....	0	0.00	0	0.00	0	0.00
5. GULF...........	0	0.00	0	0.00	0	0.00
6. PACIFIC........	0	0.00	0	0.00	0	0.00
7. GREAT LAKES....	0	0.00	0	0.00	0	0.00
8. HAWAII.........	0	0.00	0	0.00	0	0.00
9. AM. S.& PR.....	0	0.00	0	0.00	0	0.00
0. MISSISSIPPI....	0	0.00	0	0.00	0	0.00
TOTAL	16		2		18	

1/ Does not include Alaska

2/ Includes all plants where the value of sea herring constitutes greater than 80% of total plant sales.

3/ Includes all plants where the value of sea herring is less than 80% of total plant sales.

Data compiled from:
Source: National Marine Fisheries Service.

Table I-12. Summary of number of plants by select species.

Industry Segment	Number of plants 80 percent of sales by select species 1/	Number of Alaskan plants by select species
Bottomfish	142	
Gulf croaker F&F	- 2/	
Halibut	- 2/	
Salmon F&F	1	
Salmon canned	9	
Oysters Pacific, F&F	32	
Oysters Eastern, F&F	338	
Oysters Pacific, canned	1	
Oysters Eastern, canned	4	
Clams, F&F	67	
Clams, canned	1	
Fish Meal	22	
Sea Herring, canned	16	
Sea Herring, fillets	2	
Alaskan Bottomfish		3
Alaskan Salmon F&F		31
Alaskan Salmon, canned		59
TOTAL	635	93

1/ Does not include Alaska

2/ Included in bottom fish.

Table I- 13. Geographic concentration of selected segments of the seafood processing industry

Segment	Area of Concentration	Number of plants by location	Population of Host city
Sea Herring (Maine Sardines)	Lubec, Maine	4	950
	Eastport, Maine	3	1,989
	Milbridge, Maine	2	500
Menhaden	Beauford, N.C.	5	3,368
	Cameron, La.	4	950
	Empire, La.	3	600
	Biloxi, Miss.	3	48,486
	Abbeville, La.	2	10,996
	Reedville, Va.	2	400
Atlantic Bottom fish	New Bedford, Mass.	12	101,777
	Fairhaven, Mass.	9	16,332
	Delcambre, La.	4	1,975
Clams (East Coast)	Port Norris, N. J.	5	1,955
	Addison, Maine	3	250
	Stockton Springs, Maine	3	400
	Ipswich, Mass.	3	10,750
	Rowley, Mass.	3	3,040
	Chincoteaque, Va.	3	1,897
	Wildwood, N.J.	2	4,110
	Vineland, N. J.	2	47,399
	Essex, Mass.	2	637,887
	Easton, Md.	2	6,809
Oysters (East Coast)	Apalachicola, Fla.	20	3,102
	Biloxi, Miss.	18	48,486
	Coden, Ala.	17	500
	Eastpoint, Fla.	17	1,118
	Crisfield, Md.	13	3,078
	New Orleans, La.	14	593,471
	Weems, Va.	6	250
	Seabrook, Tx.	6	3,811
	Bon Secour, Ala.	6	600

continued.....

Table I- 13 . Geographic concentration of selected segments of the seafood processing industry (continued)

Segment	Area of Concentration	Number of plants by location	Population of Host city
Oysters (West Coast)	Shelton, Wa.	8	6,515
	Olympia, Wa.	4	23,111
	Newport, Ore.	2	5,188
	Ocean Park, Wa.	2	825
Anchovy Reduction	Terminal Island, Ca.	6	
Canned Salmon	Kodiak, Alaska	10	3,798
	Petersburg, Alaska	4	2,042
	Astoria, Oreg.	3	10,244
	Naknek, Alaska	3	178
	Egegik, Alaska	3	138

Source: National Marine Fisheries Service Plant List.

Table I-14. Number and size of U. S. seafood processing plants, 1970 and 1972 [1/]

Size Class	1970 No. of Plants	1970 Percent of Total	1972 No. of Plants	1972 Percent of Total
Up to $25,000 [2/]	414	24.8	309	19.4
$25,000 to $99,999	401	24.0	364	22.9
$100,000 to $199,999	233	13.9	232	14.6
$200,000 to $299,999	128	7.7	144	9.2
$300,000 to $399,999	81	4.8	65	4.1
$400,000 to $499,999	45	2.7	61	3.8
$500,000 to $749,999	76	4.5	91	5.7
$750,000 to $999,999	53	3.2	54	3.4
$1,000,000 to $1,499,999	65	3.9	54	3.4
$1,500,000 to $2,499,999	65	3.9	81	5.1
$2,500,000 to $4,999,999	46	2.8	52	3.3
$5,000,000 to $9,999,999	34	2.0	39	2.4
$10,000,000 and over	31	1.8	43	2.7
Totals	1,672	100.0	1,589	100.0

1/ Does not include Alaska.

2/ Dollar values are F.O.B. plant.

Source: National Marine Fisheries Service.

Table I-15. Concentration of fish and shellfish processing, 1972

Plants[1]	Value[2]	Percent of Total
	($1,000)	
4 largest plants	354,457	16.8
8 " "	511,097	24.3
10 " "	582,128	27.6
20 " "	850,548	40.4
30 " "	1,028,340	48.8
40 " "	1,158,258	55.0
50 " "	1,254,354	59.6
60 " "	1,329,898	63.2
70 " "	1,393,757	66.2
80 " "	1,447,774	68.8
90 " "	1,496,381	71.1
100 " "	1,538,204	73.1
125 " "	1,615,279	76.7
150 " "	1,675,015	79.6
175 " "	1,725,680	82.0
200 " "	1,769,109	84.0
Total all plants		
1,589[3]	2,105,290	100.0

1/ Ranking is by individual plant rather than by companies.

2/ F.O.B. Plant.

3/ Does not include Alaska.

Source: National Marine Fisheries Service.

Table I - 16. Percent of total value of shipments accounted for by:

Specie and Product Line	4 Largest Companies	8 Largest Companies	20 Largest Companies	50 Largest Companies	Total No. of Plants in seg.
	----------	----------	%	----------	
Fish Meal	47	65	93		38
Oysters Pacific F & F	51	69	95		38
Oysters Eastern	6	11	24	45	411
Clams Canned	93	99			13
Oysters East	56	82			16
Clams F & F	27	43	66	89	113
Bottom Fish	16	28	51	75	224
Oysters Western					3
Sea Herring	37	64			18
Salmon F & F	88	100			9

1/ Rounding to nearest whole percent.

Table I-17. Number and size of U.S. Canned Sea Herring processing plants, 1972

	Number of[1/] Plants	Percent of total sales	Percent of total plants
$0 to $25,000	0	0.0	0.0
$25,000 to $99,000	0	0.0	0.0
$100,000 to $199,999	0	0.0	0.0
$200,000 to $299,999	0	0.0	0.0
$300,000 to $399,999	0	0.0	0.0
$400,000 to $499,999	0	0.0	0.0
$500,000 to $749,999	2	4.84	11.11
$750,000 to $999,999	2	7.39	11.11
$1,000,000 to $1,499,999	6	30.08	33.33
$1,500,000 to $2,499, 999	6	44.29	33.33
$2,500,000 to $4,999,999	0 [1/]	0.0 [1/]	0.0 [1/]
$5,000,000 to $9,999,999	0	0.0	0.0
$10,000,000 and Over	0	0.0	0.0
TOTAL	18	100.0	100.0

1/ Several plants in this size class or larger have been deleted to avoid disclosure. Columns will therefore not total.

Table I-18. Number and size of U.S. fish meal processing plants, 1972.

Size class	Number of Plants 1/	Percent of total sales	Percent of total plants
$0 to $25,000	4	0.10	10.53
$25,000 to $99,000	5	0.48	13.16
$100,000 to $199,999	3	0.85	7.89
$200,000 to $299,999	0	0.0	0.0
$300,000 to $399,999	2	1.11	5.26
$400,000 to $499,999	0	0.0	0.0
$500,000 to $749,999	2	2.34	5.26
$750,000 to $999,999	4	6.31	10.53
$1,000,000 to $1,499,999	6	12.99	15.79
$1,500,000 to $2,499, 999	5	18.80	13.16
$2,500,000 to $4,999,999	4	23.46	10.53
$5,000,000 to $9,999,999	0	0.0	0.0
$10,000,000 and Over	0	0.0	0.0
TOTAL	38	100.0	100.0

1/ Several plants have been deleted to avoid disclosures. Columns will therefore not total.

Table I-19. Number and size of U.S. Eastern Oysters fresh and frozen processing plants, 1972

Size class	Number of[1/] Plants	Percent of total sales	Percent of total plants
$0 to $25,000	135	3.17	33.09
$25,000 to $99,000	126	15.61	30.90
$100,000 to $199,999	71	23.53	17.52
$200,000 to $299,999	38	20.23	9.25
$300,000 to $399,999	17	12.94	4.14
$400,000 to $499,999	12	11.95	2.92
$500,000 to $749,999	8	10.56	1.95
$750,000 to $999,999	0	0.00	0.00
$1,000,000 to $1,499,999	0	0.00	0.00
$1,500,000 to $2,499, 999	0	0.00	0.00
$2,500,000 to $4,999,999	0	0.00	0.00
$5,000,000 to $9,999,999	0	0.00	0.00
$10,000,000 and Over	0	0.00	0.00
TOTAL	407	100.01	100.00

[1/] Several plants have been deleted to avoid disclosure. Columns will therefore not total.

Table I-20. Number and size of U.S. clams, fresh and frozen processing plants, 1972

Size class	Number of[1/] Plants	Percent of total sales	Percent of total plants
$0 to $25,000	26	1.32	23.01
$25,000 to $99,000	39	10.17	34.51
$100,000 to $199,999	21	14.27	18.58
$200,000 to $299,999	10	12.10	8.85
$300,000 to $399,999	6	10.08	5.31
$400,000 to $499,999	0	0.0	0.0
$500,000 to $749,999	5	16.22	4.42
$750,000 to $999,999	3	13.86	2.65
$1,000,000 to $1,499,999	0	0.00	0.00
$1,500,000 to $2,499, 999	2	16.13	1.77
$2,500,000 to $4,999,999	0	0.0	0.0
$5,000,000 to $9,999,999	0	0.0	0.0
$10,000,000 and Over	0	0.0	0.0
TOTAL	113	100.0	100.0

1/ Several plants have been deleted to avoid disclosure. Columns will therefore not total.

Table I-21. Number and size of U.S. bottomfish processing plants, 1972.

Size class	Number of Plants	Percent of total sales	Percent of total plants
$0 to $25,000	51	0.63	22.77
$25,000 to $99,000	46	3.47	20.54
$100,000 to $199,999	43	8.17	19.20
$200,000 to $299,999	25	8.23	11.16
$300,000 to $399,999	13	6.31	5.80
$400,000 to $499,999	4	2.44	1.79
$500,000 to $749,999	17	13.76	7.59
$750,000 to $999,999	5	5.97	2.23
$1,000,000 to $1,499,999	9	16.36	4.02
$1,500,000 to $2,499,999	9	24.44	4.02
$2,500,000 to $4,999,999	2	10.21	0.89
$5,000,000 to $9,999,999	0	0.0	0.0
$10,000,000 and Over	0	0.0	0.0
TOTAL	224	100.0	100.0

Table I-22. Economic concentration & integration of selected salmon processing companies

Company Name	Plants Location	Products
Alaska Packers Assoc. Inc. (Subs. Del Monte)	Chiqnik, Alaska	Canned salmon
	Egegik, Alaska	Canned salmon
	Kodiak, Alaska	Canned salmon
	Larsen Bay, Alaska	Canned salmon
	Naknek, Alaska	Canned salmon
Alaskan Seafoods Inc.	Homer, Alaska	Crab Halibut Herring Herring roe Salmon Shrimp
Booth Fisheries (Div. Consolidated Foods Inc.)	Throughout the U.S. Canada Mexico Nicaragua France Orient	Canned sardines Canned scallops Canned tuna Frozen: clams Crabs, fish stick Flounder Haddock, halibut herring, lobster, etc.
Bumble Bee Seafoods (Div. Castle & Cook, Inc.)	Astoria, Ore.	Canned: shad roe, tuna, Alaska king crab, pet foods Frozen: dungeness crab Canned & Frozen: Salmon, shad, shrimp, sturgeon
	Cambridge, Md.	Canned: tuna, pet foods
	Honolulu, Hawaii	Canned: tuna, pet foods
	Bellingham, Wash.	Canned salmon
	Naknek, Alaska	Canned salmon
	Paramaribo, Surinam South America	Frozen Shrimp

continued.....

Table I-22. Economic concentration & integration of selected salmon processing companies (continued)

Company	Plant Location	Products
Carnation Seafoods Oceans of the World Eastern Inc.	New York, N. Y.	Frozen: clams cod, crab, fish sticks, flounder, haddock, halibut lobster, oysters, perch, salmon, scallops, shrimp
Jolly Roger Seafoods	Nahcotta, Wash.	Canned: oyster stew Frozen: clams, crabs, halibut, salmon, scallops, shrimp Canned & Frozen: crab, sturgeon, canned, Glass & Frozen oysters
Kadiak Fisheries Co.	Seattle, Wash.	Canned: salmon, crabmeat
King Salmon Inc.	Westport, Wash.	Canned & Frozen: clams, crabmeat, salmon, frozen dungeness crab, herring
Lazio Fish Co., Inc.	Eureka, Calif.	Canned: dungeness crabmeat, salmon, shrimp, tuna
New England Fish Co.	Chatham, Alaska Egegik, Alaska Ketchikan, Alaska Nakeen, Alaska Orca, Pederson Point, Sunny Point, Sand Point, Waterfall, Alaska Anacortes, Wash. La Conner, La Push, Wash. Warrenton, Oregon Newport, Oregon Miami, Fla.	Canned: salmon, shrimp, tuna, mackerel Frozen: Alaska king crab, dungeness crab, cod, fish sticks, flounder haddock, halibut lobsters, oysters, perch, scallops, salmon, shad roe, shrimp, breaded & prepared seafood items

continued.....

Table I-22. Economic concentration & integration of selected salmon processing companies (continued)

Company	Plants Location	Product
Pan-Alaska Fisheries Inc.	Monroe, Wash. Unalaska, Alaska Kodiak, Alaska	Frozen: dungeness crab, halibut, salmon, shrimp, Frozen: crabmeat, salmon Frozen: cod, crab, oysters, perch, salmon
Whitney-Fidalgo Seafoods Inc.	Seattle, Wash.	Frozen: clams, cod, crab, flounder, halibut, herring, shrimp, perch, tuna, canned & frozen salmon
	Anchorage, Alaska	Canned salmon
	Ketchikan, Alaska	canned salmon
	Kodiak, Alaska	canned crab & salmon
	Naknek, Alaska	canned salmon
	Petersburg, Alaska	Frozen: halibut, herring roe, canned & frozen: crab, salmon, shrin
	Port Graham, Alaska	Canned salmon Frozen herring roe
	Uyak, Alaska	Canned salmon Frozen herring roe

Source: Judge, Edward E., The Directory of the Canning, Freezing, Preserving Industries, 1972-73.

Table 1-23. Oysters - Landings by region, 1964-1973

Year	New England		Mid-Atlantic		Chesapeake		S. Atlantic		Gulf		Pacific		Total	
	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value
	mls. lbs	mls $	mils lbs	mils $	mils lbs	mils $	mils lbs	mils $	mils lbs	mils $	mils lbs	mils $	mils lbs	mils $
1964	.195	.326	1.36	1.37	22.10	15.81	3.53	1.51	23.39	6.27	9.97	2.65	60.53	27.93
1965	.340	.652	.757	1.06	21.19	16.70	4.08	1.51	19.16	5.71	9.17	2.23	54.69	27.87
1966	.408	.849	.917	1.17	21.23	14.54	3.66	1.58	17.18	6.49	7.83	2.75	51.22	27.37
1967	.323	.746	1.19	1.17	25.80	17.32	3.16	1.35	21.75	8.49	7.74	3.17	59.56	32.24
1968	.195	.456	1.54	1.49	22.68	15.26	2.97	1.53	26.74	10.27	7.77	3.00	61.89	32.01
1969	.152	.358	1.32	1.35	22.16	14.00	1.83	1.08	19.77	8.15	6.97	2.61	52.20	27.57
1970	.190	.403	1.41	1.76	24.67	15.08	1.63	.974	17.71	7.54	7.99	3.72	53.60	29.49
1971 1/													54.59	30.43
1972 1/													52.55	33.82
1973 1/													48.55	35.19

1/ Source: Fishery Statistics of U.S., 1973.
Source: Fishery Statistics of the U.S., 1964-1970

Table I-24. Oysters-processed product, United States, 1964-1972

Year	Fresh & Frozen						Canned 1/		Canning Plants 2/
	Shucked		Steamed		Specialties				
	Mils. lbs.	Mils. $	Mils. lbs.	Mils. $	Mils. lbs.	Mils. $	Mils. cases	Mils. $	Number
1964	46.11	35.26	.98	2.16	4.17	3.67	.538	7.46	(28)
1965	39.64	31.70	.61	1.34	4.42	3.38	.443	6.13	(21)
1966	38.41	32.46	.70	1.53	4.26	3.72	.484	7.22	(20)
1967	40.25	34.78	.852	1.41	5.00	4.60	.573	10.12	(22)
1968	43.14	38.99	1.00	2.03	5.96	5.44	.531	9.37	(22)
1969	42.70	38.62	--	--	4,87	5.00	.313	5.13	(16)
1970	46.55	41.81	--	--	5.72	5.36	.543	7.28	(12)
1971	48.39	47.66	.672	1.29	4.71	4.76	.694	9.37	(18)
1972							.658	11.35	(19)

1/ Includes both regular pack and specialties.

2/ Regular processing and does not include specialties due to uncertainty of duplication.

Source: Fishery Statistics of the U. S., 1964-1970, Canned Fish Products, 1972 (Prelim.), Processed Fish Prod., 1971.

Table I-25. Oysters, imports for consumption, 1963-1972

Year	Fresh & Frozen: Unclassified: Except seed oysters: Quant.	Fresh & Frozen: Unclassified: Except seed oysters: Value	Fresh & Frozen: Unclassified: (Prin. seed oysters): Quant.	Fresh & Frozen: Unclassified: (Prin. seed oysters): Value	Fresh & Frozen: Total: Quant.	Fresh & Frozen: Total: Value	Canned: Oysters & Oyster Juice: Quant.	Canned: Oysters & Oyster Juice: Value	Imports: Total: Quant.	Imports: Total: Value
	mils lbs	mils $	mils lbs	mils $	mils lbs	mils $	mils lbs	mils $	mils lbs	mils $
1963	1.380	.605	5.437	.469	6.817	1.074	8.463	3.101	15.280	4.175
1964	.991	.444	4.016	.497	5.007	.941	7.969	2.876	12.976	3.817
1965	1.290	.617	3.737	.416	5.027	1.033	8.638	3.225	13.665	4.258
1966	1.138	.560	1.973	.313	3.111	.873	12.015	4.494	15.126	5.367
1967	3.581	1.067	4.256	.827	7.837	1.894	16.114	5.845	23.951	7.739
1968	2.754	.888	2.102	.625	4.856	1.513	14.499	5.640	19.355	7.153
1969	1.429	.946	1.350	.550	2.779	1.496	16.720	6.373	19.499	7.869
1970	2.104	1.216	1.717	.481	3.821	1.697	14.953	8.140	18.774	9.837
1971	1.206	.855	.921	.479	2.127	1.334	9.452	6.545	11.579	7.879
1972	1.960	1.842	1.934	.237	3.894	2.079	20.848	13.763	24.742	15.842

Source: Fishery Statistics of the U.S. 1964-1970 Imports and Exports of Fishery Products-Annual Summary 1972.

Table I-26. Clams - Landings by region, 1964 - 1973

Year	New England		Mid-Atlantic		Chesapeake		S. Atlantic		Gulf		Pacific		Total	
	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value
	Quantities, million lbs., Value, million $												mils lbs	mils $
1964	6.40	3.52	46.02	7.82	10.99	3.06	.402	.152	.072	.024	.589	.318	64.46	14.89
1965	6.54	3.61	52.24	9.45	10.88	3.09	.404	.171	.114	.042	.677	.370	70.85	16.73
1966	7.46	4.14	54.90	11.13	9.50	2.85	.310	.119	.004	.001	.582	.309	72.75	18.55
1967	7.17	4.14	54.52	12.92	8.55	2.93	.320	.148	.354	.036	.585	.317	71.50	20.49
1968	7.42	4.15	45.26	12.35	13.32	3.76	.289	.150	.417	.046	.535	.294	67.25	20.73
1969	8.69	4.62	52.38	14.60	17.94	5.38	.423	.210	.647	.071	.663	.360	80.75	25.24
1970	11.08	5.93	63.30	16.75	22.69	5.21	.491	.248	.770	.081	.872	.570	99.20	28.79
1971 1/													82.66	30.54
1972 1/													89.10	31.86
1973 1/													106.29	34.73

1/ Fisheries of the U.S., 1973.
Source: Fishery Statistics of the U.S., 1964-1970.

Table I-27. Clams - processed product, United States, 1964-1972

Year	Fresh and Frozen				Canned 1/		(Canning Plants) 2/
	Shucked		Specialties				
	Quant.	Value	Quant.	Value	Quant.	Value	
	(mils. lbs)	(mils. $)	(mils. lbs.)	(mils. $)	(mils. cases)	(mils. $)	Exclusive of duplication
1964	--	--	--	--	--	--	--
1965	30.529	11.144	4.199	3.052	2.626	19.263	(39)
1966	33.014	13.238	5.425	4.219	2.701	22.690	(33)
1967	34.283	14.047	6.035	5.159	2.607	23.146	(32)
1968	27.370	14.677	13.013	9.562	2.405	21.912	(29)
1969	51.739	22.171	13.507	11.524	2.445	24.044	(31)
1970	56.333	26.658	8.228	7.146	2.609	28.161	(29)
1971	61.976	28.093	7.756	6.720	2.665	28.737	(26)
1972					2.825	28.705	(24)

1/ Whole and minced, chowder, juice and specialties

2/ Excluding canned specialties

Source: Fishery Statistics of the U.S., 1964-1970, Canned Fish Products, 1972 (Prelim.), Processed Fish Products, 1971.

Table I-28. Clams, imports for consumption, 1963-1972

Year	Fresh and frozen In shell or shucked Quant.	Fresh and frozen In shell or shucked Value	Canned Total Quant.	Canned Total Value	Imports Total Quant.	Imports Total Value
	(Imports, millions of lbs or millions of $)					
1963	.469	.097	1.544	.903	2.013	1.000
1964	.411	.080	1.433	.929	1.844	1.009
1965	.573	.097	1.423	.898	1.996	.995
1966	.703	.125	1.990	1.251	2.693	1.376
1967	.708	.171	1.750	1.079	2.458	1.250
1968	.749	.271	1.887	1.111	2.636	1.382
1969	1.087	.494	2.746	1.648	3.833	2.142
1970	1.720	.819	4.634	2.966	6.354	3.785
1971	3.072	1.251	3.186	2.130	6.258	3.381
1972	2.994	1.348	4.231	3.007	7.225	4.355

Source: Fishery Statistics of the U.S. 1964-1970.
Imports and Exports of Fishery Products, Annual Summary 1972.

Table I-29. Menhaden, U. S. landings by major states, and regions, 1963-1972

Year	State Landings						Regional Landings		Total U.S. Landings
	N.J.	Va.	N.C.	Miss.	La.	Other	Atlantic	Gulf	
	---------- Million pounds ----------								
1963	178	256	190	250	633	309	848	968	1,816
1964	64	331	173	238	600	154	656	904	1,560
1965	74	352	161	278	682	179	703	1,023	1,726
1966	13	273	182	191	556	93	515	793	1,308
1967	46	220	150	167	510	71	464	700	1,164
1968	68	270	167	150	622	98	552	823	1,375
1969	34	178	145	225	856	108	390	1,155	1,545
1970	31	446	108	206	960	86	628	1,209	1,837
1971	60	392	80	306	1,237	115	583	1,607	2,190
1972							832	1,107	1,939
1973									1,890

Source: Menhaden, Basic Economic Indicators, N.M.F.S., U.S. Dept. Commerce, Current Fisheries Statistics, No. 5934.

