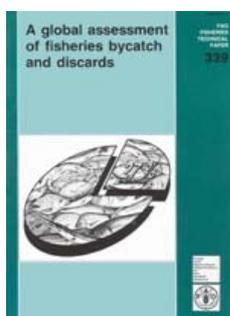




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A global assessment of fisheries bycatch and discards

[TABLE OF CONTENTS](#)

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PREPARATION OF THIS DOCUMENT

The apparent waste of living resources represented by discards has negatively influenced the image of the fishing industry which must face the issue of selectivity in fishing gear and practices. These issues will be addressed in the FAO Code of Conduct for Responsible Fishing and particularly in its chapters related to fishing operations, management and research.

The present report presents, for the first time, a global and regional analysis of bycatch and discards in fisheries, by gear, target species and fishing areas prepared by Natural Resources Consultants, Inc., 4025, 21st Street, Suite 200, Seattle, Washington, 98199, USA, with support from FAO which has agreed to publish the report.

A majority of the 800 papers examined came from the northern hemisphere. The tropical areas were covered as well as the available information permitted, and it is hoped that the study will stimulate investigations on bycatch and discards in these areas.

A complete Bycatch Database, which was compiled for the study, and a summary of it, are distributed with this document on a DOS compatible diskette to allow the readers of the report to have access to the basic data for their own analysis.

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Distribution

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Summary

The authors estimate that between 17.9 and 39.5 million tons (average 27.0 million) of fish are discarded each year in commercial fisheries. These estimates are based on a review of over 800 papers. The highest quantities of discards are from the Northwest Pacific while tropical shrimp trawl fisheries generate a higher proportion of discards than any other fishery type, accounting for one third of the global total.

Of four major gear groups, shrimp trawls stand alone at the top of the list; bottom trawls, long-lines and pot fisheries come next. The third group consists of Japanese high-seas drift net fisheries, Danish seines and purse seines for capelin. Relatively low levels result from pelagic trawls, small pelagic purse seines and some of high seas drift nets. The authors point to inadequate data to determine the biological, ecological, economic and cultural impacts of discards although economic losses run to billions of dollars. However, it appears most likely that socio-cultural attitudes towards marine resources will guide international discard policies.

Techniques to reduce bycatch levels including traditional net selectivity, fishing gear development and time/area restrictions, are discussed. Effort reduction, incentive programmes and individual transferable quotas (that make the vessel responsible for bycatch reduction) are seen as promising avenues for the future. However, quick solutions to the problem are unlikely and much more information is required.

The publication includes a diskette with the complete Bycatch Database, which was compiled for the study, and a summary of it.

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The study was sponsored by the following organizations and businesses: American Factory Trawler Association, Arctic Alaska Fisheries Corporation, Center for Marine Conservation, Farm Credit Services, The Highliners Association, Inter-American Tropical Tuna Commission, International Pacific Halibut Commission, Japanese Fisheries Association, Key Bank, Marine Mammal Commission, Minister of Fishery and Oceans - Canada, National Bank of Alaska, National Fisherman Magazine, North Pacific Fishery Management Council, Northwest Marine Technology, Ocean Trust Foundation, Pacific States Marine Fisheries Commission, Sunmar Shipping, UniSea, Inc., United Nations Food and Agriculture Organization, U.S. Department of Commerce/U.S. Department of State.

EXECUTIVE SUMMARY

The authors have examined several hundred articles concerned with bycatch and discards in world fisheries. Over 800 papers containing quantitative and qualitative information were used to characterize the nature and scope of regional and global bycatch problems. Mortalities associated with discarding practices were also reviewed.

The authors provide a provisional estimate of global discards in commercial fisheries of 27.0 million mt with a range of from 17.9 to 39.5 million mt. The region with the highest discard estimate is the Northwest Pacific. Shrimp trawl fisheries, particularly for tropical species, were found to generate more discards than any other fishery type and account for just over one-third of the global total. On a weight per weight basis, fourteen of the highest 20 discard ratios were associated with shrimp trawls. The fisheries associated with the twenty highest numbers-based ratios represented a more eclectic mix of shrimp trawl, pot, fish trawl, and longline fishery gear types. At the opposite end of the scale, fish trawl, seine, and high seas driftnet fisheries accounted for the majority of the gear types in the authors' list of the ten lowest discard ratios.

