

Extracts From

The Pacific Coast Groundfish Fishery Management  
Plan  
Bycatch Mitigation Program  
Draft Programmatic Environmental Impact Statement

1. Dear Reviewer Letter
2. Cover Sheet and Table of Contents
3. Executive Summary

*Enclosed CD-ROM contains the full document*





FEB 20 2004

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act of 1969 (NEPA), we enclose for your review the Pacific Coast Groundfish Draft Programmatic Environmental Impact Statement (DPEIS).

The Pacific Fishery Management Council (Council) and the National Marine Fisheries Service propose to evaluate, at a broad scale, how to minimize bycatch in the West Coast groundfish fisheries to the extent practicable, minimize the mortality of unavoidable bycatch, and ensure that bycatch is reported and monitored as required by law. The proposed action would establish the policies and program direction to achieve this purpose. When this Programmatic Environmental Impact Statement (PEIS) is final, the Council is expected to immediately undertake preparation of a new groundfish fishery management plan amendment that will include the conservation and management measures necessary to minimize bycatch and to minimize the mortality of bycatch that cannot be avoided, to the extent practicable. This DPEIS is intended to provide the analytical underpinnings for that effort.

The purpose of the proposed action is to (1) account for total fishing mortality by species, (2) establish monitoring and accounting mechanisms to keep total catch of each groundfish stock from exceeding the specified limits, (3) reduce unwanted incidental catch and bycatch of groundfish and other species, (4) reduce the mortality of animals taken as bycatch, (5) provide incentives for fishers to reduce bycatch and flexibility/opportunity to develop bycatch reduction methods, (6) monitor incidental catch and bycatch in a manner that is accurate, timely, and not excessively costly, (7) reduce unobserved fishing-caused mortalities of all fish, and (8) gather information on unassessed and/or non-commercial species to aid in development of ecosystem management approaches.

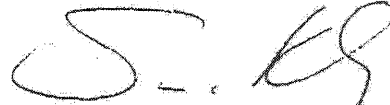
Additional copies of the DPEIS may be obtained from the Pacific Fishery Management Council 7700 NE Ambassador Place, Suite 200, Portland, Oregon 97220-1384. The document is also accessible through the Pacific Fishery Management Council's website at <http://www.Pcouncil.org>. The document is also accessible through the NMFS Northwest Region website at [http://www.nwr.noaa.gov/lsustfish/groundfish/eis\\_efh/pseis/](http://www.nwr.noaa.gov/lsustfish/groundfish/eis_efh/pseis/).

Comments or questions on the DPEIS submitted during the 60-day public comment period must be received by April 27, 2004. Written comments should be submitted by mail to D. Robert Lohn, Regional Administrator, Northwest Region, NMFS, NOAA, 7600 Sand Point Way N.E., Bldg. 1, Seattle, WA 98115-0070. Comments may be submitted by facsimile (fax) to 206-526-6736. Electronic comments may be submitted by e-mail to [Bycatch.nwr@noaa.gov](mailto:Bycatch.nwr@noaa.gov); include in the comment subject line "Comments on the Pacific Coast Groundfish Bycatch Draft Programmatic EIS". A copy of your comments should be submitted to me by mail at the NOAA



Strategic Planning Office (PPI/SP), SSMC3, Room 15603, 1315 East-West Highway, Silver Spring, Maryland 20910; or by fax to 301-713-0585; or by e-mail to [nepa.comments@noaa.gov](mailto:nepa.comments@noaa.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'S. Kennedy', written over the typed name.

Susan A. Kennedy  
Acting NEPA Coordinator

Enclosure

The Pacific Coast Groundfish Fishery Management Plan

Bycatch Mitigation Program

Draft Programmatic Environmental Impact Statement

February 2004

## COVER SHEET

### Pacific Coast Groundfish Bycatch Management PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Proposed Action: The Pacific Fishery Management Council and the National Marine Fisheries Service propose to establish the policies and program direction to minimize bycatch in the West Coast groundfish fisheries to the extent practicable, minimize the mortality of unavoidable bycatch, and ensure that bycatch is reported and monitored as required by law.

Type of Statement: Draft Environmental Impact Statement

Lead agency: NOAA Fisheries (National Marine Fisheries Service)

#### For Further Information

Contact: Mr. D. Robert Lohn  
Regional Administrator  
National Marine Fisheries Service Northwest Region  
7600 Sand Point Way  
Seattle, WA 98115-0070  
Telephone: (206) 526-6150

Dr. Donald O. McIsaac  
Executive Director  
Pacific Fishery Management Council  
7700 NE Ambassador Place, Suite 200  
Portland, OR 97220  
Telephone: (503) 820-2280

Abstract: The 1996 Sustainable Fisheries Act requires that every federal fishery management plan (FMP) must be consistent with National Standard 9 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). National Standard 9 requires that "Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch." Section 303(a)(11) of the Magnuson-Stevens Act requires each FMP "establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery."

