

WEST COAST FISHERIES ECONOMIC DATA PLAN 2000-2002

Pacific Fishery Management Council
2130 SW Fifth Avenue, Suite 224
Portland, OR 97201
(503) 326-6352
www.pcouncil.org

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The West Coast Fisheries Economic Data Plan 2000-2002 prepared for the Pacific Fishery Management Council by Mr. Jim Seger, Economic Analysis Coordinator, in consultation with National Marine Fisheries Service West Coast economists and the Pacific States Marine Fisheries Commission Economic Fishery Information Network and the Recreational Fishery Information Network. Editing and report preparation (secretarial support) was provided by Ms. Kerry L. Aden and Ms. Renee D. Heyden.

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LIST OF ACRONYMS

Council	Pacific Fishery Management Council
CZMA	Coastal Zone Management Act
EFIN	Economic Fishery Information Network
ESA	Endangered Species Act
FMA	fishery management area
FMP	fishery management plan
HMS	highly migratory species
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistics Survey
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
OMB	Office of Management and Budget
PacFIN	Pacific Coast Fisheries Information Network
PSMFC	Pacific States Marine Fisheries Service
RecFIN	Recreational Fishery Information Network
RFA	Regulatory Flexibility Act
USCG	United States Coast Guard

EXECUTIVE SUMMARY

This document is a data collection plan developed by Pacific Fishery Management Council (Council) in consultation with National Marine Fisheries Service (NMFS) economists and the Pacific States Marine Fisheries Commission (PSMFC). Implementation of the plan benefits both state and federally managed fisheries. While the plan has been adopted by the Council, the Council has neither the resources nor personnel to implement the plan. Implementation and success depends on continued funding and commitment of the agencies and agency personnel to the concepts embodied in this plan.

Economic data are needed for fishery management. Marine and anadromous fisheries are managed under a complex set of goals and objectives related to preserving the resource and meeting the needs of the fishing industry, consumers, and fishing communities. The common property nature of the resource combined with these publicly mandated goals and objectives result in regulations that are greater in number and more intrusive than for many other industries. A consequence of the intense regulatory environment is a greater need for economic information than for other less regulated industries. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the Regulatory Flexibility Act, the National Environmental Policy Act, and executive orders such as E.O. 12866 on Federal Regulations all require consideration of economic impacts of government regulations. The demand for economic information becomes even more acute when allocational issues are involved. Increasing fishing capacity and declines in some fish stocks have The widening gap between fishing capacity and allowable harvest has resulted in an increasing number of management actions with direct and indirect allocational implications. Better economic data would result in more complete and higher quality analyses. Failure to adequately consider economic effects of regulations may result in development of unacceptable or ineffective regulations and can result in lawsuits challenging the regulations.

Current economic data fall short of the need. Much of the needed economic data are unavailable or of poor quality. When the need for an economic analysis to support a particular fishery management decision becomes apparent, it is generally too late to initiate a data collection effort that can be completed in a timely fashion. Additionally, when the industry is asked to provide information in a data collection effort related to a specific controversial management issue, questions arise regarding data reliability.

This plan (Figure ES-1) specifies a program for the collection and dissemination of needed economic data (Figure ES-2). The *West Coast Economic Data Plan* is intended to assist in development and implementation of a coordinated, systematic approach to acquiring the needed economic data in a consistent and timely manner. It suggests direction for the development of efforts to collect economic data, ensuring various data collection activities are integrated with each other, helping avoid duplication of data collection efforts, and providing for the efficient dissemination of data while preserving confidentiality. This plan was first adopted by the Council in 1998. Since that time, a number of activities that address some of the elements have been initiated including cost-earnings surveys for various fishery management plan (FMP) fisheries, community impact analyses, and other studies. Many of these efforts are embodied in the PSMFC's Fisheries Economics Data Program. The Fisheries Economics Data Program is a cooperative data collection program of the PSMFC and NMFS with the help of the Pacific and North Pacific Councils.

The plan covers all West Coast fisheries and includes interfaces with other data systems. The scope of the plan is the economic data needed for management of fisheries covered by the Council FMPs and other marine and anadromous fisheries in the Washington, Oregon, California, and Idaho area. The primary focus of activity for the plan is gathering and disseminating information related to West Coast fisheries, and, as appropriate, coordination of those activities with similar programs for Alaska and the West Pacific. The plan also specifies database development, coordination, and information dissemination functions for information on industry sectors related to fisheries through impacts on fish habitat. The database systems created should readily interface and provide agreed upon core information needed for the National Fishery Information System and Vessel Registration System.

The plan identifies the major high priority projects needed and recommends guidelines for their implementation. The plan recommends priorities for the collection of specific data elements be

determined by steering committees for each project. The steering committees would include representation from NMFS, PSMFC, and the Council. Individual projects would be designed to minimize the burden on industry and preserve confidentiality. Developing industry confidence and a cooperative long-term relationship is an important guiding principle for the projects (Section 3.3). An important element of many of the projects will be developing cooperative efforts with existing projects that focus on the collection of noneconomic data.

Core economic data needs.The needed data. The following table lays out some of the major categories of core economic data for which substantial improvement is needed. These data needs are covered in greater detail in the tables referenced under each category.

Harvesters (Table 2)	Processors (Table 3)	Charter Vessels (Table 4)	Recreational Fishers (Table 5)	Communities (Table 6)
	Revenue Data	Revenue Data	Effort and Catch by Target Species	Tax Revenues
Cost Data	Cost Data	Cost Data	Cumulative per Angler Catch and Effort	Fishery Related Economic Infrastructure
Wages Paid and Jobs Employment and Income	Wages Paid and Jobs Provided Employment and Income	Wages Paid and Jobs Provided Employment and Income	Trip Costs and Angler Demographics	Fishery Related income and Employment and Income
Capacity Information			Angler vValues and Preferences Held by Anglers with Respect to Species, Sites, and Regulations	Geographic and Physical Characteristics

Funds. This plan seeks funds (\$150,000 annually) to maintain efforts to collect and disseminate economic data for commercial fishing businesses (seafood and recreational, Section 3.1.1), \$450,000 for recreational fishers (Section 3.1.2), and \$150,000 for community-related projects (Section 3.1.3). In addition, it is recommended a special projects fund be created (\$150,000 annually) for the purpose of augmenting ongoing baseline data collection efforts with coordinated special data collection activities to respond to specific questions that arise from year to year (Section 3.1.5). These projects are identified in Figure ES-2. There are some additional unfunded start-up projects that have been identified. Funding needs for the collection of economic data related to habitat have yet to be identified (Section 3.1.4). Excluding PacFIN, RecFIN, and the unidentified amount needed for data on habitat, but including an annual effort to collect socioeconomic information from recreational anglers, the total identified ongoing funding needs come to \$1,250,000 with an additional \$155,000 needed for initial start-up projects related to communities. These funds are needed to support management decisions affecting West Coast state and federally managed fisheries that, in 1999, generated \$340 million in exvessel revenue (all commercial fishtickets for marine and anadromous species landed on the West Coast) and supported approximately 11.6 million recreational angler trips (total marine trips as reported by RecFIN).

Funding NMFS Council States Sea Grant Foundations

Data Sources Existing Governmental Statistics (e.g., unemployment data) Existing Studies and Technical Data Enhancement of Existing Data Collection Activities (e.g., logbooks) Industry/Fisher/Community Surveys
--

Data Management and Program Coordination A multi agency effort for the collection and dissemination of economic data on West Coast fisheries coordinated through the Pacific States Marine Fisheries Commission in cooperation with NMFS
--

Client Users Fishery Managers Researchers Industry Public
--

Products Available to All Screened and summarized data characterizing costs and revenues for typical firms in the fishing industry (commercial harvesters, processors, and charter vessels) Stratifications characterizing the fishing industry Recreational angler trip value and expenditure information Economic data characterizing fishing communities Web page databases on fishery related economic studies
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WEST COAST ECONOMIC DATA PLAN ES-3 2000-2002 Figure ES-2. West Coast Fisheries Economic Data Program (italics indicate projects for which funding

EFIN (Economic Fishery Information Network)
Ongoing Data Collection Activities \$150K/yr (Section 3.1.1)
 Current Ad Hoc Funding \$255K
 (Tables 2, 3, and 4)

Special Projects—NMFS West Coast Regions Science Centers (Section 3.1.5)
 Current Ad Hoc Funding \$185K
 (Any Table)

Recreational Fishers
 • *Socioeconomic Survey—Minimum Two of Three Years (funded for 2000)*
 \$350K/yr (Section 3.1.2(b))
 • *Survey Development and Analysis*
 \$100K/yr (Section 3.1.2(b))
 (Table 5)

Alaska Data Collection Program

Independent Projects
 Projects developed by independent researchers to collect data addressing needs identified in the West Coast Economic Data Plan
 (Any Table)

Data Management, Program Coordination, and Outreach
EFIN—\$350K/yr Ongoing for West Coast (Section 3.1.1(b))
Some Activities Supported Through Ad Hoc Surveys
PacFIN—Maintain Current Activities (Section 3.1.1(a))
RecFIN—Increase Sampling Needed Funding to be Specified (Section 3.1.2(a))

Inland Marine and Anadromous Fisheries Habitat Related Economic Data Collection Efforts

Community Data
 • *Develop a Repository of Existing Data on Fishing Communities \$65K*
 • *Initial Baseline Quantitative Description \$65K*
 • *Identify Needed New Data Collection Activities \$25K*
 • *Implement Ongoing Update of Baseline Descriptions \$50K*
 • *Ongoing Projects to Collect Data to Link Fisheries to Existing Government Data on Communities \$100K*
 (Section 3.1.3)
 (Table 6)

needs have been identified but not met).

National Fishery Information System and Vessel Registration System

Habitat
 Economic Data Related to Fishery Impacts—to be identified (Section 3.1.4)

1.0 INTRODUCTION

An economic data plan for the West Coast is needed to provide a coordinating instrument for developing and implementing a systematic approach to acquiring the needed economic data in a consistent and timely manner. This plan suggests direction for the development of efforts to collect economic data, ensuring various data collection activities are integrated with each other, helping avoid duplication of data collection efforts, and providing for the efficient dissemination of data while preserving confidentiality. The needs for economic data are those of fishery managers, the industry, and general public. The scope is the economic data needed for management of fisheries covered by Council FMPs and other marine and anadromous fisheries under the jurisdiction of the states in the Council area.^{1/} The scope includes economic data needed for all Council-managed species (currently groundfish, salmon, coastal pelagics, and halibut)^{1/} as well as other West Coast fisheries. Both the commercial and recreational fisheries are included within the scope, as are the communities of which these sectors are a part. The commercial sector is divided into harvesters and processors, and the recreational sector is divided into the recreational fishers and the charter vessels catering to those fishers. Fulfilling all these data needs will require coordinated efforts by the Council, NMFS field and headquarters offices, PSMFC, and the states.