Table I-30. --Production of menhaden products, 1947-71

(Product-weight)

Year	Dried scrap and meal		Solubles		Oil	
	Thousand pounds	Thousand dollars	Thousand pounds	Thousand dollars	Thousand pounds	Thousand dollars
1947	197,204	10,884	-	-	63,550	11,425
1948	207,638	11,548	-	-	65,730	10,132
1949	225,282	17,773	-	-	62,204	3,408
1950	206,520	12,856	-	-	76,575	5,867
1951	230,852	13,878	-	-	94,028	9,771
1952	287,936	17,845	-	-	96,665	5,785
1953	349,504	21,767	78,076	3,593	133,684	8,806
1954	366,182	23,783	112,547	5,565	139,811	9,755
1955	381,256	25,458	123,877	4,397	159,241	12,195
1956	421,164	27,440	145,705	5,340	168,211	14,092
1957	344,776	21,726	138,797	5,615	118,484	9,466
1958	316,148	20,699	144,942	6,253	127,986	9,434
1959	447,786	26,392	216,159	5,853	154,712	10,743
1960	436,846	19,202	131,700	2,299	183,403	11,582
1961	495,102	25,852	146,610	3,142	235,167	12,913
1962	479,414	28,250	170,400	4,120	232,619	10,060
1963	368,410	22,263	149,662	4,486	167,634	9,853
1964	320,698	20,001	137,476	4,055	157,730	11,735
1965	351,918	25,869	146,360	4,666	175,204	13,241
1966	269,908	20,539	121,538	3,725	144,198	10,982
1967	238,270	15,265	103,540	3,080	101,384	4,736
1968	286,308	19,534	106,494	2,669	152,020	6,247
1969	318,986	26,960	126,534	3,069	149,155	8,253
1970	377,100	34,658	143,782	3,574	186,283	16,833
1971	442,008	34,969	182,482	3,773	242,071	19,268

Source: Fishery Statistics of the United States, various years and Industrial Fishery Products, 1970-71.

Table I-31. U.S. production of dried fish scrap and meal, solubles and manhaden oil, 1963-1972

Year	Dried Scrap and Meal			Solubles 1/			Menhaden Oil
	Menhaden	Other	Total	Menhaden	Other	Total	
	Million pounds						
1963	368	144	512	75	32	107	168
1964	321	150	471	69	24	93	158
1965	352	156	508	73	22	95	175
1966	270	178	448	61	22	83	144
1967	238	204	442	52	23	75	101
1968	286	184	470	53	19	72	152
1969	319	186	505	64	18	82	149
1970	377	161	538	72	23	95	186
1971	442	143	585	91	10	101	242
1972	387	174	561	104	30	134	167
1973	378					137	200

1/ Dry weight.

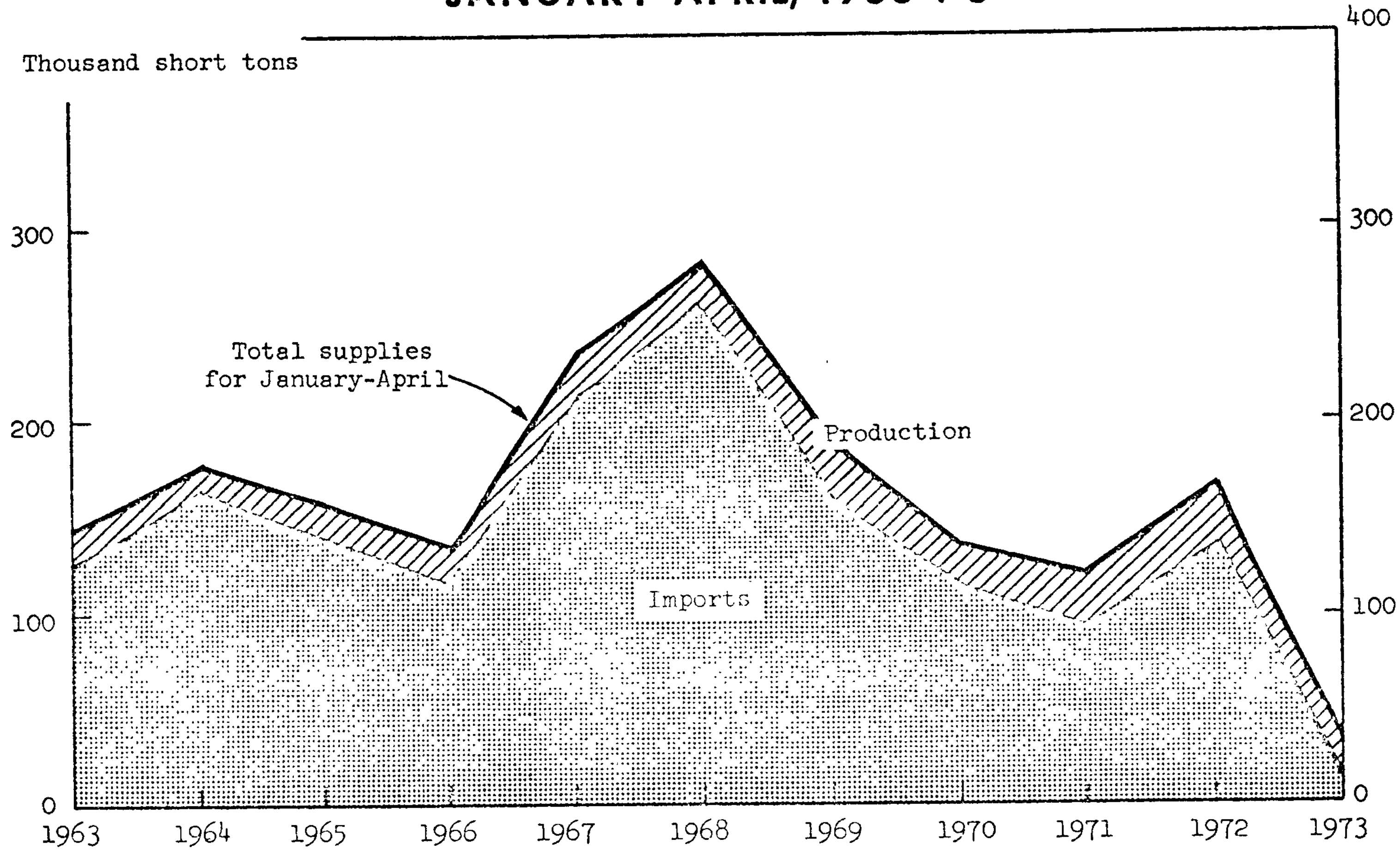
Source: Menhaden, Basic Economic Indicators, N.M.F.S., U.S. Dept. Commerce; Current Fisherty Statistics No. 5934.

Table I-32. Foreign trade dried fish scrap and meal, solubles and fish and marine animal oil[1] 1963-1972

Year	Dried scrap & meal			Solubles			Oil	
	U. S. Prodn. Mils. lbs.	Imports Mils. lbs.	% Imported %	U. S. Prodn. Mils. lbs.	Imports Mils. lbs.	% Imported %	U. S. Prodn. Mils. lbs.	Exports Mils. lbs.
1963	512	753	60	107	7	7	186	262
1964	471	878	65	93	6	6	180	152
1965	508	541	52	95	5	5	195	104
1966	448	896	67	83	4	5	164	77
1967	442	1,303	75	75	4	5	122	77
1968	470	1,711	78	72	1	1	174	65
1969	505	717	59	82	-	-	170	199
1970	538	503	48	95	-	-	206	159
1971	585	566	49	101	1	1	265	230
1972	571	784	58	134	-	-	188	193

1/ Source: Menhaden, Basic Economic Indicators, UMFS, U.S. Dept. Commerce, Current Fishery Statistics No. 5934, and where exports exceed production, it is assumed that additional supplies came from previous year's stocks.

U.S. PRODUCTION, IMPORTS, AND TOTAL SUPPLIES OF FISH MEAL, JANUARY-APRIL, 1963-73



NOAA Market Research and Services Division NMFS

Figure 1

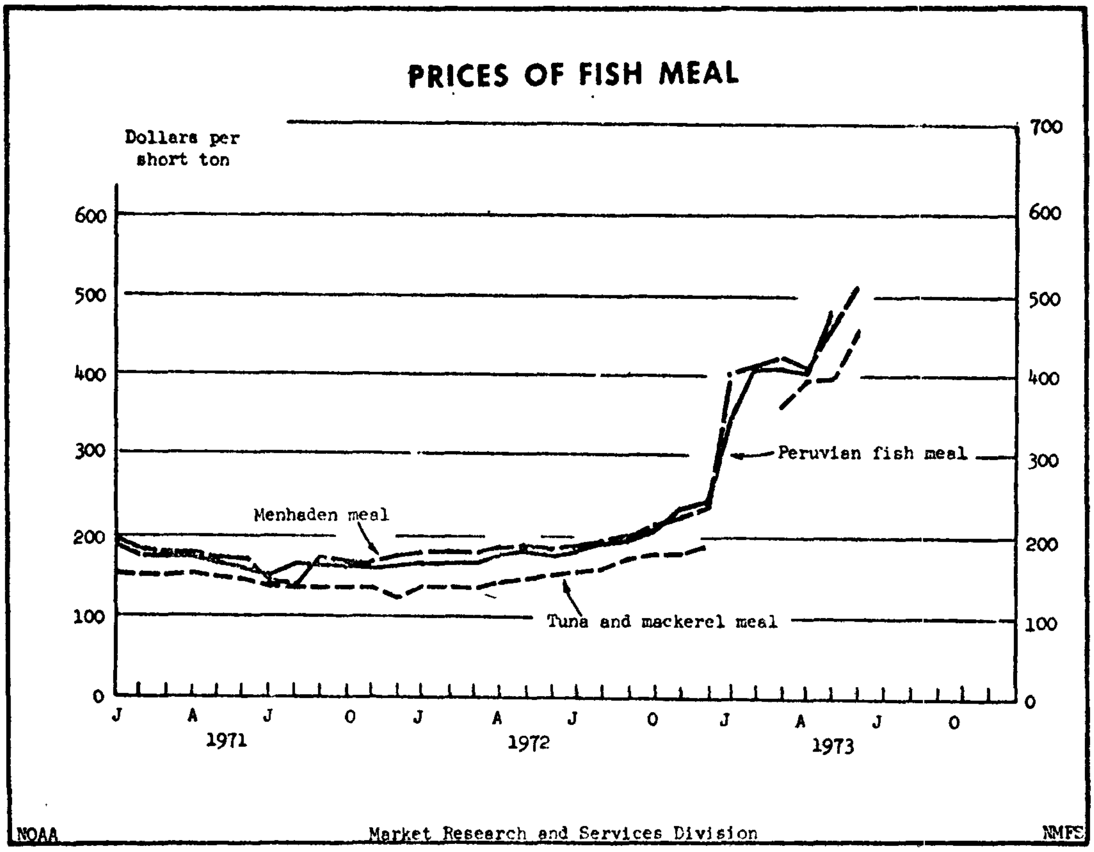

PRICES OF FISH MEAL
Dollars per short ton
700
600
500
400
300
200
100
0
Menhaden meal
Peruvian fish meal
Tuna and mackerel meal
J
A
J
O
1971
1972
1973
NOAA
Market Research and Services Division
NMFS

Figure 2

Table I- 33. Anchovies - landings and processed product, California, 1964-1973

Year	Meal & Scrap		Oil		California Landings	
	Quant.	Value	Quant.	Value	Quant.	Value
	Tons	$	(000 Lbs.)	$	Mils. lbs.	Mil. $
1964	(1)	(1)	(1)	(1)	4.98	.082
1965	(1)	(1)	409	1,208	5.73	.099
1966	4,468	675,748	773	56,608	62.28	.644
1967	5,575	722,475	1,004	39,051	69.61	.701
1968	2,762	336,523	899	32,304	31.08	.284
1969	11,436	1,738,195	4,861	207,416	192.49	2.157
1970	16,204	2,786,993	6,165	439,333	135.28	1.353
1971	7,718	1,195,465	3,169	175,702	88.00	.969
1972					149.07	1.763
1973					229.286	5.253

1/ Included in unclassified products.

Source: Fishery Statistics of the U.S. - 1964-1970. Processed Fishery Products, Annual Summary 1971

Table I-34. U. S. landings of Pacific salmon, by state, 1963-1972
(Round-weight)

Year	Alaska	Washington	Oregon	California	U.S. Total
	---------- Thousand pounds ----------				
1963	223,063	54,993	8,262	7,859	294,177
1964	311,623	21,275	9,867	9,481	352,246
1965	274,844	30,418	11,806	9,738	326,806
1966	333,325	32,367	12,373	9,447	387,512
1967	138,517	53,374	17,371	7,402	216,664
1968	285,272	25,754	9,631	6,952	327,609
1969	219,150	31,978	10,549	6,151	267,828
1970	346,465	37,601	19,442	6,611	410,119
1971					312,071
1972					216,685

Source: Salmon, Basic Economic Indicators, NMFS, U.S. Dept. Commerce, Current Fishery Statistics No. 6129.

Table I-35. U. S. salmon consumption, aggregate and per capita, canned and non-canned, 1963-1972. (Edible weight)[1]

Year	Aggregate Consumption Canned	Aggregate Consumption Non-canned[2]	Aggregate Consumption Total[3]	Per Capita Consumption Canned	Per Capita Consumption Non-canned[2]	Per Capita Consumption Total[3]
	------ Million pounds	--------		----------- Pounds	---------	
1963	136.0	36.4	171.5	.721	.193	.910
1964	145.7	34.3	179.5	.762	.179	.939
1965	162.2	36.6	198.8	.838	.189	1.027
1966	142.2	35.5	177.8	.727	.181	.910
1967	132.1	33.8	165.9	.669	.171	.840
1968	121.4	36.2	157.7	.609	.182	.791
1969	123.8	40.8	164.8	.615	.202	.818
1970	136.6	51.1	187.7	.671	.251	.922
1971	133.3	77.3	211.3	.647	.375	1.026
1972				.700		

1/ Conversion factor 0.60 of round weight.

2/ Includes fresh and frozen, smoked and cured.

3/ Up to 1965 these figures do not take into account changes in smoked, filets, steaks and canned stocks, therefore, from year to year the sum of non-canned and canned figures will vary slightly from the total consumption figures. On a continuous basis these variations cancel each other out.

Source: Salmon, Basic Economic Indicators, N.M.F.S., U.S. Dept. Commerce, Current Fishery Statistics, No. 6129.

Table I-36. U. S. supply and disposition of salmon, 1963-1972

Year	Beginning Stocks 1/	Landings 2/	Imports 3/	Total Supply	Ending Stocks	Exports 4/	Apparent Consumption
	Thousand pounds						
1963	20,305	294,177	12,614	327,096	19,132	22,187	285,777
1964	19,132	352,246	10,938	382,317	23,150	59,945	299,222
1965	231,078	326,806	9,639	567,523	185,907	50,296	331,320
1966	222,387	387,512	10,895	620,794	269,880	54,553	296,361
1967	269,880	216,664	10,685	497,229	167,217	53,540	276,472
1968	167,217	327,609	19,346	514,173	223,376	27,860	262,937
1969	223,376	267,828	13,557	504,761	170,457	59,668	274,636
1970	170,457	410,119	12,475	593,051	221,415	58,830	312,806
1971	221,415	312,071	11,747	545,233	126,624	66,524	352,085
1972							

1/ Beginning in 1965 fresh, frozen and cured, fillets and steaks, canners stocks and beginning in 1966 includes distributors stocks of canned salmon.

2/ West Coast landings.

3/ Includes all types converted to round weights.

4/ Includes canned and fresh and frozen; also includes cured to 1965, after which cured figures were no longer reported separately. All forms converted to round weight.

Source: Salmon, Basic Economic Indicators, NMFS, U. S. Dept. Commerce, Current Fishery Statistics, No. 6129.

Table I-37. Imports of salmon to the United States, by country of origin, 1963-1972.
(Round-weight equivalent)

Year	Canada			Japan			Other	Total
	Fresh & Frozen 1/	Canned	Total	Fresh & Frozen 2/	Canned	Total		
	Thousand pounds							
1963	10,287	838	11,125	713	494	1,207	282	12,614
1964	10,519	2	10,521	347	12	359	58	10,938
1965	9,321	106	9,427	38	20	58	154	9,639
1966	9,978	93	10,071	774	20	794	30	10,895
1967	10,475		10,475	157		157	53	10,685
1968	11,601	6,208	17,809	188	1,301	1,489	48	19,346
1969	10,100	2,529	12,629	3	822	825	103	13,557
1970	8,603	2,274	10,877	120	1,392	1,512	86	12,475
1971	9,234	2,060	11,294	815	616	1,431	22	12,747
1972		4,756			6,838		2	11,596

1/ Includes some smoked and cured.

2/ Less than 500 pounds.

Source: Salmon, Basic Economic Indicators, NMFS, U. S. Dept. Commerce, Current Fishery Statistics No. 6129, and Food Fish, Market Review and Outlook, NOAA, FFSOA 15, July 1973.

Table I-38. U. S. canned salmon production, imports and exports, 1963-1972.

Year	U.S. Production		Imports 2/	Exports 3/
	Std. Cases 1/	Quantity		
	- Thousands -	------------ Thousand pounds	---------	
1963	3,295	158,153	1,250	10,228
1964	3,759	180,442	236	20,924
1965	3,634	174,414	101	24,892
1966	4,358	209,161	589	20,484
1967	2,072	99,473	121	20,543
1968	3,448	165,490	4,956	5,726
1969	2,551	122,444	2,217	15,536
1970	3,822	183,466	2,441	16,811
1971	3,509	168,452	1,551	18,232
1972	1,773	85,109	11,647	21,358

1/ Various size cans converted to equivalent of 48, one-pound cans per case.
2/ Includes canned salmon in oil and not in oil.
3/ Product weight.

Source: Salmon, Basic Economic Indicators, NMFS, U. S. Dept. Commerce, Current Fishery Statistics No. 6129.

Table I-39. Pacific bottom fish, landing and values by states, 1963-1967[1/]

Year	Alaska Landing (000 lbs.)	Alaska Value (000 $)	Washington Landing (000 lbs.)	Washington Value (000 $)	Oregon Landing (000 lbs.)	Oregon Value (000 $)	California Landing (000 lbs.)	California Value (000 $)
1963	1,451	132	49,026	3,086	30,884	1,618	36,199	2,660
1964	2,679	295	40,935	2,576	31,716	1,601	32,064	2,454
1965	2,758	258	50,074	2,942	32,431	1,605	35,341	2,696
1966	2,356	278	54,255	3,168	26,575	1,515	36,177	2,975
1967	2,338	220	49,150	2,916	22,261	1,328	34,847	2,933

1/ Source: Pacific Groundifsh, Basic Economic Indicators Division of Economic Research

Table I- 40. Pacific bottom fish, U. S. landings by species 1963-1973[1]

Year	Rockfish (000 lbs)	Rockfish (000 $)[2]	Cod (000 lbs)	Cod (000 $)[2]	Lingcod (000 lbs)	Lingcod (000 $)[2]	Pollock (000 lbs)	Pollock (000 $)[2]	Sablefish (000 lbs)	Sablefish (000 $)[2]	Flounder (000 lbs)	Flounder (000 $)[2]	Ocean Perch (000 lbs)	Ocean Perch (000 $)[2]
1963	25,030	1,328	6,369	350	4,790	293	N.A.	N.A.	6,464	654	51,200	3,696	23,578	1,172
1964	19,315	1,003	6,414	351	5,229	294	N.A.	N.A.	8,068	877	47,395	3,402	20,973	999
1965	21,389	1,158	10,153	525	6,818	378	146	2	7,283	716	46,463	3,410	28,352	1,334
1966	25,529	1,412	9,983	518	7,959	450	267	4	6,931	669	46,830	3,778	21,864	1,105
1967	22,139	1,328	9,155	482	8,548	484	96	2	7,073	641	46,159	3,620	15,426	861
1970	27,593	1,830	2,782	180	--	--	9,217	697	--	--	45,948	4,100	15,265	963
1971	24,674	1,524	6,472	455	--	--	10,847	828	--	--	44,285	3,935	10,843	704
1972	30,539	1,912	10,390	779	--	--	12,796	1,139	--	--	52,285	5,363	9,752	591
1973 [3]	35,419	3,451	9,482	697	--	--	14,077	1,438	--	--	47,854	4,778	5,155	506

1/ Pacific groundfish, basic economic indicators, Division of Economic Research

2/ Ex vessel value.

3/ Fisheries of the U.S., 1973.

Table I- 41. Atlantic bottom fish, landings and value, 1963-1972 1/

Year	Landings Thousand Pounds	Value Thousand dollars
1963	518,187	34,308
1964	507,984	32,419
1965	487,425	36,610
1966	480,709	40,764
1967	403,761	32,855
1968	383,100	32,294
1969		
1970	319,385	38,528
1971	300,262	36,815
1972	284,438	43,288
1973	296,463	48,849

1/ Source: Atlantic bottom fish, Basic Economic Indicators, Division of Economic Research

2/ Includes cod, cusk, flounder, haddock, red and white hake, ocean perch, pollock and whiting.

Table I-42. Atlantic bottom fish, landings and value, by species, 1963-1972[1/]

Year	Cod		Cusk		Hake (red & white)		Ocean Perch		Pollock		Whiting		Flounder		Haddock	
	Landing	Value	Landing	Value	Landing	Value	Landing	Value	Landing	Value	Landing	Value	Landing	Value	Landing	Value
	(000 lbs)	(000 $)	(000 lbs)	(000 $)	(000 lbs)	(000 $)	(000 lbs)	(000 $)	(000 lbs)	(000 $)	(000 lbs)	(000 $)	(000 lbs)	(000 $)	(000 lbs)	(000 $)
19[illegible]	42,177	3,106	1,909	110	12,961	336	131,870	6,319	14,607	670	92,643	2,178	121,627	11,036	123,972	11,705
1964	38,746	2,669	2,319	118	11,303	384	110,141	4,780	13,287	658	94,233	2,067	125,330	10,897	133,498	11,845
1965	36,048	2,877	2,177	131	10,052	365	111,960	4,728	11,856	723	82,574	2,204	127,364	13,288	133,892	13,630
1966	37,576	3,196	2,218	133	5.961	280	103,416	4,530	9,018	511	90,408	3,955	121,955	15,325	132,288	13,943
1967	44,400	3,578	1,717	106	2,800	153	71,409	2,799	7,297	410	69,543	2,156	106,508	12,495	98,464	11,094
1968	48,600	3,500	1,500	94	3,000	100	61,500	2,400	6,400	300	77,900	2,700	112,900	13,900	71,300	9,300
1969																
1970	53,226	5,740	1,351	101	6,300	358	55,290	2,725	9,217	697	44,515	3,890	122,598[2/]	18,973[2/]	26,888[2/]	6,044[2/]
1971	52,824	6,345	1,776	157	7,898	456	59,852	3,047	10,847	828	33,201	2,106	112,265	18,256	21,599	5,620
1972	46,254	7,887	2,170	215	9,513	686	58,791	3,289	12,796	1,139	26,711	2,382	116,482	23,399	11,721	4,291
1973	50,080	8,989	2,866	331	10,046	915	53,683	4,132	14,077	1,438	42,671	3,394	114,727	26,490	8,313	3,160

1/ Source: Atlantic Bottom Fish, Basic Economic Indicators, Division of Economic Research.

2/ Derived by subtracting Pacific landings from total landings for 1970 to 1973, Fisheries of U. S., Landings by Specie.