The Pacific Fishery Management Council (Council) is responsible for developing fishery management plans (FMPs) that are consistent with the Magnuson-Stevens Act and other applicable law. The Council's Pacific Coast Groundfish FMP includes goals, objectives and management measures addressing bycatch. This Environmental Impact Statement analyzes the Council's objectives for its bycatch mitigation program and evaluates alternative programs to achieve those objectives. Various bycatch mitigation tools are evaluated for effectiveness in reducing unwanted catches of marine species, potential for mitigating other effects on the marine environment, social and economic effects, administrative costs, and other potential impacts. Some alternatives would require more comprehensive scientific observations of catch and bycatch.

---

## Table of Contents

### Executive Summary

1.0 Purpose of and Need for Action .....	1- 1
1.1 The Proposed Action .....	1- 1
1.2 Need for the Proposed Action .....	1- 1
1.3 Purpose of the Proposed Action .....	1- 2
1.4 How this Chapter Is Organized .....	1- 2
1.5 Background .....	1- 2
1.6 Scoping: Key Issues and Development of Alternatives .....	1- 12
1.6.1 Key Issues Identified During Initial Scoping Period .....	1- 13
1.6.2 Key Issues and Comments During Second Scoping Period .....	1- 15
1.7 The Groundfish Fishery Management and Bycatch Mitigation Program .....	1- 15
1.8 Selecting and Implementing the Agency Preferred Alternative .....	1- 21
1.9 How This Document is Organized .....	1- 22
2.0 Alternatives, Including the Status Quo .....	2-1
2.1 Introduction .....	2-1
2.1.1 How this Chapter is Organized .....	2-1
2.1.2 Available Management Measures (The “Bycatch Mitigation Toolbox”) .....	2-1
2.1.3 Structure of the Alternatives .....	2-2
2.2 The Alternatives .....	2-3
2.2.1 Alternative 1: No Action (The Status Quo) .....	2-3
2.2.2 Alternative 2 (Larger Trip Limits and Trawl Fleet Reduction) .....	2-7
2.2.3 Alternative 3 (Larger Trip Limits - Shorter Fishing Season) .....	2-8
2.2.4 Alternative 4 (Vessel and Sector Catch Caps) .....	2-9
2.2.5 Alternative 5 (Individual Fishing (Catch) Quotas and Increased Retention) .....	2-11
2.2.6 Alternative 6 (No-take Reserves, Individual Catch Quotas, and Full Retention) .....	2-13
2.3 Summary of Environmental Impacts .....	2-14
3.0 The Affected Environment .....	3 - 1
3.1 Introduction .....	3 - 1
3.1.1 How The Chapter Is Organized .....	3 - 2
3.2 The Physical Environment .....	3 - 3
Geology .....	3 - 3
California Current System .....	3 - 5
Climate .....	3 - 6
3.3 The Biological Environment .....	3 - 8
Primary and Secondary Productivity .....	3 - 8
Vegetation .....	3 - 8
3.3.1 Groundfish .....	3 - 9
Generalized Rockfish ( <i>Sebastes</i> spp.) Biology .....	3 - 10
Generalized Thornyhead Biology .....	3 - 10

---

---

Generalized Flatfish Biology .....	3 - 11
Generalized Gadid Biology .....	3 - 11
Generalized Shark Biology .....	3 - 12
Generalized Skate Biology .....	3 - 13
Lingcod Biology .....	3 - 13
Sablefish Biology .....	3 - 14
Cabazon Biology .....	3 - 15
Status of Overfished Groundfish Species .....	3 - 15
Status of Emphasis Groundfish Species .....	3 - 18
3.3.2 Other Relevant Fish, Shellfish and Squid .....	3 - 21
Pacific Halibut .....	3 - 21
California Halibut .....	3 - 22
Pink shrimp .....	3 - 22
Spot Prawn .....	3 - 23
Ridgeback Prawn .....	3 - 24
Dungeness Crab .....	3 - 24
Market Squid .....	3 - 25
Jack Mackerel .....	3 - 25
Pacific (Chub) Mackerel .....	3 - 26
Walleye Pollock .....	3 - 26
Common Thresher Shark .....	3 - 27
Eulachon .....	3 - 28
3.4 The Social and Economic Environment .....	3 - 57
3.4.1 Incentives and Disincentives Regarding Bycatch .....	3 - 59
3.4.2 Commercial Harvesters .....	3 - 61
3.4.2.1 Limited Entry Trawl Fisheries .....	3 - 62
3.4.2.2 Limited Entry Fixed-gear Fisheries .....	3 - 64
3.4.2.3 Open Access – Directed Groundfish Fishery .....	3 - 65
3.4.3 Recreational Fisheries .....	3 - 67
3.4.4 Tribal Fisheries .....	3 - 68
3.4.5 Buyers and Processors .....	3 - 70
3.4.6 Fishing Communities .....	3 - 72
3.4.7 Consumers of Groundfish Products and Other Members of the General Public .....	3 - 74
3.4.8 Fishing Vessel Safety .....	3 - 75
3.4.9 Management and Enforcement .....	3 - 76
3.4.10 Other Fisheries that Affect Groundfish (Open Access Non-groundfish Fisheries) .....	3 - 80
California Halibut .....	3 - 80
Dungeness Crab .....	3 - 81
California Gillnet Complex .....	3 - 82
Pink shrimp .....	3 - 82
Pacific Halibut .....	3 - 82
Salmon Troll .....	3 - 83
Spot Prawn .....	3 - 83
Ridgeback Prawn .....	3 - 84