1.1 Problem Statement

Marine and anadromous fisheries are managed under a complex set of goals and objectives related to preserving the resource and meeting the needs of the fishing industry, consumers, fishing communities, and the trust interest of the general public. The common property nature of the resource combined with these publicly mandated goals and objectives result in regulations that are greater in number and more intrusive than for many other industries. A consequence of the intense regulatory environment is a greater need for economic information than for other less regulated industries. The Magnuson-Stevens Act, the Regulatory Flexibility Act, the National Environmental Policy Act, and executive orders such as E.O. 12866 on Federal Regulations all require consideration of economic impacts of government regulations (Table 1). The demand for economic information becomes even more acute when allocational issues are involved. Increasing fishing capacity and declines in some fish stocks have The widening gap between fishing capacity and allowable harvest has resulted in an increasing number of management actions with direct and indirect allocational implications. Better economic data would result in better more complete analyses. Failure to adequately consider economic effects of regulations may result in development of unacceptable or ineffective regulations and can result in lawsuits challenging the regulations. Ongoing data collection is needed to monitor and evaluate the health of the industry and provide managers with information on the consequences of their actions so that appropriate adjustments can be made and repetition of poor policy choices avoided.

The need for economic data to address management issues should be anticipated before those issues become critical. Once the need for an economic analysis of a particular management issue becomes apparent, it is generally too late to initiate a data collection effort that can be completed on time to support the required analysis. When industry is asked to provide information in a data collection effort related to a specific controversial management issue, questions arise regarding data reliability.

Lack of coordination between data collection efforts and between efforts to collect economic and noneconomic data can result in duplication of effort, higher-than-necessary costs, and greater-than-necessary industry burden. Similar situations can occur with respect to the management of repositories for such data. The need to bring existing data into documented and accessible repositories with appropriate protections for confidential information has become increasingly apparent.

Since the Council first adopted this economic data plan in 1998, a number of activities have been initiated

1/ The specified scope includes state managed fisheries. This is consistent with the scope of the national fishery information system mandated under the Sustainable Fisheries Act and is in line with the broader interests of PSMFC and the states.

2/ A plan for highly migratory species is under development.

to address the need for socioeconomic data and personnel in a coordinated manner.

- In 1998, NMFS conducted a planning exercise to estimate the number of social scientists and socioeconomic data collection budgets needed to address NMFS and Council needs nationwide. This information is serving as the basis for a current \$50 million budget request.
- In recent years, NMFS has provided funding for a variety of economic data collections pertaining to commercial and recreational fisheries. Funding of recreational surveys is rotated on a regular basis among the various regions of the country. Funding of commercial cost-earnings surveys (which, until recently, has been provided on a fairly ad hoc basis) is now evolving into a process whereby NMFS expects to provide each of its regions with \$100,000 per year for surveys of this type.
- As opportunities for economic data collections have increased, West Coast economists have initiated efforts to coordinate data collections and to ensure that projects are funded in a strategic manner. For instance, most of the economic data collections pertaining to West Coast commercial fisheries are implemented as part of the Economic Fisheries Information Network (EFIN), a cooperative data program of the PSMFC and NMFS, with input from the Pacific and North Pacific Councils. Similarly, economic data collections on recreational fisheries are implemented as part of the Recreational Fisheries Information Network (RecFIN), another cooperative program of PSMFC and NMFS. NMFS Southwest Region/Center has recently established procedures for allocation of future monies it receives for commercial and recreational data collection, and NMFS Northwest Region/Center anticipates establishing procedures of its own in the near future.

1.2 Objectives for the Collection of Economic Data

Objective: Provide economic information and analyses needed for management of fisheries to achieve a broad variety of objectives including protection of the fishery resource, habitat, and ecosystem, as well as social and economic objectives. (Mandates which require the use of economic information include the Magnuson-Stevens Act, Executive Order 12866, the Regulatory Flexibility Act, and the National Environmental Protection Act [Table 1].)

The types of economic information and analyses needed include the following:

1. Baseline descriptions of the fishing industry (commercial and recreational, including charter) and communities including measures of economic performance over time, assessments of user and community dependence on the fishery, and specific harvest areas.
2. Predictions and estimates of economic impacts of management measures and fishery developments on groups (e.g., crew members, coastal communities, fishing communities, vessel owners, enforcement agencies, processor workers), including impacts on personal income, employment, financial viability, and agency/government budgets.
3. Predictions/Projections of responses to management regulation and market changes.
4. Predictions and estimates of regulation-induced changes in net economic value of fishery resources by the fish resource from national and regional perspectives.
5. Evaluations of cost effectiveness of government fishery management activities (i.e., where performance standards exist, determine whether or not those performance standards are being met in the least cost manner).

1.3 Objectives for the Data Plan

Objective 1: Generate systematic, efficient, and coordinated economic data collection efforts.

Actions Specified to Meet the Objective

1. Identify data needs.
2. Identify and pursue high priority data collection projects and the financial and personnel support required.
3. Modify existing organizational structure and processes as necessary to facilitate coordination of economic data collection activities.

4. Specify and implement guidelines for development and management of a system for the collection of economic data.
5. When practical and appropriate, integrate West Coast data planning, collection, and management efforts with Alaska and Western Pacific efforts.
6. Assist independent researchers (i.e., university and Sea Grant researchers) in identifying, developing, and seeking support for projects which will provide needed data to West Coast fishery management economists.

Objective 2: Develop integrated and efficiently accessible data and information repositories.

Actions Specified to Meet the Objective

1. Identify high priority data management and dissemination projects and the financial and personnel support required.
2. Modify existing organizational structure and processes as necessary to develop a data repository and data dissemination system.
3. Specify and implement guidelines for development and management of a system for the evaluation, holding, maintenance, and dissemination of economic data.
4. To the extent practicable, ensure that collected data are specified, formatted, and coded so they are compatible with the Fishing Vessel Registration and Fisheries Information Management System.

2.0 THE ECONOMIC DATA NEEDED

This section presents core economic data needs at a very general level. Core data needs are described as those essential for economic analysis that need to be collected on a periodic basis. During a December 1996 meeting of West Coast fishery economists a more detailed list of core data needs was developed. These are provided in Appendix B. Prioritization of data needs is difficult, because incompleteness in the data in any of the below categories can often create enough uncertainty regarding the direction of a result to render the analysis equivocal in its conclusions.^{1/} Priorities for specific data needs within these broad categories should be determined as part of the scope of projects initiated to collect the needed data. Additional detail on the types of data needed and an assessment of current availability is provided in corresponding tables.

2.1 Commercial Harvesting

Exvessel Value (Price and Quantity)

Exvessel value may be the highest priority data need, because it provides a starting point that sets a likely upper bound on the net value that may be generated from harvesting (Table 2). It also provides the total amount of revenue which must be divided into different expenditure categories for input-output analyses. For financial analyses it provides half the equation for evaluating the financial viability of the firm.

Exvessel values are currently collected through Pacific Coast Fisheries Information Network (PacFIN). Uncertainties regarding the values in PacFIN have to do with the form in which the product is delivered (level of processing prior to first delivery), the meaning of size categories (it is believed there is some variability in size categories by year and area), and whether buyers have provided or received compensation in addition to the sale price of the fish (e.g., provided ice or additional compensation not recorded on fishtickets). Information on area of catch is needed on a finer geographic scale in order to understand fisheries/habitat interactions the effects area closures, such as marine reserves, may have on the industry and communities.

Harvester Costs and Effort Information

Cost and expenditure information is needed for financial analysis of the effects of regulations on fishing businesses, estimates of personal income generated in local communities, and cost-benefit analyses. In order to understand the long-term effects of regulations, a better understanding is needed of how harvesters may respond. This requires revenue and cost information for not only the vessels activity in the fishery to which the regulations being considered will apply, but also the other fisheries in which the harvester participates or may turn to in the face of increasing regulation.

Closely related to the cost and revenue information are measures of effort. Measures of effort may be in terms of factors such as soak or tow time and numbers of hooks or size of mesh and nets used. Effort information is the critical link between marginal costs and marginal revenue. Most fishery regulations are directed at modifying the duration or effectiveness of effort. Thus cost and revenue information needs to be characterized in terms of units and quality of effort. In order to assess need for marine reserves, evaluate baseline and project economic impacts, effort information is needed on a finer geographic scale than is currently collected through means such as log books.

A complete harvester behavioral response analysis or cost-benefit analysis of harvesting activities would require estimates of all production costs including information on debt burden and available capital. The largest single cost of any harvesting operation is generally labor. Crew labor often constitutes between 30% and 50% of total variable costs. For cost-benefit analyses and behavioral analysis, opportunity cost of labor is needed. Knowing the opportunity costs of labor may narrow the range of possible net benefits more than any other single input. Financial analyses and input-output analyses of income impacts

3/ This is a particularly sensitive problem when allocational issues are involved.

require information on actual payments to labor. For income impact analyses, the single most important element of the expenditures are the direct income payments (payments to labor and owner profits). The effect on the income impact results from misspecifying the amounts spent on any other item in the firm budget is relatively minor compared to a misspecification of the amount going to direct income.

There is currently no systematic and consistent collection of harvester cost data. Various ad hoc studies have been conducted; however, the information is often difficult to access, outdated, and not specified and disaggregated to the level needed for economic analysis of regulatory effects.

Ownership

It is usually assumed vessels and business firms are equivalent units; however, many businesses take part in the ownership of more than one vessel (horizontal integration), and some vessels are owned by firms that also own processing facilities (vertical integration). In order to understand the impacts of regulations such as owner-on-board provisions or the elimination of foreign ownership rights in the industry (provisions that might be considered or congressionally mandated under future individual quota programs), more information is needed on the forms in which vessels are owned and degrees of horizontal and vertical integration, including exclusive marketing contracts.

2.2 Commercial Fish Buying and Processing

Exprocessor Values (Price and Quantity) and Product Recovery Rates

Cost and revenue information is also needed for processors. As with the harvesting sector, exprocessor values provide a likely upper bound on the total net value generated by the time the product leaves the processor level. Product recovery rates help relate volume of raw product to total output. When exvessel and exprocessor values are known, likely upper bound for the total net value generated at the processor level can be generated. The role of exprocessor values in financial and income impact analyses is similar to that described for exvessel values.

Some exprocessor values are collected through annual processed product surveys conducted by the NMFS regional offices. These surveys were initiated for the purpose of allocating Saltonstall-Kennedy Act funds between regions of the country. In the past, there have been substantial questions about the reliability of the exprocessor value information collected through these surveys. Concerns center around accuracy and completeness of the information provided and whether or not the information is representative of the processing industry.

