



Agenda #12 (Dec)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Rockville, Md. 20852

SEP 28 1977

Mr. James Branson
Executive Director
North Pacific Fishery
Management Council
P. O. Box 3136DT
Anchorage, Alaska 96813

Dear Mr. Branson:

Enclosed for Council review and comment is a draft report dealing with economic and allied data needs under the new fisheries management regime established by extended jurisdiction.

This report was compiled by a committee composed of representatives from the National Oceanic and Atmospheric Administration and other Department of Commerce organizations involved in the extended jurisdiction program. Its findings are briefly laid out in the covering executive summary.

I would appreciate the Council's giving this report its close attention. I believe that timely and accurate data are essential to the development of sound management plans, and that appropriate strengthening of such data should be given a very high priority.

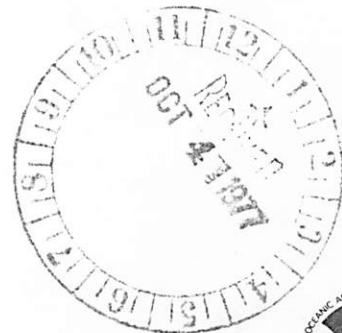
I would also appreciate receiving any Council comments on this report by October 21, 1977.

Sincerely,

Richard A. Frank
Administrator

Enclosure

cc: Council (60)



ECONOMIC AND ALLIED DATA NEEDS FOR FISHERIES MANAGEMENT

Executive Summary

Purpose. The subject study specifies economic and allied data needs under the Fisheries Conservation and Management Act, the so-called extended jurisdiction law. It assesses the extent to which needed data are not now available and establishes priorities for providing the missing data. It also identifies problems which affect data availability, quality, and usage.

The study is a draft intended for circulation among the regional fisheries councils and other organizations outside of the Department of Commerce.

General Data Needs. The Fisheries Conservation and Management Act gives the Department and the councils major regulatory and management responsibilities for a substantial portion of U.S. fishery resources. Though conservation remains a major consideration, the Act also requires utilization of these resources in a manner that will promote the economic health and efficiency of commercial fishing and provide benefits to consumers and recreational fishermen. Achievement of these goals requires accurate and timely economic data. Much of these data are, in addition, specifically required by the Act and must be reflected in the management plans. The plans, of course, set the allowable catch (optimum yield) for each fishery. They are developed by the councils and approved by the Department.

Accurate and timely data are also needed to determine the economic impact of other Department actions involving fisheries. Tuna is a good example of a fishery which, though not subject to the Act, is being substantially impacted by Department actions. For this and other reasons, the need for timely and accurate data runs beyond the Act and involves all U.S. fisheries.

Methodology. The study determines data needs by a review of the Act's specific data requirements, and also by analysis of an economic model depicting the commercial industry and recreational fishing. The model has five sectors:

Consumption,
International trade,
Processing and marketing,
Recreational fishing, and
Commercial production or harvesting.

The analysis determines data needs in the context of the economic forces at work in each sector and of the probable sectorial impact of the management plans.

Specific Needs and Priorities. The study finds 19 areas in which there are demonstrable needs for economic and allied data. These needs relate specifically to fishing and involve all five model sectors. They do not include general-purpose economic data or data on the food industry as a whole, which are usually available from standard sources.

Of these 19 areas, four are characterized by generally adequate data. Data in the remaining 15 areas have serious inadequacies.

Of these 15 areas, relatively specific needs can be established in 14. The remaining area (recreational fishing) is associated with broad conceptual problems that must be solved before specific needs can be identified.

The following tabulation shows the current status of data in each area, and indicates those which should receive top-priority for upgrading. Such priority is assigned to eight of the 15 areas where serious inadequacies are identified; these eight areas are shown by asterisk. Data in these areas are necessary to identify basic supply-demand factors, and hence essential if management plans are to reflect economic impact. Data in other areas where serious inadequacies are identified should also be upgraded, but the need is less urgent.