---



---

Sea Cucumber .....	3 - 85
Coastal Pelagic Species .....	3 - 85
Highly Migratory Species .....	3 - 86
4.0 Impacts of the Alternatives .....	4 - 1
4.1 Introduction .....	4 - 1
4.1.1 How this Chapter is Organized .....	4 - 3
4.1.2 Description of Critical Comparative .....	4 - 3
4.1.3 Practicability .....	4 - 7
4.1.4 Bycatch Mitigation Tools .....	4 - 8
Harvest Level Specifications: ABCs, OYs and Allocations .....	4 - 9
Trip Limits, Bag Limits, and Catch Limits .....	4 - 10
Discard Caps (limits and prohibitions) .....	4 - 12
Gear Definitions and Restrictions .....	4 - 13
Time/Area Restrictions (including closures, marine protected areas and reserves) .....	4 - 23
Capacity Limits .....	4 - 24
Vessel Restrictions .....	4 - 24
Data Reporting, Record-keeping, and Monitoring Requirements ...	4 - 25
4.1.5 General Effects of Bycatch Mitigation Tools .....	4 - 28
Tools and Their Linkage to Species Associations .....	4 - 28
Effects of Bycatch Mitigation Tools .....	4 - 30
Harvest Level Specifications: ABCs, OYs and Allocations .....	4 - 30
Trip Limits, Bag Limits, and Catch Limits .....	4 - 31
Gear Restrictions .....	4 - 37
Time/Area Restrictions (Marine Protected Areas, No-take Reserves, Seasons and Closures) .....	4 - 41
Capacity Limits .....	4 - 42
Vessel Restrictions .....	4 - 43
Data Reporting, Record-keeping, and Monitoring Requirements ...	4 - 43
4.1.6 General Economic Factors and Effects: Economic Dimensions of the Bycatch Issue .....	4 - 44
Incentives and Disincentives to Discard .....	4 - 44
Costs of Bycatch .....	4 - 60
a. Costs associated with catching, sorting and throwing the unwanted or prohibited catch over board .....	4 - 61
b. Foregone catch as a result of mortalities imposed on recruits to the target fisheries .....	4 - 61
c. Foregone catch resulting from mortalities imposed on target fisheries by fisheries targeting other species .....	4 - 62
d. Costs of endangered or threatened species bycatch .....	4 - 62
e. Disruption of marine food chains and ecosystems .....	4 - 63
f. Bycatch monitoring costs .....	4 - 63
g. Ethical concerns regarding “waste” in fisheries .....	4 - 64
Bycatch Costs as Externalities .....	4 - 65

---

---

4.2 Impacts to The Physical Environment .....	4 - 66
4.3 Impacts to The Biological Environment .....	4 - 67
4.3.1 Impacts of the Alternatives on Groundfish Resources .....	4 - 68
4.3.1.1 Impacts of Alternative 1 (Status quo/ No Action) .....	4 - 71
4.3.1.1.1 Effects of Harvest Levels under Alternative 1 ....	4 - 76
4.3.1.1.2 Effects of Trip Limits under Alternative 1 .....	4 - 79
4.3.1.1.3 Effects of Catch Limits under Alternative 1 .....	4 - 82
4.3.1.1.4 Effects of Gear Restrictions under Alternative 1 .	4 - 82
4.3.1.1.5 Effects of Time/Area Management under Alternative	4 - 86
4.3.1.1.6 Effects of Capacity Reduction under Alternative 1	4 - 87
4.3.1.1.7 Effects of Data reporting, Record-keeping, and Monitoring under Alternative 1 .....	4 - 88
4.3.1.2 Impacts of Alternative 2 (Larger trip limits - fleet reduction)	4 - 88
4.3.1.2.1 Effects of Harvest Levels under Alternative 2 ....	4 - 92
4.3.1.2.2 Effects of Trip Limits under Alternative 2 .....	4 - 92
4.3.1.2.3 Effects of Catch Limits under Alternative 2 .....	4 - 94
4.3.1.2.4 Effects of Gear Restrictions under Alternative 2 ..	4 - 94
4.3.1.2.5 Effects of Time/Area Management under Alternative	4 - 95
4.3.1.2.6 Effects of Capacity Reduction under Alternative 2	4 - 96
4.3.1.2.7 Effects of Data Reporting, Record-keeping, and Monitoring under Alternative 2 .....	4 - 97
4.3.1.3 Impacts of Alternative 3 (Larger trip limits - shorter season)	4 - 98
4.3.1.3.1 Effects of Alternative 3 Harvest Level Specifications	102
4.3.1.3.2 Effects of Trip Limits under Alternative 3 .....	4 - 102
4.3.1.3.3 Effects of Catch Limits under Alternative 3 ....	4 - 103
4.3.1.3.4 Effects of Gear Regulations under Alternative 3 .	4 - 104
4.3.1.3.5 Effects of Time/Area Management under Alternative	4 - 104
4.3.1.3.6 Effects of Capacity Reduction under Alternative 3	4 - 105
4.3.1.3.7 Effects of Data Reporting, Record-keeping, and Monitoring under Alternative 3 .....	4 - 105
4.3.1.4 Impacts of Alternative 4 (Sector and vessel catch limits) .	4 - 106
4.3.1.4.1 Effects of Harvest Levels under Alternative 4 ...	4 - 113
4.3.1.4.2 Effects of Vessel Trip Limits under Alternative 4	4 - 114
4.3.1.4.3 Effects of Catch Limits under Alternative 4 ....	4 - 115
4.3.1.4.4 Effects of Gear Restrictions under Alternative 4 .	4 - 116
4.3.1.4.5 Effects of Time/Area Management under Alternative	4 - 117
4.3.1.4.6 Effects of Capacity Reduction under Alternative 4	4 - 117
4.3.1.4.7 Effects of Data Reporting, Record-keeping, and Monitoring under Alternative 4 .....	4 - 118
4.3.1.5 Impacts of Alternative 5 (Individual Fishing (Catch) Quotas and Increased Retention) .....	4 - 119
4.3.1.5.1 Effects of Harvest Level Specifications under Alternative 5 .....	4 - 126
4.3.1.5.2 Effects of Trip Limits under Alternative 5 .....	4 - 127
4.3.1.5.3 Effects of Catch Limits under Alternative 5 ....	4 - 128
4.3.1.5.4 Effects of Gear Restrictions under Alternative 5 .	4 - 129