Processor Costs

Fishtickets provide information on raw product costs. Labor may comprise a smaller component of processing costs than it does of vessel costs; however, it remains an important component for the purposes of income impact analysis and understanding the place of the processor in the local economy (see Section 2.5). As discussed above with respect to harvesters, for income impact analysis proper identification of expenditures going directly to personal income is one of the most important steps in developing an accurate assessment of income impacts.

Information on processing costs is sparse. The best information available is probably on whiting processing, because of surimi production feasibility studies conducted in the 1980s, and because of data collection efforts in response to whiting allocation battles in the 1990s.

Ownership

The paragraph on ownership in Section 2.2 also applies to processors.

2.3 Charter Vessels

The information needed for charter vessels is similar to that needed for the commercial harvesters discussed in Section 2.1 (Table 4). There is probably less cost and revenue information on the charter vessel sector than any other sector of the fishing industry. In comparison to the commercial harvest sector for which there is substantial harvest and revenue information from fishtickets, there is only limited collection of vessel-specific harvest information for charter vessels. Revenue information may be the highest priority need, for reasons similar to those stated for harvesting vessels. There have been few ad hoc studies focused on the acquisition of economic information on charter vessels. Recently, NMFS has provided some onetime funds for a survey of charter vessels. Some of the initial pieces of information which would be useful are types of charter activities engaged in, by vessel, typical fees charged for each type of activity, and total revenues. To understand the relationships between management actions and charter vessel activities, this revenue information needs to be available in the context of units of production (numbers of vessel trips and angler trips), amounts of resource consumed (catch information), and time of year and specific location of catch (important for considering local area closures). This information is analogous to catch weight, price, and trip information conveyed by commercial fishery fishtickets. Labor and other cost information would be needed to conduct full financial and cost benefit analysis. Also needed is vessel information such as vessel size and passenger carrying capacity.

2.4 Recreational Fishers

The central repository for recreational fishery data (Recreational Fishery Information Network [RecFIN]) primarily contains information generated from the Marine Recreational Fisheries Statistics Survey (MRFSS) and some data from the state sampling programs. The MRFSS is designed to provide state level annual estimates of effort, catch, and discards. To avoid duplication of sampling effort, MRFSS sampling does not customarily occur in fishing modes, areas, and times of year when the states conduct their own recreational sampling programs. Some variables that are critical for conducting economic analysis (e.g., number of trips by target species, area of residence of the angler) are not consistently collected across all sampling programs. However, in the last few years NMFS funded economic surveys have been conducted in connection with MRFSS, and the needed data has been collected for all modes and times. The need for data to support the economic surveys has sometimes resulted in more overlap with state sampling program.^{4/} It is important that effort, catch, target species, and other variables that are critical for economic analysis be available in a comparable manner for all segments of the recreational fishery in all years.

More complete and refined estimates of catch, discards, and effort by mode of fishing, target species and geographic area are needed (Table 5). These estimates provide starting points for baseline assessments of the importance of the recreational fishery to the local areas; empirical information for projection of responses to changes in management regulations; and information needed to improve estimates of the values anglers place on the fishery. At present, there are gaps in the MRFSS field sampling effort that make it difficult to identify the number of trips targeting on a particular species and the residence of the angler. For Washington this information is completely missing for coastal trips, for Oregon it is missing for trips taken in July and August,^{5/} for California target species information is missing for party boat trips north of San Luis Obispo for July-December in recent years. Additionally, tPrograms are being developed to apply post-stratification techniques to MRFSS data in order to generate estimates at lower levels (for example, local level as opposed to state level and two-month periods rather than annual). The level of sampling for MRFSS is not high enough to provide precise estimates at these lower levels or for two variables at the same time (for example, the number of trips targeting on a species using a particular mode). This makes it very difficult to adequately answer questions such as "How dependent is Lincoln County and its recreational fishing industry on new money attracted to the area by lingcod fishing

4/ On other occasions where MRFSS and state sampling have occurred concurrently, differences in the resulting estimates of effort and catch have generated confusion regarding which sets of estimates should be used to evaluate the effects of management actions. Attempts to resolve these discrepancies are expected to result in improvements to both the MRFSS and state sampling programs.

5/ Target species information is available for Oregon for July and August but at a much more general level than from the MRFSS survey trips are only classified as groundfish or salmon.

opportunities?" The Council has recently undertaken consideration of marine reserves. Accurate projection of the impacts of creating marine reserves would require knowing not only what port recreational fishers departed from, but also the area in which they fished. The MRFSS field survey is asking fishers to more precisely identify the area in which they fish. More refined estimates of catch, discards and effort by mode of fishing, target species, and geographic areas are needed (Table 5). These estimates would provide starting points for baseline assessment of the importance of the recreational fishery to the local areas; empirical information for projection of responses to changes in management regulations; and information needed to improve estimates of the values anglers place on the fishery.

Two of the major types of economic information needed on recreational fishers are consumer surplus and expenditure information. Consumer surplus provides information on the value anglers place on a particular fishing experience, and information is needed in detail that is sufficient to predict angler response to changing management regulations. Expenditure information can be used for the generation of estimates of consumer surplus and has immediate use for developing estimates of personal income associated with recreational fishing and the dependence of communities on recreational fishing.

Travel cost and contingent value models^{6/} are often used to generate estimates of consumer surplus. Information for these models is collected through carefully structured surveys. There have been a number of travel cost and contingent value studies conducted for West Coast recreational fisheries. More have been conducted for salmon than for other species. Generally, not all of the needed information is captured in a single survey. Information is needed not only on the dollar values anglers place on a particular experience, but also on how that value changes by fishing area and management regulations and the value of the experience relative to other activities in which the fisher might engage. This information on fisher values can be used to predict behavioral response to regulations, and so to estimate the effect of regulations on economic activities in local communities as well as to model conservation effects. For example, in response to a reduced bag limit, do fishers continue to spend the same amount of time going after their target species, target on alternative species, or cease marine water fishing in favor of other recreational activities? For purposes of predicting fisher behavior, ranking of relative values of alternative recreational activities may be more important than generating dollar estimates of the value of different experiences. In 1998, the annual MRFSS survey was being augmented with socioeconomic questions designed to generate travel cost estimates and ask contingent behavior response questions. These contingent behavior questions will provide some information of relative value and behavior response for different management regulations. These data are currently being analyzed. In 2000, the MRFSS is being augmented with socioeconomic questions designed to generate estimates of the economic impact of the recreational fishery on local economies.

The current NMFS plan to conduct a recreational fishery socioeconomic survey on the West Coast once every three years is not considered to be adequate for West Coast needs. While there is an overlap in the information needed for estimates of the economic impacts of recreational fishing activities and for consumer surplus, the information needed is different enough between the two that it must be gathered in separate surveys. If the survey alternates between emphasis on development of estimates of economic impacts and estimates of consumer surplus then a survey emphasizing consumer surplus would occur only once every six years. There are a number of factors that make it difficult to make a comprehensive estimate of the value of various types of recreational fishing experiences in a single year. These factors include: low contact rates for fishers who participate in the particular kind of recreational fishing activity for which a value estimate is sought, and between year differences in the quality of recreational fishing opportunities due to variation in the fishery management regulations and recreational fishing opportunities available (particularly when large scale events are occurring such as major restrictions in the salmon fishery and El Niño related shifts in the available ocean species). Additionally, there is enough uncertainty about the appropriate survey questions to use for generating various estimates of recreational values and enough different aspects of the recreational values that need to be measured that subsequent surveys will be required to validate initial results and further explore the characteristics of fishing trips which change the value of such a trip to the angler. In particular, there will likely be an ongoing need to evaluate angler response to different types of fishing regulations. All of these factors lead to the

6/ Contingent value models generally rely on fishers response to questions posed regarding their willingness to pay for fishing or accept compensation in return for not fishing.

conclusion that a survey focused on estimating consumer surplus needs to be conducted more frequently than once every six years. An increase in funds to carry out surveys would need to be accompanied by increased funds for survey design and analysis of results.

2.5 Fishing Communities

Fishing and fish processing operations interact with communities through the jobs provided, tax revenues paid, and public services and infrastructure required. The development of a fishing community in a particular location may depend on services and infrastructure available at a port, protection from ocean conditions, ocean access, and proximity to exploitable fish populations and major population centers. The latter of these factors are classified here as geographic and physical characteristics of the port. The following are the data collection needs related to fishing communities (Table 6).

Jobs Employment and Income Provided

Information is generally readily available on total employment and income levels and income classes in a particular community. To relate these general statistics to the fishery, information is needed on employment generated by the fishing industry and income levels of the participants. The high priority types of information needed by job class are number and duration of jobs, wages paid, and employee total household income. Information on wages is covered under the costs sections for harvesters, processors, and charter vessels.

Tax Revenues

Information is needed on the amount of tax revenue generated by the fishing industry. Information on local tax payments is needed in the context of local area governmental budgets. Some information on tax revenues generated for state and local communities may be forthcoming as part of the effort to meet the needs for cost data for each sector discussed above.

Public Services and Infrastructure Required and Available

The public services and infrastructure required by the fishing industry may either burden or benefit the local community. Needs for electrical services or the treatment of sewage outfall may place a burden on the local community. On the other hand, the commercial activities generated may provide the justification for public works projects such as channel dredging, the major part of which may be financed with external funds and the benefits of which flow to more than just the fishing industry. To fully understand the role of the fishing industry in the economic health of the local community, information should be collected on the local infrastructure which supports the fishing industry and special public projects or expansions of public services related to the fishing industry.

Geographic and Physical Port Characteristics

Geographic and physical port characteristics include information on geographic proximity to exploitable fishing resources, ease and safety of ocean access, degree of shelter provided by the port, distances to major markets and distribution points for commercial fishing products, and distances to major population centers from which recreational fishers come.

Much of this information is likely to be readily available through a few contacts at each port. Information on distances to exploitable fishery resources may be the most difficult to develop. Good quality information collection in response to essential fish habitat concerns may also be useful in describing the potential fishery resource base of a community.

3.0 PLAN FOR ACTION

3.1 Priority Projects

One of the principles for developing this section is that projects be included only if there is a reasonable opportunity for progress in the next two or three years. The intent is to keep the plan workable and within reach, so it can be pursued with the hope of success. At the same time, to improve the current situation, the plan must look beyond the resources that are available today.