	<u>Generally Adequate</u>	<u>Serious Inadequacies</u>
Consumption:		
Home		0*
Restaurant		0*
Institutional		0*
Industrial Utilization	0	
International Trade:		
U.S. imports	0	
U.S. exports	0	
Other world trade		0*
Recreational Fishing		0*
Processing and Marketing:		
Plant capacity		0
Production and prices		0
Production costs		0
Labor force characteristics		0
Production:		
Catch and ex-vessel price	0	
Size and composition of the fleet		0*
Fishing effort		0*
Costs and earnings		0*
Vessel construction costs		0
Labor force characteristics		0
Fees charged by foreign countries		0

Policy and Analysis. Data problems of this magnitude will not be solved in the absence of policy guidance and long-range planning. These functions involve the regional councils, but council work must be well coordinated at the national level. Much data (e.g., consumption data) can only be collected on a national basis, and even regionally collected data should meet national standards. There has to be a national policy and planning capability.

Policy-planning functions would be most effectively performed as part of a comprehensive information system, one which takes into account biological, social, and other data needs and which addresses operational as well as policy matters. Much of the data which the study reviews (e.g., catch data) relate to biological as well as economic aspects of fisheries management. The same is true for social aspects (e.g., labor force data).

The information system should present data to fisheries managers in meaningful form. This means substantial interpretive and analytical capabilities, specifically capabilities for quantitative economic analysis, an area in which existing capabilities are especially weak.

Data Location. Some attention also needs to be paid to data location and retrieval. It will take years to develop the comprehensive, easily accessible data series contemplated by the study. In the meantime, management plans will have to use existing data which, besides being seriously inadequate, are often inaccessible. Such data should be put into a central inventory, a national data locator.

August 1977

Table 4.1.--Suggested Data Priorities

Sector	Data Service	Priority Rating		
		1	2	3
Consumption:				
	Home	X		
	Restaurant	X		
	Institutional	X		
International Trade:		X		
Recreational Fisheries:		X		
Processing:				
	Plant capacity		X	
	Production and Price		X	
	Production cost analysis		X	
	Labor force			X
Harvest:				
	Vessel inventories	X		
	Fishing effort	X		
	Costs and earnings	X		
	Vessel construction costs		X	
	Labor force			X
	Foreign fees		X	

V. REFERENCES

Karalunas, John. 1976. "Environmental Socioeconomic Data Sources". Department of the Air Force, DCS/Program and Resources, Directorate, Engineering and Services, Environmental Planning Division and U.S. Department of Commerce, Bureau of the Census, Center for Census Use Studies.

Kolhonen, Judda A. 1976. "Identification of Economic Data on Menhaden Industry". Unpublished working paper, November, 1976 Industry and Consumer Services Division, National Marine Fisheries Service, National Oceanic and Atmospheric Agency U. S. Department of Commerce, Washington, D.C.

Maine Commercial Fisherman, The. 1976. "Tariffs are the Problem". October, 1976 issue, Stonington, Maine

Rothchild, B. J., J. M. Gates and A. M. Carlson. 1977. "Management of Marine Recreational Fisheries". in a monograph to be published by the Sport Fishing Institute, Washington, D. C.

Yeats, Alexander J. 1976. "Effective Protection for Processed Agricultural Commodities: A Comparison of Industrial Countries". Journal of Economics and Business 29(1):31-39

Appendix A : Agencies and Persons Contacted 1/

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1/ See Appendix E for List of Agency Acronyms used in this report

APPENDIX B:

A DESCRIPTIVE MODEL OF THE FISHERIES SYSTEM

Fisheries management in the U. S. has an entirely new policy foundation under P.L. 94-265. For the first time an institutional framework exists for comprehensive management. In various parts of this Act it is made abundantly clear that management decisions are to reflect economics. The Act instructs Regional Councils to manage for "optimum yield" (OY) and defines OY in terms of maximizing benefits. While fisheries management has never entirely ignored economic considerations, it behooves managers in the future to provide for much more explicit and systematic description, measurement and analysis of the parameters and relationships inherent in an economic viewpoint of the fisheries system. It is the intent of this paper to present this economic viewpoint in terms of the development of a simplified conceptual model of the entire system.