---

---

4.3.1.5.5 Effects of Time/Area Management under Alternative 5	4 - 129
4.3.1.5.6 Effects of Capacity Reduction under Alternative 5	4 - 130
4.3.1.5.7 Effects of Data Reporting, Record-keeping, and Monitoring under Alternative 5	4 - 130
4.3.1.6 Impacts of Alternative 6 (No-take Reserves, Individual Catch Quotas, and Full Retention)	4 - 131
4.3.1.6.1 Effects of Harvest Level Specifications under Alternative 6	4 - 136
4.3.1.6.2 Effects of Trip Limits under Alternative 6	4 - 137
4.3.1.6.3 Effects of Catch Limits under Alternative 6	4 - 138
4.3.1.6.4 Effects of Gear Restrictions under Alternative 6	4 - 138
4.3.1.6.5 Effects of Time/Area Management under Alternative 6	4 - 139
4.3.1.6.6 Effects of Capacity Reduction under Alternative 6	4 - 141
4.3.1.6.7 Effects of Data Reporting, Record-keeping, and Monitoring under Alternative 6	4 - 141
4.3.2 Impacts on Other Relevant Fish, Shellfish, and Squid	4 - 142
4.3.3 Impacts on Protected Species	4 - 145
4.3.3.1 Impacts on Pacific Salmon	4 - 145
4.3.3.2 Impacts on Seabirds	4 - 147
4.3.3.3 Impacts on Marine Mammals	4 - 153
4.3.3.4 Impacts on Sea Turtles	4 - 158
4.4 Impacts on the Social and Economic Environment	4 - 160
4.4.1 Social and Economic Impacts of Alternative 1 (No Action/Status Quo)	4 - 161
4.4.1.1 Effects on Fishers' Incentives to Reduce Bycatch	4 - 161
4.4.1.2 Effects on Commercial Harvesters	4 - 162
4.4.1.3 Effects on Recreational Fisheries	4 - 170
4.4.1.4 Effects on Tribal Fisheries	4 - 171
4.4.1.5 Effects on Buyers and Producers	4 - 172
4.4.1.6 Effects on Communities	4 - 174
4.4.1.7 Effects on Consumers of Groundfish Products	4 - 176
4.4.1.8 Effects on Fishing Vessel Safety	4 - 176
4.4.1.9 Effects on Management and Enforcement Costs	4 - 177
4.4.2 Social and Economic Impacts of Alternative 2 (Larger trip limits - fleet reduction)	4 - 179
4.4.2.1 Effects on Fishers' Incentives to Reduce Bycatch	4 - 180
4.4.2.2 Effects on Commercial Harvesters	4 - 181
4.4.2.3 Effects on Recreational Fisheries	4 - 182
4.4.2.4 Effects on Tribal Fisheries	4 - 183
4.4.2.5 Effects on Buyers and Processors	4 - 183
4.4.2.6 Effects on Communities	4 - 183
4.4.2.7 Effects on Consumers of Groundfish Products	4 - 185
4.4.2.8 Effects on Fishing Vessel Safety	4 - 185
4.4.2.9 Effects on Management and Enforcement Costs	4 - 185
4.4.3 Social and Economic Impacts of Alternative 3 (Larger trip limits - shorter seasons)	4 - 186
4.4.3.1 Effects on Fishers' Incentives to Reduce Bycatch	4 - 187