The following are projects which need to be continued or undertaken as the next steps in developing West Coast fishery economic data. For most projects, an estimate is provided for the funds necessary to support the project. Costs of time and travel are included. Funding estimates are not provided where the next identified step is to develop a project proposal to meet a particular need. No estimates are provided for activities which can be conducted with current personnel as a part of normal work and meeting activities.

The top priority for this plan is to maintain and expand as needed the funding to support current PacFIN and RecFIN projects. The RecFIN project in particular is likely to need additional funds to expand sampling effort to meet needs for management and economic data. This plan seeks \$500,000 annually to maintain efforts to collect and disseminate economic data for commercial fishing businesses (seafood and recreational, Section 3.1.1), \$450,000 for recreational fishers (Section 3.1.2), and \$150,000 for community related projects (Section 3.1.3). In addition, it is recommended a special projects fund be created (\$150,000 annually) for the purpose of augmenting ongoing baseline data collection efforts with coordinated special data collection activities to respond to specific questions that arise from year to year (Section 3.1.5). Funding needs for the collection of economic data related to habitat have yet to be identified (Section 3.1.4). Excluding PacFIN, RecFIN, and the unidentified amount needed for data on habitat, but including an annual effort to collect socioeconomic information from recreational anglers, the total identified ongoing funding needs come to \$1,250,000 with an additional \$155,000 needed for initial start-up projects related to communities. The following table summarizes the identified costs and references the section with the corresponding project description.

Project		Current Ad Hoc Funding	Funds Needed for Economic Projects	
			Initial	Ongoing
Commercial Fishing Businesses (Seafood and Recreational)				
3.1.1	Ongoing Data Collection	\$255,000		\$150,000
	Ongoing Management, Data Dissemination, and Outreach	0		\$350,000
Recreational Fishers				
3.1.2	Maintain and Enhance RecFIN			not included
	Increase Frequency of Socioeconomic Survey	\$350,000		\$350,000
	Increase Personal to Design Survey and Analyze Results			\$100,000
Communities				
3.1.3	Develop Data Repository Linked to PacFIN and RecFIN		\$65,000	
	Develop Baseline Descriptions		\$65,000	
	Identify Unmet Data Needs and Develop Proposal		\$25,000	
	Update Community Descriptions			\$50,000
	Ongoing Data Collection, Management, and Dissemination			\$100,000
Habitat				
3.1.4	Need and Priority Uncertain (Place Holder)			not available
Special Projects				
3.1.5	Special Projects Fund	\$185,000		\$150,000
Total for Identified Funding Needs		\$790,000	\$155,000	\$1,250,000

3.1.1 Commercial Fisheries (Seafood and Recreational)

(a) Maintain and Enhance PacFIN and Data Access

Maintain and continue to enhance the PacFIN data system. This system provides West Coast fisheries economists with vessel revenue information for all shoreside landings of marine and anadromous species. This important information is available to economists and others in a number of useful reports and standardized summary files. However, economists often require specialized subsets of this information in order to analyze specific management problems. PacFIN personnel and personnel associated with the PSMFC commercial fishery economic data project provide economists with an important link to this data.

Augment Current Funding As Necessary to Maintain and Enhance Current Functions

(b) Maintain the Fishery Economic Data Collection Program for Commercial Fisheries

The beginnings of an economic data collection program have been established by the PSMFC. In 2000, a cost-earnings pilot project for trawl vessels and processors was carried out that is expected to assist in determining the best way to implement an annual program for the collection of cost and earnings data from harvesters, processors, and first buyers. This project was conducted under a cooperative agreement between NMFS and PSMFC. Other cooperative projects being undertaken include a survey of the albacore and swordfish fleets (soon to be undertaken, see Section 3.1.5) and surveys of the charterboat and fixed gear/open access fleets (these surveys are being developed). Baseline funds should be committed to establish an economic data collection program as a permanent part of the West Coast fishery information system. This program should include both data collection and the full development of a data management and dissemination system. Economic information is needed not only to estimate the direct effects of regulations on the commercial fishery, but also to project impacts on communities.

Elements of the program:

1. Determine which of the data/information needs listed in Appendix B are of highest priority.
2. Identify those high priority data needs best collected in projects focused solely on the collection of economic data and those high priority needs which might be collected as part of other fishery monitoring and data collection activities.
3. Develop cost estimation routines that can be used with survey results and other data collected. (Development of such estimation routines can ensure cost data is collected in the needed format.)
4. Continue economic data collection projects and modifying as appropriate based on initial experiences.
5. Continue development of the data system that will act as a repository and dissemination point for economic data.
6. Begin development of alternative data sources by pursuing the "add-on" of economic data collection tasks to other fishery monitoring and data collection efforts.
7. Conduct interagency and industry coordination and outreach to gain cooperation.

Ongoing Funding Need

The ongoing funding need estimated for this program is:

Data collection (Element 4 of the program)	\$150,000
System design, implementation, management, interagency advocacy and industry outreach.	<u>\$350,000</u>
Total Ongoing Funding Need	\$500,000

Current Funding

As of October 2000, NMFS has funded three projects that are actively being carried out and may lead to the collection of cost data that may be integrated with PacFIN and other vessel specific data:

Salmon and Processor Data Sets for Economic Analysis	\$20,000
Preparation for Salmon Cost/Earnings Survey	\$10,000
Cost, Earnings, and Employment Survey of West Coast Limited Entry and Open Access Harvesters	<u>\$95,000</u>
Total Current Funding for the Seafood Industry	\$135,000
Recreational Charter Vessel Survey	<u>\$125,000</u>
Total Current Funding for the Commercial Fishery	\$255,000

Additionally, \$185,000 has been provided for a special project on highly migratory species (HMS) (Section 3.1.5). The contract for the special HMS project has been given to the PSMFC economic data program and will help maintain the PSMFC staff devoted to the West Coast program while stable funding is sought.

The HMS project is counted as a special project rather than as part of the base program, because the cost data to be collected will be summarized and not be available to the system or economists on a vessel specific basis. This is the type of targeted need project that Section 3.1.5 is intended to cover. Including the HMS project, a total of \$440,000 of West Coast economic data collection activities are being managed by the PSMFC project, as of October 2000.

3.1.2 Recreational Fishers

- (a) Provide full funding for the RecFIN program, expand or redirect sampling to increase the reliability of estimates of effort and catch for less than annual periods and at the community level. Expand use of the MRFSS angler intercept forms or questions to provide complete estimates for such factors as target species, catch composition, and county of angler residence.

Fully fund program and augment as necessary to maintain full functions (year 2000 funding was about \$1.1 million, approximately \$400,000 short of what is needed to fully fund the program).

- (b) Fully fund and increase the frequency of socioeconomic add-on survey, and work with the RecFIN program to make optimal use of the opportunity to economically collect data on the recreational fishery through existing survey programs. At a minimum the socioeconomic survey should be run in alternating years or in two out of every three years with the focus of the survey rotating between generating estimates of angler experience values and expenditures.

Supplement with \$350,000 per year for an annual socioeconomic survey and \$100,000 per year to fund a position to assist with survey design and data analysis

3.1.3 Communities

1. Develop a repository of economic and social data on geographically defined communities. Many of these data are currently available from federal and state agencies. The data should be summarized and located in tables readily available to West Coast fishery economists and linked to PacFIN and RecFIN landings and effort data. \$65,000
2. Develop baseline quantitative descriptions of the importance of commercial and recreational fisheries in the economies of coastal communities. Include estimates of income and employment generated from fishing activities. Inventory commercial and marine recreational opportunities supporting infrastructure and the geophysical amenities of the ports. \$65,000
3. Identify community data not currently available that may be useful in understanding the effects of fishery management actions on communities and develop proposals for the collection of such data. \$25,000
4. Implement an ongoing program to maintain and augment community data and update community

descriptions.

\$50,000

5. Initiate an ongoing data collection project to collect demographic and social data on the fishery that will allow analysts to link fishery information with generally available government statistics on geographic communities and provide better assessments of community impacts. \$100,000

3.1.4 Habitat

Determine the priority for acquiring economic information which may be needed to fulfill Council and NMFS responsibilities regarding the identification and protection of essential and critical fish habitat. Regulatory Flexibility Analyses may be required on best management practices for restoring habitat. When habitat is defined as critical, analysis of the implications may be required. If appropriate, develop project proposals for the collection of needed data.

3.1.5 Special Projects

No data system can or should try to collect every type of data that may be needed for economic analyses. An efficient system that attempts to acquire the needed data while keeping the burden on industry low may best be achieved through the use of special projects to focus on the collection of certain data elements as needs arise. A fund should be established for special projects to address high priority data collection needs that arise but are not covered by the projects listed above. Such a fund would be reminiscent of the socioeconomic fund administered for many years by the economists at the NMFS Southwest Region/Center. Specific plans for the use of this money should be developed in consultation with the steering committees for the projects specified in this plan and appropriate within NMFS monitoring and coordination. Data resulting from these studies should be integrated with the economic data systems developed under other projects of this plan.

\$150,000

3.2 Implementation

The following implementation details were agreed to by the affected parties when this plan was first adopted in 1998. With the assistance of the PSMFC staff, the economic data plan steering committee for commercial fisheries (Section 3.2.1) and the RecFIN economic subcommittee will review and update the data plan once every two years, ensure the plan is distributed to all interested persons, identify potential funding sources, and actively seek support for the implementation of the plan. PSMFC will maintain descriptive information on all projects conducted in support of this plan and provide this information to any researcher interested in using the data or developing new data collection efforts.

3.2.1 Commercial Fisheries (Seafood and Recreational)

Implementation of the collection of data related to the commercial fishery will be coordinated through the Pacific Coast Data Committee. The Commercial Fisheries Economic Database Coordinator assigned to the PSMFC PacFIN office will work with a steering committee comprised of economists from the NMFS Northwest and Southwest Regions and Centers and the Council.

3.2.2 Recreational Fishers

Implementation of data collection efforts related to recreational fishers will be coordinated through the RecFIN committee and, in particular, its economic subcommittee. The PSMFC RecFIN Coordinator will work with the subcommittee in coordinating these efforts.

3.2.3 Communities

PSMFC will work with NMFS and the Council in developing projects to address the need for community level data for analysis of fishery impacts (Section 3.1.3).

3.2.4 Habitat

The Council economist will work with the NMFS Northwest Region Economist to determine whether to maintain habitat-related economic data as a part of this plan and, if so, to further specifying data needs.

3.2.5 Special Projects

The West Coast economists should seek to encourage NMFS to reinstate annual funds for special economic studies related to West Coast management issues.