Table I-43. Atlantic bottom fish, U.S. sources and disposition, 1960-1972[1/] [2/]

Year	Beginning stocks	Landings	Imports	Total supply	Ending stocks	Exports	Apparent total consumption
				million pounds			
1960	251.3	528.5	575.3	1,355.1	229.7	1.7	1,123.7
1961	229.7	532.8	709.1	1,471.6	201.5	1.4	1,268.7
1962	201.5	542.4	802.8	1,546.7	220.7	1.4	1,324.6
1963	220.7	518.2	835.0	1,573.9	234.1	1.7	1,338.1
1964	234.1	508.0	901.4	1,643.5	211.1	1.6	1,430.8
1965	211.1	487.4	1,082.4	1,780.9	250.2	2.0	1,528.7
1966	250.2	480.7	1,173.3	1,904.2	305.8	2.8	1,595.6
1967	305.8	403.8	1,063.6	1,773.2	271.0	3.1	1,499.1
1968	271.0	383.1	1,446.9	2,101.0	307.1	2.0	1,791.9
1969	307.1				306.9		
1970							
1971							
1972							

1/ Source: Atlantic Bottom Fish, Basic Economic Indicators, Division of Economic Research.

2/ Includes cod, cusk, flounder, haddock, red and white hake, ocean perch, pollock and whiting.

Table I-44. Supply of bottom fish fillets and steaks, 1960-1973 1/

Year	U. S. Production		Imports		Total
	Thousand pounds	Precent	Thousand pounds	Percent	Thousand pounds
1960	93,818	37.6	155,550	62.4	249,368
1961	93,039	32.3	195,099	67.7	288. 138
1962	93,625	29.7	221,420	70.3	315,045
1963	83,419	26.5	231,768	73.5	315,187
1964	75,166	23.4	246,569	76.6	321,735
1965	77,180	20.7	294,954	79.3	372,134
1966	75,418	19.3	315,097	80.7	390,515
1967	71,034	20.0	283,567	80.0	354,601
1968	55,349	12.4	390,236	87.6	445,585
1969	47,269	10.0	426,728	90.0	473,997
1970	42,894	8.6	458,762	91.4	501,656
1971	43,808	8.3	482,618	91.7	526,426
1972	35,683	5.9	568,714	94.1	604,397
1973	46,685	7.5	578,826	92.5	625,511

1/ Includes Atlantic ocean perch and includes blocks and slabs.

Source: Fisheries of the U. S., 1972.

Table I-45. Halibut, U. S. landings, 1963-1972

Year	Landings		
	Pacific	Atlantic	Total
	Thousand pounds		
1963	45,569	272	45,841
1964	35,047	307	35,354
1965	40,497	328	40,825
1966	40,326	307	40,633
1967	39,778	293	40,073
1968	25,740	251	25,991
1969	33,205	211	33,416
1970	34,349	198	34,547
1971	28,413	238	28,651
1972			26,834
1973			24,196

Source: Halibut, Basic Economic Indicators, NMFS, U.S. Department of Commerce, Current Fisheries Statistics, No. 6128.

Table I-46. U. S. halibut consumption, aggregate and per capita, 1963-1972 (Edible weight)

Year	Aggregate	Per Capita
	(Thousand pounds)	(Pounds)
1963	34,962	.185
1964	38,587	.202
1965	34,398	.177
1966	31,762	.162
1967	34,396	.174
1968	35,175	.176
1969	33,067	.164
1970	30,151	.148
1971	31,080	.150
1972		

Source: Halibut, Basic Economic Indicators, NMFS, U. S. Department of Commerce, Current Fisheries Statistics, No. 6128.

Table I-47. Halibut, U. S. imports, 1963-1972

Year	Dressed, fresh & frozen	Fillets & Steaks 1/	Total
	---------- Thousand pounds ----------		
1963	22,722	4,817	27,539
1964	22,567	5,569	28,136
1965	21,726	5,942	27,668
1966	19,496	5,699	25,195
1967	15,567	8,377	23,944
1968	18,082	10,940	29,022
1969	20,093	8,448	28,541
1970	18,213	6,501	24,714
1971	19,971	5,749	25,720
1972	16,731		
1973	12,619		

1/ Prior to 1964, includes salmon. It is estimated that approximately 75 percent was halibut. After September, 1963, includes only halibut.

Source: Halibut, Basic Economic Indicators, NMFS, U. S. Department of Commerce, Current Fisheries Statistics, No. 6128.

Table I- 48. Sea Herring - landings and processed product, Maine, 1963-1973

Year	Canned Pack		Landings	
	Sardines	Value	Quantity	Value
	Mils. cases	Mils. $	Mils. lbs.	Mils. $
1963	1.62 1/			
1964	.866	7.584	60.866	1.275
1965	1.27	10.868	70.180	1.168
1966	1.33	12.262	58.299	1.209
1967	1.25	13.862	64.600	1.538
1968	1.73	19.297	69.703	1.669
1969	1.04	11.512	54.214	.968
1970	.807	11.227	36.593	.653
1971	.951	10.856		
1972	1.56	23.884		
1973	.955			

1/ Processed fishery products 1970-1972, Source: Fishery Statistics of the U.S., 1967-1969.

2/ Source: Fisheries of the U.S., 1973

Table I-49. Canned sardines, U. S. supply, 1960-1973[1/]

Year	U. S. Production		Imports		Exports [2/]		Total for
	Maine	Pacific	In Oil	Not in Oil	In Oil	Not in Oil	U.S. Cons.
	Thousand pounds						
1960	46,744	27,714	21,236	6,140	264	20,955	80,615
1961	17,635	18,859	27,877	14,611	185	7,475	71,322
1962	50,248	6,168	32,603	20,342	578	7,188	101,595
1963	37,890	2,568	19,908	21,640	146	3,493	78,367
1964	20,259	5,438	20,033	24,602	839	2,426	67,067
1965	29,646	374	21,532	23,538	3/	3,376	71,714
1966	31,118	116	23,601	33,987	3/	3,557	85,265
1967	29,260	4/	25,494	26,945	3/	1,373	80,326
1968	40,489	4/	28,436	30,431	3/	3,033	96,323
1969	24,401	-	27,220	18,147	3/	2,095	67,673
1970	18,872	-	34,070	12,838	3/	1,456	64,324
1971	22,249	-	31,034	18,985	3/	890	71,378

continued.....

Table I-49. Canned sardines, U. S. supply, 1960-1973[1] (continued)

Year	U. S. Production .		Imports		Exports [2]		Total for
	Maine	Pacific	In Oil	Not in Oil	In Oil	Not in Oil	U.S. Cons.
	Thousand pounds						
1972	36,540	-	41,544	28,671	3/	3,030	103,748
5/ 1973	23,284	-	36,089	31,330	3/	1,740	88,963

1/ Source: Fisheries of the U.S., 1972; U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Maine Fisheries Service, Current Fishery Statistics 20. 6100.

2/ It has been pointed out by the Maine Sardine Council that most of the exports presented above are actually shipment to Canada for warehousing which are then reshipped to the domestic markets.

3/ Data on the pack in oil have been included with the pack not in oil.

4/ Data not available.

5/ Fisheries of the U.S., 1973.

II. FINANCIAL RETURNS AND FINANCIAL CHARACTERISTICS OF THE INDUSTRY

The ability of industry or individual plants to withstand the financial impacts of mandatory pollution abatement standards depends on many financial, production and locational factors. These obviously include qualitative and quantitative considerations, many of which directly or indirectly reflect the financial profile of the plant. The objective of this chapter is to briefly outline some of the salient characteristics which influence the ability of industry segment or plants to either acquire capital or bear the additional operating expenses resulting from the installation or operation of waste treatment facilities.

This objective is complicated by the fact that basic investment and operating costs for the seafoods industry are not available in published form nor is such information generally available from all firms in the industry. The development of investment and operating costs for specific products, e.g., bottom fish, oyster or salmon, becomes particularly difficult where these products are processed as part of multi-product plant operations. In addition, some of the major processors are parts of conglomerates or diversified food processors so that analysis of financial statements given in annual reports or of data given in such publications as Standard and Poors reveals little about the costs and returns from the seafood processing operations of these corporations or specific product lines.

The situation is further complicated by the fact that the age and construction of seafoods processing plants varies greatly from plant to plant. Even though plants may be nearly standardized, i.e., fish meal, virtually no data on investments and operating costs are available in published form. Many of the processors operate from a variety of facilities. Some are parts of diversified seafoods processing plants, some have "floater" plants based on barges, converted ferries, obsolete "Liberty" ships or other hulls, and some operate out of shore-based plants which vary from ramshackle operations in old waterfront buildings to new, modern, specialized processing plants.

Only a limited amount of meaningful work on the costs of processing seafoods has been conducted by universities or other research organizations. In its evaluation of the market research and service programs of the National Marine Fisheries Service, reported in October, 1972, Development Planning and Research Associates, Inc., recommended that priority be given to costs of processing seafoods and to economies of scale in the processing of seafoods.[1/]

1/ Seltzer, R. E., Evaluation of Market Research and Service Activities of the National Marine Fisheries Service, Development Planning and Research Associates, 1972.

Faced with this situation, the economic contractor has been forced to develop its own estimates of investment and operating costs based on such data as are available from a variety of unpublished sources and a great number of personal contacts with firms engaged in seafoods processing.

Ideally the procedure would involve a plant by plant assessment of all relevant financial and production characteristics. Clearly this is not practical due to the number of plants that must be considered herein.

It must also be recognized that the seafood processing industry is one of the most complex and diverse in terms of number of plants, size of plants, age of plants, yearly production variations, final product form and raw production variations. The model plants presented in this chapter therefore represent general financial characteristics of broad processing segments. The impact analysis will, however, account for unexplained variations by utilizing sensitivity analysis to account for production and profitability variations.

As explained earlier we adopted a return on sales framework of analysis. The implication of the above for the current chapter is that we shall present general financial considerations and estimated profitability ranges by industry segment and the emphasis will not be on presenting detailed cost or expense breakdown by processing segment.

General economic considerations including constraints on financing additional capital assets are presented in the following sections. Model plants and general profitability levels are presented in section C of this chapter.

A. General Considerations

As mentioned above many considerations must be evaluated to accurately determine the economic impact of impending effluent limitation standards. There are many unique factors intrinsic to the seafood processing industry that substantially and in some cases adversely influence the industry's ability to absorb or withstand the financial impacts of pollution abatement standards. Many of these characteristics are enumerated in the following subsections. Some of these items or subsections are directly related to physical or location characteristics that in turn possess financial consideration or facets. The critical nature of some of these factors is such that they must be repeated and further emphasized.

1. Physical Considerations

As mentioned above, many segments of the seafood processing industry are dominated by many small plants. This is true for all segments considered herein, with the exception of various portions of the salmon, clam and fish meal segments. For many of the remaining segments relatively low capital requirements have provided unrestricted entry which has resulted in a highly competitive and fragmented industry.

These plants (small economically and physically) are in general relatively old facilities that are in many cases being operated by second and third generation family members. Plant age, however, is a nebulous concept since some modernization is required and plant replacement is an on-going process. The mere fact, however, that many plants are located on sites initially established years ago has several implications.

For example, frequently the surrounding land has been developed for industrial, residential, or commercial activities, which has left the seafood processing plant enclosed and a virtual enclave. Land required for expansion or waste water treatment facilities is frequently available only at exorbitant prices. Frequently, even if land is available various constraints are encountered. These include zoning regulations or rugged terrain which is not compatible with land requirements for plant expansion or waste water treatment facilities. Additional constraints stemming from tribal land ownership by native Americans (Indian or Eskimo), principally in Alaska, are also encountered.

2. Economic Considerations

The above general physical characteristics can be expressed in general financial or economic terms. In this case the description or narrative is couched in terms of under-utilization of plant capacity, lack of raw product, difficulties acquiring required capital and declining number of small plants. For most of the seafood industry the above description is the general rule rather than the exception.

B. Constraints on Financing Additional Capital Assets

Constraints on financing additional capital required for water pollution control facilities will vary greatly from firm-to-firm and from location-to-location. In general, it is anticipated that there will not be serious constraints in securing capital required for pollution control for most large seafoods processing plants. However, in individual situations where plants are old, obsolete or unprofitable, and where local conditions may require substantial investments for internal pollution abatement systems or for participation in expanding capacity of sewer systems in communities, the seafood processing owner/management may hesitate or be unable to make the investments required. The difficulties encountered depend on the amount of capital required and the constraints encountered.

Seafood processing plants that are owned by conglomerates, large diversified food processing firms or by large diversified seafoods processing companies will have less difficulty acquiring capital and capital availability is not expected to be a limiting factor. In situations where uncertainty exists concerning the resource stock even the large processors may hesitate to seek the funds required for pollution abatement equipment.

Capital availability may be a much more serious problem for small plants which continue to operate primarily because owners have depreciated out original investment costs, consider their investment in the plant as "sunk capital" and consider that the plant has a "utility value" if continued in operation which is greater than the "market value" or "salvage value" of the plant should they decide to cease operations. For such plants the increased investment required for pollution control may be difficult to obtain since it may be unattractive to continue plant operations. In these situations, the decision to attempt to obtain additional capital may be based on the desire of the owners to maintain the business for personal employment reasons rather than on the expectation of realizing a return on invested capital.

In the following section we shall briefly highlight the salient features of the model plants that have been developed to represent respective industry segments.

C. Estimated Earnings and Financial Considerations by Segment

Prior to this point most of the discussion has been in reference to general characteristics and statistics concerning plant numbers, landing, demand and supply by industry segment. It is now time to focus attention on specific financial considerations by industry segment. This is accomplished by developing model plants which are used to represent financial profiles of various types of plants.

It must be emphasized that model plants are intended to portray the financial characteristics of groups of plants and do not portray the exact characteristics of one specific plant. It is therefore probable that any one observation or specific plant will have profitability measures that differ from the estimates provided. Unique location, production or process characteristics indeed insure this. The economic contractor recognizes that variations occur and no single or reasonable number of model plants will accurately portray the exact financial characteristics of each and ever plant. Cognizant of this fact we shall utilize broad profitability measures and sensitivity analysis in the impact analysis to attempt to account for unexplained variations in profitability.

The model plants that have been developed do not attempt to estimate numerous specific line items such as labor, cans, fuel etc. All plants were, however, constructed with as mucn detail as possible and were then aggregated into broader items such as product related or plant related expenses. It should also be pointed out that investment data is even more difficult to gather and analyze than direct or indirect expenses. Numerous variations and complications enter due to plant age, process and other factors.

The procedures utilized in constructing the model plants included plant visits, personal interviews and in general acquiring data from numerous seafood processors throughout the country. Written and oral communications provided much of the data. Published data and prices have also been utilized. These data were then analyzed (in some cases rejected or corroborated) and used for the model plants presented at the end of this chapter.

A brief review of the models is presented below.

1. Alaskan Salmon Canning Segments

A total of twelve Alaskan salmon canning model plants have been constructed. These have been delineated into various sizes of plants in three general locations -- Southeast, Central and Western Alaska. These models have been constructed from specific plant data from numerous salmon processing plants in these areas.

The effects of low plant utilization are obvious. All data is based on 1972 figures which indicate that plants were operating from 15 to 30 percent capacity. Due to the large fixed investments and fixed costs the Alaskan salmon canning plants all show large losses for this time period. Losses approach 40 percent of sales. Annual cash flow is negative in all cases including the large plants. Tables II-1 to II-3 present model plant data for these plants. It is impossible to justify the existence of the Alaskan salmon canning segments considering the magnitude of the losses portrayed in these tables.

Due to the fact that 1972 reflects the effects of extremely low utilization, efforts were also expended to construct model plants for a five year period, 1968 to 1972. These model plants show positive cash flow and profits for the five year period. Profits as a percent of sales for this period range from 1 to approximately 5 percent of sales before tax. This rate of return is relatively low considering the risk and variability that may be attached to future salmon runs. Two or three consecutive years of low plant utilization can effectively reduce profits to very low levels. Tables II-4 through II-6 present model plant and cash flow for Alaskan salmon canners over a five year period.

Even over a five year period, which should be a long enough period of time to erase seasonal variations, the profitability estimates are sufficiently low that new capital is not likely to be attracted to this segment. This is especially true considering the unusually high risk and uncertainty. The high percentage of underutilized capacity coupled with substantial variations in volume of landings further discourage new capital investment.

2. West Coast Salmon Canning Segments

Two West Coast salmon canning model plants have also been constructed. This includes one model with sales of approximately $600,000 and another with sales of approximately $2,500,000. Using published prices of $50.50 per case this represents 12,500 and 50,000 cases annually.

Both plants are shown to be operating at 50 percent of capacity. Even at this relatively low level of capacity both have a positive cash flow for the period.

Before tax return on sales for the two models is 6.1 and 9.9 percent respectively. Cash flow and earnings data for these models is shown in Table II-7.

3. West Coast Fresh and Frozen Salmon Segment

A total of five West Coast fresh and frozen salmon models have been constructed. These plants range in size from 20,000 pounds to 1,350,000 pounds.

In general the plants have positive cash flow, and a profitability rate of 4.5 to 8.8 percent tax return on sales. Little investment is required for a plant of this type. The small plant has total assets of $17,000, much of which is current (inventory). Return on investment is estimated to be between 6.5 and 14.5 percent.

Investment, profitability and operating data are shown in Tables II-8 to II-10. A halibut processing line is also presented for two of these plants.

4. West Coast Bottom Fish Segment

Table II-11 present data for bottom fish and halibut processors. Both of the segments show low levels of profitability with the small bottom fish plant and all of the halibut processors showing a loss. Before tax return on sales for the bottom fish processors varies from - 11.2 percent to plus 2.8 percent.

The above plants and profitability measures will be used for West Coast and Alaskan bottom fish processors.

5. Atlantic Bottom Fish Segment

At 75 percent capacity, the Atlantic bottom fish processing models show a before tax return on sales of 2.3 to 5.3 percent. Return on investment is estimated to be 3.2, 3.7 and 5.8 percent for the three plants. (Table II-12)

The basic relationships for these models were developed on plant interviews and actual plant data plus fundamental relationships derived in other segments.

6. Fish Meal Segment

Two models were developed for the fish meal segment. The model presented in Table II-13 was developed for the anchovy reduction segment and the model presented in Table II-14 was developed for small menhaden producers. While only one small model plant is presented for the menhaden segment this is not viewed as a serious limitation due to the fact that the guidelines require only in-plant changes for large menhaden plants. Both segments have a positive cash flow and profits. Before tax, return on sales is 3 and 6 percent for menhaden and anchovy reduction plants respectively.

7. Oyster Segments

Three oyster models are shown in Table II-15 through II-17. This includes one model for eastern fresh and frozen oysters, one for oyster canners and one model for West Coast fresh and frozen oysters. All show a positive cash flow and returns ranging from 2.9 percent before tax return on sales to 5 percent before tax return on sales.

Return on investment is estimated to be 4.6, 8.7, and 8.5 percent for the three plants.

8. Clam Segments

Estimated earnings and cash flow for two clam models are presented in Tables II-18 and II-19. Before tax return on sales is estimated at 4.4 and 4.9 percent for the canned clam and fresh and frozen clam models respectively.

9. Maine Sardine Segment

Two models have been developed for the Maine sardine segment. These are for plants with approximately 40,000 and 130,000 case productions in 1972. These models are presented in Table II-20.

The returns are estimated at 5.4 and 3.7 for the small and large plants respectively. This is due to a higher rate of utilization for the small plant. Since plant utilization is somewhat higher in 1972 than in preceeding or subsequent years these profitability rates and financial returns are higher than should be expected over the long run.

Individual models for the sea herring filleting segment have not been included.

D. Summary

The model plants as presented in this chapter have utilized all data available to the economic contractor. A great number of personal contacts and published data, when available, have been used to develop these models. Even though every attempt was made to be comprehensive there are cases where data were not available or were deliberately withheld. In these situations basic relationships were extrapolated from other segments.

The profitability measures as presented in the model plants will be used in the impact analysis, Chapter IV. As has been stated earlier modifications will be made and a sensitivity analysis utilized.

Some of the data developed and presented in the model plants are further summarized in Tables II-21 and II-22. Table II-21 presents a summary of financial returns by segment and Table II-22 presents selected margins by processing segment.

In general several conclusions can be made from the models analyzed.

1. Alaskan seafood plants in 1972 appeared to be generally unprofitable, but were marginally profitable as an average of the 1968-72 period.

2. Larger plants are generally more profitable than smaller plants.

3. The West Coast salmon industry appears more profitable than other fishery segments studied.

4. Returns on investment to most segments are below current interest rates.

Table II.-1. Estimated earnings and cash flow for Southeast Alaska salmon canner, 1972

	Plant size $1,468,000 Annual sales 1/	Plant size $2,431,000 Annual sales 1/	Plant size $2,889,000 Annual sales 1/
Annual capacity (cases)	105,000	175,000	210,000
1972 Utilization	30%	30%	30%
1972 Production (cases) 2/	32,000	53,000	63,000
Sales	1,468 3/	2,431 3/	2,889 3/
Product related expenses	1,122	1,928	2,335
Plant related expenses	436	750	908
Cash earnings	(91)	(247)	(354)
Depreciation	72	102	114
Interest	36	51	57
Pretax income	(199)	(400)	(525)
Income tax	--	--	--
After tax income	--	--	--
Annual cash flow	(55)	(196)	(297)
Estimated replacement investment	3,000	4,250	4,750
Book value investment	1,200	1,700	1,900
Current assets	485	812	953
Net working capital	191	326	375
Total assets	1,685	2,512	2,853
Estimated long-term debt	556	810	910
ROS (% before tax)	(13.6)	(16.4)	(18.1)
ROI (% profit before tax/ total assets)	(11.8)	(15.9)	(18.4)

1/ All revenue, expense and financial data shown in thousands.

2/ Standard cases defined as 48/1 lbs.

3/ Ave. price $45.86 per case as reported by selected Southeast Alaska salmon canners.

Table II-2. Estimated earnings and cash flow for Central Alaskan salmon canner, 1972

	Plant size $1,079,000 Annual sales 1/	Plant size $2,159,000 Annual sales 1/	Plant size $3,285,000 Annual sales 1/
Annual capacity (cases)	116,000	232,000	348,000
1972 Utilization	20%	20%	20%
1972 Production (cases) 2/	23,000	46,000	70,000
Sales	1,079 3/	2,159 3/	3,285 3/
Product related expenses	865	1,740	2,731
Plant related expenses	336	677	1,062
Cash earnings	(122)	(258)	(508)
Depreciation	36	79	108
Interest	18	40	54
Pretax income	(176)	(377)	(670)
Income tax	--	--	--
After tax income	--	--	--
Annual cash flow	(140)	(298)	(562)
Estimated replacement investment	1,500	3,300	4,500
Book value investment	600	1,320	1,800
Current assets	356	712	1,084
Net working capital	140	280	427
Total assets	956	2,032	2,884
Estimated long-term debt	296	640	891
ROS (% before tax)	(16.3)	(17.5)	(20.4)
ROI (% profit before tax/ total assets)	(18.4)	(18.6)	(23.2)

1/ All expense, sales and financial data shown in thousands.
2/ Standard cases defined as 48/1 lbs.
3/ Ave. price $46.93 per case as reported by selected Central Alaska salmon canners.

Table II -3. Estimated earnings and cash flow for Western Alaska salmon canner, 1972

	Plant size $489,000 Annual sales 1/	Plant size $978,000 Annual sales 1/	Plant size $1,956,000 Annual sales 1/
Annual capacity based on 34 days, at 8 hrs/day	68,000 cases	136,000 cases	272,000 cases
1972 Utilization	15%	15%	15%
1972 Production (cases) 2/	10,000	20,000	40,000
Sales	489 3/	978 3/	1,956 3/
Product related expenses	487	998	1,966
Plant related expenses	146	298	589
Cash earnings	(144)	(318)	(599)
Depreciation	32	43	112
Interest	16	22	56
Pretax income	(192)	(383)	(767)
Income tax	--	--	--
After tax income	--	--	--
Annual cash flow	(160)	(340)	(655)
Estimated replacement investment	1,800	2,400	6,200
Book value investment	540	720	1,860
Current assets	194	387	775
Net working capital	77	152	305
Total assets	734	1,107	2,635
Estimated long-term debt	247	349	866
ROS (% before tax)	(39.3)	(34.8)	(33.5)
ROI (% profit before tax/ total assets)	(26.2)	(34.6)	(29.1)

1/ All expense, sales and financial data shown in thousands.