It should be noted that although data are tremendously variable, four major gear groups stand out. Shrimp trawls are alone at the top of the list, while relatively low levels are recorded for pelagic trawls, purse seines targeting on menhaden, sardines, and anchoveta, and some of the high seas driftnet fisheries. Between these two extremes lie two other groups. The first of these is comprised of bottom trawls, unspecified trawls, longline gear, and the majority of the pot fisheries. The final group fits between the very low ratios of the pelagic trawl group and the moderate ratios of the aforementioned bottom trawl/pot/line assemblage. Fisheries in this last group include the Japanese high seas driftnet fisheries, Danish seines, and purse seines for capelin.

The authors note there is in most instances inadequate data to determine the real biological, ecological, economic, or socio-cultural impact of discards. Nevertheless, data do suggest that survival of most discarded species is low, declines in some non-target species have been significant, overfishing often involves a significant discard component, and shifts in species dominance and the occupation of certain ecological niches have been in part due to discarding. The extent to which discarding alone and not the fishing process as a whole is responsible for these shifts is, however, unclear.

Economic losses tied to the act of discarding and objectives of monitoring or preventing discards presently run into billions of dollars. Such losses include those associated with discards of species of commercial value to other fisheries, discards of non-legal individuals (for reasons of sex, size, or management policy), and indirect costs related to discarding of non-target species of little commercial value. Included in the

bundle of monitoring and prevention costs are bycatch-related marine fisheries management expenditures, lost fishing opportunity due to premature target fishery closures following the attainment of bycatch caps, observer costs, enforcement expenses, modifications to fishing behavior, and increases in sorting and handling times.

The authors feel socio-cultural attitudes toward marine resources should be an important consideration in the development of international discard policies. Unfortunately, to date the policy process has paid too little attention to socio-cultural perspectives which are often influenced by differing national dependencies on marine resources as a protein staple. The authors also note the growing importance of non-consumptive uses to fisheries and bycatch policy changes. They urge evolution of global discard policies be ear-marked by the minimization of social conflicts, be independent, to the degree possible, of ideological differences, and be based on sound conservation principles.

Case studies are provided for bycatch and discard problems in the Northeast Pacific, as well as the Northeast and Northwest Atlantic. Bycatch and discard issues have been intensively studied in these locations relative to other areas. In the Northeast Pacific, a suite of fisheries produces a bycatch total exceeding one billion individuals annually. Impacts appear low on most species except the Pacific halibut and possibly king and Tanner crab.

Discard problems in the Northwest Atlantic were classified into four groups: (1) marketable species too small or otherwise prohibited from landings, (2) species for which no current market exists, but are caught along with commercial or recreational species, (3) species-specific fleet sectors discarding another fisheries target species, and (4) non-fishery bycatch species, including marine mammals, turtles, and birds. Regulatory approaches and management actions to address these problems are also discussed.

The section covering the Northeast Atlantic focuses on discarding in the mixed-species trawl fisheries for North Sea gadoids. The impact of discards on mortality rates for haddock and whiting and the effect of reductions in fishing effort draw particular scrutiny. Most of the discard problems noted in earlier chapters pertaining to North American fisheries are also noted in the fisheries of the Northeast Atlantic. Local variations associated with misreporting and environmental effects are, however, discussed. Also provided is a review of regulatory and gear management measures commonly applied in the region. The authors point out that many supposed technical solutions can generate unsuspected side effects which may impair their effectiveness. Further, they remind the reader voluntary bycatch reduction measures are unlikely to be successful if they are not in the short-term economic interest of the affected fisher.

A variety of techniques have been attempted by managers, engineers, and scientists to reduce bycatch/discard levels. These have included traditional net selectivity approaches, the development of fishing gear taking advantage of differential species behavior, and time/area fishing restrictions. These methodologies have worked with varying degrees of success depending on the species being managed and the willingness of industry to work together for positive solutions.