3.3 Guidelines for Development of Data Collection, Management, and Dissemination Projects

For each project intended to contribute to the economic data system:

1. Data models should be developed which show how the project fits in with other efforts to collect economic and noneconomic information.
2. A design review committee should ensure the system developed meets the users' needs. This committee should be comprised of representatives from the NMFS Northwest and Southwest Regions/Centers, the Council, PSMFC, and, as appropriate and requested, the states. The design review committee would play a role similar to that played by the Pacific Coast Data Committee with respect to PacFIN and the RecFIN committee with respect to the MRFSS survey and related data repository.
3. It should be a primary concern of each design review committee that activities be coordinated with related projects in order to minimize duplication and industry burden and ensure that related data sets can be harmonized and integrated. In particular, data collection efforts should be coordinated with efforts in Alaska.¹⁷ Additionally, to the extent appropriate, the design review committees should ensure that data collected is consistent with the standards and formats necessary to allow summary for transmittal to the national fishery information system.
4. Common coding should be maintained between West Coast data sets. Common coding includes standardized naming of variables, standardized coding of the variables (e.g., standard species codes), and standardized units of measure. National coding standards and coding used for Alaska data collection programs should be taken into account in developing coding for West Coast data.
5. Where the data to be collected may have applications broader than those of direct interest to economists, to the extent practicable, effort should be made to ensure data elements are specified in a manner useful in those applications. This may be particularly important with respect to effort data.
6. It should be a primary concern to develop and maintain a cooperative long-term relationship with industry.

7/ Coordination with the North Pacific Fishery Management Council is important to the success of projects for the collection of data on commercial fisheries. Such coordination will enhance the efficiency of the data collection efforts and help develop and maintain a cooperative relationship with industry. Overlaps include data collected from commercial vessels which participate in both Council areas and the development of data collection methodologies.

7. In determining the data collection approach to be used for a particular project, consideration should be given to the quality of information likely to be collected, degree of burden placed on industry, and data collection costs.^{1/} Required degrees of accuracy and needed sample sizes should also be addressed in each individual project.
8. Convenient, accessible, and secure systems should be developed for the delivery of collected data to fishery analysts. To maintain the cooperation and confidence of industry, it is essential to the success of all projects that there be strict adherence to confidentiality standards.

8/ Potential data collection methodologies identified by West Coast economists during a December 1996 meeting included: key informant approach, Delphi approach, group interviews, individual in-person interviews or phone interviews (including recreational intercept surveys), mailed surveys, logbooks, engineering approach, and direct observation.

TABLE 1. Outline of requirements for each section of a fishery management plan (FMP) amendment package with an economic aspect and identification of potential contributions by economists. (Page 1 of 5)

Major Element of the Amendment Package	Primary Legislation and Executive Orders (E.O.) Affecting Contents of FMP Amendment Packages ^{a/}				Economist Contributions
	Magnuson-Stevens Act	E.O. on Regulatory Planning and Review (E.O. 12886)	Regulatory Flexibility Act (RFA)	National Environmental Policy Act (NEPA) & Other Resource Protection Acts ^{b/}	
Purpose and Need for Action (Problem Statement)		Identify the problem and assess its significance.	Identify why the action is being considered.		How significant is the problem? Quantify if possible. Identify market failures.
Management Objectives	Management objectives should be consistent with the National Standards (priorities should be set among competing objectives).		State objective and legal basis for the proposed action.		Are the management objectives likely to address the problem given the economic dynamics of the situation?
Describe Alternatives	National Standard 7. Conservation and management measures shall, where practicable, minimize costs	<ul style="list-style-type: none"> • Include no action alternative. • Include alternatives to direct regulation (e.g., marketable permits) and seek alternatives which minimize effect on non-federal governments. • Design the alternatives to be cost effective and least burdensome while achieving their objective (flexibility and equity are included as costs/benefits). • Draft the alternatives to be simple and easy to understand. • To the extent feasible, specify performance objectives rather than behaviors or manner of compliance. 	Identify alternatives which minimize impacts on small businesses.		Are there alternatives which meet management objectives, but are more cost effective or have less of a burden on small businesses and small governmental jurisdictions? Have all relevant alternatives with differing economic effects been considered?
Description	Description of the fishery including: <ul style="list-style-type: none"> • Sectors (commercial, recreational and charter) • Landings trends • Number of vessels • Gear used • Species • Location of activities 			Description of the Affected Environment <ul style="list-style-type: none"> • Physical • Fishing Industry • Consumers • Communities • Governmental Jurisdictions (ports, 	Include descriptive information which will provide a baseline for evaluation of impacts under the criteria of the RFA, (e.g., What groups are affected? What is the composition of the groups in terms of small and large entities? What is

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	<ul style="list-style-type: none"> Likely management costs Fishery revenues Fishing communities Foreign fishing Indian treaty fishing rights 			<ul style="list-style-type: none"> towns, counties etc.) Agencies 	the size of the groups relative to the sector of which they are a part?).
Environmental Consequences	National Standard 1. Prevent overfishing.	Under E.O. 12886 environmental consequences would be included in the cost benefit analysis.		Environmental Consequences <ul style="list-style-type: none"> Bio Impacts (e.g., redirection of effort, bycatch, benthic organisms) Physical Impacts (e.g., habitat destruction) Protected Resources (ESA, MMPA) Cumulative Impacts (e.g., ecosystem, other agency activities)^{c/} 	Project behavioral changes that have environmental consequences (e.g., the highgrading incentive created under cumulative harvest limits).
Cost Benefit Analysis	National Standard 5. Where practicable, consider efficiency in the utilization of fishery resources	Include both quantitative and qualitative factors as well as an accounting of distributional, safety, and other effects of social concern.	Identify all costs associated with each of the alternatives and estimate the classes of small entities that will be subjected to the costs.		Economists take lead in developing the cost benefit analysis.
Effects on Groups Identified in Description	Fishery Impact Statement: assess effects on participants in the fisheries, fishing communities, and in fisheries conducted in adjacent areas under the authority of other Councils. National Standard 4. Conservation and management shall not discriminate between residents of different states . . . allocations shall be: (1) fair and equitable, . . . (3) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. National Standard 8. Conservation and	Assess effects on employment, profits, competitive position, efficiency, and regulatory burden. Include management and implementation costs for governmental agencies.	Provide information for evaluation of whether or not there will be a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act standards. ^{d/} Compare the costs of compliance for small businesses to those for large businesses. Assess effects on production and		Provide economic information on distributional effects and consequences. Evaluate significance for RFA.

TABLE 1. Outline of requirements for each section of a fishery management plan (FMP) amendment package with an economic aspect and identification of potential contributions by economists. (Page 1 of 5)

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	Magnuson-Stevens Act	E.O. on Regulatory Planning and Review (E.O. 12886)	Regulatory Flexibility Act (RFA)	National Environmental Policy Act (NEPA) & Other Resource Protection Acts ^{b/}	
	management measures shall . . . take into account the importance of the fishery to fishing communities in order to . . . [sustain participation and minimize economic impacts on communities].		employment.		
Evaluation of Alternatives Based on Policy Criteria	<ul style="list-style-type: none"> • Magnuson-Stevens Act National Standards.^{e/} National standards not listed elsewhere in this column: Standard 2, use the best scientific information available; Standard 3, manage the stock throughout its range; Standard 6 take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches; National Standard 9, minimize bycatch; National Standard 10, promote safety. • Magnuson-Stevens Act 302(c) Criteria for Actions Limiting Entry to the Fishery. • Magnuson-Stevens Act 304(e) Requirements to specify rebuilding schedules while taking into account the needs of the community. • Management plan objectives • Socioeconomic framework criteria (for groundfish FMP^{f/}) • Management objectives identified for the Proposed Action • Does the act resolve the problem 	The alternative chosen should maximize net benefits (net benefits include such factors as equity considerations).	Evaluate significance under the RFA. The RFA requires consideration of alternatives which minimize impacts on small entities. It does not require that the alternative with minimum impacts be selected, but does require the specification of a rationale for not selecting the minimum impact alternative.	Section 7. Consultation may be required under the ESA.	Provide summary on the performance of alternatives with respect to economic criteria--most of this will likely be derived directly from sections above.
Other Applicable Law	National Standard 7. . . . avoid unnecessary duplication.	Avoid inconsistency, incompatibility, or duplication of other regulations.	Identify any federal rules which duplicate, overlap, or conflict with the proposed rule.		Help identify conflicting policies, (e.g., policies to reduce capacity and the Capital Construction Fund).

a/ Not included in the body of this table are the following executive orders and legislation which may need to be addressed in the analytical documents:

- E.O. 12612. Federalism. Requires that federal preemption of state law be the minimum level necessary. Proposed policies with federalism implications must be accompanied by a "Federalism Assessment".

- E.O. 12630. Requires preparation of a "Takings Implication Assessment" for actions that effect or may effect the use of any real or personal property. Includes prohibition of a gear.
- Coastal Zone Management Act (CZMA). Requires federal consistency with state coastal management programs to maximum extent practicable.
- Paperwork Reduction Act (PRA). Requires federal agencies to minimize paperwork and reporting burdens. Requires Office of Management and Budget (OMB) clearance of any new information collection requirements.

b/ The Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA).

c/ NEPA considerations which may but often do not relate to fisheries management actions by the Council include impacts on aquaculture and hatcheries.

TABLE 1. Outline of requirements for each section of a fishery management plan (FMP) amendment package with an economic aspect and identification of potential contributions by economists.
(Page 5 of 5).

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- d/ The following are guidelines to be used in evaluating criteria of the RFA. Substantial number: over 20% of small entities in the sector. Small business: less than \$2.0 million. Significant impact: (a) five percent reduction in gross revenues, (b) five percent increase in total costs, (c) compliance costs as a percent of sales for small entities are ten percent higher than for larger entities, (d) capital costs of compliance requires a significant portion of the capital available to small entities, (e) over two percent of small business entities will be forced to cease operation.
- e/ Magnuson-Stevens Act decision criteria would take precedence over RFA decision criteria. Magnuson-Stevens Act decision criteria took precedence over E.O. 12291. However, this executive order has been replaced by E.O. 12886. No interpretation of the status of E.O. 128896 with respect to the Magnuson-Stevens Act has been provided.
- f/ Section 6.2.3 of the groundfish FMP.