2/ Standard cases defined as 48/1 lbs.

3/ Ave. price $48.90 per case as reported by selected Western salmon canners.

Table II-4. **Estimated earnings and cash flow for Southeast Alaska salmon canners, (5-year average 1968-1972)**

	Plant size $2,250,000 Annual sales	Plant size $2,400,000 Annual sales	Plant size $2,500,000 Annual sales
Annual capacity (based on 50 day, 7 hr/day)	105,000 annual cases[1/]	175,000 annual cases	210,000 annual cases
Sales	2,250[2/]	2,400[2/]	2,500[2/]
Product related expenses Plant related expenses	2,042	2,122	2,189
Cash earnings	208	278	311
Depreciation	72	102	114
Interest	36	51	57
Pretax income	100	125	140
Income tax	48	60	67
After tax income	52	65	73
Annual cash flow	124	167	187
Replacement investment	3,000	4,250	4,750
Book value of investment	1,200	1,700	1,900
Current assets	743	792	825
Net working capital	293	312	37[illegible]
Total assets	1,943	2,492	2,725
ROS (% before tax)	4.4	5.2	5.6
ROI(% profit before tax/ total asset)	5.1	5.0	5.1

1/ Standard cases are assumed to be 48/1 lbs.

2/ All expense, sales and financial data shown in thousands.

Table II-5. Estimated earnings and cash flow for Central Alaska salmon canners, (5-year average 1968-1972)

	Plant size $1,000,000 Annual sales	Plant size $2,300,000 Annual sales	Plant size $4,000,000 Annual sales
Annual capacity (based on 50 day, 7 hr/day)	116,000 annual cases [1]	232,000 annual cases	348,000 annual cases
Sales	1,000 [2]	2,300 [2]	4,000 [2]
Product related expenses Plant related expenses	898	2,071	3,678
Cash earnings	102	229	322
Depreciation	36	79	108
Interest	18	40	54
Pretax income	48	110	160
Income tax	23	53	77
After tax income	25	57	83
Annual cash flow	61	136	191
Replacement investment	1,500	3,300	4,500
Book value of investment	600	1,320	1,800
Current assets	330	759	1,320
Net working capital	130	299	520
Total assets	930	2,079	3,120
ROS (% before tax)	4.8	4.8	4.0
ROI(% profit before tax total asset)	5.2	5.3	5.1

1/ Standard cases are asrumed to be 48/1 lbs.

2/ All expense, sales and financial data shown in thousands.

Table II-6 . Estimated earnings and cash flow for Western Alaska salmon canners (5-year average 1968-1972)

	Plant size $1,358,000 Annual sales	Plant size $2,675,000 Annual sales	Plant size $3,319,000 Annual sales
Annual capacity (based on 34 day, at 8 hr/day)	68,000 cases 1/	136,000 cases 1/	272,000 cases 1/
Sales	1,358 2/	2,675 2/	3,319 2/
Product related expenses Plant related expenses	1,292	2,475	2,976
Cash earnings	66	200	343
Depreciation	32	43	112
Interest	16	22	56
Pretax income	18	135	175
Income tax	9	65	84
After tax income	9	70	91
Annual cash flow	41	178	287
Replacement investment	1,800	2,400	6,200
Book value investment	540	720	1,860
Current assets	448	883	1,095
Net working capital	176	348	431
Total assets	988	1,603	2,955
Current Liabilities	272	535	664
Long term debt	286	427	916
ROS (% before tax)	1.3	5.0	5.3
ROI (% profit before tax/ total assets)	1.8	8.4	5.9

1/ Standard cases are assumed to be 48/1 lbs.

2/ All expense, revenue and financial data shown in thousands.

Table II-7. Estimated earnings and cash flow for West Coast salmon canner, 1972

	Plant size $630,000 Annual sales	Plant size $2,500,000 Annual sales
Annual capacity (cases)	25,000	100,000
1972 Utilization	50%	50%
1972 Production (cases) 1/	12,500	50,000
Sales	631,250 2/	2,525,000 2/
Product related expenses	482,500	1,810,000
Plant related expenses	85,000	365,000
Cash earnings	63,750	350,000
Depreciation	7,500	30,000
Interest	17,500	70,000
Pretax income	38,750	250,000
Income tax	12,250	113,600
After tax income	26,500	136,400
Annual cash flow	34,000	166,400
Estimated replacement investment	170,000	1,600,000
Book value investment	80,000	530,000
Current assets	310,000	1,230,000
Net working capital	145,000	570,000
Total assets	390,000	1,760,000
Estimated long-term debt	38,000	250,000
ROS (% before tax)	6.1	9.9
ROI (% profit before tax/ total assets)	9.9	14.2

1/ Ave. price $50.50 per case

Source: Canned Fishery Products, 1972. Annual Summary (Preliminary) National Marine Fisheries Service, April 10, 1973 pg. 5.

Table II -8. Estimated earnings and cash flow for West Coast and Alaskan fresh and frozen salmon processor, 1972

	Plant size $25,000 Annual sales	Plant size $370,000 Annual sales	Plant size $1,000,000 Annual sales
Annual capacity	40,000	600,000	1,500,000
1972 Utilization	50%	50%	50%
1972 Production (pounds)	20,000	300,000	800,000
Sales	24,600	369,000[1/]	984,000[1/]
Product related expenses	20,000	297,000	792,000
Plant related expenses	2,500	30,000	65,000
Cash earnings	2,100	42,000	127,000
Depreciation	600	8,900	24,000
Interest	400	6,000	16,000
Pretax income	1,100	27,100	87,000
Income tax	250	6,600	35,400
After tax income	850	20,500	51,600
Annual cash flow	1,450	29,400	75,600
Estimated replacement investment	15,000	210,000	360,000
Book value investment	5,000	70,000	120,000
Current assets	12,000	180,000	480,000
Net working capital	5,500	83,000	230,000
Total assets	17,000	250,000	600,000
Estimated long-term debt	2,400	35,000	58,000
ROS (% before tax)	4.5	7.3	8.8
ROI (% profit before tax/ total assets)	6.5	10.8	14.5

1/ Ave. price $1.23 per lb.

Source: Food Fish Market Review and Outlook, National Marine Fisheries Service July, 1973, p. 51. Wholesale price, ave. of King and Silver dressed salmon, 1972.

Table II-9. Estimated earnings and cash flow for West Coast and Alaskan fresh and frozen salmon processor, 1972

	Halibut $390,000 Annual sales		Salmon $1,657,500 Annual sales
Annual capacity	620,000		2,700,000
1972 Utilization	60%		50%
1972 Production (pounds)	371,400		1,347,600
Sales	390,000 1/		1,657,500 2/
Product related expenses	393,600		1,335,000
Plant related expenses	3,200		108,000
Cash earnings	-6,800		214,500
Depreciation	2,200		27,000
Interest	1,700		26,900
Pretax income	-10,700		160,600
Income tax	-0-		70,700
After tax income	-10,700		89,900
Annual cash flow	-8,500		116,900
Estimated replacement investment		950,000	
Book value investment		473,000	
Current assets		998,000	
Net working capital		461,000	
Total assets		1,471,000	
Estimated long-term debt		227,000	
ROS (% before tax)		7.3	
ROI (% profit before tax/ total assets)		10.2	

1/ Ave. price $1.05 per lb. as reported by selected West Coast processors.

2/ Ave. price $1.23 per lb.

Source: Food Fish Market Review and Outlook, National Marine Fisheries Service, July 1973, pg. 51. Ave. wholesale price of King and Silver dressed salmon, 1

Table II-10. Estimated earnings and cash flow for West Coast and Alaskan fresh and frozen salmon processor, 1972

	Halibut $5,000 Annual sales		Salmon $389,000 Annual sales
Annual capacity	8,000		630,000
1972 Utilization	60%		50%
1972 Production (pounds)	4,800		316,000
Sales	5,000 1/		389,000 2/
Product related expenses	5,110		313,000
Plant related expenses	700		32,000
Cash earnings	-810		44,000
Depreciation	204		9,000
Interest	86		6,000
Pretax income	-1,100		29,000
Income tax	-0-		7,500
After tax income	-1,100		21,500
Annual cash flow	-896		30,500
Estimated replacement investment		320,000	
Book value investment		159,000	
Current assets		192,000	
Net working capital		89,000	
Total assets		351,000	
Estimated long-term debt		92,000	
ROS (% before tax)		7.1	
ROI (% profit before tax/ total assets)		7.9	

1/ Ave. price $1.05 per lb. as reported by selected West Coast processors.

2/ Ave. price $1.23 per lb.

Source: Food Fish Market Review and Outlook, National Marine Fisheries Service, July 1973, pg. 51, Ave. wholesale price of King and Silver dressed salmon, 1972

Table II-11. Estimated earnings and cash flow for West Coast and Alaskan bottom fish processor, 1972

	Plant size $80,000 Annual sales	Plant size $300,000 Annual sales	Plant size $640,000 Annual sales
Annual capacity	115,000	430,000	915,000
1972 Utilization	80%	80%	80%
1972 Production (pounds)	92,000	344,800	732,000
Sales	80,000 1/	300,000 1/	637,000 1/
Product related expenses	70,800	255,100	534,300
Plant related expenses	14,000	30,000	66,500
Cash earnings	(4,800)	14,900	36,200
Depreciation	2,900	4,700	13,000
Interest	1,500	2,500	5,500
Pretax income	(9,200)	7,700	17,700
Income tax	-0-	1,700	4,000
After tax income	(9,200)	6,000	13,700
Annual cash flow	(6,300)	10,700	26,700
Estimated replacement investment	175,000	300,000	675,000
Book value investment	61,000	103,000	228,900
Current assets	39,000	146,000	310,000
Net working capital	18,000	67,000	143,000
Total assets	79,000	249,000	538,900
Estimated long-term debt	29,000	49,000	110,000
ROS (% before tax)	(11.5)	2.6	2.8
ROI (% profit before tax/ total assets)	(11.6)	3.1	3.3

Table II-12. Estimated earnings and cash flow for Atlantic bottom fish processor, 1972

	Plant size $100,000 Annual sales	Plant size $215,000 Annual sales	Plant size $1,720,000 Annual sales
Annual capacity	160,000	325,000	2,600,000
1972 Utilization	75%	75%	75%
1972 Production (pounds)	120,000	250,000	2,000,000
Sales	103,000 1/	214,700 1/	1,720,000 1/
Product related expenses	84,000	175,450	1,398,000
Plant related expenses	15,000	30,000	200,000
Cash earnings	4,000	9,250	122,000
Depreciation	600	1,250	10,000
Interest	1,000	2,500	20,000
Pretax income	2,400	5,500	92,000
Income tax	500	1,200	38,000
After tax income	1,900	4,200	54,000
Annual cash flow	2,500	5,550	64,000
Estimated replacement investment	75,000	125,000	2,250,000
Book value investment	25,000	45,000	750,000
Current assets	50,000	105,000	840,000
Net working capital	23,000	49,000	390,000
Total assets	75,000	150,000	1,590,000
Estimated long-term debt	12,000	22,000	360,000
ROS (% before tax)	2.3	2.6	5.3
ROI (% profit before tax/ total assets)	3.2	3.7	5.8

1/ Ave. price $.86 per lb. as reported by selected by Atlantic bottom fish processors, 1972.

Table II - 13. Estimated earnings and cash flow for anchovy processor, 1972

	Plant size $405,000 Annual sales
Annual capacity	--
1972 Utilization	--
1972 Production (pounds)	5,800,000
Sales	405,000 [1/]
Product related expenses	321,000
Plant related expenses	20,000
Cash earnings	64,000
Depreciation	25,000
Interest	15,000
Pretax income	24,000
Income tax	5,400
After tax income	18,600
Annual cash flow	43,600
Estimated replacement investment	750,000
Book value investment	225,000
Current assets	130,000
Net working capital	60,000
Total assets	355,000
Estimated long-term debt	110,000
ROS (% before tax)	6.0
ROI (% profit before tax/ total assets)	8.8

1/ Ave. price for dried scrap and meal, solubles and oil $.07 per lb as reported by selected anchovy processors.

Table II - 14. Estimated earnings and cash flow for Menhaden processor, 1972[1/]

	Plant Size $1,200,000 Annual sales
Annual capacity	--
1972 Utilization	--
1972 Production (pounds)	13,000,000
Sales	1,200,000[2/]
Product related expenses	964,000
Plant related expenses	95,000
Cash earnings	141,000
Depreciation	53,000
Interest	53,000
Pretax income	35,000
Income tax	10,000
After tax income	25,000
Annual cash flow	78,000
Estimated replacement investment	1,200,000
Book value investment	470,000
Current assets	390,000
Net working capital	180,000
Total assets	860,000
Estimated long-term debt	225,000
ROS (% before tax)	3.0
ROI (% profit before tax/ total assets)	4.1

1/ Although there are substantial numbers of small fish meal plants, these are primarily fish scrap processors, not Menhaden processors.

2/ Ave. price dried meal and scrap, $185.50 per ton or $.093 per lb.

Source: Industrial Fishery Products Market Review and Outlook, National Marine Fisheries Service, July 1973, pg. 19.

Table II-15. Estimated earnings and cash flow for Eastern fresh and frozen oyster processor, 1972

	Plant size $60,000 Annual sales	Plant size $240,000 Annual sales
Annual capacity	58,750	235,000
1972 Utilization	85	85%
1972 Production (pounds)	50,000	200,000
Sales	59,500	238,000[1/]
Product related expenses	49,500	198,000
Plant related expenses	7,500	30,000
Cash earnings	2,500	10,000
Depreciation	500	2,000
Interest	250	1,000
Pretax income	1,750	7,000
Income tax	400	1,600
After tax income	1,350	5,400
Annual cash flow	1,850	7,400
Estimated replacement	25,000	
investment	25,000	100,000
Book value investment	9,500	38,000
Current assets	28,000	115,000
Net working capital	13,000	53,000
Total assets	38,000	153,000
Estimated long-term debt		
ROS (% before tax)	2.9	2.9
ROI (% profit before tax/ total assets)	4.6	4.6

1/ Ave. price $1.19 per lb.

Source: Fisheries of the United States, 1972, National Marine Fisheries Service, March, 1973, p. 66.

Table II-16. Estimated earnings and cash flow for oyster canner, 1972

	Plant size $270,000 Annual sales
Annual capacity	30,000
1972 Utilization	85%
1972 Production (cases) 1/	25,000
Sales	268,500
Product related expenses	227,500
Plant related expenses	26,000
Cash earnings	15,000
Depreciation	1,000
Interest	500
Pretax income	13,500
Income tax	3,000
After tax income	10,500
Annual cash flow	11,500
Estimated replacement investment	75,000
Book value investment	25,000
Current assets	130,000
Net working capital	60,000
Total assets	155,000
Estimated long-term debt	12,000
ROS (% before tax)	5.0
ROI (% profit before tax/ total assets)	8.7

1/ Standard cases are defined as 24/4-2/3 oz.

2/ Ave. price $10.74 per case.

Source: Canned Fishery Products, 1972, National Marine Fisheries Service, April 10, 1973, pg. 3.

Table II - 17. Estimated earnings and cash flow for West Coast fresh and frozen oyster processor, 1972

	Plant size $180,000 Annual sales
Annual capacity	165,000
1972 Utilization	90%
1972 Production (pounds)	150,000
Sales	178,500 [1/]
Product related expenses	152,000
Plant related expenses	15,000
Cash earnings	11,500
Depreciation	1,500
Interest	1,000
Pretax income	9,000
Income tax	2,000
After tax income	7,000
Annual cash flow	8,500
Estimated replacement investment	40,000
Book value investment	19,000
Current assets	87,000
Net working capital	40,000
Total assets	106,000
Estimated long-term debt	9,000
ROS (% before tax)	5.0
ROI (% profit before tax/ total assets)	8.5

1/ Ave. price $1.19 per lb. as reported by selected West Coast oyster processors, 1972.

Table II -18. Estimated earnings and cash flow for clam canner, 1972

	Plant size $240,000 Annual sales
Annual capacity	---
1972 Utilization	---
1972 Production(cases) 1/	25,000
Sales 2/	240,000 2/
Product related expenses	204,000
Plant related expenses	24,000
Cash earnings	12,000
Depreciation	1,000
Interest	500
Pretax income	10,500
Income tax	2,400
After tax income	8,100
Annual cash flow	9,100
Estimated replacement investment	60,000
Book value investment	25,000
Current assets	117,000
Net working capital	54,000
Total assets	142,000
Estimated long-term debt	12,000
ROS (% before tax)	4.4
ROI (% profit before tax/ total assets)	7.4

1/ Standard case defined as 48/5 oz.

2/ Ave. price $9.60 per case.

Source: Canned Fishery Products, 1972. National Marine Fisheries Service, April 10, 1973, p. 3.

Table II - 19. Estimated earnings and cash flow for fresh and frozen clam processors, 1972.

	Plant size $75,000 Annual Sales	Plant size $255,000 Annual Sales
Annual capacity (gallons)	26,000	88,000
1972 Utilization	85%	85%
1972 Production (gallons) 1/	22,000	75,000 2/
Sales	$75,000	$255,000
Product related expenses	63,000	215,000
Plant related expenses	7,000	24,000
Cash earnings	4,700	16,000
Depreciation	600	2,000
Interest	400	1,500
Pretax income	3,700	12,500
Income tax	900	3,000
After tax income	2,800	9,500
Annual cash flow	3,400	11,500
Estimated replacement investment	53,000	180,000
Book value investment	25,000	85,000
Current assets	36,500	124,000
Net working capital	17,000	57,000
Total assets	61,500	209,000
Estimated long-term debt	12,000	40,000
ROS (% before tax)	4.9	4.9
ROI (% profit before tax/ total assets)	6.0	6.0

1/ Gallons are defined as 8.75 lbs.

2/ Ave. price $3.40 per gallon as reported by selected clam processors.

Table II-20. Estimated earnings and cash flow for Maine sardine processors, 1972

	Plant size $720,000 Annual sales	Plant size $2,150,000 Annual sales
Annual capacity (cases)	43,000	150,000
1972 Utilization	100%	85%
1972 Production (cases) 1/	43,000	127,500
Sales	722,400 2/	2,142,000 2/
Product related expenses	511,300	1,490,000
Plant related expenses	159,100	535,000
Cash earnings	52,000	117,000
Depreciation	8,600	25,500
Interest	4,300	12,500
Pretax income	39,100	79,000
Income tax	12,400	31,500
After tax income	26,700	47,500
Annual cash flow	35,300	73,000
Estimated replacement investment	643,000	1,950,000
Book value investment	66,000	420,000
Current assets	380,000	1,125,000
Net working capital	325,000	645,000
Total assets	446,000	1,545,000
Estimated long-term debt	32,000	200,000
ROS (% before tax)	5.4	3.7
ROI (% profit before tax/ total assets)	8.8	5.1

1/ Standard cases defined as 100/1/4 lb.

2/ Ave. price $16.80 per case.

Source: Foodfish Market Review and Outlook, National Marine Fisheries Service, December 1973, p. 50.

Table II-21. Summary of financial returns by segment, 1972

	Table No.	Plant Size	Sales $	Production	ROS % Before tax	ROI % Before tax	Cash Flow
				(lbs.)			
West Coast Fresh and Frozen Salmon	II-8	S	25,000	20,000	4.5	6.5	1,450
	II-8	M	370,000	300,000	7.3	10.8	29,400
	II-8	L	1,000,000	800,000	8.8	14.5	75,600
	II-10	M	389,000	316,000	7.1	7.9	30,500
	II-9	L	1,657,500	1,350,000	7.3	10.2	116,900
				(cases)			
West Coast Salmon Canner	II-7	M	63,000	12,500 1/	6.1	9.9	34,000
	II-7	L	2,500,000	50,000 1/	9.9	14.2	166,400
Western Alaska Salmon Canner	II-3	S	489,000	10,000 1/	(39.3)	(26.2)	(160,000)
	II-3	M	978,000	20,000 1/	(34.8)	(34.6)	(340,000)
	II-3	L	1,956,000	40,000 1/	(33.5)	(29.1)	(655,000)
Southeast Alaska Salmon Canner	II-1	M	1,468,000	32,000 1/	(13.6)	(11.8)	(55,000)
	II-1	LL	2,431,000	53,000 1/	(16.4)	(15.9)	(196,000)
	II-1	L	2,889,000	63,000 1/	(18.1)	(18.4)	(297,000)
Central Alaska Salmon Canner	II-2	M	1,079,000	23,000 1/	(16.3)	(18.4)	(140,000)
	II-2	L	2,159,000	40,000 1/	(17.5)	(18.6)	(298,000)
	II-2	L	3,285,000	70,000 1/	(20.4)	(23.2)	(562,000)
West Coast Bottom fish	II-11	S	80,000	92,000 lbs.	(11.5)	(11.6)	(6,300)
	II-11	M	300,000	344,800 lbs.	2.6	3.1	10,700
	II-11	L	640,000	732,000 lbs.	2.8	3.3	26,700

Continued........

Table II-21. Summary of financial returns by segment (continued)

Segment	Table No.	Plant Size	Sales	Production	ROS % Before tax	ROI % Before tax	Cash Flow
Atlantic Bottom fish	II-13	S	100,000	120,000 lbs.	2.3	3.2	2,500
	II-13	M	215,000	250,000 lbs.	2.6	3.7	5,550
	II-13	L	1,720,000	2,000,000 lbs.	5.3	5.8	64,000
Maine sardine	II-20	M	720,000	43,000 cases[2]	5.4	8.8	35,300
	II-20	L	2,150,000	127,500 cases[2]	3.7	5.1	73,000
Fish Meal, Menhaden,	II-14	S	1,200,000	13,000,000 lbs.	3.0	4.1	78,000
Anchovy	II-13	M	405,000	5,800,000 lbs.	6.0	8.8	43,600
West Coast Fresh and Frozen Oyster	II-17	M	180,000	150,000 lbs.	5.0	8.5	8,500
East Coast Fresh and Frozen Oyster	II-15	M	240,000	200,000 lbs.	2.9	4.6	7,400
Oyster Canner	II-16	M	270,000	25,000 cases[3]	5.0	8.7	11,500
Fresh and Frozen clam	II-19	M	255,000	75,000 gal.[4]	4.9	6.0	11,500
Clam canner	II-18	M	240,000	25,000 cases[5]	4.4	7.4	9,100

1/ Standards cases defined as 48/1 lb.

2/ Standard ~~cases~~ defined as 100/4oz.

3/ Standard cases defined as 24/4-2/3 oz.

4/ Standard gallons defined as 8.75 lb.

5/ Standard cases defined as 48/5 oz.

Table II-22. Summary of basic financial characteristics for selected seafood processing segments.

	West Coast fresh and frozen salmon					West Coast salmon canner		Western Alaska salmon canner		
Plant Size	S	M	L	M	L	M	L	S	M	L
Net Sales	100	100	100	100	100	100	100	100	100	100
Cost of goods sold (including all dried product related expenses)	81.3	80.5	80.5	80.7	84.4	76.4	71.7	99.6	102	100.5
Gross margin	18.7	19.5	19.5	19.3	15.6	23.6	28.3	.4	(2)	(.5)
All other expenses	14.2	12.2	10.7	12.2	8.3	17.5	18.4	39.7	34.6	33.0
Net income	4.5	7.3	8.8	7.1	7.3	6.1	9.9	(39.3)	(34.8)	(33.5)

	Southeastern Alaska salmon canner			Central Alaska salmon canner			West Coast bottom fish			
	M	L	L	M	L	L	S	M	L	L
Net Sales	100	100	100	100	100	100	100	100	100	100
Cost of goods sold (Product related expenses)	76.4	79.3	80.8	80.2	80.6	83.1	88.5	85.0	83.9	86.5
Gross margin	23.6	20.7	19.2	19.8	19.4	16.9	11.5	15.0	16.1	13.5
All other expenses	37.2	37.1	37.3	36.1	36.9	37.3	23.0	12.4	13.3	8.3
Net income	(13.6)	(16.4)	(18.1)	(16.3)	(17.5)	(20.4)	(11.5)	2.6	2.8	5.2

Continued.........