Emerging ideas include effort reduction, incentive programs, and individual transferable quotas that move the responsibility for bycatch reduction to the individual vessel level. The authors feel major gains against the global bycatch problem are likely to occur as such shifts towards individual responsibility take place. Progress may be impeded, however, because observer programs, an uncommon characteristic of today's fisheries, are necessary to audit progress toward bycatch goals adequately. For many fisheries suffering from growth overfishing, a reduction in effort may be the most straightforward means of reducing bycatch and improving fisheries conservation and management. Because the solution to global discard problems will vary between fisheries and regions, a clear understanding of the nature and scope of specific fishery problems should precede the introduction of management and other measures.

In the final chapter of the report, the authors scrutinize their work, remind the reader of particularly noteworthy findings, and discuss weaknesses in an analysis of the proportions associated with a global review. They also point out that actual data are often at odds with common perceptions and that many commercial and recreational fishers see bycatch as someone else's problem when, in fact, it is an all too common heritage. Finally, the authors note the many inconsistencies and inadequacies associated with current bycatch data and call upon the scientific community to work toward standardizing data presentation, if not collection, formats. In saying that, however, the authors recognize particular numbers and ratios may have little to do with actual ecological impacts. Consequently, they encourage heightened scientific attention to the assessment of population, community, and ecosystem impacts, in conjunction with improvements in our quantification of bycatch and discard losses.

Quick solutions to the bycatch problem are unlikely. Instead, a concerted national and international effort that will take money and time is necessary. A critical component of such action will be the reduction in effort levels from today's excessive amounts to quantities which will avoid conservation and ecological problems and will efficiently harvest the sea's resources.

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TABLE OF CONTENTS

[LIST OF TABLES](#)

[LIST OF FIGURES](#)

[GLOSSARY](#)

[INTRODUCTION](#)

[PART I ESTIMATES OF GLOBAL FISHERY BYCATCH AND DISCARDS](#)

[CHAPTER 1 ESTIMATES OF FISHERY BYCATCH AND DISCARDS](#)

[Terminology](#)

[Operational Definitions](#)

[Data Sources](#)

[Database Characteristics⁹](#)

[Estimates of Global and Regional Bycatch and Discard Levels](#)

[Regional Break-Outs](#)

[Species/Group Break-Outs](#)

[Fishery-Specific Discard Ratios](#)

[Gear-Specific Discard Rates](#)

[Bycatch of Marine Mammals](#)

[Discard Mortality Rates](#)

[Halibut](#)

[Crab](#)

[Salmon](#)

[Other Observations Regarding Discard](#)

[Mortality](#)

[Chapter Summary](#)

PART II BYCATCH AND DISCARD IMPACTS

CHAPTER 2 BIOLOGICAL AND ECOLOGICAL IMPACTS

[Introduction](#)

[General Observations](#)

[Population Level Impacts](#)

[Changes in Species Assemblages](#)

[Environmental Impacts](#)

[Impacts Enhancing Population Levels](#)

[Impacts on Marine Mammals, Turtles, and Birds](#)

[Marine Mammals](#)

[Seabirds](#)

[Sea Turtles](#)

[Chapter Summary](#)

CHAPTER 3 ECONOMIC IMPACTS

[Impacts Associated with Discard Mortalities](#)

[Discards of Species of Value to Other Fisheries](#)

[Discards of Non-Legal Individuals](#)

[Discards of Non-target Species of Little Commercial Value](#)

[Costs Associated with Monitoring and Preventing or Reducing Discard Levels](#)

[Chapter Summary](#)

CHAPTER 4 SOCIO-CULTURAL IMPACTS

[Discard Conflicts Based in Socio-Cultural Differences](#)

[Attitudes Toward Non-Consumptive Uses and Their Impact on Policy Formulation](#)

[Discard Conflicts Spawned by Socio-Cultural Differences between Developed and Developing Countries](#)

[Socio-Cultural Attitudes Toward Discards Based on Different Dependencies on Marine Resources](#)