TABLE 2. Economic data needed on commercial seafood harvesters. (Page 6 of 3)

Data Need	Application ^{a/}	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
1. West Coast exvessel value of catch, including price, quality, quantity, and catch location	A, B, C, D, E, F, G, H, I	Most	PacFIN	Y	Generally adequate. Does not include other goods and services that may be provided by processors in addition to direct payments for the fish. Does record payments not included on the fishticket. Gear information should be more specific and be available for each line on the fishticket. More specific area of catch is needed to facilitate development and analysis of marine reserves.	Data should include all relevant market information such as species, condition (dressed, headed, and gutted, etc.), gear used, and, where relevant, size. Data for salmon should include number of fish caught.
2. Total firm revenues	A, F, G, H, I	Minimal	Ad hoc surveys and Southwest Center West Coast Fishing Vessel Cost Earnings Database	Y	Fishing revenue for vessels in nonWest Coast activities are the top priority within this category. Available information is often outdated and applies only to certain sectors of the fleet. Little work has been done above the vessel level.	What are the firm's total revenues from all sources, including other vessels owned by the firm and nonWest Coast fisheries in which the vessels participate, as well as nonfishing activities? Ideally, net revenues are desired.
3. Other revenue information	E, F, H	Minimal	Fishery Management Area(FMA)	Y	Historic market order prices negotiated by FMA for association trawlers. Not currently available for other gears and species.	Processor market orders and market limits.
4. Employment and labor costs (crew and skipper)--nominal and opportunity costs	A, B, C, D, E, F, G, H, I	Some	Ad hoc study results	Y	Available information is often outdated, incomplete, and applies only to certain sectors of the fleet during certain types of operations.	Method of determining payments should be included (e.g., share, wage, piece). Whether or not a hired skipper is used. All operational costs are needed at the trip level with information on how costs vary with duration of trip and amounts of harvest. Labor cost data is needed by crew/operator position. Information is needed on number, types, and durations of jobs; numbers of days worked by vessel, and type of fishing activity.
5. Nonlabor operation costs	A, B, C, D, E, F, G, H, I	Some	Ad hoc study results	Y	Same as above.	All operational costs are needed at the trip level with information on how costs vary with duration of trip and amounts of harvest.
6. Owner profits and opportunity costs	E, F, G, H	None	N/A	Y	-	Information is needed at the trip level or lowest level of activity aggregation across which opportunity costs vary. Information is needed on differences between owner-operator and owner nonoperators.
7. Capital costs	A, B, C, D, E, F,	Some	Ad hoc surveys	Y	Information generally incomplete and difficult	Includes cost of vessels and permits.

TABLE 2. Economic data needed on commercial seafood harvesters. (Page 6 of 3)

Data Need	Application ^{a/}	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
	G, H, I				to acquire. Some information has been available from the Capital Construction Fund.	
8. Employee and owner income	B, C, D, F, I	Minimal	Ad hoc study results	Y	Information is often outdated and applies only to certain sectors of the fleet during certain types of operations.	Income levels of employee/owner households; household dependence on fishing income; and dependence on government assistance; and community of residence.
9. Employee and owner characteristics	F, I	Minimal	Ad hoc study results	-	Information is often outdated and applies only to certain sectors of the fleet during certain types of operations. There is no centralized system for identifying and tracking vessel owners and operators. Owner and operator identity may be more important in predicting vessel activity and impacts than most other data elements described.	Length of participation in the fishery and amount of experience.
10. Effort information	F, G, H	Some	Oregon pilot observer program, coastwide logbooks	Y	Most information available is for trawl gear. Improvements need to be made in accessibility to this data.	Type, size/number/quantity of gear, soak/tow times, number or tows/sets, times of tows/sets, search time, trip length by target species information is needed, tied to specific landings.
11. Other catch information	F, G, H	Some	Data on trawl discards from Oregon pilot observer program	-	Discard information is most important.	Information is needed on discards by target species.
12. Vessel information	A, F, G, H, I	Some	USCG, PacFIN, NMFS limited entry office, state license programs	-	Updated, better quality and better access is needed to information on vessel size and permits held. Fish hold capacity information is generally not available.	Vessel size, fish hold capacity, and permits held. Identity of vessel operator and owner.
13. Other vessel and information	A, B, C, D, E, F, G, I (depending on the approach to analysis)	Some	USCG and state license programs, fishtickets	e.	Priority depends on approach to developing estimates of operating costs. If an engineering approach is taken, this item may have a higher priority.	Vessel engine(s) including auxiliary (and model) equipment, and ability to use different types of gear.

TABLE 2. Economic data needed on commercial seafood harvesters. (Page 3 of 3)

- a/ Types of analyses:
- A. Financial analysis
 - B. Input/output income impact
 - C. Input/output job impact
 - D. Input/output impact by income level (income or job)
 - E. Effects on supply and demand
 - F. Prediction of fishers' strategic response to regulations
 - G. Bio-economic models
 - H. Cost benefit analysis
 - I. Baseline fleet and community descriptions

TABLE 3. Economic data needed on commercial processors. (Page 9 of 2)

Data Need	Application ^a /	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
1. Exprocessor value of products, including price, quality, quantity, and product form	A, B, C, D, E, G, H, I	Some	Processed Product Survey and PacFIN information	Y	Generally incomplete. This type of information is a high priority for species for which the product is brought to shore in different product forms (e.g., whiting and sablefish). There are questions regarding bias in the processed product survey estimates. The information is also needed to fully assess the community dependence on the fishing industry.	Data should include all relevant market information such as species, condition (dressed, headed, and gutted, etc.), and, where relevant, gear used and size.
2. Product recovery rates and raw product costs by product form	A, B, C, D, E, G, H, I	Some	PacFIN data, ad hoc studies, and agreed standards for enforcement	Y	PacFIN data provides information on product landed at the site of the processing plant, but not information on product transported to the plant from other locations.	Raw product costs are also covered under harvester exvessel prices. Information is needed on fish landed directly to the processing plant and fish transported to the processing plant from other landings sites. Product recovery rates are necessary to determine the amount and cost of raw product cost for a given amount of exprocessor sales.
3. Total firm revenues	A, I	Minimal	Ad hoc survey	Y	Some information as been collected on horizontal integration of West Coast processing plants.	What are the firm's total revenues from all sources including other processing plants owned by the firm and nonWest Coast products which are handled, as well as nonfishing activities. Ideally, net revenues for nonfish related activities would be obtained or estimated.
4. Other revenue information	E	Minimal	FMA	-	Historic market order prices negotiated by FMA. This information may be available from	Processor market orders and market limits.

TABLE 3. Economic data needed on commercial processors. (Page 9 of 2)

Data Need	Application ^a /	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
					either the vessels or the processors.	
5. Employment and labor costs--nominal and opportunity	A, B, C, D, E, G, H, I	Some	Ad hoc study results	Y	Available information is often outdated and applies only to certain species or processes.	Method of determining payments should be included (e.g., share, wage, piece). Labor cost information is needed by type of position. Information is needed on number, types, and durations of jobs; and numbers of days worked by type of processing activity.
6. Nonlabor operation costs	A, B, C, D, E, G, H, I	Minimal	Ad hoc study results	Y	-	-
7. Owner profits and opportunity costs	A, B, C, D, E, G, H, I	Minimal	Ad hoc estimates based on cost information	Y	-	If both owner profits and payments to labor were known along with their related opportunity costs, the need to know other costs would diminish.
8. Capital costs	A, B, C, D, E, G, H, I	Minimal	Ad hoc surveys	Y	Information generally incomplete and difficult to acquire. Priority is substantially higher for operations processing Pacific whiting.	-
9. Employee and owner income	C, D, I	Minimal	Some ad hoc study results	Y	Information is often outdated and applies only to certain processing sectors. In addition to helping to better describe impacts on individuals the information would assist in describing effects on communities.	Income levels of employee/owner households; household dependence on fishing income; dependence on government assistance; and community of residence.
10. Location of fish buying and processing plants and transshipments	B, C, D, I	Minimal	Some ad hoc study results	Y	In order to properly model the effects of fisheries on communities it is important to know whether fish landed in a particular port is also processed there. The license	Is the first point of sale a buying station or processing facility. What is the location of the first significant processing of the product?

TABLE 3. Economic data needed on commercial processors. (Page 9 of 2)

Data Need	Application ^a /	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
					number in the processor code field of the fishtickets may be for a buying station or processing facility. Even if offloaded at a processing facility, in some cases raw product may be transhipped to another plant for processing.	
11. Employee and owner characteristics	B, C, D, I	Minimal	Some d hoc study results	-	-	Length of participation in the fishery and amount of experience.
12. Other plant information	A, B, C, D, E, F, G, I (depending on the approach to analysis)	Minimal	Some ad hoc study results	-	Priority depends on approach to developing estimates of operating costs. If an engineering approach is taken, this item may have a higher priority. It may also be of more importance for certain product forms such as surimi.	Needed information may include brand and model numbers for equipment in the plant.

- a/ Types of analyses:
- A. Financial analysis
 - B. Input/output income impact
 - C. Input/output job impact
 - D. Input/output impact by income level (income or job)
 - E. Effects on supply and demand
 - F. Prediction of fishers' strategic response to regulations
 - G. Bio-economic models
 - H. Cost benefit analysis
 - I. Baseline fleet and community descriptions

TABLE 4. Economic data needed on recreational charter vessels. (Page 12 of 2)

Data Need	Application ^{a/}	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
1. Charter operation revenue	A, B, C, D, E, F, G, H, I	Minimal	Ad hoc studies	Y	Any information available is generally outdated, difficult to acquire, and applies only to certain sectors of the fleet during certain types of operations. Information needs to be tied to area of catch in order to facilitate analysis of marine reserves.	Total revenue Information should include, by trip type, total trips, price of all goods and services (including gratuities), and typical per angler expenditures.
2. Total firm revenues	A, F, G, H, I	Minimal	Ad hoc studies	Y	Same as above.	Total vessel earnings in all activities and total firm earnings.
3. Employment and labor costs (crew and skipper)--nominal and opportunity	A, B, C, D, E, F, G, H, I	Minimal	Ad hoc studies	Y	Same as above.	Method of determining payments should be included (e.g., share, wage, piece) and whether or not a hired skipper is used. All labor costs (including gratuities) are needed at the trip level. Cost information is needed by crew/operator position. Information is needed on number, types, and durations of jobs; numbers of days worked by vessel and type of activity.
4. Nonlabor operation costs	A, B, C, D, E, F, G, H, I	Minimal	Ad hoc studies	Y	Same as above.	All operational costs are needed at the trip level with information on how costs vary with duration of trip and number of customers on board. These costs include payment to charter offices.
5. Owner profits and opportunity costs	A, B, C, D, E, F, G, H, I	Minimal	Ad hoc studies	Y	Same as above.	Information is needed at the trip level or lowest level of activity aggregation across which opportunity costs vary.
6. Capital costs	A, B, C, D, E, F, G, H, I	Minimal	Ad hoc studies	Y	Same as above.	Includes cost of vessels and permits.
7. Income (including self employment)	B, C, D, F, I	Minimal	Ad hoc studies	Y	Same as above.	Income levels of employee/owner households; household dependence on fishing income; dependence on government assistance; and community of residence.
8. Employee and owner characteristics	F, I	Minimal	Ad hoc studies	Y	There is no centralized system for identifying and tracking vessel owners and operators. Owner and operator identity may be more important in predicting vessel activity and impacts than most other data elements described.	Length of participation in the fishery and amount of experience.
9. Effort information	F, G, H	Minimal	Harvest data, California charter	Y	Average angler success rates are available, other information needed is generally	Average number of passengers, number of poles, trip length, target species, angler

TABLE 4. Economic data needed on recreational charter vessels. (Page 12 of 2)

Data Need	Application ^{a/}	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
			vessel log books and ad hoc studies		unavailable.	success rates, travel time from home port to fishing grounds, travel time between different fishing grounds, harvest/customer satisfaction strategies. Harvest methods (trolling, mooching, types of hooks and weights, depths of fishing).
10. Catch information	F, G, H	Some	Data from harvest monitoring programs and ad hoc studies	Y	The RecFIN MRFSS study provides estimates, however, the information is not vessel specific.	Discards and catch composition by vessel target species.
11. Vessel information	A, F, G H, I	Some	Information may be available through licensing programs	Y	Data is not readily available.	Vessel identification, size, passenger carrying capacity, ports of operation, home port.
12. Other vessel and information	A, B, C, D, E, F, G, I (depending on the approach to analysis)	Minimal	Ad hoc studies, some data may be available through licensing programs	-	Data is not readily available. Priority depends on approach to analysis.	Vessel engine(s) including auxiliary (HP and model) and equipment.