Table II-22. Summary of basic financial characteristics for selected seafood processing segments (continued).

	Atlantic bottom fish			Maine sardines		Fish Meal Menhaden	Fish Meal Anchovy	West Coast F & F oyster	Eastern F & F oyster
	S	M	L	M	L	S	M	M	M
Net Sales	100	100	100	100	100	100	100	100	100
Cost of goods sold (Product related expenses)	81.6	81.7	81.3	70.8	69.6	80.3	79.3	85.2	83.2
Gross margin	18.4	18.3	18.7	29.2	30.4	19.7	20.7	14.8	16.8
All other expenses	16.1	15.7	13.4	23.8	26.7	16.7	14.7	9.8	13.9
Net income	2.3	2.6	5.3	5.4	3.7	3.0	6.0	5.0	2.9

	Oyster canner	F & F clam	Clam canner
	M	M	M
Net Sales	100	100	100
Cost of goods sold (Product related expenses)	84.7	84.3	85.0
Gross margin	15.3	15.7	15.0
All other expenses	10.3	10.8	10.6
Net income	5.0	4.9	4.4

III. PRICING

Both the total and per capita consumption of all fishery products by U. S. consumers have risen gradually since 1955, when the per capita rate was 10.5 pounds to 12.2 pounds in 1972. This 16.2 percent rise occurred during a period when the domestic catch used for human food declined. The fishery industry increased its imports from 1,332 million pounds in 1955 to 3,582 million pounds in order to meet the requirements of U. S. consumers. Since there has been no substantive increase in the world production fishery products for human food when worldwide consumption was rising, competitive buying intensified among fish processors and distributors in various parts of the world. The competition for available supplies, particularly for such items as shrimp, crab, tuna, halibut, cod and salmon increased as demand increased both in the U. S. and other countries.

The result of supply limitations, i.e,, fish meal and salmon, and growth in demand has resulted in record prices. Industry is quite concerned over increasing exvessel prices and further is quite dubious about the prospects of passing on additional price increases required for pollution control that would be in addition to previous price increases. It is the general feeling that substantial price pass through is not realistic for most segments since consumers would shift to poultry, red meats or imported processed seafood products where possible.

The objective of this chapter is twofold. We shall briefly discuss price determination and secondly we shall discuss the basic factors influencing potential price effects.

A. Price Determination

The structure of the industry and the general fragmented nature of the industry (including the large number of small plants) in essence means that most of the plants have very little control or influence over final product prices. The only segment under consideration in this report that has any appreciable price leadership is the salmon canning industry. In this segment several larger companies appear to have some influence in establishing exvessel and wholesale prices. In all segments (including fish meal) the prices are a function of supply and demand forces including the influence of foreign producers. For example, the influence of foreign production can be observed by reviewing domestic fish meal prices as influenced by the anchovy situation on the supply side and the broiler situation on the demand side.

For the most part demand and supply dictate prices and the individual plant has little control over prices. Recent price increases have caused industry considerable concern and the consensus is that with seafood prices reaching peak levels future price increases are likely to encounter considerable resistance and reduced sales.

Exvessel prices as established by regional auctions or markets and contracts are sensitive to landings and plant utilization. Regional markets such as those in the Boston or New Bedford area serve as a guide to other buyers and areas and serve to provide benchmark prices. Seafood processors must therefore decide on a daily basis whether exvessel prices and volumes are sufficient to warrant operating the plant for perhaps a minimum of four hours. In other cases processors have established relationships with fishing fleets whereby one processor purchases the total output of the boat or fleet. In any case plant utilization, demand and supply are key factors in establishing exvessel prices.

Wholesale prices are also determined on a daily basis for some products. Processors frequently have established informal relationships with wholesalers so as to be assured of a steady buyer. This in many cases requires expanding product lines to accomodate the wholesaler. Again, however, landing and supplies influence prices. Cold storage units have increased the ability of many processors to hold product and capitalize on higher offseason prices.

Basic supply and demand factors in the segments considered in this report were discussed in Chapter I and will not be repeated here.

B. Potential Price Effects

Price effects induced by pollution controls are perhaps the most critical and difficult facet of the entire impact analysis. These effects are critical in that plant and production impacts are very closely related to the ability of the industry to absorb, pass forward or pass backward the total and incremental costs induced by pollution abatement standards. Price effects are difficult to analyze or ascertain in that the data requirements frequently exceed data availability.

A variety of methods and techniques could be and have been used to ascertain the price effects of pollution abatement standards. The nature of the problem, the state of the data, and the number and type of factors involved dictates that the problem be approached in qualitative terms. The ultimate conclusion as to the portion of pollution abatement costs to be passed through will also, by necessity, involve a considerable amount of judgment.

The market clearing equilibrium price involves both supply and demand considerations. The following demand and supply factors are important in ascertaining the price effects of pollution abatement standards. A cursory review of the list of factors presented below reveals that many demand, supply, production and structural factors have been included and that it would be extremely difficult to express all of the variables in quantitative terms.

Demand Factors

- Substitute and competitive products
- Expected demand growth
- Foreign demand
- Captive usage
- Price elasticity of demand
- Cross elasticity of demand
- Major or dominant demand components

Supply Factors

- Capacity utilization
- Foreign competition
- Supply elasticity
- Competitive structure of the industry
- Market share distribution
- Number of producers
- Price determination
- Relative bargaining power of marketing segments
- Industry leaders
- Capital acquiring ability
- Industry profit variations
- Raw material & labor availability

Abatement Cost Factors

- Municipal sewer availability by industry segment
- Segments incurring unequal abatement costs
- Collective and cooperative treatment potentials
- Physical factors affecting abatement costs
- Exogenous factors

These factors are explained briefly as follows:

Substitute Products -- The existence of substitute products will tend to reduce the amount of water treatment costs that will be passed to the final consumer.

Capacity Utilization -- The greater the capacity utilization for the industry the greater the possibility of cost pass through.

Demand Growth -- A rapidly expanding market will tend to increase the possibility of pollution abatement cost pass through.

Foreign Competition -- The greater the percentage of the domestic market served by foreign producers, the less likely it is that pollution abatement costs can be passed through.

Demand Elasticity -- The more inelastic the demand, the more likely it is that cost can be passed through.

Captive Usage -- Captive usage or fixed consumption will tend to increase the amount of costs that can be passed through to the final consumer.

Abatement Cost Differences -- If some plant or some segments of the industry will not incur significant or substantial pollution abatement costs, the less likely it is that the remaining segments can pass through their pollution abatement costs.

Basis for Competition -- If the basis for competition in the industry is primarily price as opposed to service, technology or product brand, the more difficult it will be to pass through cost increases.

Market Share Distribution -- Segments with few concentrated producers (frequently associated with price leaders) will have a greater possibility of passing through the increased costs associated with pollution abatement standards.

Number of Producers -- The greater the number of producers with different production cost structure, the more difficult it will be to pass through increased costs of pollution control, since lower cost producers may be able to absorb increased costs and expand production at the expense of higher cost producers.

Relative Bargaining Power -- The relative bargaining power of individual marketing or producing segments will influence the degree of cost pass through possibilities. If the producers are the dominant bargaining force, cost increases may be passed backwards and forwards.

Physical Factors - Physical factors affecting abatement costs would include temperature (Alaska vs. Florida), humidity, topography and related land - climate conditions.

Exogenous Factors - Factors not directly related to the abatement system itself but which affect abatement costs. The principal one would be land costs, especially where lagoons or other treatment systems requiring land are required. In some instances zoning, traffic patterns and plant locations would directly influence the cost or practicability of abatement systems.

It must be recognized that the price effects depends on the number of closures and the number of closures depends on expected price effects. This simultaneous relationship is not surprising in view of the fact that any discussion of market clearing price must incorporate both demand and supply considerations.

The above is a broad overview of the price considerations. This portion of the methodology will be interfaced with the impact methodology in the following chapter. The actual price estimates and calculations are presented in the impact chapter.

IV. ECONOMIC IMPACT METHODOLOGY

A variety of methods and analytical procedures have been utilized to assess the economic impacts of effluent limitation guidelines. Discounted cash flow, breakeven analysis and other procedures have been applied to the problem. While a number of techniques have been used, they all have a common objective, i.e., ascertaining the extent to which firms are financially impacted by the imposition of mandatory regulations.

Conceptually (in the absence of data constraints) all methods would produce nearly identical results. Realistically, however, availability is a requisite consideration in selecting the methodology to be employed.

In the case of seafood processing, a significant amount of data has recently been transmitted to the economic contractor which has been used to supplement existing data banks. This data contains quantity and sales data for virtually all primary seafood processors. The availability of this data has several implications. These are as follows:

1. An accurate listing of all seafood processing plants--exclusive of duplication--is now available.

2. Primary processors can be separated from producers of specialty items.

3. It is further possible to accurately classify or delineate all plants in the industry on the basis of various characteristics including sales and quantity of specific product produced.

In summary, it is now possible to deal with selected individual characteristics of all seafood processing plants. As a direct result, the economic contractor has altered the methodology that is normally used. The discounted cash flow analysis has been replaced with return on sales analysis since we can now deal with all plants individually. The profitability measures, and model plant data are, however, used in assessing the severity of the impacts.

A. Fundamental Methodology

The impact methodology consist of five basic parts. A description of each separate step is present below.

1. Industry Segmentation

Industry segmentation is now much more refined and detailed as a result of the above mentioned data. First, the analysis is limited to primary seafood processors. Secondly, the data facilitates delineating the industry on the basis of major commodities produced.

As discussed in Chapter I we have considered only those plants that meet the 80 percent criteria, i.e., greater than 80 percent production (on the basis of sales) of group two species.

This second item, i.e., 80 percent criteria, greatly reduces the multi-product or multi-species problem encountered. Since the effluent guidelines are written on a species by species basis and different technologies are required for different species, some specialization criteria is required. It must be recognized, however, effluent limitation guidelines will eventually cover all species and all plants--multispecies and single species plants. We further recognize that the above 80 percent specialization criteria in some respects simply forestalls the difficulties associated with applying single species guidelines to multispecies plants until a later date.

In addition to the above items, the quantity data has facilitated a more refined size classification of plants considered. Annual production data, length of operating season as provided in the Development Document and other peak production data provided by EPA (Effluent Guideline Division) permits classifying all plants on the basis of estimated capacity in tons per day (raw product basis).

2. Pollution Abatement Cost Conversion

The second major step involves converting and scaling the pollution abatement cost estimates received from EPA. This includes ascertaining the correct costs to be applied to the different size plants. These costs include capital, operating and maintenance and monitoring costs. All costs are converted or expressed on an annualized basis. This includes all expenditures required for principal and interest payments on required capital over a ten year period at eight percent interest. Other interest rates, both above and below eight percent, were considered, but the eight percent rate was used in the analysis. These costs (annualized capital industry debt service, operating and maintenance and an estimate of monitoring) are then totaled to arrive at a total annualized cost for each level of treatment for each plant.

The above costs do not include land acquisition costs for those treatment technologies (such as lagoons) which require land, and insofar as land acquisition is required, then these costs would be understated.

At the time of the development of this report, eight percent cost of borrowed capital was realistic. Persistent inflationary trends and recent high interest rates tend to make the initial capital costs and borrowing costs rather conservative. Continued inflation and high interest rates between now and 1977 could result in substantially higher production and effluent treatment costs. Increases in final product prices and technology advances may offset some of the potential effluent treatment cost increases. At the present time, however, no one can accurately project 1977 price levels.

3. Preliminary Impacts

Preliminary impacts have been computed by expressing total annualized cost of pollution abatement as a percent of sales. This calculation provides only a rough estimate of the magnitude of the required expenditures (annualized) relative to total plant sales.

Industry or segment profitability measures (based on the model plants presented in Chapter II) will be utilized to determine number of closures. Differences or variations in processing and profitability will be accounted for by utilizing profitability ranges and sensitivity analysis. Final impacts will be determined by relating total annualized costs of pollution abatement control to sales and to profitability measures as presented in Chapter II.

4. Price Effects

Estimating possible price effects induced by pollution abatement standards is the next major step in the analysis. This is perhaps the most difficult and unsettled step in the entire analysis. The reasons are many but in general relate to difficulties associated with estimating the influences of substitution, product elasticity and many other variables and in some cases, unknown factors.

The economic contractor has reviewed most EPA industrial development documents, participated in the preparation of others, and reviewed most of the literature on possible price effects induced by pollution abatement stand standards. For some commodities and/or industries, it has been assumed that all costs are passed forward or backward. In other situations all cost increases are shared by producer, wholesaler or supplier on some basis. Other examples have been uncovered where the price pass through is estimated to be greater than the actual pollution abatement costs incurred, thereby increasing processor margins.

A few selected examples will adequately illustrate the complexities involved in projecting price effects. For example, there are no doubt situations where large producers dominating local markets also have access to low cost waste treatment options or are currently utilizing municipal waste treatment systems. Small producers that find it necessary to finance their own private treatment system at higher costs may therefore be constrained from passing on all or any added production costs incurred as a result of effluent limitation guidelines. Alternatively, some producers are able to spread waste treatment costs over a large number of products and thereby achieve lower per unit waste treatment costs which will create greater inequities in required waste treatment costs and total product production costs.

Other producers or perhaps entire regions may gain or already possess favorable competitive positions due to geographical proximity to markets, raw product or with respect to land suitable for low cost waste water disposal. Segments that do not possess these advantages will have difficulty passing on higher pollution abatement costs and still compete with low cost producing segments or areas.

Price increases may be further restrained by low cost foreign producers, e.g., foreign producers that are not subject to EPA regulations and therefore effluent treatment costs.

To further complicate matters, economists have not been overly successful and a concerted effort has not been focused on quantifying elasticity and cross elasticity measures. While some work has been done in this area, the results as of this time are too general to be useful.

In summary, the economic contractor feels that the most important factors influencing possible price increases include the structure of the industry, the strength of product demand, demand for substitute and complementary products, magnitude of impacts and industry abatement cost differences. At this point in time, quantitative estimates of these factors are simply not available and are not likely to be in the near future.

The dilemma encountered is that price effects must be considered before closures are estimated. Simultaneity is also encountered in that closures influence industry capacity utilization and therefore price effects and on the other hand industry capacity utilization influences price effects and therefore potential closures.

The assumption that has been adopted for this report is that the price effects are assumed approximately equal to the pollution abatement costs incurred by the largest producers which is viewed as the constraining factor. In some cases where several large plants are clustered together, a weighted average has been used to ascertain price effects.

The exact price pass through estimate, by segment is presented in the impact analysis--Chapter VI.

5. Estimated Impacts

The final step or procedure is that of estimating the number of plants that will not be able to withstand the net (after price increases) impacts of pollution abatement standards. This is accomplished by relating profitability levels before the imposition of controls with profitability estimates after imposing controls.

This step involves considerable judgment in that many quantitative factors must be considered. Some of these items are:

1. Salvage value of the plant
2. Book value of plant
3. Alternative employment options available to owners and managers
4. Age of plants
5. Consideration of other constraints such as impending action by OSHA, FDA
6. Factors such as labor availability, expected industry trends, alternative seasonal or part-time employment, land availability, required modernization, and age of owner also influences potential closure decisions.
7. Capital acquiring ability

Community impacts, employment effects and balance of trade impacts can be explored after plant closures have been estimated.

The decision to close a plant seldom depends on only one factor. It is desirable to net out all factors and consider each influence separately. The complication encountered is that by doing so the sum of the parts do not necessarily equal the total. For example, the influence of OSHA, FDA, NMFS, EPA, lack of available labor and required modernization may not be sufficiently important to classify a plant as a potential closure when considered separately. When considered jointly, nowever, the total impact of these factors may be catastrophic. On the other hand, it is not realistic to assume that all production cost increases are a direct result of effluent guidelines.

An additional complication is that it is difficult to define "acceptable" profit levels. At what point or how low do profits have to dip until they are no longer acceptable. This obviously varies by individual operator or owner and is influenced by other employment options available. It is relatively easy to locate seafood processors that are not realizing what may be considered by many to be sufficient returns based on the risk and uncertainty associated with the seafood processing industry. In other cases it must be realized that the owner's labor is often included in normal production costs and the profit remaining must be viewed as a residual over and above payments to family labor.

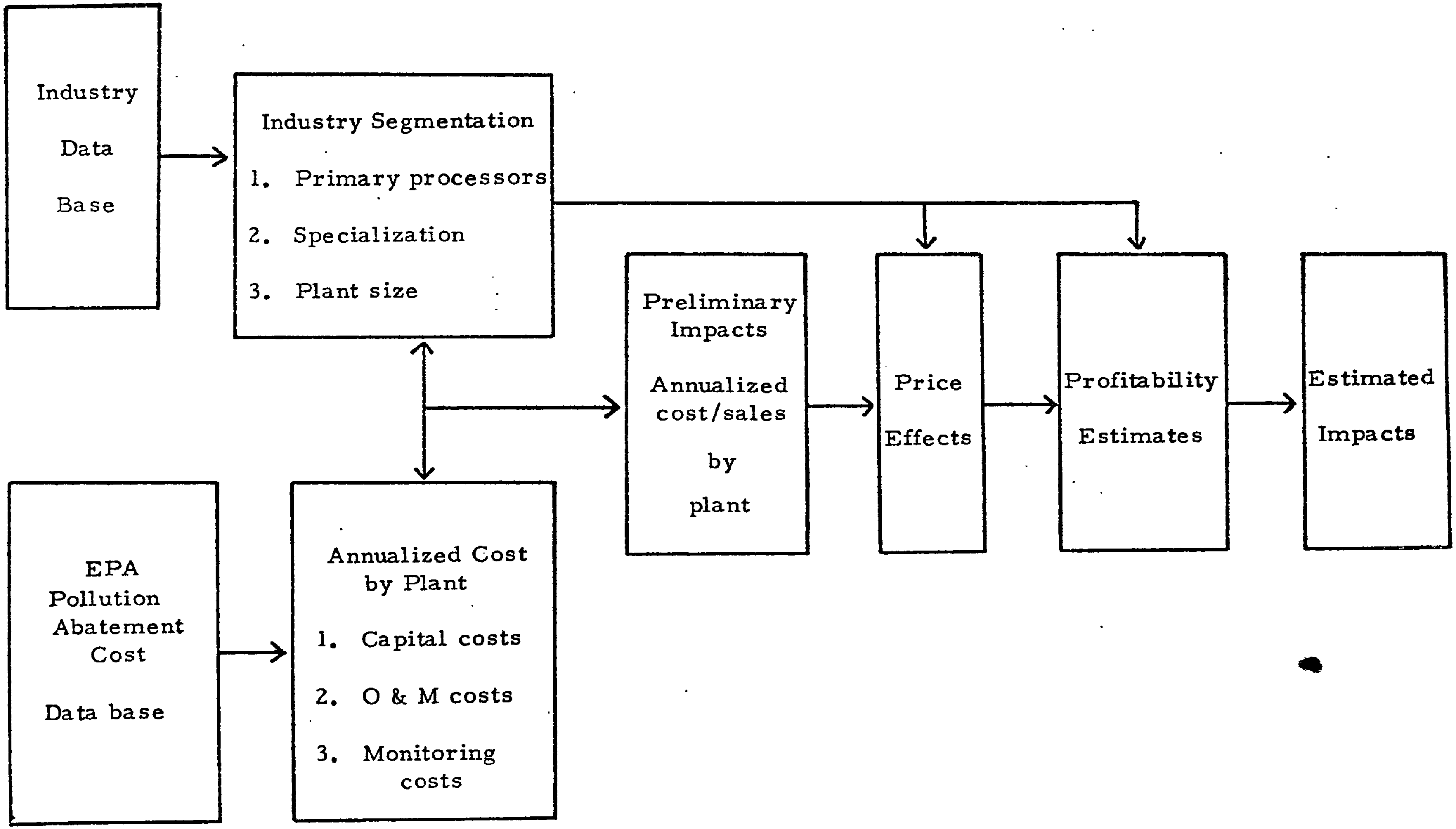
The large number of old, small and run-down processing plants may be viewed as the result of poor profitability and not necessarily the cause of poor financial performance.

In other words, many factors influence the closure decision of plants and not all of these factors can be conveniently expressed in quantitative terms. Judgment, by necessity, must enter the analysis.

Insofar as possible, the estimated number of plant closures is based on only the impacts of pollution abatement standards. All other influences are not considered in estimating the number of plant closures.

A schematic presentation or recapitulation of the above methodology is presented in Figure IV-1.

Figure IV-1. Impact methodology -- Summary



V. EFFLUENT CONTROL COSTS

Water pollution control costs used in this analysis were furnished by the Effluent Guidelines Division of the Environmental Protection Agency. These basic data were adapted to the types and sizes of plants specified in the analysis.

Three effluent control levels were considered:

BPT - Best Practicable Control Technology Currently Available, to be achieved by July 1, 1977

BAT - Best Available Control Technology Economically Achievable, to be achieved by July 1, 1983.

NSPS - New Source Performance Standards, apply to any source for which construction starts after the publication of the standards.

A. Description of Effluent Control Levels and Costs

The technical document describing the recommended technology for achieving the BPT, BAT and NSPS guidelines was prepared for EPA by Environmental Associates, Inc. of Corvallis, Oregon and is titled "Development Document for Effluent Limitation Guidelines and Standards of Performance--Canned and Preserved Fish and Seafoods Processing Industry," draft, February, 1974. To avoid duplication and possible confusion, no details or technical descriptions of BPT, BAT and NSPS guidelines are given in this report. The interested reader is referred to the above-mentioned document for technology descriptions and a complete break down of costs for individual components.

The proposed technologies, capital and operating costs, furnished by EPA for use in this analysis are shown in Table V-1.