Micro economics of the Fisheries System. Economics is a topic of concern to everyone, and there is a general understanding of the discipline's basic precepts of supply and demand. The economics with which most are familiar is that which hits closest to one's own pocketbook. Everyone is, in some way or another, an economic decision maker or agent. Consumers strive to spend money so as to derive the greatest satisfaction possible from a limited budget. Businessmen or fishing captains strive to make decisions which will enhance long-term

income or wealth as well as maximizing net returns from a given trip. Crew members compare expected crew shares for the coming month with expected earnings in alternative work; e.g., lumbering. From this comparison and a balancing of monetary gain and job preferences a decision must be made as to whether or not to go fishing. Processors examine current fish prices relative to expected prices next month, the cost of cold storage, idle cold storage capacity, etc. and make decisions with respect to current purchases of fish. All of these separate and often complex decisions are familiar examples at least to the respective agents who must make them. Yet how can an almost limitless set of apparently uncoordinated decisions be put together in some sort of consistent (more or less) coordinated system? That is basically what is done conceptually, by the economic viewpoint, and practically, by a market system of decentralized decision-making.

To describe the interplay of economic forces, the concepts of supply and demand are useful. Supply is depicted as a schedule, or table, or function, relating the quantity supplied to the price received, with supply as an increasing function of price received. Demand is viewed similarly as a schedule relating the quantity demanded to the price paid, with quantity demanded a decreasing function of price paid. Given supply and demand curves and the condition that quantity supplied must equal quantity demanded, one can determine

market prices and quantities and how these change when supply or demand curves are shifted by random events or public policy. One might be a change in fisheries stocks abundance. Another event--this affecting demand--might be a general economic recession.

What is meant by "Quantities" in this concept of supply and demand? Basically, for a complete analysis of the fisheries system one must have as many markets as there are sectors of interest. For each market one must have a demand and supply curve with associated quantities. For example, the supply and demand curves in each of the following markets will reflect the technology and economic data as perceived by the decision agents.

<u>Sector or Market</u>	<u>Quantity Variable(s)</u>	<u>Price(s)</u>
Consumption	pounds product	retail price
International Trade	pounds product	import, export prices
Recreation	fish density	incremental value
Processing	pounds product	wholesale, retail prices
Production	pounds fish	ex-vessel price
Labor market	man-days	wage rates, shares
Capital market	dollars	owner shares and interest rates

Consequently, the configurations and shapes of supply and demand curves can be expected to differ among sectors. These curves actually constitute a system in which decisions in one sector become input data for decisions in subsequent sectors.

Supply, Demand, Systems Analysis and Policy Evaluation.

Supply and demand are, first of all, convenient ways of

summarizing the responses or decisions of numerous economic agents. If they served no other role than this, their development is justified for the purposes of forecasting prices, quantities and incomes.

More fundamental, however, is the task of putting together a model of the fisheries system within which the effects of changes in the system of supply and demand can be systematically evaluated.

For example, what happens to existing demand/supply relationships if public policy results in the development of substitute species? Or, what do waste disposal regulations do to the supply function of the processing sector? Or what is the impact of a quota on the landings supply function? Or what are the costs and benefits to crews of increased abundance? Table B.1 summarizes some of the events or changes which could be analyzed in economic terms via their impacts on supply and/or demand functions.

Table B.1 QUANTITATIVE ANALYSIS OF POLICY DEVELOPMENT

Event or Change	Relation Impacted	
	Supply Curve	Demand Curve
1. Develop substitute species	X	X
2. Prices of substitutes (meat, poultry, soybeans)		X
3. Resource management	X	X
4. Prices of marketing sector inputs (wages, energy, overhead)	X	
5. Consumer income		X
6. Export subsidies and import tariffs	X	X
7. Food technology	X	X
8. International agreements	X	X
9. Prices of harvest sector inputs	X	
10. Waste disposal restrictions	X	

Table B.2--Fishery Management and Primary Economic Benefits

	Beneficiary		
	Capital	Labor	Consumer
Consumption	X	X	X
International Trade	X	X	X
Recreational	X	X	X
Processing and Marketing	X	X	X
Production	X	X	