---

---

4.4.3.2 Effects on Commercial Harvesters .....	4 - 188
4.4.3.3 Effects on Recreational Fisheries .....	4 - 190
4.4.3.4 Effects on Tribal Fisheries .....	4 - 190
4.4.3.5 Effects on Buyers and Producers .....	4 - 191
4.4.3.6 Effects on Communities .....	4 - 192
4.4.3.7 Effects on Consumers of Groundfish Products .....	4 - 192
4.4.3.8 Effects on Fishing Vessel Safety .....	4 - 193
4.4.3.9 Effects on Management and Enforcement Costs .....	4 - 193
4.4.4 Social and Economic Impacts of Alternative 4 (Sector catch limits- vessel caps) .....	4 - 194
4.4.4.1 Effects on Fishers' Incentives to Reduce Bycatch .....	4 - 195
4.4.4.2 Effects on Commercial Harvesters .....	4 - 197
4.4.4.3 Effects on Recreational Fisheries .....	4 - 200
4.4.4.4 Effects on Tribal Fisheries .....	4 - 201
4.4.4.5 Effects on Buyers and Processors .....	4 - 201
4.4.4.6 Effects on Communities .....	4 - 202
4.4.4.7 Effects on Consumers of Groundfish Products .....	4 - 202
4.4.4.8 Effects on Fishing Vessel Safety .....	4 - 202
4.4.4.9 Effects on Management and Enforcement Costs .....	4 - 203
4.4.5 Social and Economic Impacts of Alternative 5 (Vessel catch quotas, discard caps) .....	4 - 204
4.4.5.1 Effects on Fishers' Incentives to Reduce Bycatch .....	4 - 205
4.4.5.2 Effects on Commercial Harvesters .....	4 - 206
4.4.5.3 Effects on Recreational Fisheries .....	4 - 211
4.4.5.4 Effects on Tribal Fisheries .....	4 - 212
4.4.5.5 Effects on Buyers and Processors .....	4 - 212
4.4.5.6 Effects on Communities .....	4 - 214
4.4.5.7 Effects on Consumers of Groundfish Products .....	4 - 217
4.4.5.8 Effects on Fishing Vessel Safety .....	4 - 217
4.4.5.9 Distribution Issues with Rights-Based Management .....	4 - 218
4.4.5.10 Effects on Management and Enforcement Costs .....	4 - 220
4.4.6 Social and Economic Impacts of Alternative 6 (Marine reserves, individual caps and full retention) .....	4 - 221
4.4.6.1 Effects on Fishers' Incentives to Reduce Bycatch .....	4 - 222
4.4.6.2 Effects on Commercial Harvesters .....	4 - 222
4.4.6.3 Effects on Recreational Fisheries .....	4 - 226
4.4.6.4 Effects on Tribal Fisheries .....	4 - 228
4.4.6.5 Effects on Buyers and Processors .....	4 - 228
4.4.6.6 Effects on Communities .....	4 - 229
4.4.6.7 Effects on Consumers of Groundfish Products and Other Segments of the American Public .....	4 - 230
4.4.6.8 Effects on Fishing Vessel Safety .....	4 - 231
4.4.6.9 Effects on Management and Enforcement Costs .....	4 - 232
4.5 Summary of Impacts of Alternative Monitoring Programs .....	4 - 235
4.6 Summary of Impacts to Biological Environment .....	4 - 241

---

4.6.1 Summary of Alternative 1 .....	4 - 241
4.6.2 Summary of Alternative 2 .....	4 - 245
4.6.3 Summary of Alternative 3 .....	4 - 246
4.6.4 Summary of Alternative 4 .....	4 - 247
4.6.5 Summary of Alternative 5 .....	4 - 248
4.6.6 Summary of Alternative 6 .....	4 - 249
4.7 Summary of Impacts to the Socioeconomic Environment .....	4 - 250
4.8 Cumulative Effects of the Alternatives .....	4 - 257
4.8.1 Cumulative Effects Marine Ecosystem, Habitat, and Biodiversity .....	4 - 259
4.8.2 Cumulative Effects Groundfish .....	4 - 259
4.8.3 Cumulative Effects Protected Species .....	4 - 260
4.8.4 Cumulative Effects Groundfish Fisheries .....	4 - 260
4.8.5 Cumulative Effects Safety .....	4 - 261
5.0 Consistency with the Groundfish FMP and Magnuson-Stevens Act National Standards .	5-1
5.1 Consistency with the Groundfish FMP .....	5-1
5.2 Consistency with Magnuson-Stevens Act National Standards .....	5-9
6.0 Other Federal Laws and Executive Orders .....	6-1
6.1 Other Federal Laws .....	6-1
6.1.1 Coastal Zone Management Act .....	6-1
6.1.2 Endangered Species Act .....	6-1
6.1.3 Marine Mammal Protection Act .....	6-2
6.1.4 Migratory Bird Treaty Act .....	6-3
6.1.5 Paperwork Reduction Act .....	6-3
6.1.6 Regulatory Flexibility Act .....	6-4
6.2 Executive Orders .....	6-4
6.2.1 EO 12866 (Regulatory Impact Review) .....	6-4
6.2.2 EO 12898 Environmental Justice .....	6-5
6.2.3 EO 13132 (Federalism) .....	6-6
6.2.4 EO 13175 (Consultation and Coordination With Indian Tribal Governments) .....	6-7
6.2.5 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) .....	6-7
7.0 Preparers .....	7 - 1

## Glossary

## Volume 2: References and Appendices

### References

#### Economic References

---

Appendix A:	Distribution, Life History, and Status of Relevant Species
Appendix B:	Northwest Fisheries Science Center West Coast Groundfish Observer Program Initial Data Report and Summary Analyses - January 2003
Appendix C:	The Potential Use of Electronic Monitoring Technology to Monitor Catch and Discards in the West Coast Groundfish Fisheries
Appendix D:	Social, Economic and Historical Information Regarding Treaty Tribes