Since the publication of the Development Document selected changes in treatment strategy and the cost of various strategies have been made by EPA, Effluent Guideline Division. These changes have been incorporated in the pollution control cost data illustrated in Table V-1. All pollution control costs were extrapolated to fit actual plant sizes. Monitoring costs, not included in the Development Document, were added to the

Table V- 1 . Effluent control costs, seafood processing plants, 1972 1/

Product category	Industry coverage	Proposed effluent treatment technology		Capital costs 4/			Daily operating and maintenance cost		
Fish meal with solubles plant	No size cut-off specified	Level I	In plant changes	Costs have not been estimated and are assumed to be small					
		Level II	In plant changes	Costs have not been estimated and are assumed to be small					
Fish meal without solubles plant	No size cut-off specified				49 TPD				
		Level I	In plant changes with barging		38,000 5/				
				200 TPD		100 TPD	200 TPD		100 TPD
		Level II	Solubles plant	225,000		35,000	200		130
Alaskan fresh and frozen salmon	No size cut-off specified			53 TPD		13 TPD	53 TPD		13 TPD
		Level I 2/	Grinding	31,000		24,000	47		43
		Level I	Screening with barging	78,600		55,900	192		164
		Level II	Screening, air flotation with barging	214,600		131,900	209		180
Alaskan salmon canning	No size cut-off specified			150 TPD	90 TPD	20 TPD	150 TPD	90 TPD	20 TPD
		Level I 2/		54,000	45,000	30,000	97	87	69
		Level I 3/	Screening with barging	146,000	119,950	71,560	443	366	236
		Level II	Screening, air flotation with barging	862,000	589,950	237,560	568	453	260
West Coast fresh and frozen salmon	No size cut-off specified			35 TPD		11 TPD	35 TPD		11 TPD
		Level I	Screening	16,000		11,000	5		3
		Level II	Screening, air flotation	62,000		41,000	23		13
West Coast salmon canning	No size cut-off specified			40 TPD		15 TPD	50 TPD		15 TPD
		Level I	Screening	35,000		22,000	8		5
		Level II	Screening, air flotation	157,000		90,000	46		27
Alaskan Bottom fish	No size cut-off specified			106 TPD		14 TPD	106 TPD		14 TPD
		Level I 2/	Grinding	38,000		20,000	63		54
		Level I	Screening, with barging	98,040		58,000	188		150
		Level II	Screening, air flotation with barging	294,040		121,000	200		161
Non-Alaskan Bottom fish (Conventional)	>4,000 lbs liveweight			43 TPD	23 TPD	10 TPD	43 TPD	23 TPD	10 TPD
		Level I	Screening	19,000	17,000	12,000	6	5	4
		Level II	Screening aerated lagoon	53,000	46,000	28,000	13	11	9
Non-Alaskan Bottom fish (Mechanical)	No size cut-off specified			49 TPD		8 TPD	49 TPD		8 TPD
		Level I	Screening	24,000		16	6		5
		Level II	Screening, air flotation	104,000		63	30		19

Table V-1. (continued)

Product category	Industry coverage	Proposed effluent treatment technology		Capital costs 4/			Daily operating and maintenance cost		
				46 TPD		27 TPD	46 TPD		27 TPD
Clams(conventional)	> 4,000 lbs. liveweight	Level I	Screening	21,000		18,000	5		5
		Level II	Screening	21,000		18,000	5		5
				265 TPD		78 TPD	265 TPD		78 TPD
Clams(mechanical)	No size cut-off specified	Level I	Screening	66,000		29,000	13		7
		Level II	Screening, aerated lagoon	120,000		62,000	33		16
				3.2 TPD	1.6 TPD	.8 TPD	3.2 TPD	1.6 TPD	.8 TPD
West Coast hand shucked oysters	> 1,000 lbs. liveweight	Level I 3/	Screening	20,000	16,000	8,000	5	5	4
		Level II	Screening extended aeration	94,000	79,000	33,000	15	12	11
					1.6 TPD			1.6 TPD	
Eastern hand shucked oysters	> 1,000 lbs. liveweight	Level I	Screening		11,000			4	
		Level II	Screening, extended aeration		48,000			11	
					7 TPD			7 TPD	
Steamed or canned oysters	No size cut-off specified	Level I	Screening		26,000			6	
		Level II	Screening, aerated lagoon		56,000			14	
				66 TPD	44 TPD	17 TPD	66 TPD	44 TPD	17 TPD
Maine sardine	No size cut-off specified	Level I	Screening	31,300		19,350	40		18
		Level II	Screening, air flotation	87,300		45,350	53		28
					20 TPD				20 TPD
Alaskan scallops	No size cut-off specified	Level I 2/	Grinding		45,000				23
		Level I	Screening, with barging		82,000				61
		Level II	Screening, with barging		82,000				61
					50 TPD				20 TPD
Non-Alaskan scallops	No size cut-off specified	Level I	Screening		17,000				1
		Level II	Screening		17,000				1
					179 TPD				179 TPD
Herring Fillets	No size cut-off specified	Level I 2/	Grinding		51,000				70
		Level I	Screening, with barging		178,600				358
		Level II	Screening, air flotation, with barging		849,600				432
					179 TPD				179 TPD
Non-Alaskan Herring filleting	No size cut-off specified	Level I	Screening, air flotation		313,000				86
		Level II	Screening, air flotation		313,000				86
					7 TPD				7 TPD
Abalone/sea urchin	No size cut-off specified	Level I	Screening		7,000				3
		Level II	Screening		7,000				3

Table V-1. (Continued)

1/ Source: Effluent Guidelines Division, Environmental Protection Agency, from materials developed by Environmental Associates, Inc., 1974 cost adjusted to 1972 levels by DPRA by applying appropriate cost adjusting factors. Costs are also scaled to reflect appropriate plant sizes.

2/ Grinding is the recommended technology for Remote Alaskan plants, screening with barging is recommended for Non-remote Alaskan plants.

3/ Level I refers to Best Practicable Technology (1977), Level II refers to Best Available Technology (1983).

4/ Cost of Level I starting from no control. Does not include land acquistion costs. Plant size represents estimated peak capacity in tons raw product per day.

5/ Barging costs for fish meal plants without solubles plants is expressed in annual costs only.

pollution costs illustrated in the above table. Further, land acquisition costs for technologies that require land have not been included. Normal land preparation costs for technologies requiring land were, however, included in the respective cost estimates.

All effluent control technologies, costs and related plant characteristics to which these costs apply were specified by EPA Effluent Guidelines Division, based on the technical report of Environmental Associates, Inc. All treatment system costs are in terms of 1971 dollars, and it has therefore been necessary to up-date these to 1972 dollars by the use of appropriate cost inflators, i.e., Index of Sewage Treatment Plant Construction Costs for Investment and the Implicit Price Inflator for GNP for operating costs.

B. Current Status of Effluent Control in the Industry

The availability and usage of municipal wastewater treatment systems is an important factor influencing potential closures of seafoods processing plants. For the purposes of this study, estimates of percent of plants on municipal treatment systems were provided in the Development Document. These estimates are shown in Table V-2. For those plants, located on the water front, which do not have sewer connections, fishery processing wastes are usually returned to the ocean through outlet pipes. In some instances, solids are ground before being discharged. In other instances screens are used to remove solids which are then disposed of in land fills or, in a few cases, are processed into animal feeds, pet foods or fertilizer. Estimates of the percent of plants which currently have screens in place are also presented in Table V-2.

While only the costs of "end of pipe" treatment strategies have been considered herein it must be recognized that plants discharging into municipal treatment systems will also be financially impacted. As a general rule, however, the hook-up and user fees for disposing of liquid wastes into municipal systems are less than privately owned treatment systems. Since the cost of discharging into municipal systems varies from community to community these impacts have not been considered. It should also be brought to the reader's attention that exceptions do exist. Examples can be sited, where the municipal sewer charges are in excess of the total annual cost of privately owned treatment systems. Other examples, can also be sited where seafood processors were prevented from acquiring municipal sewer hook-ups.

Table V-2. Industrial waste treatment model data--
Percent treatment existing for each subcategory.

Subcategory	No. of Plants	Existing % Municipal	Treatment % Screen	Ave. Flow gal./min.
Fish meal				
w/solubles plant	20	20	N.A.	3884
w/o " "	10	60	80	208
Salmon canning	*	30	50	277
F/F salmon process	*	25	0	40.6
Bottom fish process	*	35	20	128
Sardine canning	17	15	80	163
Herring filleting	7	15	15	310
Pickled herring	10	0	0	195
Mackerel canning	4	0	90	1370
Clam				
mechanical	27	30	5	661
conventional	7	0	0	85
Oyster				
steamed	48	0	0	170
conventional	27	0	0	25
Scallop	*	0	20	79.5
Abalone	20	80	65	8.6
Sea urchin	6	90	0	8.3
Lobster				
American	*	0	5	190
spiny	*	85	0	3

Note: * indicates all plants that exceed 20 in number; N.A. means it was not necessary to screen since solids were removed prior to discharge.

Source: "Development Document for Effluent Limitation Guidelines and Standards of Performance -- Supplement A, Canned and Preserved Fish and Seafood Processing Industry," draft document, February, 1974.

The estimates of percent of plants on municipal systems and the percent of plants with screening currently in place (presented in Table V-2) were used in the analysis. For segments that do not appear in Table V-2, it was assumed that all were direct dischargers. Using this data and the economic contrator's knowledge of the industry, the percent of directed dischargers for BPT and BAT was estimated as presented in Table V-3.

Table V-3. Industrial waste treatment model data--
Percent Direct Dischargers 1/

Segment	% of Plants Direct Dischargers requiring BPT	% of Plants Direct Dischargers requiring BAT
Bottom fish (Conventional)	65	65
Bottom fish (Mechanized)	65	65
Clams Fresh and Frozen (Conventional)	100	100
Clams Fresh and Frozen (Mechanized	65	70
Eastern Oysters Canned	100	100
Eastern Oysters Fresh and Frozen	100	100
West Coast Oysters Fresh and Frozen	100	100
West Coast Canned Salmon	20	70
West Coast Fresh and Frozen Salmon	20	70
Maine Sardines	50	65
Fish Meal (w/solubules)	80	80
Fish Meal (w/o solubules)	20	40
Alaskan Salmon Canning	100	100
Alaskan Bottom fish	100	100
Abalone	20	20
Herring Fillets	85	85
Scallops, non-Alaskan	80	80

Source: Based on Table V-2 and additional data estimates by the economic contractor.

VI. IMPACT ANALYSIS

The imposition of effluent controls on the seafood processing industry will have both direct and indirect impacts on the industry, on consumers, on its suppliers and on communities in which plants are located. An analysis was made, for specified effluent control technologies in both quantitative and qualitative terms.

The following types of impacts will be discussed.

Price Effects
Financial Effects
Production Effects
Employment Effects
Community Effects
Balance-of-Trade

A. Total Investment Required under BPT and BAT

Table V-1 presents the estimated total investment required for BPT guidelines. These estimated costs were calculated on a plant by plant basis and then aggregated for each segment and for the nation. The estimates are net of estimates in that those plants that are on municipal systems or currently have screening "in place" are not included in the totals. The total investment for BPT is $5,500,300.

Table V-1 shows total investment for BAT guidelines also. Total investment for BPT + BAT was $13,059,100.

Annual costs, including debt service, operation and maintenance and monitoring for BPT and BPT + BAT is $1,150,400 and $2,806,200, respectively.

B. Price Effects

As will be seen in the production effects section of this chapter, the role of price effects in this analysis is critical. The industry is one with a relatively low value added and low profit margin in relation to sales. A small change in the wholesale price with raw product prices

Table VI-1. Estimated total investment and annual cost of BPT and BAT effluent limitation guidelines

Segment	No. of plants	Plants above cut-off	% plants 1/ direct dischargers requiring BPT	% plants 1/ direct dischargers requiring BAT	BPT Invest	BPT Annual 2/	BPT + BAT Invest	BPT + BAT Annual 2/	Range for annual costs as % of sales BPT	Range for annual costs as % of sales BPT+BAT
					$	$	$	$		
Fish Meal (w solubles)	16	16	80	80	0	0	0	0	None	None
Fish Meal (w/o 3/ solubles)	6	6	20	40	0	0	0	0	9.6-22.9	6.7-16.0
Alaskan Fresh & Frozen Salmon (non-remote)	7	7	100	100	216,400	68,800	560,100	123,600	.8-11.3	1.4-15.9
Alaskan Fresh & Frozen Salmon (remote)	24	24	100	100	380,400	100,500	620,500	202,400	.2-4.1	.8-11.3
Alaskan Salmon Canning (Non-remote)	9	9	90	100	393,700	96,500	623,600	107,000	.7-16.9	2.4-20.0
Alaskan Salmon Canning (Remote)	50	50	100	100	2,132,600	426,000	5,308,300	1,274,100	.2- 2.8	.6- 5.8
West Coast Fresh and Frozen Salmon	1	1	20	70	0	0	28,700	5,000	.4	1.3
West Coast Canned Salmon	9	7	20	70	31,700	5,200	401,400	67,000	.3- 1.2	1.2 - 4.1

Table VI-1. cont.

Segment	No. of plants	Plants above cut-off	% plants[1/] direct dischargers requiring BPT	% plants[1/] direct dischargers discquiring BAT	BPT Invest $	BPT Annual[2/] $	BPT + BAT Invest $	BPT + BAT Annual[2/] $	Range for annual costs as % of sales BPT	Range for annual costs as % of sales BPT+BAT
Alaskan Bottom-fish[4/]	1	1	100	100	0	0	0	0	13.2	17.0
Bottom Fish (Conventional)	128	59	65	65	307,200	61,500	575,300	116,000	.1-2.1	.2-4.2
Bottom Fish (Mechanized)	14	14	65	65	206,700	37,600	758,600	135,000	.1-.4	.4-1.7
Clams Fresh and Frozen (Conventional)	60	20	100	100	183,400	37,500	183,400	37,500	.3-1.8	.3-1.8
Clams Fresh and Frozen (Mechanized)	7	7	65	70	113,000	20,900	267,200	49,600	.5-.6	.9-1.3
West Coast Oysters Fresh and Frozen	32	18	100	100	182,800	34,100	229,900	37,700	1.0-1.6	3.6-5.7
Eastern Oysters Fresh and Frozen	338	109	100	100	814,600	163,800	2,589,600	470,800	.4-1.0	1.6-3.6
Eastern Oysters Canned	4	4	100	100	45,700	7,600	98,300	16,600	.5-.8	1.0-1.7
Maine Sardines	16	16	50	65	199,000	43,600	521,100	107,100	.3-3.7	.7-9.8

Table VI-1.cont.

Segment	No. of plants	Plants above cut-off	% plants direct dis-chargers re-quiring BPT 1/	% plants direct dis-chargers re-quiring BAT 1/	BPT Invest $	BPT Annual 2/ $	BPT + BAT Invest $	BPT + BAT Annual 2/ $	Range for annual costs as % of sales BPT	Range for annual costs as % of sales BPT+BAT
Alaskan Scallops	1	1	100	100	0	0	0	0	None	None
Non-Alaskan Scallops	5	5	80	80	9,600	1,500	9,600	1,500	.1-56.0	.1-56.0
Herring fillets	2	2	85	85	280,900	44,800	280,900	44,800	3.6-18.9	3.6-18.9
Abalone	5	5	20	20	2,600	500	2,600	500	.2-1.0	.2-1.0
Total 5/					5,500,300	1,150,400	13,059,100	2,806,200		

1/ Source: Effluent Guidelines Division, Environmental Protection Agency, from materials developed by Environmental Associates, Inc., 1974 cost adjusted to 1972 levels by DPRA by applying appropriate cost adjusting factors. Costs are also scaled to reflect appropriate plant sizes.

2/ Grinding is the recommended technology for Remote Alaskan plants, screening with barging is recommended for Non-remote Alaskan plants.

3/ Level I refers to Best Practicable Technology (1977), Level II refers to Best Available Technology (1983).

4/ Cost of Level I starting from no control. Does not include land acquisition costs. Plant size represents estimated peak capacity in tons raw product per day.

5/ Barging costs for fish meal plants without solubles plants is expressed in annual costs only.

staying constant results in significant changes in industry profits. The converse of this argument is likewise true. Hencc, if an increase in processor margins can be expected as a result of mandatory effluent treatment practices, the adverse economic impacts of those controls on the industry will be substantially ameliorated.

The extent to which price increases can be passed on depends on many factors. These factors include essentially all demand and supply considerations and were enumerated in Chapter IV. Some of these factors are repeated below.

1. the number of firms in the industry
2. the number of plants with low cost waste treatment options such as municipal sewer
3. the relationship of domestic production relative to imports
4. possible substitution effects
5. the competitive structure of the industry.

The complicating factor encountered is that many of the above items as well as those presented in Chapter IV can not, at this time, be expressed in quantitative terms.

The competitive nature of the industry, the importance of imports, the large number of small independent plants and the fact that in some cases we are dealing with a product that has very limited shelf or freezer life indicates that the industry is not in a position to demand and realize unlimited price increases resulting from effluent guidelines or increased production costs. In some segments products can be retained or stored for some time by the processor only to be subjected to additional discounts by the wholesaler.

In general, the industry can be characterized as "price takers". Price levels are determined by the strength of aggregate demand, existing supplies and prices of competitive products. We therefore assume that as a general rule only modest price increases can be passed on to the consumers. Further, we do not expect that exvessel prices will decline as a result of pollution abatement standards. A general scarcity of fish and other seafoods will tend to keep exvessel prices as high as the market will allow. A reduction in processor margins can therefore be expected for most seafood processing plants in the short run.

The price increases that are utilized in the analysis are assumed to be approximately equal to the impact which would be experienced by the largest plant within each segment. In some cases where several larger plants cluster at the upper end of the size spectrum, a weighted average price increase has been used. In other situations where various segments are in direct competition, i.e., Alaskan salmon and West Coast salmon, a weighted average between segments has been adopted.

In almost all segments the largest plants in each segment are only slightly impacted by the proposed guidelines, which means that the price increases utilized in the analysis are quite small and that price increases which will be available to small plants will be no greater than those for large plants.

The exact price increase that has been assumed for each segment is presented in the production effects section of this chapter. The basic assumption, i.e., that price effects will be limited to the impact of the largest plant in the respective segment, is the most pragmatic and realistic considering the structural characteristics of the segments and the industry. The reader is encouraged to refer to Table VI-2 to review the exact price pass through that was used in the analysis.

C. Financial Effects

Financial profiles for the relevant portions of the seafood processing industry have been presented in Chapter II of this report. Basic industry information and data assimilated during the completion of this section of the study has revealed that there is a great disparity in profit rates, production practices, prevailing technology and expected future profitability within and between all industry segments.

Attempts to acquire specific plant financial data have also indicated that many plants and entire industry segments are operated on a day to day basis influenced primarily by the availability of raw product. Detailed raw product costs, production and financial data, are in many cases considered incidental to raw product availability. Variation in raw product availability and the failure of many plants to account accurately for specific production costs and financial data has, in some cases, thwarted attempts to quantify numerous inter and intra industry relationships. These constraints have necessitated a higher degree of generalization than normally desirable. In summary, the impacts of pollution abatement standards within segments were developed by using fundamental industry relationships, profitability levels reported by knowledgeable industry representatives, published reports and derived relationships.

Profitability ranges based on the model plants developed, as well as numerous industry contacts are presented in the production effects section of this chapter. Table VI-2 presents the profitability levels used in the analysis.

D. Production Effects

Of fundamental interest are the production impacts which the implementation of BPT and BAT effluent controls may bring out. Of particular interest are potential plant closures. As discussed in Chapter IV, the methodology used is a return on sales framework of analysis. The financial burden of pollution abatement standards was applied to the industry segments to ascertain the financial impacts. Inference regarding closures for each segment was drawn, based on the relationship of annualized pollution abatement costs as related to prevailing profitability levels and sales. The number of plant closures is "net" in that they reflect only those plants that do not discharge to municipal systems or those plants that do not have waste treatment equipment in place at this time. The number of plant closures indicated represents only closures directly attributable to costs associated with the establishment of pollution control systems. Other closures, due to economic conditions, poor management, etc. as reflected by the general trend in plant numbers in these industry segments (the baseline condition), would primarily be found in very small plants below the cut-off limits specified.

1. Potential Plant Closures Under BPT Assumption

BPT effluent limitation guidelines as presented herein suggest relatively low level treatment technologies. In most segments, the small plants will be impacted more severely than larger plants due to lower profitability levels and higher per unit waste treatment costs. The differential impacts have been at least partially circumvented by providing cut-off points or levels which exempt small plants from the guidelines.

It should also be recognized that the impacts assessed are applicable to national effluent limitation standards only. No attempt has been made to assess the economic impact associated with more restrictive state or local effluent limitation standards. States that pass more restrictive standards must recognize that as more sophisticated treatment strategies are required, the economic impact may be greatly increased.

Expected price increases, profitability levels and projected plant closures are presented in Table VI-2. All calculations were completed on a plant by plant basis. The results of these calculations were then aggregated into multi-plant groups to prevent divulging individual plant data.

It should be pointed out that baseline closures have not been specified. It is, however, expected that past trends will continue through 1977 and 1983 and some small plants will close or discontinue production prior to the 1977 or 1983 implementation deadline. Baseline closures are most likely to include those plants that are projected as closed or threatened because of the guidelines. Estimated number of plant closures because of the guidelines may be expected to err on the high side of the realized closures.

Fish Meal

Proposed effluent limitation guidelines for fish meal processing plants includes housekeeping for the plants with solubles and barging for those plants that do not have solubles plants. Impacts were not computed for the plants with solubles in that housekeeping costs were not provided. Since these requirements are relatively minor and therefore inexpensive, no significant impacts are projected for fish meal plants with solubles.

A total of 6 (out of a total of 22) fish meal plants currently do not have solubles plants. Since there is no treatment available for stickwater, it is recommended that fish meal processes without solubles plant barge stickwater, recycled bailwater and washdown water to sea. The preferred method, however, would be to direct or funnel the waste flows to a fish meal plant with solubles capabilities in the near vicinity for by-product recovery or to build a solubles plant. This option is currently being practiced by some plants in the industry.

The cost of BPT guidelines was computed on the basis of leasing the required barges. On this basis the annual costs would be in excess of $100, 000 for larger non-solubles plant, and the guidelines would result in the closing of all fish meal processing plants without solubles recovery. This, however, is an overstatement of the impact in that some non-soluble plants currently utilize the by-product recovery facilities of other plants. Data reviewed and developed by the economic contractor indicates that at least 1 plant does not have the option of utilizing the solubles facilities of other processors. The projection is that this plant will be forced to discontinue operations or to build adequate by-product recovery facilities. This closure estimate may vary by one to two plants in either direction. Regardless, industry production should not be significantly affected since remaining plants would have sufficient excess capacity to compensate for the closure of this one plant.

Table VI-2. Number of plants, price effects and BPT impact by industry segment.

Segment/size	Total no. of plants	No. of plants above cut-off	Estimated precontrol profitability level (% of ROS)	Total annualized pollution abatement costs (% of sales)	Assumed price pass through	Net impact (cost as % of sales)	Estimated closures attributed to BPT
Fish meal with solubles	(16)	Costs have not been estimated, and are assumed to be small					
Fish meal without solubles	(6)						
> 40-150 TPD		2	3.0	17.00	0.0	17.00	None
> 150 TPD		4	3.0	10.20		10.20	1[1/]
Alaskan Fresh and Frozen Salmon (non-remote)							
< 10 TPD	(7)	3	5.9	8.3		7.9	3
> 10-20 TPD		2	8.8	1.9	.4	1.5	1
> 20 TPD		2	8.8	.8		.4	None
Alaskan Fresh and Frozen Salmon (Remote)	(24)						
< 10 TPD		14	5.9	2.95		2.55	8
> 10-20 TPD		7	8.8	.65	.4	.25	None
> 20 TPD		3	8.8	.25		No impact	None
Alaskan Salmon Canning (non-remote)							
<50 TPD	(9)	8	4.8	3.90		3.60	3
>50 TPD		1	5.6	.70	.3	.40	None

Table VI-2. cont.

Segment/size	Total no. of plants	No. of plants	Estimated precontrol profitability level	Total annualized pollution abatement costs	Assumed price pass through	Net impact (cost as % of sales)	Estimated closures attributed to BPT
		above cut-off	(% of ROS)	(% of sales)			
Alaskan Salmon Canning (remote)	(50)						
< 42 TPD		13	2.8	1.40)		1.10	6
42-111 TPD		17	4.5	.40) ----	.3	.10	None
> 111 TPD		20	4.9	.25		No Impact	None
West Coast Fresh and Frozen Salmon	(1)						
4 TPD		1	7.3	.4) ----	.4	No Impact	None
West Coast Salmon Canning	(9)						
< 15 TPD		3	6.1	.75)		.45	None
> 15 TPD		4	9.9	.30) ----	.3	No Impact	None
Alaskan Bottom Fish (Non-remote)	(1)	1	2.6	13.20) ----	.3	12.90	1
Bottom fish (Conventional)	(128)						
> 2-5 TPD		30	2.6	.80)		.50	5
> 5-15 TPD		24	2.7	.50) ----	.3	.20	None
> 15-30 TPD		5	4.0	.30)		No Impact	None
Bottom Fish (Mechanical)	(14)						
> 24-35 TPD		8	4.0	.30)		No Impact	None
> 35 TPD		6	4.0	.30) ----	.3	No Impact	None

Table VI-2 .cont.

Segment/size	Total no. of plants	No. of plants	Estimated precontrol profitability level	Total annualized pollution abatement costs	Assumed price pass through	Net impact (cost as % of sales)	Estimated closures attributed to BPT
		above cut-off	(% of ROS)	(% of sales)			
Clams Fresh and Frozen (Conventional)	(60)						
> 2-15 TPD		12	4.9	1.55)		1.25	4
> 15-40 TPD		7	4.9	1.05) ----	.3	.75	2
> 40 TPD		1	4.9	.60)		.3	None
Clams Fresh and Frozen (Mechanical)	(7)						
>40 TPD		7	4.9	.50) ----	.3	.20	None
West Coast Oysters fresh and frozen	(32)						
>.5 - 2 TPD		12	5.0	1.90)		.90	3
> 2 - 3 TPD		3	5.0	1.70) ----	1.0	.70	1
> 3 TPD		3	5.0	1.10)		.10	None
Eastern Oysters fresh and frozen	(338)						
> .5 - 1 TPD		67	2.9	.75)		.25	None
> 1 - 2 TPD		36	2.9	.60) ----	.5	.10	None
> 2 TPD		6	2.9	.50)		No Impact	None
Eastern Oysters canned	(4)						
< 1.75		2	5.0	.75)		.25	None
> 1.75		2	5.0	.50) ----	.5	No Impact	None

Table VI-2.cont.