Role of Modeling in Policy Development. Models are on occasion abused, misunderstood, appreciated, and used. In fact, however, the choice is never one of model versus no model. Models comprise a continuum from pad and pencil graphics (such as those in Figure B.1) to large scale computer simulators. They may be partial, i.e., considering any one or a few sectors, or general equilibrium models encompassing all sectors simultaneously. In the latter case one would examine changes throughout the system instead of just changes in one sector, for example, the harvest sector, as is frequently done. Models may be static or dynamic in nature, and they may or may not involve explicit optimization algorithms. Thus, one must to a considerable degree base the choice of model and method on the question to be answered and the value versus cost of substitute analysis. In general, once one goes beyond very simple abstractions such as those in Figure B.1, or attempts to convert these into numerical statements, the computational task requires a computer. For example, as is well established in fisheries literature, the desired harvest supply curve should be a marginal cost curve which must be simulated by taking into account population dynamics as well as costs of harvest sector inputs. Thus, one very real, and usually the stated, objective of modeling is to give empirical content to supply, demand, and benefit concepts for the purpose of policy development and evaluation.

Another objective is, however, to evaluate perceived needs for more or better quality data. A lack of data or quality of data are sometimes given as reasons for failing to give certain issues a thorough examination. At the same time it is sometimes said that the need for such data has not been demonstrated; which imparts a distinct flavor of Catch 22. A systematic quantitative analysis should be able to evaluate the sensitivity of policy conclusions to parameter values. From such an evaluation one can make informed judgments concerning the worth of improved accuracy in parameter estimation via more or improved data.^{1/}

Finally, there is another objective in modeling which is more subtle. The exercise of developing and testing a model is an excellent educational process for participants. As a result, participants are able to incorporate improved insights into their more routine thinking and evaluation processes. It is for this reason, as well as tactical considerations, that model development and policy development should proceed in an overlapping, rather than separate manner.

Model Selection. There are always numerous choices to be made in developing any model. The model outlined in Table B.2

^{1/} Needs for data are sometimes not determined by strictly statistical considerations. If, for example, Regional Council members question model predictions of rising harvest cost, then the frequency of cost and earnings surveys may have to reflect this demand even if a cost-effectiveness analysis suggests that a less frequent sampling strategy would be adequate.

is a highly general one, perhaps hiding as much as it reveals. Yet it seems quite suitable for the purpose of evaluating data needs. Its lack of specificity is largely confined to areas where data are either not unique to the fishing industry (marketing) or probably not available in any great detail (foreign production and markets). It lays out the end-points of the product chain, and the intermediate links are clearly identified. The key sectors and their major interrelationships are specified.

Had the purpose been to analyze a specific sector in detail, a different, more detailed model would be appropriate. It is believed, however, that such a specialized model would have been less useful for this report. With this simple framework or "model," it has been possible to indicate, in a very general way, the kinds of analyses, and hence data, that will be required for fisheries management under the FCMA.

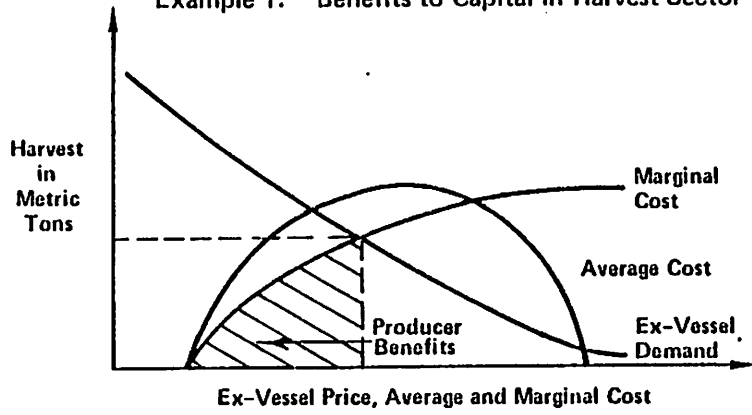
APPENDIX C: ECONOMIC AND ALLIED INFORMATION REQUIREMENTS OF THE FCMA

Appendix C contains references to information that is either (a) specifically required by the FCMA, (b) needed to make determinations required by the FCMA or (c) needed to evaluate extent to which purposes of the FCMA are being fulfilled. Appendix C includes primarily, information which is economic or social in character. With a few exceptions, e.g., catch and effort data, Appendix C does not include biological, ecological, enforcement or administrative information requirements. The rationale for this focus is discussed in Chapter I.