[Within-Culture, Social Differences that Drive Discard Conflicts](#)

[Development of Discard Policies Recognizing Socio-Cultural Differences](#)

[Chapter Summary](#)

PART III CASE STUDIES

CHAPTER 5 THE BERING SEA: A MICROCOSM OF GLOBAL BYCATCH ISSUES

[Introduction](#)

[The Evolution of Bycatch Regulation in the North Pacific](#)

[Fisheries in the North Pacific after World War II](#)

[Bering Sea Bycatch and Discard Statistics](#)

[Discard Impacts on Stock Dynamics](#)

[Species Diversity in the Bering Sea Fisheries](#)

[Chapter Summary](#)

CHAPTER 6 THE NORTHWEST ATLANTIC

[Introduction](#)

[The Nature of Bycatch and Discards](#)

[Discards of Small Fish](#)

[Catch of Non-Marketed Species](#)

[Competition Among Fleet Sectors](#)

[Catches of Protected Resources](#)

[Some Results from Comprehensive Discard Sampling](#)

[Incorporation of Discards into Assessments](#)

[Some Examples](#)

[Summary and Prospects for Bycatch Mitigation](#)

CHAPTER 7 NORTHEAST ATLANTIC EXPERIENCES WITH BYCATCH, NON-TARGET MORTALITY, AND UNOBSERVED MORTALITY PROBLEMS

[Introduction](#)

[The Scale of Bycatch Problems](#)

[Mixed Fishery Problems](#)

[Incidental Catch](#)

[Commercial Discards](#)

[Non-Target Mortalities](#)

[Other Environmental Effects of Fishing](#)

[Fishery-Generated Food for Scavengers](#)

[The Biological Significance of Bycatch and Related Problems](#)

[Administrative Actions to Reduce Bycatch Problems](#)

[Underlying Problems of Stock Assessment and Management Posed by Bycatch Problems](#)

[Chapter Summary](#)

PART IV POLICY, SOLUTIONS AND CONCLUSIONS

CHAPTER 8 EVOLUTION OF NATIONAL AND INTERNATIONAL POLICY CONCERNED WITH INCIDENTAL HARVEST DISCARDS

[Policy Development in the U.S.](#)

[High Seas Salmon Driftnet Fisheries](#)

[Squid Driftnet Fisheries](#)

[Country and Regional Policy Developments](#)

[European Community](#)

[Norway](#)

[Canada](#)

[New Zealand](#)

[Central West Africa](#)

[East Africa](#)[Southeast Asia](#)[Middle East](#)[UNCLOS Provisions](#)[U.N. Involvement with High Seas Driftnetting](#)[Cancun Declaration](#)[Chapter Summary](#)

[CHAPTER 9 SEARCHING FOR SOLUTIONS](#)

[Questions Confronting a Search for Discard Solutions](#)[Why are particular species or sizes and sexes of certain species caught and discarded?](#)[What quantities of different species \(sizes and sexes\) are discarded?](#)[What is the ultimate fate of are discards?](#)[Solutions to Current Discard Problems](#)[Gear-based Selectivity Solutions](#)[Outlawing use of gear types for specified fisheries](#)[Reduction in discards using gear selectivity](#)[Reductions in discards based on differential species behavior](#)[Regulatory-Based Solutions](#)[Effort reduction](#)[Use of incentive and disincentive programs](#)[Individual transferable quotas](#)[Time/area solutions to bycatch and discards](#)[Regulation of fishing methods](#)[Discard reduction through use of a broader spectrum of the catch](#)[Chapter Summary](#)

[CHAPTER 10 DISCUSSION AND COMMENTARY](#)

[REFERENCES](#)