Segment/size	Total no. of plants	No. of plants above cut-off	Estimated precontrol profitability level (% of ROS)	Total annualized pollution abatement costs (% of sales)	Assumed price pass through	Net impact (cost as % of sales)	Estimated closures attributed to BPT
Maine Sardine	(16)						
< 40 TPD		6	2.70	1.10		.90	1
> 40 - 60 TPD		7	2.70	.40	.20	.20	None
> 60 TPD		3	1.85	.35		.15	None
Alaskan Scallops	(1)	1	Costs have not been estimated, and are assumed to be small				
Non-Alaskan Scallops	(5)						
< .5 TPD		5	3.00	2.10	.2	1.90	2
Herring fillets	(2)						
4.5 TPD		1	5.0	18.90		15.30	1
149 TPD		1	5.0	3.60	3.6	No Impact	None
Abalone	(5)						
< 5 TPD		5	3.0	.45	.4	.05	None

A word of caution should be interjected at this point. Some meal plants are operated as an intricate part of larger processes. If, for example, separate and distinct guidelines apply to separate components of a large complex process, high costs may be incurred in separating waste flow streams. The closing of a meal plant that is associated with a complex, integrated operation will certainly impact the entire production complex, and the firm may be willing to reallocate part of the meal plant overhead costs to other divisions and thus keep the plant in operation.

Salmon

1. Alaskan Salmon -- Two categories are proposed for Alaskan Salmon. These segments are mechanized and hand butchered salmon processes. These categories are further delineated into geographical subsets, i.e., remote and non-remote. Remote plants are those plants not located in major Alaskan cities or in locations where good transportation facilities exist. Non-remote plants are located in major cities (e.g. Anchorage or Fairbanks) or in locations having good transportation services. The proposed BPT guidelines for Alaskan hand butchered, non-remote salmon include grinding, screening and barging solids to sea. Hand butchered for remote locations requires grinding and ocean outfall. The proposed guideline for mechanized salmon is identical, i.e., screening and barging for non-remote and grinding for remote.

The above segmentation has been somewhat difficult to deal with due to the fact that one cannot readily identify type of process from plant lists. However, most of the salmon canning operations in Alaska are at least partically mechanized. The impacts were computed on the mechanized basis. Grinding costs range from $30,000 to $54,000 for a 20 ton per day plant and a 150 ton per day plant respectively. Screening and barging costs vary from $71,000 to $146,000 for the same plants.

The impact analysis reveals that the remote plants will be impacted from 1 percent of sales to approximately 2.6 percent of sales. Only a small portion of this cost is expected to be passed on in the form of higher product prices.

After examining profitability, plant size and pollution abatement costs, the economic contractor has estimated that 14 remote plants are expected to close. Most of these plants are relatively small. This represents approximately 11 percent of the production of all remote plants.

Non-remote plants (required to screen and barge) will be impacted from 0.4 percent of sales to 7.9 percent of sales. After examining profitability, sales, plant size and pollution abatement costs, the economic contractor has classified 7 plants as expected closures. These closures would represent approximately 38 percent of the total production of all non-remote plants.

A word of explanation is perhaps required. First, it should be recognized that extreme variations in yearly landings, climatic conditions and uncertainty in general increases the difficulty of projecting plant closures. Secondly, industry representatives are quite concerned about the disposal of solids. In many topographic, climatic or unique local conditions impose serious constraints for the disposal of solid wastes. The industry already faces serious problems in solid waste disposal. Costs of solid waste disposal added to effluent disposal costs could increase plant closures. These constraints are discussed in Chapter VII. Finally, the classification of remote and non-remote is somewhat obscure and perhaps should be implemented on a plant by plant basis after specific constraints, i.e., barging and land disposal conditions at specific locations, are further clarified.

In general, there are many factors (mostly nonquantifiable) that may influence actual plant closures. These factors must be assessed on a plant by plant basis. The best approach may therefore be to develop a procedure where the specific waste treatment requirements reflect the unique constraints of individual plants.

2. West Coast Salmon - Categories "R" and "S" of the guideline's are entitled West Coast hand butchered and West Coast mechanized salmon. These categories include a total of 10 plants that meet the 80 percent criteria as discussed in Chapter I. The impacts were computed on the basis of the mechanized costs in that most plants are at least partically mechanized.

The technical development document has estimated that 30 percent of the West Coast salmon plants are currently on municipal sewers. The development document further estimated that 50 percent of the West Coast salmon plants have already installed screens. On this basis and since the net cost of screening is expected to be approximately $22,000 - $35,000 or about half of one percent of sales, the economic impact of effluent guidelines for the West Coast Salmon segment is very minor and no plants are projected as definite closures.

Bottom Fish

1. Alaskan Bottom Fish - The Alaskan bottom fish segment has been the topic of considerable interest in recent years. Many feel that this fishery resource has great potential and will be the outlet for considerable investment in the future. At the present time, however, the resource is not heavily utilized. Data for 1972 indicates that 14 plants processed bottom fish. Most of these plants were multispecie plants with most of the production devoted to salmon and/or shellfish. These data indicate that bottom fish comprised a significant portion of total plant production in only one plant.

The investment cost of grinding varies from $20,000 for a 14 ton plant to $38,000 for a 106 ton per day plant. Screening and barging costs vary from $58,000 for the 20-ton plant to $98,040 for the 106-ton plant. These costs are sufficiently large to identify one plant as a closure as a result of BPT guidelines.

2. Non-Alaskan Conventional Bottom Fish. The guidelines apply to conventional and mechanized bottom fish plants located in the contiguous 48 states. This includes a total of 142 plants that meet the 80 percent specialization criteria.

The basis segmentation criteria, i.e., conventional as opposed to mechanized is required due to the fact that water usage varies directly with mechanization. Checks with industry and government personnel failed, however, to isolate any source of data accurately portraying the number of mechanized plants. The difficulty is that mechanization is a continuum and not an either/or situation. Plants may use mechanized processes at a number of production stages. For example, skinning may be performed manually or by machine. The two processes could be combined in any form, i.e., manual or mechanized as plants vary in the degree of mechanization employed.

Since it is impossible to accurately ascertain the number of mechanized plants, we have first estimated the impacts assuming the upper ten percent (based on sales) of plants are mechanized and the remainder utilize conventional processes. It is assumed that the larger plants are those which are mechanized.

The impact for the mechanized plants is minimal. No plants are classified as threatened or closed.

The impact for the conventional plants is greater than that for the mechanized plants. The results of the analysis indicates that small plants (2-5 tons per day) will be impacted on an average of approximately .5 percent of sales. Plants between 5 and 15 tons per day will be impacted on an average of .20 percent of sales. Larger plants (greater than 15 tons per day) will experience no impact. On this basis the economic contractor (after examining sales, profit, effluent treatment costs on a plant by plant basis) has projected 5 small plant closures.

The impact has been substantially reduced as a result of the 2 ton per day cut-off, i.e., plants producing less than 2 tons per day are exempt from the guidelines, as are those plants on municipal sewers.

3. Miscellaneous bottom fish - Impacts of BPT guidelines on miscellaneous bottom fish are shown in Table VI-3. A total of 34 plants, both conventional and mechanized, were identified. Of these 17 were larger than cut off levels. Only one conventional plant was projected to close as a result of BPT guidelines. The impact on production would be negligible as remaining plants could process the volume lost by this closure.

Clams

The guidelines apply to both hand shucked and mechanized clam processing. BPT guidelines require screening for all plants greater than 2 tons per day (live weight basis). All plants less than two tons per day are exempt from the guidelines.

On the basis of the analysis, we again find that the small plants are disproportionately impacted. Four closures are projected for the first group of hand shucked plants above the 2 ton per day cut-off, i.e. 2 to 15 tons per day. On the average these plants will experience an impact of 1.25 percent of sales. In addition two conventional plants in the 15-45 TPD range are projected to close with a price impact of .75 percent of sales. The closing of these plants would represent a loss of 5 percent of total industry capacity.

The per unit cost of the technology decreases rapidly as size of plant increases. The net impact for the mechanized clam segment (assumed to be the largest 10 percent of plants in the industry) is 0.20 percent of sales. This is not sufficiently large to classify the plants as potential closures.

Oysters

1. West Coast, fresh and frozen - Plants producing less than 0.5 tons per day are exempt and this small plant cut-off effectively eliminates numerous small, and in some cases inefficient, marginal plants. All categories recommend screening, estimated to cost between $8,000 for an 0.8 TPD plant to $20,000 for a 3.2 TPD plant. The price impact ranges from .10 percent for a 3 TPD plant to .90 percent for a 0.5 - 2 TPD plant. Three closures of small (0.5 - 2 TPD) plants and one medium (2-3 TPD) plant closure are projected. Loss of production would be approximately 20 percent, but could probably be absorbed by the remaining plants.

2. Eastern and Gulf, fresh and frozen - There are 338 plants in this category, of which 109 are above cut off levels. Screening costs, for a 1.6 TPD plant are estimated at $11,000. Price impacts are small (.10 - .25 percent) and no plant closures are projected for this segment.

Table VI-3. Estimated impacts of BPT and BAT effluent limitation guidelines for miscellaneous plants

Segment	No. of plants	Plants above cut-off	% Plants 1/ direct dis-chargers re-quiring BPT	% Plants 1/ direct dis-chargers re-quiring BAT	BPT Impacts Closures	BPT + BAT Impacts Closures
Bottom fish (Conventional)	17	12	65	65	1	2
Bottom fish (Mechanized)	17	5	65	65	0	1
Clams Fresh & Frozen (Conventional)	13	11	100	100	2	Same
Clams Fresh & Frozen (Mechanized)	13	3	65	70	0	0
Eastern Oysters Fresh and Frozen	29	11	100	100	0	3
Blue Crab	16	14	80	80	0	0
Catfish	8	1	80	80	1	1
Shrimp	27	25	85	85	11	17

1/ Source: Development Document for Proposed Effluent Limitations Guidelines, and data estimates made by the economic contractor.

3. Eastern Canned Oysters - There are only four plants identified in this category, none are exempt. Screening costs for a 7 TPD plant are estimated at $26,000. Price impacts are small and none of these plants are projected to close.

4. Miscellaneous Eastern Oyster Processors - These are processors for whom oysters constitute less than 80 percent of total volume but are, nevertheless, the primary species processed. Twenty-nine plants were identified, with 11 being above cut-off levels (Table VI-3). All were direct dischargers. Imposition of BPT guidelines is not expected to result in any closures in this group of processors.

Maine Sardines

Economic impact of BPT effluent limitation guidelines that have been analyzed for Maine sardines and includes only screening, capital requirements are estimated to vary from $19,350 for a 17 TPD plant to $31,300 for a 66 TPD facility. In accessing the economic impact, every attempt was made to utilize representative cost data. The frequency of monitoring was established at what some feel to be arbitrarily high levels. This was done to insure that the costs included in the analysis were not understated. Further, since the effective operation of this particular technology is time consuming and therefore costly, Effluent Guidelines Division has increased the initial cost estimates to insure that representative cost estimates are utilized and to provide for engineering services required by the system. In summary every attempt has been made to guarantee that appropriate or realistic costs are involved in the analysis.

The profitability estimates developed in Chapter II for Maine Sardines were based on 1972 production data. Correspondence with the industry indicates that 1972 was an atypical year. Landings were high and the concensus of that 1972 was perhaps the most profitable year in the last 10 production seasons. For the above reason the analysis or computation of closures was based on a profitability rate of 50 percent of those presented in Chapter II.

On the basis of the above we have determined that the net impact is as high as 0.9 percent of sales for plants with capacity of less than 40 tons per day. It is projected that 1 plant will close and the impact on production will be minimal.

Scallops

Recommended control for non-Alaskan scallops is screening with an estimated investment of $17,000. However, these plants are small, .5 TPD and the investment is thus relatively large. Five plants were identified. Net impact, cost as percent of sales, was 1.9 percent and two small scallop plants were estimated to close.

Herring Fillets

Only two plants were identified, one with 4.5 TPD capacity and the other, a large plant, with 149 TPD. The small plant would be heavily impacted, costs 15.3 percent of sales, and would close. The other plant would not be heavily impacted and would remain in operation.

Abalone

Five abalone processors were identified. Only screening is required and the net impact was small, .05 percent. No abalone processors should close as a result of BPT controls.

Miscellaneous Phase I Plants

Plants which processed a mix of Phase I and Phase II species could not be analyzed when the Phase I guidelines were published. Now that Phase II is ready for publication, these plants have been included in the economic impact section. Miscellaneous plants that process mostly a particular Phase II specie have been discussed with that specie (see Bottomfish Clams and Oysters). In this section, the impact on plants which process a mix of species, but mostly one of three Phase I species (Blue Crab, Catfish and Shrimp) will be discussed. The analysis was conducted on a plant-by-plant basis and is summarized below.

Prices -- Blue Crab price increases are projected to be 0.2 percent for BPT and 0.5 percent for BAT. Catfish prices are not expected to be increased. Shrimp price increases are projected as 0.2 percent for BPT and 0.5 percent for BAT. These estimates are equal to the price increases projected for these species under Phase I since these miscellaneous plants are only a minor part of the industry.

Production/Shutdown Effects -- No blue crab processors of the 16 plants in this segment are projected to close. One catfish processor of the 8 in this segment is projected to close due to BPT (or BAT). Of the 27 shrimp processors in this segment, 11 closures are estimated for BPT and 17 closures are projected for BAT. Industry production will not be significantly affected since these plants are small and a large portion of supply comes from the exclusive plants covered under Phase I. The remaining plants can make up for the lost capacity from these projected closures.

E. Employment Effects

1. Distribution of Employment by Plant Size

There is substantial concentration of employment in large firms in the seafoods processing industry. Published data are not available on each industry and product category considered in this study, but industry wide data from the Census of Manufactures provides an indication of the situation which exists.

In the fresh and frozen packaged fish industry, in 1967, 79 percent of the plants employed less than 50 people and accounted for 29 percent of total employment. At the other end of the scale, 3 percent of the plants employed over 250 people, but had 34 percent of the total number of employees. Details, by plant size are shown in Table VI-4.

In the canned, cured and preserved seafoods industry, in 1967, 75 percent of the plants employed less than 50 people and accounted for 23 percent of total employment. In the large plant category, 3 percent of the total number of plants employed over 250 people, but had 33 percent of the total number of employees. Details, by plant size, are shown in Table VI-5.

Approximately 91 percent of the total employees in the fresh and frozen fish industry and 89 percent in the canned seafoods industry are production employees.

2. Possibility of Reemployment in New Plants Being Built

There would be little probability that new plants would be built in the same area to replace small or obsolete plants which were forced to close because of their inability to add necessary equipment to comply with water pollution control requirements. This is especially true for the Alaskan segments. It does, however, hold to varying degrees for

Table VI-4. Employment in the fresh and frozen packaged fish industry, by size group, 1967 1/

Number of employees per plant	Number of establishments	Number of employees	Average per firm
Less than 10	178	600	3.4
10 - 49	213	5,600	26.3
50 - 99	65	4,500	69.2
100 - 249	25	3,500	140.0
250 - 499	11	3,500	318.0
500 and over	6	3,800	633.0
Total	497	21,400	43.1

1/ Source: Census of Manufactures, 1967, U.S. Department of Commerce.

Table VI-5. Employment in the canned and cured seafood products industry, by size group, 1967 1/

Number of employees per plant	Number of establishments	Number of employees	Average per firm
Less than 10	109	400	3.7
10 - 49	131	3,300	25.2
50 - 99	46	3,300	71.7
100 - 249	26	3,700	142.0
250 - 499	4	1,500	375.0
500 and over	4	3,600	900.0
Total	320	15,800	49.4

1/ Source: Census of Manufactures, 1967, U. S. Department of Commerce the other segments as well. Small seafood processing plants face substantial disadvantages due to economies of scale in processing and water pollution control operations. As a result, it is doubtful that these small plants would be replaced since medium or large plants which might survive could absorb the added volume represented by these small plants. Obsolete plants are most likely to persist in areas where the fishing and seafood processing industries are declining and as a result there would be little inducement to replace plants in these areas. New plants built would be in the medium-to-large size range.

3. Absorption of Laid-off Employees by Other Plants

However, it is probable that good reemployment opportunities would exist in those medium and large plants which would be able to bear the cost of effluent control programs. Many of the jobs in the fishery processing industry required skilled or semi-skilled labor and a high proportion of displaced labor should be able to find jobs in the remaining plants. There is, also, the possibility that some plants could increase imports of partially processed raw materials, reorganize their production lines and concentrate on final processing only. To the extent that this occurs, some employees would be retained and the adverse unemployment impacts partially ameliorated. In general, however, this is expected to have a minor influence on unemployment impacts.

4. Direct Employment Effects

On the basis of the plant closures estimates presented earlier (Tables VI-2 and VI-3), it is estimated that approximately 750 jobs will be lost from BPT guidelines. A sizeable portion of this loss is contributed by the bottomfish, Alaskan Salmon and oyster segments. Table VI-6 shows employment loss for both BPT and BAT, by segment. However, since substantial reemployment opportunities are expected, the net loss in employment from BPT controls is estimated to be 190 jobs.

5. Secondary Unemployment Effects

The closure of seafood processing plants could result in some unemployment among fishermen who depended on these plants to provide a market for the fish and shellfish which they caught.

The exact magnitude of the indirect effects is not known at this time, however, it should be kept in mind that the indirect effects may well be expected to exceed the direct effect. Additional indirect effects would be experienced by transportation agencies, especially air freight, suppliers of ice, cans, cartons, and other packing materials and other supplier firms associated with the seafoods industry.

Table VI-6. Estimated direct employment loss attributal to BPT and BAT guidelines for selected segments

Segment and technology level	Total no. of plants	Total no. of employees	No. of employees jobs lost for BPT	No. of employees jobs lost for BPT+BAT
Fish meal (w solubles)	16	800	0	0
Fish meal (w/o solubles)	6	75	10	10
Alaskan Fresh and Frozen Salmon	31	820	100	300
Alaskan Salmon Canning	59	5,100	150	550
West Coast Fresh and Frozen Salmon	1	*/	0	0
West Coast Salmon Canning	9	1,680	0	160
Alaskan Bottom Fish	1	*/	*/	*/
Non-Alaskan Bottom Fish	142	5,800	220	440
Clams Fresh and Frozen	67	2,400	80	80
West Coast Oysters Fresh and Frozen	32	630	120	510
Eastern Oysters, Fresh and Frozen	338	6,000	0	920
Eastern Oysters, Canned	4	790	0	0
Maine Sardines	16	1,250	40	230
Alaskan Scallops */	1	*/	0	0
Non-Alaskan Scallops	5	45	20	20
Herring Fillets	2	270	10	10
Abalone	5	*/	0	0
Total			750	3,230
Less: Reemployment 1/			560	2,820
Net employment lost			190	410

*/ Data not available

1/ Due to geographic concentration of plants and their utilization of present capacity, reemployment in plants not affected is predicted for most segments, with the exceptions being remote Alaskan salmon processors and Maine sardine processors.

F. Community Effects

Direct and indirect employment losses can soon be transmitted into adverse community effects. The data used in the analysis was actual production, sales and volume data on a plant by plant basis. Actual plant location information and firm names were not included. This prevents pin-pointing the actual location of potential closures. The discussion of community effects must therefore be couched in a very general framework.

Although the closing of a major canner or freezer represents a substantial economic loss to any community, the impact in a major city such as Los Angeles, San Diego or Tampa, would not be as disastrous as would the closing of a much smaller plant in a location such as Kodiak, Alaska (population under 3,000) where processing of fishery products is the primary local industry. Although the situation in Kodiak is dramatic because of the concentration of seafood processing at this location and the lack of alternative employment opportunities, the impact of plant closures would be equally severe in large numbers of isolated communities where the landing and processing of fish and shellfish represents a major segment of the local economy. Even considering reemployment possibilities in surviving plants, the loss of a plant in a specialized seafood processing community cannot help but damage the economic base of the area.

Without knowing the exact location of plant closures, it is not possible to list specific communities where the impact can be expected to be acute. It is possible, based only on the number of plant closures, to state only that adverse community impacts are most likely in Alaska, Maine and the rural areas of Chesapeake Bay. While this is hardly a definitive statement of community impacts further refinement is not possible at this time.

G. Balance of Trade Effects

All other factors being equal, effluent limitation guidelines will have an adverse effect on U.S. trade balances. Increased production costs emanating from effluent limitation guidelines will tend, ceteris paribus, to increase the competitive advantages of those foreign producers who are not subject to pollution controls. The net effect of the guidelines could result in forcing additional processing overseas.

The total value of U.S. fishery imports (edible and non-edible) reached an all time high of $1,578,700,000 in 1973. This represents an increase of 6 percent over 1972. While a dramatic shift is not expected in 1977, domestic producers are finding it increasingly difficult to compete with foreign producers. Approximately 70 percent of all seafood products consumed in the U.S. is provided by foreign processors. Increased production costs for domestic processors can not help but increase the advantages of foreign competitors.

The impacts of BPT standards are not great in terms of production lost, however, minor price increases are projected in all segments. It must also be remembered that EPA is not the only Federal agency that has or will implement industry standards or controls which may be passed on in terms of higher prices.

The net balance of trade effect is unknown, however, the direction is well established.

H. Impact of BAT Guidelines

Impacts for 1983 (BAT) guidelines were computed in the same manner as the previously discussed BPT guidelines. Table VI-7 presents number of plants, profitability levels, annualized costs as a percent of sales, assumed price pass through, net impact, estimated number of plant closures, and estimated number of threatened plants.

As may be expected, the higher level technology results in greater costs and a greater number of closed or threatened plants. For example, 42 Alaskan salmon plants are listed as closures. In total 135 plants are projected as closures for the segments presented in Table VI-7.

It should be pointed out that the above numbers are net of BPT closures.