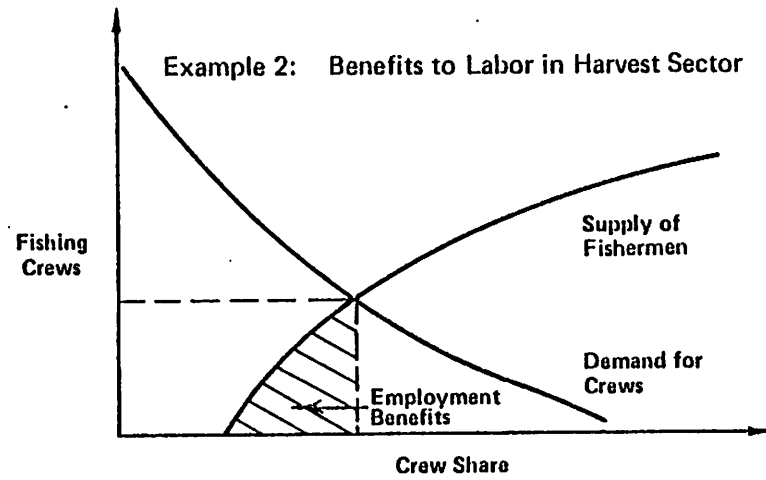
<u>Item #</u>	<u>Requirements</u>	<u>Context</u>	<u>Citations</u>	<u>Sectors</u>
1.	Citizen benefit from employment, food supply and revenue	Purpose of Act	2a-7	All
2.	Social and economic needs of the States	Purpose of Plans	2b-5	All
3.	Efficiency	Policy of Act	2c-3	All
4.	Supply of food and other products recreational benefits	Purpose of conservation and management measures	3-2A1 301a-1	All, especially production and recreation
5(a)	Overall benefit to the Nation, with particular reference to food production and recreational opportunities			
(b)	Maximum sustainable yield as modified by any relevant economic, social or ecological factor	Same	3-18 201g-1 301a-1	Same
6.	Traditional fishing activity of U. S. vessels in foreign fishery conservation zones	Recognition of foreign conservation zones	202-3	Production

<u>Item #</u>	<u>Requirements</u>	<u>Context</u>	<u>Citations</u>	<u>Sectors</u>
7.	Tonnage, capacity, speed, processing equipment, gear and fishery, catch, area and season in which fishing will be conducted	Information from foreign fishermen	204b-3	Production
8(a)	Nondiscrimination between residents of different states			
(b)	Allocations or assignments of privileges to be fair and equitable and carried out so no individual, corporation etc. acquires an excessive share of such privileges	Purpose of C&M measures	301a-4	Production
9.	Efficiency in the utilization of fisheries resources	Same	301a-5	All, especially production
10.	Minimal costs and avoidance of unnecessary duplication	Same	301a-7	All
11.	Relevant information on foreign fishing and international fishing agreements	Sec'y to furnish RC's	302f-5	Production and international trade
12.	Descriptive material, including the number of vessels, type and quantity of fishing gear, actual and potential revenues, and recreational interests	Information in plans	303a-2	All, especially production and recreation
13.	Capacity and extent to which U.S. fishing vessels, on annual basis, will harvest the optimum yield	Same	303a-4A	Production and recreation