LIST OF TABLES

Table 1.	Key of fishery, area, and species codes pertaining to the world bycatch database
Table 2.	Total number and number of records in weight-based and numbers-based formats for each gear type in the NRC bycatch database
Table 3.	The number of records associated with the top ten target and bycatch species/groups contained in the NRC bycatch database
Table 4.	Estimated bycatch and discards from world shrimp fisheries derived from reported bycatch levels and estimated amount of bycatch retained
Table 5.	Discard weight by major world region
Table 6.	Global marine discards on the basis of the FAO International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) species groups
Table 7a.	Top twenty fisheries with the highest recorded discard ratios by weight (discard weight per landed target catch weight)
Table 7b.	Top twenty fisheries with the highest recorded discard ratios by number (discard number per landed target catch number)
Table 8a.	The ten lowest observed weight-based discard ratios in fisheries other than shrimp (discard weight per landed target catch weight)
Table 8b.	The ten lowest observed numbers-based discard ratios in fisheries other than shrimp (discard number per landed target catch number)
Table 9a.	The top weight-based discard to landed target catch ratios by gear type
Table 9b.	The top numbers-based discard to landed target catch ratios by gear type
Table 10.	The highest discard to target catch ratios by region (discard weight per landed target catch weight)
Table 11.	Discards of young tuna and other pelagic fish species in the ETP tuna fishery (number of fish)
Table 12.	Dolphin mortality and fishery production
Table 13.	Halibut discard mortality rates estimated by fishery

Table 14.	Trend in halibut discard mortality rates during 1990 through 1993 and recommendations for 1994 preseason rates
Table 15.	Reported crab bycatch mortality rates in North Pacific fisheries
Table 16.	Reported salmon mortality rates in North Pacific fisheries
Table 17a.	Percentage (by weight) of three taxonomic groups in a subset of discards (fish, non-commercial crustaceans, and cephalopods) from prawn trawls, the percentage of each group that floated, and the percentage of each group that was alive 12 hours after a 30-minute exposure to air on deck
Table 17b.	Percentage of animals surviving for 12 hours after exposure for 10 minutes on deck
Table 18.	Dab mortality from shrimp fishery bycatch
Table 19.	Mortality of selected fish species in the bycatch of the shrimp fishery after five days of maintenance
Table 20.	Annual discard mortalities by species and the percent of total fishing mortality attributed to discards for fisheries in the Northeast Pacific (Bering Sea)
Table 21.	Total retained and discarded weight and number for four gear types and nine target fisheries in the Bering Sea
Table 22.	Catches and discards (mt) of all groundfish species in the Bering Sea/Aleutian Islands trawl fisheries during 1992
Table 23.	Catches and discards (mt) of all species in all Bering Sea/Aleutian Islands hook-and-line fisheries during 1992
Table 24.	Discard ratio for Bering Sea crab fisheries, 1991 and 1992
Table 25.	Estimated fishing mortality rates for key species in the Bering Sea in 1992 resulting from discarding major commercial target species
Table 26.	Estimated king crab population, discard as a percentage of population size (number landed per number landed), and discard mortality as a percentage of population size, 1980–1991
Table 27.	Incidental mortality (number of fish) of chinook salmon in West Coast and Alaska salmon purse seine fisheries
Table 28.	Different species taken in major commercial fisheries in the Bering Sea along with Caddy's Index and Simpson's Diversity Indices
Table 29.	Cumulative percent of top fourteen bycatch taxa by region
Table 30.	Impact of discards on retrospective results
Table 31.	Impact of discards on fishery predictions
Table 32.	Annual weights of haddock and whiting in human consumption landings, discards, and bycatches of the industrial fishery
Table 33.	The severity of bycatch problems in a number of North Sea fisheries
Table 34.	Fishing mortality by age for haddock and whiting generated by human consumption landings, discards, and bycatches of the industrial fishery for North Sea haddock and North Sea whiting
Table 35.	The comparison of landings by main fleets at current effort levels and at 50% of trawl and other demersal effort
Table 36.	The comparison of value of landings by main fleets at current effort levels and at 50% of trawl and other demersal effort
Table 37.	Comparison of approximate profit (million ECU) at current effort and with 50% reduction of effort in all but the herring human consumption and mackerel fisheries
Table 38.	Minimum net sizes for EC Region 2 (excluding Skagerrak and Kattagat) as laid down in EC Conservation Regulation, No. 3094/86, as amended
Table 39.	CPUE rates (# per unit of gear) for various species groups in Japanese, Korean, and Taiwanese driftnet fisheries in 1990
Table 40.	Bycatch reduction (%) and proportional target species loss (%) from various shrimp sorting experiments by region
Table 41.	Relationship between demersal fish biomass and catch of target species