A summary of projected closures due to BAT follows:

Segment	Number of Projected BAT Closures
Fish Meal (without solubles)	1
Salmon	
1. Alaskan salmon, canning (non-remote)	8
2. Alaskan salmon, fresh and frozen (remote)	11
3. West Coast salmon, canning	1
Bottom Fish	
1. Conventional processing	11
2. Mechanical processing	2

Table VI-7. Number of plants, price effects and BAT impact by industry segment

Segment/size	Total no. of plants	No. of plants above cut-off	Estimated precontrol profitability level (% of ROS)	Total annualized pollution abatement costs (% of sales)	Assumed price pass through	Net impact (cost as % of sales)	Estimated closures attributed to BAT
Fish meal (with solubles)	(16)	Costs have not been estimated and are assumed to be small					
(without solubles	(6)	Solubles Plants					
> 40 - 150 TPD		2	3.0	7.76	) 0.0	7.76	None
		4	3.0	7.48	)	7.48	1 1/
Alaskan Salmon Canning (Non-remote)							
< 50 TPD	9	8	4.8	6.30	) 1.0	5.30	8
> 50 TPD		1	5.6	2.40	)	1.40	None
(Remote)							
< 42 TPD	50	13	2.8	3.60	)	2.60	9
> 42 - 111 TPD		17	4.5	1.30	) 1.0	.30	2
> 111 TPD		20	4.9	.80	)	No impact	None
West Coast Fresh & Frozen Salmon							
4 TPD	(1)	1	7.3	1.30	1.0	.3	None
West Coast Salmon Canning							
<15 TPD	(9)	3	6.1	2.80	) 1.0	1.80	1
>15 TPD		4	9.9	1.25	)	.25	None
Bottom Fish (conventional)	(128)						
>2 - 5 TPD		30	2.6	1.70	)	1.00	9
>5 - 15 TPD		24	2.7	1.00	) .7	.30	2
>15 - 30 TPD		5	4.0	.75	)	.05	None
(mechanical)	(14)						
>24 - 35 TPD		8	4.0	1.5	) .7	.45	1
>35 TPD		6	4.0	1.10	)	.40	1

Table VI- 7. (continued)

Segment/size	Total no. of plants	No. of plants	Estimated precontrol profitability level	Total annualized pollution abatement costs	Assumed price pass through	Net impact (cost as % of sales)	Estimated closures attributed to BAT
		above cut-off	(% of ROS)	(% of sales)			
Clams, Fresh and Frozen (conventional)	(60)						
> 2 - 15 TPD		12	4.9	1.55	)	1.25	4
>15 - 40 TPD		7	4.9	1.05	) .3	.75	2
>40 - TPD		1	4.9	.60	)	.30	None
(mechanical)							
>40 - TPD	(7)	7	4.9	1.10	.90	.20	None
West Coast Oysters Fresh and Frozen	(32)						
>.5 - 2 TPD		12	5.0	7.6	)	.90	11
>2.0 - 3 TPD		3	5.0	7.4	) 3.7	3.70	3
>3.0 TPD		3	5.0	4.4	)	.70	1
Eastern Oysters Canned	(4)						
< 1.75		2	5.0	1.60	) 1.00	.60	None
> 1.75		2	5.0	1.10	)	.10	None
Fresh and Frozen	(338)						
> .5 - 1 TPD		67	2.9	2.90	)	.90	28
>1.0 - 2 TPD		36	2.9	2.20	) 2.0	.20	4
>2.0 TPD		6	2.9	1.80	)	No impact	None
Maine Sardines	(16)						
< 40 TPD		6	2.70	3.00	)	1.50	3
> 40 - 60 TPD		7	2.70	1.10	) .5	.60	None
> 60		3	1.85	1.00	)	.50	None

Table VI- 7. (continued)

Segment/size	Total no. of plants	No. of plants above cut-off	Estimated precontrol profitability level (% of ROS)	Total annualized pollution abatement costs (% of sales)	Assumed price pass through	Net impact (cost as % of sales)	Estimated closures attributed to BAT
Alaskan Scallops	(1)	1	Costs have not been estimated and are assumed to be small.				
Non-Alaskan Scallops < .5 TPD	(5)	5	3.0	2.10	.2	1.90	2
Herring Fillets	(2)						
< 4.5 TPD		1	5.0	18.90	) 3.6	15.3	1
> 149 TPD		1	5.0	3.60	)	No impact	None
Abalone < 5 TPD	(5)	5	3.0	.45	.4	.05	None

1/ Closures of all plants without access to solubles plants.

Segment	Number of Projected BAT Closures
Clams	6
Oysters	
1. West Coast, fresh and frozen	15
2. Eastern and Gulf fresh and frozen	32
3. Eastern, canned	None
Sardines	3
Scallops	2
Herring fillets	1
Abalone	None
Total BAT Closures	93

Several qualifications should, however, be stated at this time. These are as follows:

1. The structure of the industry is expected to undergo considerable change between now and 1983. Baseline closures are expected to continue. Larger, more efficient, mechanized plants are expected to increase in number and importance. Small, marginal plants will continue to face financial hardship and subsequently discontinue production.

2. Significant changes in water use, water efficiency and waste treatment are expected. The net effect may be reduced per unit waste treatment costs.

3. Increased by-product recovery (reduction and solubles plants) and greater efficiency are likely to result in more recovery facilities and greater efficiency in general.

4. The number of plants served by municipal waste treatment systems is expected to increase.

5. Developments in Alaska will change the status of some plants from remote to non-remote.

6. BAT guidelines will be reviewed before 1983.

7. Profitability levels and production costs will also change from those presented in Chapter II.

In the aggregate, the above factors will influence the accuracy of the closure estimates presented in Table VII-7.

I. Combined Impact BPT + BAT Guidelines

The combined impact BPT + BAT guidelines is shown in Table VI-8. By way of summary, the combined BPT + BAT closures are as follows:

Segment	Projected BPT + BAT Closures
Fish Meal	
1. With solubles	None
2. Without solubles	1
Salmon	
1. Alaska, canned	19
2. Alaska, fresh and frozen	18
3. West Coast, canned	2
4. West Coast, fresh and frozen	None
Bottom Fish	
1. Alaska	1
2. Continental U.S.	13
Clams	6
Oysters	
1. West Coast	15
2. Eastern and Gulf, fresh and frozen	32
3. Eastern, canned	None
Sardines	3
Scallops	2
Herring fillets	1
Abalone	None
Total BPT + BAT closures	113

Table VI-8. Estimated impacts of BPT and BAT effluent limitation guidelines

Segment	No. of plants	Plants above cut-off	% Plants 1/ direct dis-chargers re-quiring BPT	% Plants 1/ direct dis-chargers re-quiring BAT	BPT Impacts Closures	BPT + BAT Impacts Closures
Fish meal						
With solubles	16	16	80	80	0	0
Without solubles	6	6	20	40	1 2/	1 2/
Salmon						
Alaskan fresh and frozen (non-remote)	7	7	100	100	4	4
Alaskan fresh and frozen (remote)	24	24	100	100	8	14
Alaskan canning (non-remote)	9	9	90	100	3	8
Alaskan canning (remote)	50	50	100	100	6	11
West Coast fresh and frozen	1	1	20	70	0	0
West Coast canned	9	7	20	70	0	2
Bottom fish						
Alaskan bottom fish	1	1	100	100	1	1
Non-Alaskan (conventional)	128	59	65	65	5	11
Non-Alaskan (mechanized)	14	14	65	65	0	2
Clams						
Fresh and frozen (conventional)	60	20	100	100	6	6
Fresh and frozen (mechanized)	7	7	65	70	0	0

Table VI-8. (Continued)

Segment	No. of plants	Plants above cut-off	%Plants 1/ direct dis-chargers re-quiring BPT	% Plants 1/ direct dis-chargers re-quiring BAT	BPT Impacts Closures	BPT + BAT Impacts Closures
Oysters						
West Coast fresh and frozen	32	18	100	100	4	15
Eastern fresh and frozen	338	109	100	100	0	32
Eastern canned	4	4	100	100	0	0
Maine Sardines	16	16	50	65	1	3
Scallops						
Alaskan scallops	1	1	100	100	0	0
Non-Alaskan scallops	5	5	80	80	2	2
Herring Fillets	2	2	85	85	1	1
Abalone	5	5	20	20	0	0

1/ Source: Development Document for Effluent Limitation Guidelines, and data estimates made by the economic contractor.

2/ Closures of plants without access to a solubles plant.

J. Impact of New Source Performance Standards

New Source Performance Standards apply to any source for which construction starts after the publication of the standards. The requirements are presented below.

Title	New Source Performance Standards
Fish meal	
With solubles	Housekeeping
Without solubles	Solubles Plant
Alaskan hand butchered Salmon	
Non Remote	In plant, grinding, screening, barging
Remote	In plant, grinding, screening, barging
Alaskan mechanized Salmon	
Non Remote	In plant, grinding + flotation
Remote	In plant, grinding, screening, barging
West Coast Hand Butchered Salmon	In plant, screening, flotation
West Coast Mechanized Salmon	In plant, screening, flotation
Alaskan Bottom fish	
Non remote	In plant, grinding, screening, barging
Remote	In plant, grinding, screening, barging
Non Alaskan Convention Bottom fish	In plant, screening, aerated lagoon
Non Alaskan Mechanized Bottom fish	In plant, screening, flotation
Hand shucked clams	In plant, screening
Mechanized clams	In plant, screening, aerated lagoon

Title	New Source Performance Standards
West Coast Hand Shucked Oysters	In plant, screening, extended
East and Gulf Coast Oysters	In plant, screening, extended aeration
Steamed, canned oysters	In plant, screening aerated lagoon
Main Sardines	In plant, screening, flotation
Alaskan Scallops	
Non remote	In plant, grinding, screening, barging
Remote	In plant, grinding, screening, barging
Non Alaskan Scallops	In plant, screening
Alaskan herring fillets	
Non remote	In plant, grinding, screening, barging flotation
Remote	In plant, grinding, screening, barging
Non Alaskan herring fillets	In plant, screening, flotation
Abalone	In plant, screening

For the most part, new source performance standards will not halt new investment in seafood processing facilities. Even though substantial impacts and relatively high baseline closures have been projected, new plants are planned or proposed. This stems from the fact that new production facilities are different than the projected closures. The closures are predominately obsolete, inefficient production facilities that have outlived their usefulness. New facilities tend to be large, mechanized and efficient multi-specie processing units.

One factor that should be considered, however, is that industry views waste treatment and a host of other government regulations as a never ending array of restrictions that can never be satisfied. The uncertainty relevant to unknown standards is a deterrent to new investment.

However, long run plants and investment can and will be made if future requirements are clarified.

VII. LIMITS OF THE ANALYSIS

A. General Accuracy

The seafoods processing industry is complex in terms of the number, ownership, location, type and size of plants. Variations in the seasonal pattern of operations, extreme variation in climatic conditions (Kodiak, Alaska to Key West, Florida) and substantial differences in raw produce characteristics all contribute to the complexity of this industry.

Published data on sales and quantities of seafoods are generally released in aggregate form. A substantial effort was made to develop supplemental detail to simplify and to improve the accuracy of the analysis. In addition, considerable time has been spent supplementing original data sources and revising critical assumptions. Even though additional time and effort has been invested, there is still a great deal of unexplained variation from plant to plant. There are very few industries in the U.S. that are more complex in terms of number and type of plants than the seafood processing industry.

Throughout the study, an effort was made to evaluate the data available and to update these materials wherever possible. Checks were made with informed sources in both industry and government to help insure that data were as reliable and representative.

Although processing cost data, information on investments and profitability information must be considered approximate, general information on these items was obtained from a substantial number of processors and when classified and cross-checked, showed reasonable degrees of consistency.

Published information from the Internal Revenue Service, Standard and Poors, Dun and Bradstreet, and other sources of data on financial ratios and financial performance were also used as checks on the reasonableness of results obtained in the impact analysis.

While the accuracy of this report has been enhanced by greater cooperation and data availability, the complexity of the problem and data limitations are such that judgment is invariably involved. Whenever judgment is involved, the possibility of error increases.

These errors emanate from a variety of sources. Collectively, they may be additive or offsetting. Some of the major sources of possible error are enumerated below.

1. Effluent Control Costs

Water pollution control costs were furnished by the EPA Development Document. These costs were developed for a variety of industry categories, subcategories and effluent treatment systems. It was necessary to adapt these effluent control costs to the types and sizes of plants used in this analysis. Whenever it becomes necessary to ascertain estimates of effluent treatment systems for plant sizes other than that provided, the possibility exists that the cost extrapolation technique utilized may not be appropriate. Most extrapolation techniques assume smooth functions when in fact step functions may exist.

2. Current Effluent Treatment Status of the Industry

Assumptions concerning the current effluent treatment status of the industry are also critical to the analysis. In this report, based on the recommendations of the EPA Development Document, it was assumed that only limited investment in pollution abatement equipment is current "in place".

3. Current Status of Municipal Treatment in the Industry

Only limited information is available concerning the number, location and types of seafoods processing plants discharging into municipal sewage systems. These estimates were presented in Chapter V. Although these estimates are not based on a complete survey of all of the plants in each area and product category, it is believed that contacts made in each area were adequate to provide a useful estimate of the importance of municipal waste treatment system connections to the seafood processing industry. In some situations, e.g., Astoria, Oregon and Terminal Island, California, expanded and/or improved sewage treatment facilities are either planned or actually under construction. These new facilities will relieve the situation in those locations as they are completed and come on stream.

4. Estimating Peak Capacity

This possible error stems from the fact that effluent control costs are or should be based on peak capacity of the plant which must be estimated. In the seafood processing industry, plant capacity is a rather nebulous concept. This stems from the fact that plant capacity may be doubled or expanded greatly by simply adding an additional filleting table.

Peak plant capacity was assumed to be thirty percent greater than average annual production. This assumption was based on the recommendations of the EPA Development Document.

5. Economic Status of the Industry

In addition to the above factors there is likely to be a great deal of variation in the economic profiles of individual seafood processing plants. Throughout the report we have estimated profitability by industry segment. These estimates are broad generalizations for the entire segment. The profitability of any one plant may deviate from the industry average by a factor of two or more.

6. "Shutdown" Decisions

The general purpose of the "shutdown" analysis is to examine the profitability of plants before and after the imposition of effluent limitation guidelines, to determine the probability of plant closures and to calculate the price changes required to cover the added effluent control costs. This requires assumptions relative to numerous factors which are described in detail in previous sections of this report. Assumptions utilized were made on the basis of the best information which could be developed regarding conditions prevailing in the seafoods processing industry. The possibility of error does however exist.

7. Price Effects

The extent to which the seafoods industry and the specific segments considered, can pass increased costs forward to consumers or backward to fishermen is an important factor affecting the impact which pollution control costs would have on the industry. Little information is available on demand elasticity for seafoods and even less on supply elasticity. Thus the price effects and impacts assumed are value judgments and as such represent a possible source of error.

8. Inflationary Trends

Another source of concern to industry is the inflationary spiral that has persisted in recent years. 1972 was used as the base year in the analysis.

Continuation of these trends will increase production, effluent treatment costs and final product prices. The net effect on processor margins can not, however, be determined at this time. For example, recent communications with blue crab industry representatives indicate that labor payments have increased 25 percent, cans 5 percent and energy cost 80 percent in recent months. These increases are of great concern to industry and the reader is advised that these costs have not been reflected in the 1972 data used in the analysis.

B. Other Considerations

While an attempt was made to utilize all data available, there are several other areas and methodological procedures embodied in the report that influence the overall accuracy of this document.

One of these factors stems from the fact that the analysis assumes "end of pipe" treatment. In many areas cooperative treatment, reduction of solids, cooperative barging will substantially reduce the actual effluent treatment cost.

At the direction of EPA it was also assumed that the current effluent treatment status of the industry is very low. In most segments, however, one can easily locate plants with fairly advanced effluent treatment systems. Since it is assumed that the current treatment status of the industry is less than is actually in place, it appears that the projected closures may be on the high side.

Still another factor which has been difficult to analyze is the impact on the mechanized processing segments. This terminology is somewhat misleading in that there is not a clear cut distinction between mechanized and non-mechanized segments. Some plants may utilize machines in various processes at peak processing periods. During periods of low plant utilization, all processes may be performed manually. In most cases, the number of mechanized and partially mechanized plants is simply not available. For the above reasons, the taxonomy, i.e., mechanized as opposed to conventional, is simply not a useable framework or segmentation basis.

In addition, it has not been possible to analyze in detail the incremental aggregate effects of other regulatory programs (FDA, OSHA, State laws, etc.) which place specific requirements and costs on the seafoods industry.

In summary, the above material briefly discusses several factors that would increase or decrease the number of plant closures projected herein. Other factors not discussed could also influence the accuracy of the analysis. In general, however, it is believed that the impacts projected in this report could be represented as the worst or extreme situation and that the actual closures may be fewer in number.

C. Selected Qualifications for Alaskan Segments

There are some indications that solid waste disposal in Alaska continue to be a problem for industry. There are further indications that there are many physical constraints to both barging and/or land fill. These items reappear frequently in the solid waste disposal summary presented below. Land fill and barging constraints exist and are heavily dependent upon local conditions. The following summary is intended as a description of constraint at selected locations. These problems should be explored prior to 1977 and 1983.

1. Problems Associated with Land Fill Solids Disposal in Alaska

General - Land fills are governed by State law. In order to obtain and keep a State permit, strict conditions must be met. Land fills must be operated in a sanitary manner in acceptable locations without risk of contamination to state waters by seepage or leakage. Sufficient soil must be available to cover the dumped materials at the end of each day's operation. The operation must not cause any esthetic or ecological damage.

None of the plants listed in this report is presently using a land fill for disposal of seafood processing waste. In some areas the surrounding land is definitely not suitable for land fill. In the other areas where the distance to the site is listed, the site is potential and conditions would have to be further investigated before a final decision could be made.

Bristol Bay - The land area in Bristol Bay is at approximately sea level. It is flat and there are numerous lakes and pot holes. The surface is covered with tundra with underlying permafrost. Land fills in this area would not appear to be workable because of the natural conditions and the fragile nature of the sub-arctic environment.

Kodiak Island - Plants in the City of Kodiak are handling processing solids in a reduction plant and have no need for land fill. Plants on the rest of the island have potential sites but since the island is essentially rock without much top soil there might be a problem in finding enough covering material to comply with State operating regulations.

Cook Inlet - Land filling on the Kenai Peninsula would probably be more successful than in other areas of Alaska. Potential sites are available; however, local conditions would have to be investigated, especially sandy areas, to determine whether the leakage could contaminate State waters. Also muskeg soils would cause problems.

Prince William Sound - Limited area may be possible. Much of the land is mountainous and flat areas are tide flats. These areas would obviously be unsuitable.

Southeastern Alaska - Generally mountainous behind the beach areas where canneries are located. Terrain would make land filling difficult Also, the high annual rainfall might cause problems with leakage entering State waters.

Washington and Oregon - Solids are generally used in reduction plants. Land fill areas are available, however experience with various cities indicates that available sites are rapidly being used up.

2. General Comments on Barging Processing Waste From Seafood Plants

There are a number of critical constraints on barging of solid seafood waste for ocean disposal and they are as follows.

a. It is not clear from applicable state and Federal regulations exactly what constitutes proper disposal areas for seafood waste. If such areas are outside of three miles, barging could require round trips in excess of 200 miles such as in Cooks Inlet.

b. In some cases, barging of solid waste would require the construction of new dock facilities, and the purchase of barges and towing equipment. In some areas such as Bristol Bay and Cooks Inlet barges would have to be of shallow draft to operate in the area. In some areas, as in the case of the Whitney-Fidalgo plant in Petersburg, Alaska there is no space available to build docking facilities for barges. Docks, barges, and towing equipment would only be used for a period of one to three months. The barges and vessels would have to be stored ashore the remainder of the year. The cost of leasing such equipment during the summer season may be prohibitive.

c. In regions with great tidal movements, such as Cook Inlet and Bristol Bay, barges could only be taken out at high tide and would therefore necessitate extra barges and dock space to handle full barges waiting for ties. The crew expense would be quite high as barges would have to be moved on high tide regardless of the hour of day or night.

d. The general weather conditions would not make it possible to move barges in many cases on any reasonable schedule. Handling barges because of strong tide, heavy seas, and high winds in unprotected areas would be impossible. It is probable that barges could not be towed and dumped in the proper areas 25 to 30 percent of the time because of the weathe. factor alone.

e. Barges laying at the processing plants which contain processing waste would be an attractant for flies and other insects, birds, and rodents and consequently would create a serious problem in terms of plant sanitation in the view of local, state, and federal health agencies.

3. Consideration of Alternate Plant Sites

The problems associated with moving existing seafood processing plants to other areas to provide for disposal by barging, land fill or municipal treatment are numerous.

The matter of moving a processing plant would still leave the plant subject to all of the constraints on barging and land fill noted previously.

The availability of property is also very difficult because of the importance of remaining near fish producing areas in order to minimize transportation time from the fishing grounds to the plants to help assure wholesome products. The varying seasonality of fishing by districts emphasizes this problem.

The status of land in Alaska is another problem at this time because a number of Native Corporations have not selected their lands under the Native Land Claims Act and because the State of Alaska also has the subsequent right of land selection

There are only a limited number of locations which afford plants adequate processing water, labor force, transportation, and protection of docks and the plant from weather.

Additional considerations are presented in Table VI-2 which briefly ennumerates solid waste disposal constraints for selected plants. Many of these plants are salmon processing plants as well as processors of other fish and shellfish but are included as representative examples of the Alaskan seafood processing industry.

In summary, it appears that there are many technical or physical constraints on solid waste disposal in Alaska. In addition, there is some doubt as to whether the pollution abatement costs adequately reflect the actual costs that may be incurred, i.e., duplicate barges etc. If this is the case then additional plant closures could result from the imposition of BPT guidelines.

The lack of available land, dock and duplicate barge requirements could result in greatly inflated BPT closure estimates.

Table VII-1. Solid waste disposal summary of selected seafood processing plants in Alaska.

Company Name	Plant Location	Potential Miles to Land Fill	Acres Owned by Plant	Ownership of Surrounding Land
		BRISTOL BAY		
Whitney-Fidalgo	Naknek	Land not suitable	3	Local residents
North Pacific Processors	So. Naknek	Land not suitable	6	Local residents & City
Columbia Wards Fisheries	Ekuk	Land not suitable	6	Alaska Native Corporation
Bumble Bee Seafoods	So. Naknek	Land not suitable	5	Local residents No. Pacific Seafoods
New England Fish Co.	Pederson Point	Land not suitable	10	Other business Native Private Ownership
New England Fish Co.	Egegik	Land not suitable	1	Other business City & Private
		KODIAK ISLAND		
Whitney-Fidalgo	Kodiak	5	2	Local residents Peter Pan Seafoods
North Pacific Processors	Kodiak	5	2	Alaska Packers Kodiak Airways
Columbia Wards Fisheries	Alitak	NA	4	Federal Wildlife Reserve
Columbia Wards Fisheries	Port Bailey	NA	6	Private & State Lands
Kodiak King Crab, Inc.	Kodiak	NA	4	City, State, & other processors

NA = Not Available

Table VII-1. (continued)

Company Name	Plant Location	Potential Miles to Land Fill	Acres Owned by Plant	Ownership of Surrounding Land
		KODIAK ISLAND (Cont.)		
Kodiak King Crab, Inc.	Zachar Bay	NA	2	Native Land Claims Act
Kodiak King Crab, Inc.	Port Williams	NA	11	National Forest, Native Land Claims
New England Fish Co.	Uganik	1/4 mile	5	State & Federal
		COOKS INLET		
Whitney-Fidalgo	Anchorage	17	Lease Property	Alaska Railroad
Whitney-Fidalgo	Port Graham	NA	4	Local Alaska Natives
Kenai Packers	Kenai	NA	46	Alaska Packers & Local homesteads
Columbia Wards Fisheries	Kenai	NA	55	Local homesteads
		PRINCE WILLIAM SOUND		
Whitney-Fidalgo	Whittier	NA	Lease Property	Alaska Railroad
North Pacific Processors	Cordova	NA	Lease Property	City of Cordova
St. Elias Ocean Products	Cordova	NA	1	Indian Land Claims
New England Fish Co.	Orca	5 miles	7	Federal
		SOUTHEASTERN ALASKA		
Whitney-Fidalgo	Ketchikan	NA	2	Union Oil Co. Local Metal Shop

Table VII-1. (continued)

Company Name	Plant Location	Potential Miles to Land Fill	Acres Owned by Plant	Ownership of Surrounding Land
		SOUTHEASTERN ALASKA (cont.)		
Whitney-Fidalgo Seafoods	Petersburg	NA	Plant on piling 100 [illegible] from shore	U. S.
New England Fish Co.	Chatham	1	None owned - Leased Fed.	Federal
Juneau Cold Storage	Juneau	15 - probably not available	1	City
McCallum Legaz Fish Co.	Hydaburg	NA	Leased	Indian owned
Excursion Inlet Pkg. Co.	Excursion Inlet	NA	6	U. S. Forest Service
Wards Cove Packing Co.	Wards Cove	NA	5	Private land
		WASHINGTON		
New England Fish Co.	LaConner	10	None owned - Leased city	Private
Whitney-Fidalgo	Anacortes	NA	" "	Other business
Whitney-Fidalgo	Seattle	NA	5	Other business
Bumble Bee Seafoods	Bellingham	NA	4	Other business
Perfection Smokery	Seattle	NA-City pickup	1/4	Private
		OREGON		
Bumble Bee Seafoods	Astoria	NA	7	Other business