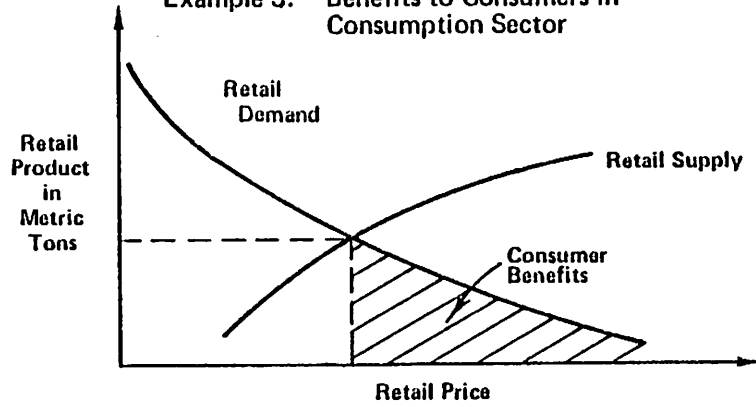
Example 1: Benefits to Capital in Harvest Sector



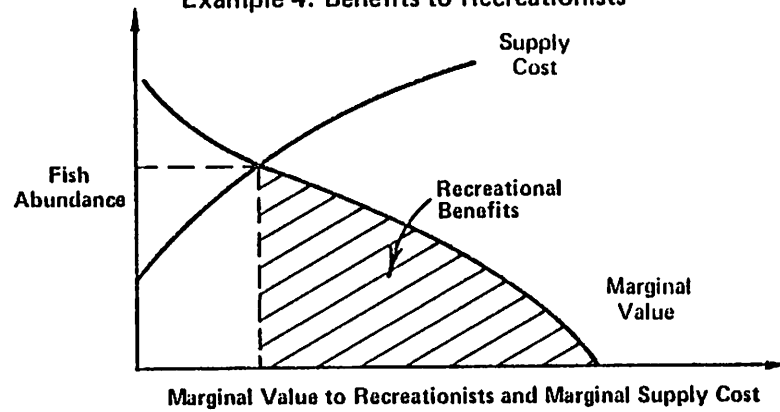
Example 2: Benefits to Labor in Harvest Sector

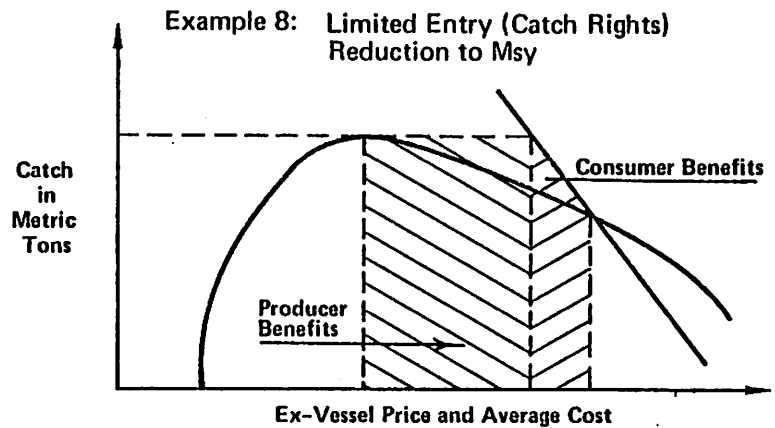
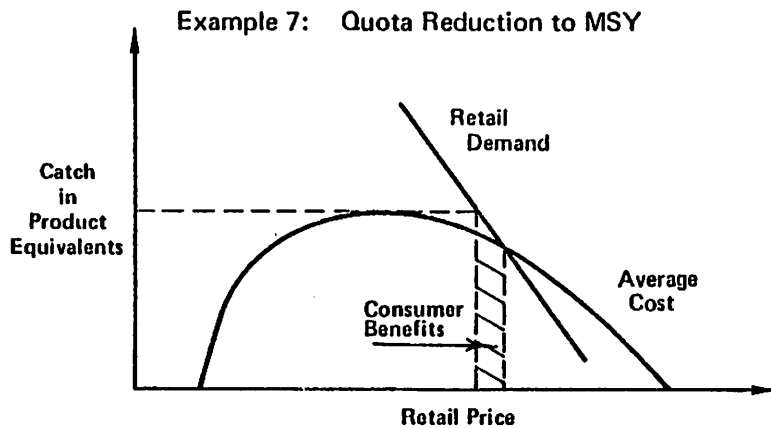
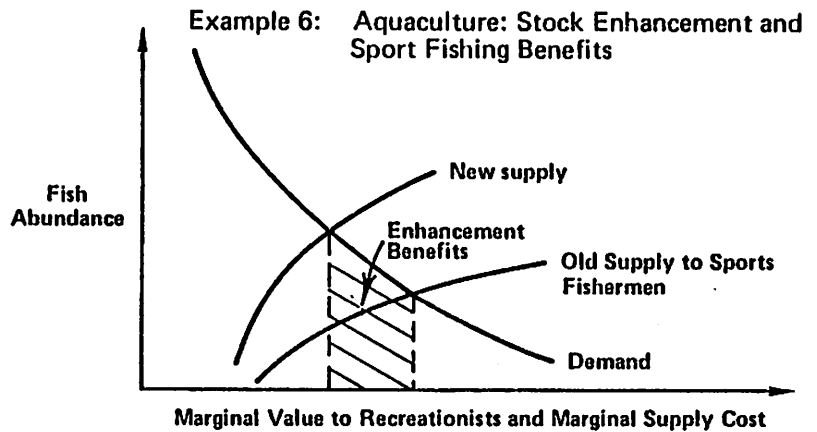
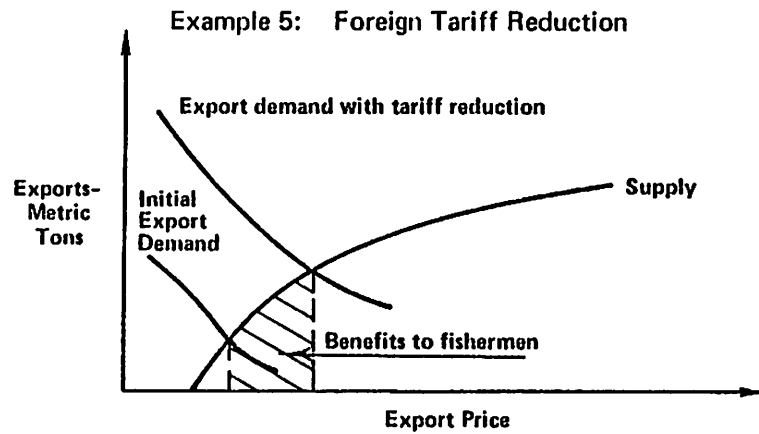