- a/ Types of analyses:
- A. Financial analysis
 - B. Input/output income impact
 - C. Input/output job impact
 - D. Input/output impact by income level (income or job)
 - E. Effects on supply and demand
 - F. Prediction of fishers' strategic response to regulations
 - G. Bio-economic models
 - H. Cost benefit analysis
 - I. Baseline fleet and community descriptions

TABLE 5. Economic data needed on recreational fishers. (Page 1 of 1)

Data Need	Application ^{a/}	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
1. Total effort and catch by target species including inland anadromous stock fisheries	A, B, C, D, E, F, G, H, I	Some	RecFIN MRFSS, state and tribal creel surveys, California charter vessel logbooks	Y	The RecFIN program collects much the needed marine data; however, the estimates produced are generally valid only at the state coastwide and annual level. The data is needed for biological modeling, baseline community descriptions, and modeling of angler effort for most economic analyses of regulatory effects. Data for inriver fisheries are available only for areas and time periods covered by state and tribal sampling programs.	Total catch, discard, and catch-per-unit effort information is needed by target species, fish size, harvest mode, area and season for marine and inriver fisheries.
2. Angler experience values	E, F, G, H	Some	RecFIN socioeconomic survey and ad hoc study results	Y	The RecFIN program is attempting to collect some of this information through the socioeconomic add-on to the MRFSS. Frequency of this effort has increased, but commitment to two out of three year or every year studies has not been made. Available information is often outdated, incomplete, and applies only to certain sectors of the fleet during certain types of operations.	How does consumer related-economic value vary with types of species available, fishing site, and fishing regulations? What fishing and nonfishing activities will individuals substitute for the most desired target species?
3. Angler by angler data on fishing activity (number, type of trips) trip expenditures and angler demographics	A, B, C, D, E, F, G, H, I	Some	RecFIN socioeconomic survey and ad hoc studies	Y	The RecFIN program is attempting to collect some of this information. Other available studies are outdated or incomplete.	Fishing activity, trip cost and demographic data are needed to estimate economic value of fishing trips by target species, mode, area and season, and to predict changes in angler behavior and value associated with changes in regulations. Trip expenditure data is also needed to estimate economic impacts of recreational fishing on local communities.
4. Factors important to anglers' recreational choices	F, H	Minimal	RecFIN socioeconomic survey and possibly some ad hoc study results	?	Some information may be forthcoming from the 1998 RecFIN socioeconomic survey. Additional studies are needed.	What characteristics of catch (e.g., number or size of fish, total weight of catch, catch versus keep) are most important to anglers? What fishing and nonfishing activities do anglers view as best substitutes for most desired target species?

a/ Types of analyses:

- A. Financial analysis
- B. Input/output income impact
- C. Input/output job impact
- D. Input/output impact by income level (income or job)
- E. Effects on supply and demand
- F. Prediction of fishers' strategic response to regulations
- G. Bio-economic models
- H. Cost benefit analysis
- I. Baseline fleet and community descriptions

Table 6. Economic data needed on fishing communities. (Page 1 of 1)

Data Need	Application ^{a/}	Available	Current Source	High Priority Core Need	Comment on Priority and Adequacy (if some data is available)	Additional Description
6. Fishery related employment, wages, income and other demographic descriptors	I	Minimal	Ad hoc studies	Y	Existing data is often outdated and applies only to certain sectors of the fleet during certain types of operations.	In order to relate a fishery to other general socioeconomic statistics on communities collected by various governmental bodies, similar statistics are needed on the fishing industry. For example, to relate impacts of groundfish open access hook-and-line regulations to income classes and ethnicity in a geographic community, one needs to know both the income classes and ethnicity of the fishery and the geographic community in which participants reside.
7. Baseline economic data	I	Yes	Census and state agency data	Y	Data needs to be compiled and regularly updated.	Total population, personal income, employment, per capita income, income distribution, employment cycles, tax base
8. Tax revenues	I	Minimal	Ad hoc studies	Y	Information on tax revenues generated for state and local communities should be collected as part of an effort to meet the needs for cost data needs related to each sector discussed above.	Information is needed to further describe dependence of communities on fisheries.
9. Fishery related economic infrastructure	I	Minimal	Ad hoc studies and reports	Y	The public services and infrastructure required by the fishing industry may either burden or benefit the local community.	Inventory of required and available public services and infrastructure.
10. Geographic and physical characteristics of the fishing harbors including distances to fishing grounds	I	Some	Ad hoc studies and reports	Y	Much of this information likely to be readily available through a few contacts at each port.	Geographic and physical port characteristics include information on geographic proximity to exploitable fishing resources, ease and safety of ocean access, degree of shelter provided by the port, and distances to major markets, and distribution points for commercial fishing products and major population centers which utilize recreational fishing opportunities.

- a/ Types of analyses:
- A. Financial analysis
 - B. Input/output income impact
 - C. Input/output job impact
 - D. Input/output impact by income level (income or job)
 - E. Effects on supply and demand
 - F. Prediction of fishers' strategic response to regulations
 - G. Bio-economic models
 - H. Cost benefit analysis
 - I. Baseline fleet and community descriptions

APPENDIX A

APPLICATIONS FOR ECONOMIC DATA

Types of Management Actions Which May Need to Be Analyzed

In Section 2 the legislative mandates for conducting economic analyses are reviewed. This section lists some of the types of management actions taken by the Council which are often the subject of economic analysis.

Commercial Harvester Regulations

- Reporting requirements
- Change in level of harvest
- Capacity reduction measures (e.g., permit buyback and permit stacking)
- Change of a trip size/frequency limit
- Change of a cumulative limit
- Opening/closing (shortening/increasing) a season
- Changing catch per unit of effort by restricting gear (e.g., mesh size, cod-end size, amount of gear, type of hook)
- Gear prohibition (e.g., gillnet)
- Requirements to carrying an observer
- Change in a size limit (e.g., salmon)
- Local area closures (some of which just increase travel times while others may effectively eliminate a fishery)
- Bycatch retention or control measures
- Stock rebuilding programs
- Actions to regulate adverse impacts of fishing gear on habitat

Commercial Processors and First Fish Buyer Regulations

- Reporting requirements
- Requirements for onshore observers
- Utilization requirements
- Waste disposal requirements

Recreational Fishery Regulations (Including Private and Charter Recreational Harvesters)

- Reporting requirements
- Change in level of harvest (including changes which result from revisions of allocations, rebuilding schedules, or optimal harvest strategies)
- Capacity reduction measures for charter vessels (including new limited entry programs and buyback programs)
- Opening/closing (shortening/increasing) a season
- Change in bag limits
- Change in size limits
- Gear restrictions (e.g., barbless hooks and circle hook requirements)
- Prohibitions on retaining wild fish
- Local area closures
- Bycatch retention or control measures
- Stock rebuilding programs
- Actions to regulate adverse impacts of fishing gear on habitat

Types of Economic Analyses and Data Required

Financial Analyses

Financial analyses provide information on the effect of management actions on the financial viability of fishing industry businesses. Financial viability is generally measured in terms of profit levels after taking into account all firm expenses including taxes and debt burden. To conduct financial analyses, information is needed on firm costs and revenues. In financial analysis it is generally assumed that prices remain unchanged or an estimated change in prices is provided as a result of econometric^{1/} estimation of supply and demand (see System Behavior Analysis).

For harvesting and processing costs and exprocessor prices, analysts are often faced with the need to initiate new data collection efforts or attempt to adapt existing data. Existing data are often outdated and/or only partially appropriate for the needs of the analysis at hand. In order to be useful, cost data must be broken down to the level of the business operation on which the management regulation has effect. For example, in order to analyze the effect of a change in trip limits on the financial viability of an operation, information is needed on how costs vary with the amount of fish taken on and duration of a particular trip. Annual or monthly information is of little use unless it can be used to derive the needed trip level information.

Input/Output Impact Analysis

Input/output analysis is a method by which the flows of production are traced among the various sectors of the economy (local, state, or national) through to either the final consumers or an export. Econometric methods are used to develop input/output models. Regional input/output models are used to estimate regional changes in economic activities (impacts) resulting from management actions. Regional effects of a management action may vary from effects measured from a national perspective, even to the extent of being the opposite of a national effect.

One type of input/output analysis models effects on personal income. Income impact estimates can be generated for direct, indirect, and induced personal income.^{2/} Information on fishing firms similar to that needed for financial analysis is used for generating income impact estimates. To develop input/output income models for the fishery, fishery expenditure information is combined with input/output data and results such as those derived from the U.S. Forest Service IMPLAN model.

Regional input/output models can also be used to develop estimates for a variety of other economic impacts including changes in total sales or employment. Modifications can be applied to the models to allow the generation of estimates of the effect on income or employment by income level. To develop job generation estimates or stratify income impact information by the income level of those affected, additional information would be required on number of workers in the industry, wages, and family income levels.

System Behavior Analysis

For fisheries, system behavior analysis refers to a variety of approaches to economic analysis that involve assessing the dynamic effects of changes in fishery management. Examples include price responses to changes in supply and demand, fisher behavioral response modeling, and bioeconomic modeling. Aspects of these analyses may incorporate or contribute to other types of analyses discussed here.