## List of Figures

Figure 1.1. Diagrammatic representation of bycatch and other catch-related terms. . . . .	1- 7
Figure 3.1. Bathymetry off the West Coast of the U.S. . . . .	3 - 3
Figure 3.2. Major ocean currents off the West Coast of North America. . . . .	3 - 5
Figure 3.3. Some Key Overfished Groundfish Stocks. . . . .	3 - 15
Figure 3.4. Yelloweye Rockfish Biomass Trend, 1990-2000 (mt). . . . .	3 - 16
Figure 3.5. Lingcod Population Biomass (mt, age 2+). . . . .	3 - 16
Figure 3.6. Pacific Whiting Biomass, 1965 - 2000 (1,000 mt). . . . .	3 - 17
Figure 3.7. Sablefish Biomass trend, 1970-2000 (1,000 mt) . . . . .	3 - 18
Figure 3.8. Dover Sole Biomass Trend, 1956-1996 (mt). . . . .	3 - 18
Figure 3.9. English sole biomass trend (mt). . . . .	3 - 18
Figure 3.10. Petrale Sole Biomass Trend, 1977-1997. . . . .	3 - 19
Figure 3.11. Arrowtooth Flounder Triennial Survey Biomass (mt). . . . .	3 - 19
Figure 3.12. Chilipepper Rockfish Biomass Trend, 1970 - 2000. . . . .	3 - 19
Figure 3.13. Yellowtail Rockfish Biomass Trend, 1967-1997 (mt). . . . .	3 - 20
Figure 3.14. Shortspine Thornyhead Biomass Trend, 1990-2000 (mt). . . . .	3 - 20
Figure 3.15. Longspine Thornyhead Biomass Trend, 1990-2000 (mt). . . . .	3 - 20
Figure 3.16. Black Rockfish Biomass Trend, 1985-2000 (mt). . . . .	3 - 21
Figure 3.17. Groundfish landings, excluding at-sea whiting, 1987 - 2000. . . . .	3 - 62
Figure 3.18. Limited entry trawl vessel participation by period and year, 1999-2002, excluding whiting-only vessels. . . . .	3 - 63
Figure 3.19. Limited entry fixed-gear vessel participation by period and year, 1999-2002. . . . . .	3 - 64
Figure 3.20. Open access vessel participation by period and year, 1999-2002. . . . .	3 - 65
Figure 3.21. Value of Daily Landings of Groundfish (Excluding Pacific Whiting), 1999-2002. . . . . .	3 - 71
Figure 4.1. Harvester decisions regarding bycatch (trawl used as example). . . . .	4 - 55
Figure 4.2. Landings in the groundfish fisheries by species group, 1987-2000. Source: Scholz 2003. . . . .	4 - 163
Figure 4.3. Limit entry fixed-gear vessel participation by period and year, 1999-2002. Source: PacFIN data 11/2004. . . . .	4 - 165
Figure 4.4. Limited entry trawl vessel participation by period and year, 1999-2002, excluding whiting-only vessels. Source: PacFIN data, 11/2004. . . . .	4 - 165
Figure 4.5. Open access vessel participation by period and year, 1999-2002. . . . .	4 - 166
Figure 4.6. Average number of trips/landings per limited entry trawl vessel by period and year, 1999-2002. Source: PacFIN data 11/2003. . . . .	4 - 167
Figure 4.7. Average number of trips/landings per limited entry fixed-gear vessel by period and year, 1999-2002. Source: PacFIN data 11/2003. . . . .	4 - 168
Figure 4.8. Average number of trips/landings per open access vessel by period and year, 1999- 2002. Source: PacFIN data 11/2003. . . . .	4 - 168
Figure 4.9. Value of Daily Landings of Groundfish (Excluding Pacific Whiting), 1999-2002. Source: PacFIN. . . . .	4 - 172