LIST OF FIGURES

Figure 1.	Example records of the world bycatch database
Figure 2.	FAO fishery statistical areas
Figure 3.	Major discard families by region
Figure 4.	Discard mortalities (numbers of porpoise) in the Eastern Tropical Pacific tuna purse seine fisheries, 1959–1993
Figure 5.	Estimated values of fish length at 50% selection (L-50), length at 25% selection (L-25), and length at 75% selection (L-75) for yellowtail flounder, based on nine research studies
Figure 6.	Estimated catch (landings and discards) of the 1987 year class of southern New England yellowtail flounder, 1988–1990
Figure 7.	Results of sea sampling trip reports for four Gulf of Maine groundfish fisheries in 1991
Figure 8.	Calculated ex-vessel value of six fishery units exploiting Gulf of Maine groundfish resources under current bycatch conditions and assuming no discard mortalities for groundfish species
Figure 9.	Relative effect of primary species sought on total discard rates from sea sampled otter trawl trips in the Northwest Atlantic off the U.S., 1989–1992
Figure 10.	F-ratios from general linear models fitted to sea sampling data collected from otter trawl fisheries in the Northwest Atlantic off the U.S., 1989–1992
Figure 11.	Effects of cod-end mesh size on the proportion of trawl catch discarded for all species caught in otter trawl sea sampling in the Northwest Atlantic off the U.S., 1989–1992
Figure 12.	Calculated fishing mortality rates at age for the 1987 year class of southern New England yellowtail flounder
Figure 13.	The relative size and maturity of cod and whiting at age
Figure 14.	Reasons for discards in four Gulf of Maine groundfish fisheries from sea sampling trips conducted in 1991
Figure 15.	Reasons for discards in five West Coast groundfish fisheries from sea sampling trips conducted in 1991
Figure 16.	Basic hard TED and factors influencing bycatch reduction rates, i.e., bar spacing, funnel or no funnel, and flap size
Figure 17.	World fish catch (metric tons) and numbers of overexploited and underexploited species, 1980–1991

GLOSSARY

ADF&G - Alaska Department of Fish and Game (U.S.)

DANIDA - Danish International Development Agency

DFO - Canadian Department of Fisheries and Oceans

EEZ - Exclusive Economic Zone

ETP - Eastern Tropical Pacific

FAO - Food and Agriculture Organization

FCMA - Fisheries Conservation and Management Act (U.S.)

FFA - Forum Fisheries Agency

IATTC - Inter-American Tropical Tuna Commission

ICCAT - International Commission for the Conservation of Atlantic Tunas

ICES - International Council for the Exploration of the Sea

ICLARM - International Center for Living Aquatic Resources Management

IDCA - International Dolphin Conservation Act

IFC - International Fisheries Commission

INPFC - International North Pacific Fisheries Commission

IPHC - International Pacific Halibut Commission

IUCN - International Union for the Conservation of Nature

IWC - International Whaling Commission

MFCMA - Magnuson Fisheries Conservation and Management Act

MMPA - Marine Mammal Protection Act (U.S.)

MSY - Maximum Sustainable Yield

NAFO - Northwest Atlantic Fisheries Organization

NMFS - National Marine Fisheries Service (U.S.)

NOAA - National Oceanic and Atmospheric Administration (U.S.)

NRC - Natural Resources Consultants, Inc. (U.S.)

NRI - Natural Resources Institute (U.K.)

ODA - Overseas Development Administration

PSC - Prohibited Species Catch

SPC - South Pacific Commission

UN - United Nations

UNCED - United Nations Conference on Economic Development

UNCLOS - United Nations Convention on the Law of the Sea

UNGA - United Nations General Assembly

USFWS - United States Fish and Wildlife Service