Estimation of market demand and supply help predict the effects of changes in product supply on prices.

1/ Econometrics is the use of economic theory and data to develop statistical models to estimate economic relationships.

2/ Direct income is income payed directly to crew members and owners of harvesting and processing firms (including charter vessels for the recreational charter industry). Indirect income is income earned by workers and owners who supply the harvesting and processing firms (e.g., a bait supply operation or engine repair business). Induced income is income earned by those from whom the workers and owners purchase goods (e.g., income of clerk at grocery store where crew members and the owner of a bait operation purchase groceries for personal use).

Estimates of supply and demand may also be used in the estimation of total consumer and producer surplus for the purpose of developing cost-benefit (net economic value) analyses. Estimation of these relationships generally require the application of econometric techniques to historic information on prices and volume for the product which is the subject of the analysis. Other information used in models estimating supply and demand includes historic prices and volumes for close substitutes for the product being considered and information on other factors which influence prices, such as consumer income, foreign currency exchange rates, population, and variables which may reflect changes in consumer preferences over time. Most of the needed time series information is routinely collected by various governmental bodies.

Modeling of fisher behavioral response is important if we are to understand the effects of management actions on communities and other fisheries. Projecting response is also important in evaluating whether a particular management action is likely to be successful over the long term. The information typically needed for response modeling includes both the information used for cost-benefit analysis of the activities in the fishery in question as well as costs and revenues associated with participation in alternative fisheries, costs associated with moving between fisheries, and degree to which fishing skills are transferable between fisheries.

Bioeconomic modeling attempts to account for a number of processes which respond dynamically to changes in management. For example, changing the time of year of a fishery may change the age classes exploited by the fishery which in turn affects long term sustainable yields and the future age structure available to the fishery. Age structure of the harvest and season-dependent flesh quality affect the quality of product delivered. The time of year and amount and quality of product delivered in turn affect market prices. A broader variety of information is needed for this type of modeling as compared to other analyses mentioned so far. In addition to the biological information required for such modeling, economic information is needed on price response to the amount and quality of product supplied. The complete bioeconomic model requires some unit of economic measure in which to quantify results. These units may be gross value (sale price unadjusted for costs) or in units resulting from financial impact or cost-benefit components of the bioeconomic model.

Cost-Benefit Analyses

Cost-benefit analyses are attempts to estimate the producer and consumer surpluses that would be expected to result from alternative management actions.^{3/} One approach to cost benefit analysis involves the identification, quantification, and valuation of the true costs and benefits of a proposed action as measured from a national, as opposed to private perspective. It varies from financial analysis in that effects on all members of the economy, including consumers and the public at large, aspects of the economy are considered rather than just the effects on individual firms. From an economy-wide perspective, the market prices used in financial analysis may not reflect the true cost or benefit of a particular item, (i.e., may not reflect the opportunity cost). For example, assume an individual is hired to work in a fishery at a rate equivalent to \$2,000 per month and that absent the opportunity to fish the next best job this person could obtain would pay \$1,800 per month. For the purpose of the firm financial analysis the cost of this person's labor would be \$2,000 per month, but for the cost-benefit analysis the cost would be \$1,800 per month. In other words, the cost-benefit analysis would show a \$200 benefit associated with the higher wage earned by the individual when employed in the fishery while the financial analysis would show the entire amount of wages paid as a cost. Additionally, in some cases, cost-benefit analyses impute values for factors for which there is no significant market transaction and hence no market price that can be used to measure value. An example of such nonmarket transactions would be a recreational fishing trip on a private vessel. Because market prices may not reflect values from a social point of view or may not exist, the cost and revenue information needed for the cost-benefit analysis may differ from that needed for the financial analysis.

Cost-benefit analyses usually assume fixed prices, wages, and discount rates; however, if the scope of

3/ Producer surplus is the amount producers are paid to produce a certain quantity of goods minus the minimum amount they would have been willing to accept to produce the same quantity. Consumer surplus is the amount consumers would have been willing to pay for a given quantity of goods less the amount they actually had to pay.

the action is sufficiently large, these must be determined within the analysis. The estimation of demand and supply needed to project changes in prices can also be used to estimate producer and consumer surplus. Data needed for the estimation of demand and supply curves is discussed above in the section on system behavior analysis.

Risk and Trade-off Analysis

Risk and trade-off analyses can be used to portray results from any of the above analyses in a format which helps those making decisions better understand the consequences of their actions.

Risk analysis involves the development of information on possible outcomes and probabilities of outcomes given different courses of action. Outcomes can be measured using the results from cost-benefit analyses, income impact analyses, or financial analyses. A typical risk analysis would display alternative courses of action, alternative assessments of the current situation and/or future events (e.g., current stock status or future possible recruitment levels), and the outcomes which might result from every possible combination of action and current situation. Using this approach an array of possible outcomes for each action will be displayed. Ideally, for each assessment of a current situation a probability that the assessment is correct would be provided. However, providing these probabilities is often difficult.

Trade-off analyses identify effects of concern and show how those effects vary depending on the chosen course of action. Effects of concern are generally related to policy objectives. Risk assessments are a type of trade-off analyses. For example, a risk assessment assists in evaluating the trade-off between higher harvest rates and the size of the downside risk that harvest will have to be reduced in the future. Another type of trade-off analyses might display a trade-off between national economic efficiency and the number of jobs or amount of income generated for a local economy depending on a particular policy option chosen.

APPENDIX B CORE DATA NEEDS

The following is a list of core fishery economic data needs identified during a December 1996 meeting of West Coast fishery economists.

Commercial Harvesters and Processors and First Fish Buyers

Employment

- Employment by harvesters and processors
- Crew size and positions
- Use of hired skippers
- Crew and skipper residence
- Length of employment opportunity (include work time at-sea and on-shore)
- Unemployment benefits (extent of coverage)
- Nonfishing employment of crew and skippers
- Labor opportunity costs
- Experience of employees (by fishery and gear type)
- Percent of total household income from fishing
- Method of payment (share, wage, piece)
- (Information is needed by fishery/gear type)

Catch and Landings--Commercial

- Discards
- More specific areas of catch
- Catch quality
- Targeting and ability to control catch composition
- Processor market orders and market limits

Prices

- Exvessel prices
- Exprocessor price by species, product form, and quality
- Permit and license prices
- Unit prices for inputs

Vessels

- Identification of owners (especially for undocumented vessels)
- Updated and better quality information needed on vessels including:
 - Vessel size
 - Engine horse power
- Information needed on vessel:
 - Hold capacity
 - Engine models
 - Presence of auxiliary engines
 - Market value
- Vessel ability to use different gears
- List of all permits held by vessel (may be provided through the core statistics program)

Effort

For nontrawl vessels:

- Trip length (total)
- Set times
- Number of sets

For all vessels:

- Search time
- Gear used
 - Type deployed
 - Quantity deployed

Cost and Earnings

Total vessel and firm earnings in all fisheries including Alaska

Earnings by share for vessel skipper crew etc.

Total costs/expenditures broken down as necessary for cost benefit analysis and income impact modeling (see "Economic Data Needs" developed at the Northeast Data Needs Workshop, March 31-April 1, 1993)

Debt burden

Gear

Concern was expressed about the quality of the gear codes on fish tickets. Specific gaps identified were as follows:

- Gear by line on fish tickets to allow recording of gear used on multigear trips
- Specific type of gear--e.g., trawl (bottom trawl, pelagic trawl, shrimp trawl), longline (including type of longline, e.g., snap) etc.
- Size/number/quantity of gear used

Processor and First Fish Buyer

Ownership information related to horizontal integration

Buyer codes

Employment (number of workers by type)

Wage basis (hourly, piece, etc.)

Plant capacity

Products

Equipment

Markets

Recovery rates

Weigh backs

Recreational Charter Businesses

Employment

Crew size and positions

Use of hired skippers

Crew and skipper residence

Length of employment opportunity (include work time at-sea and on-shore)

Unemployment benefits (extent of coverage)

Nonfishing employment of crew and skippers

Labor opportunity costs

Experience of employees (by fishery)

Percent of total household income from fishing

Method of payment (share, wage, piece)

(Information needed by fishery)

Catch and Landings

Discards
Target catch composition

Prices

Pricing of goods and services provided and typical gratuities (because pricing schemes vary widely, breakdowns will be needed to detail what is and is not included in the prices)
Unit prices for inputs

Vessels

Vessel identification
Ports of operation
Identification of owners (especially for undocumented vessels):
Information needed on vessel:

- Vessel size
- Engine horse power
- Passenger capacity
- Home port
- Market Value

Vessel ability to target on different species from the specified home port
List of all permits held by vessel (may be provided through the core statistics program)

Effort and Gear

Average number of passengers
Trip length
Travel time from home port to fishing grounds for each species
Travel time between fishing grounds for each species

Cost and Earnings

Total vessel earnings in all sea-going activities
Total firm earnings in all activities
Earnings by share for owner, vessel skipper, crew, charter office, etc.
Total costs/expenditures broken down as necessary for cost benefit analysis and income impact modeling (see "Economic Data Needs" developed at the Northeast Data Needs Workshop, March 31-April 1, 1993)
Debt burden

Gear

Average number of fishing poles
Harvest methods and gears used (e.g., trolling, mooching, types of hooks and weights, depths of fishing)

Marketing

Marketing strategies
What attracts the clients

Recreational Fishers

An economic database on recreational fisheries should include by fishing mode and geographic location:

- Total number of anglers targeting on particular species
- Catch, discards, and success rates
- Average angler expenditures per trip

Related economic tables might contain information on:

- Net economic value by target species
- Fishing gear and method used

Information is needed on the relationship of angler trip net economic values to mode of fishing (private vessel, charter vessel, and bank fishing), producer surplus, success rates, retention opportunities and limits, and species caught. Studies of both ocean and inriver components of the salmon fishery are of most immediate importance with studies of the halibut, rockfish, and lingcod fisheries of greater long-range importance.

Data is needed on substitution rates between recreational activities and angler response to changes in recreational management measures such as size limits, bag limits, gear restrictions, and season closures. Such data would include measures of angler preferences and studies of the process by which decisions are made to target on particular species during a particular trip.

Fishing Communities

- Socioeconomic statistics by community
 - Total population
 - Total personal income
 - Total employment
 - Per-capita income
 - Frequency distribution of income levels
 - Employment cycles
 - Tax base
 - Fishery-related employment
 - Fishery-related income
 - Fishery-related municipal revenues
- Marine recreational opportunities by community
- Inventories of recreational market fishing businesses by community
- Cycle or recreational activities in the community
- Commercial harvest opportunities by distance from community port
- Inventories of commercial harvester and processor business by community
- Cycle of commercial fisheries for the community port(s)