Example 3: Benefits to Consumers in Consumption Sector



Example 4: Benefits to Recreationists





APPENDIX D: COMMITTEE ON FISHERIES MANAGEMENT DATA

Brian J. Rothchild (Co-chairman)
Director, Office of Policy Development and
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James T. Caprio (Co-chairman)
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Office of Budget and Evaluation

Note. This report was authored by John Gates, with particular assistance from James Caprio and David Lund and with the benefit of review by the full committee.

APPENDIX E: LIST OF AGENCY ACRONYMS
USED IN THIS REPORT

DOC: U. S. Department of Commerce

BEA: Bureau of Economic Analysis, DOC

BC: Bureau of the Census, DOC

NOAA: National Oceanic and Atmospheric Administration, DOC

NMFS: National Marine Fisheries Service, NOAA

USDA: U. S. Department of Agriculture

USDL: U. S. Department of Labor

BLS: Bureau of Labor Statistics

FAO: Food and Agriculture Organization of the United Nations

HEW: U. S. Department of Health, Education and Welfare

FDA: Food and Drug Administration, HEW

USDOT: U. S. Department of Transportation

USCG: U. S. Coast Guard, USDOT

APPENDIX F: AUTHOR'S ACKNOWLEDGEMENTS

I am indebted to B. Rothchild, Director, Office of Policy and Development and Long Range Planning for the opportunity and encouragement to work on the problem of data needs. This opportunity has permitted refinement and extension of earlier work done for the U. S. Congress, Office of Technology Assessment.

The author has benefited from the constructive criticism of many people within the Department of Commerce and its components. The Committee on Fisheries Management Data, in particular, provided intensive review especially on the initial draft.

I am indebted to Mrs. D. Dorr of the Office of Policy Development and Long Range Planning, NMFS, for typing earlier drafts and to the staff of the NOAA Word Processing Center for an introduction to the advantages of modern word processing technology.