## List of Tables

Table 2.1. Bycatch Mitigation Tools .....	2-1
Table 2.3.1. Bycatch reduction methods (bycatch mitigation tools) included in the alternatives. .....	2-18
Table 2.3.2. Summary of how well alternatives achieve the stated purposes for the proposed action. ....	2-19
Table 2.3.3. Significance of effects on the biological environment. ....	2-20
Table 2.3.4(a). Summary of effects of Alternatives 1, 2 and 3 on the social and economic environment. ....	2-21
Table 2.3.4(b). Summary of effects of Alternatives 4, 5 and 6 on the social and economic environment. ....	2-23
Table 2.3.5. Significance of effects on the social and economic environment. ....	2-26
Table 3.4.1. Socioeconomic Components of the Human Environment and Impact Assessment Variables. ....	3 - 57
Table 3.4.2. Exvessel revenues in the groundfish fisheries (excluding the Pacific whiting fishery) by sector, 1999-2002. ....	3 - 62
Bycatch Mitigation Tools: The Mitigation Toolbox .....	4 - 8
Table 4.1.0. Species Associations and Attributes Important to Application of Bycatch Mitigation Tools .....	4 - 29
Table 4.1.0b. Reasons given for discard during three years (1997-99) of the Oregon Enhanced Data Collection Project (EDCP). Percentages based on recorded reasons for discard of species (market, quality, or regulation). Species discarded for an unspecified or unknown reason were not included in record count. Environment refers to classification given for species used in EIS analysis, not necessarily the location where the reason for discard was determined by the EDCP observer. ....	4 - 34
Table 4.1.1. Direct effect of bycatch mitigation tools on regulatory and non-regulatory bycatch, habitat, and monitoring, and rationale for the effect .....	4 - 45
Table 4.1.2. Indirect effects and rationale for the indirect effects of the application of management measures (tools) designed to reduce bycatch and improve accountability .....	4 - 48
Table 4.1.3. Management tools and potential actions using each tool that have potential to reduce bycatch or bycatch mortality, and potential direct and indirect impacts of each action. ....	4 - 51
Table 4.3.1. Alternative 1: Status quo management. Relative rank of tools used to reduce bycatch and bycatch mortality. Overfished species in bold and emphasis species in italic. Species below MSY and subject to precautionary management are noted with (p). .	4 - 72
Table 4.3.2. Alternative 2: Reduce groundfish bycatch by increasing trip limit size (reduce commercial trawl fleet 50% from 2002-2003 level). Relative rank of tools used to reduce bycatch and bycatch mortality. Overfished species in bold and emphasis species in italic. Species below MSY and subject to precautionary management are noted with (p). .	4 - 89
Table 4.3.3. Alternative 3: Reduce groundfish bycatch by increasing trip limit size (reduce commercial season). Relative rank of tools used to reduce bycatch and bycatch mortality. Overfished species in bold and emphasis species in italic. Species below MSY and	



subject to precautionary management are noted with (p) . . . . .	4 - 99
Table 4.3.4. Alternative 4: Reduce groundfish bycatch establishing vessel and sector catch caps/limits. Relative rank of tools used to reduce bycatch and bycatch mortality. Overfished species in bold and emphasis species in italic. Species below MSY and subject to precautionary management are noted with (p). . . . .	4 - 108
Table 4.3.5. Alternative 5: Reduce groundfish bycatch by establishing individual transferable quotas (RSQ or IFQ). Relative rank of tools used to reduce bycatch and bycatch mortality. . . . .	4 - 121
Table 4.3.6. Alternative 6: Reduce groundfish bycatch by large area closures and gear restrictions, RSQs, and IFQs, with 100% retention of groundfish. Relative rank of tools used to reduce bycatch and bycatch mortality. . . . .	4 - 133
Table 4.3.7. Salmon bycatch in the Pacific whiting fisheries, 1995-2002. . . . .	4 - 146
Table 4.3.8. Interactions between seabirds and the Pacific Coast groundfish fisheries documented by West Coast Groundfish Observers between September 2001 and October 2002. . . . .	4 - 149
Table 4.3.9. Marine mammal species that occur off the West Coast that are, or could be, of concern with respect to potential interactions with groundfish fisheries. . . . .	4 - 153
Table 4.3.10. Cetaceans that are present but not likely to interact with groundfish fisheries or that have not been documented having had interactions in observed groundfish fisheries. . . . .	4 - 154
Table 4.3.11. Sea turtle species occur off the West Coast that are or could be of concern with respect to potential interactions with groundfish fisheries. . . . .	4 - 158
Table 4.4.1. Socioeconomic Components of the Human Environment and Impact Assessment Variables. . . . .	4 - 160
Table 4.4.2. Exvessel revenues in the groundfish fisheries (excluding the Pacific whiting fishery) by sector, 1999-2002. . . . .	4 - 164
Table 4.5.1. Monitoring tools and effects on improving accountability and cost impacts of each tool. . . . .	4 - 237
Table 4.5.2. Monitoring alternatives and rank of effects on improving accountability, and cost impacts of each alternative. . . . .	4 - 238
Table 4.6.1. Relative rank of bycatch reduction methods (tools) for each alternative used to reduce bycatch and bycatch mortality, and address accountability issues. . . . .	4 - 242
Table 4.6.2. Alternatives ranked by their effectiveness at reducing bycatch, enforcing and monitoring bycatch measures, and reducing compliance costs to industry. . . . .	4 - 243
Table 4.7.1(a). Summary of effects of Alternatives 1, 2 and 3 on the social and economic environment (Alternatives 4, 5 and 6 in following table). . . . .	4 - 251
Table 4.7.1(b). Summary of effects of Alternatives 4, 5 and 6 on the social and economic environment. (Alternatives 1, 2 and 3 in preceding table). . . . .	4 - 253
Table 4.7.2. Significance of indirect effects on the social and economic environment. . . . .	4 - 256
Table 4.8(a). Summary of direct, indirect and cumulative effects of Alternatives 1, 2 and 3. . . . .	4 - 262
Table 4.8(b). Summary of direct, indirect and cumulative effects of Alternatives 1, 2 and 3. . . . .	4 - 263



---

## Executive Summary

The Proposed Action is to establish policies and program direction that minimize bycatch to the extent practicable, minimize the mortality of unavoidable bycatch, and ensure that bycatch is reported and monitored as required by law.

### ES.1 The Proposed Action

The Pacific Fishery Management Council (Council) and National Marine Fisheries Service (NMFS, also called NOAA Fisheries - National Oceanic and Atmospheric Administration, U.S. Department of Commerce) propose to evaluate, at a broad scale, how to minimize bycatch in the West Coast groundfish fisheries to the extent practicable, minimize the mortality of unavoidable bycatch, and ensure that bycatch is reported and monitored as required by law. The proposed action would establish the policies and program direction to achieve this purpose. When this Programmatic Environmental Impact Statement (PEIS) is final, the Council is expected to immediately undertake preparation of a new groundfish fishery

management plan amendment that will include the conservation and management measures necessary to minimize bycatch and to minimize the mortality of bycatch that cannot be avoided, to the extent practicable. This PEIS is intended to provide the analytical underpinnings for that effort.

#### ES.1.1 Why is Action Needed?

The 1996 Sustainable Fisheries Act requires that every federal fishery management plan (FMP) must be consistent with National Standard 9 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). National Standard 9 requires that "Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch." Section 303(a)(11) of the Magnuson-Stevens Act requires each FMP "establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority –

- (A) minimize bycatch; and
- (B) minimize the mortality of bycatch which cannot be avoided."

The Council's Groundfish FMP includes provisions relating to bycatch mitigation. Some measures, such as gear definitions and restrictions, have been established as long-term regulations that remain in effect for until the Council and NMFS amend them. Other measures are established through the annual management process and expire at the end of each year (or every two years, under the Council's new two-year management process). The current bycatch mitigation program is not clearly spelled out in a single place. Rather, elements are spread throughout the FMP, the regulations as recorded in the *Code of Federal Regulations*, various FMP amendments, and numerous *Federal Register* notices. The proposed action is needed to describe the elements of the groundfish bycatch program, to identify the various bycatch mitigation tools available to the Council, to evaluate the effects and effectiveness of those tools,

and to evaluate potential improvements that might result from other combinations and applications of bycatch mitigation tools. A comprehensive program to minimize bycatch and bycatch mortality to the extent practicable in the groundfish fishery would (1) reduce waste, discard, and collateral damage to marine plants and animals by groundfish fishing activities on the Pacific coast, (2) collect and report appropriate and adequate information to support the groundfish fishery management program, and (3) balance these needs with environmental and social values (i.e., need to allow for fishing).

### ES.1.2 What is the Purpose of the Proposed Action?

The Council appointed an ad hoc Environmental Impact Statement Oversight Committee (Committee) to provide direction to drafters of this EIS. The committee identified the following objectives for the groundfish bycatch mitigation program. These objectives define the purpose of the proposed action:

- account for total fishing mortality by species
- establish monitoring and accounting mechanisms to keep total catch of each groundfish stock from exceeding the specified limits
- reduce unwanted incidental catch and bycatch of groundfish and other species
- reduce the mortality of animals taken as bycatch
- provide incentives for fishers to reduce bycatch and flexibility/opportunity to develop bycatch reduction methods
- monitor incidental catch and bycatch in a manner that is accurate, timely, and not excessively costly
- reduce unobserved fishing-caused mortalities of all fish
- gather information on unassessed and/or non-commercial species to aid in development of ecosystem management approaches.

This draft EIS has been prepared as a programmatic document to assist the Council and NOAA Fisheries in taking the next steps necessary to meet the bycatch requirements of the Magnuson-Stevens Act.

### ES.1.3 Background

Since 1996, the Council prepared two FMP amendments to bring the FMP into compliance with the Magnuson-Stevens Act requirements. The first attempt was Amendment 11. NMFS disapproved the bycatch provisions of that amendment as inadequate and returned it to the Council for further consideration. The Council and NMFS worked together to prepare Amendment 13, which NMFS subsequently approved. However, the amendment was challenged in federal district court. The court disapproved Amendment 13 and its accompanying Environmental Assessment (EA) as inadequate in Pacific Marine Conservation Council v. Evans, 200 F.Supp.2d 1194 (N.D. Calif. 2002). This court ruling is referred to as PMCC in this EIS.

In PMCC, the court made several rulings with respect to the adequacy of the Amendment 13 bycatch revisions and the EA. The court held that Amendment 13 failed to establish a standardized reporting methodology because it established neither a mandatory nor an adequate observer program. Further, the amendment did not minimize bycatch and bycatch mortality

because it failed to include all practicable management measures in the FMP itself. The court also found a lack of reasoned decisionmaking, as the amendment rejected four specific bycatch reduction measures (fleet size reduction, marine reserves, vessel incentives, and discard caps) without consideration on their merits. With respect to NEPA, the EA prepared for Amendment 13 failed to address adequately the ten criteria for an action's significance set forth in the CEQ regulations at 40 CFR 1508.27(b), and also failed to analyze reasonable alternatives, particularly the immediate implementation of an adequate at-sea observer program and bycatch reduction measures.

This draft EIS addresses the specific legal deficiencies identified by the court in the PMCC decision. When the EIS is final, the Council is expected to immediately undertake preparation of a new FMP amendment that will include the conservation and management measures necessary to minimize bycatch and to minimize the mortality of bycatch that cannot be avoided, to the extent practicable. This EIS is intended to provide the analytical underpinnings for that effort. In addition to other bycatch mitigation tools, it includes consideration of fleet size reduction, marine reserves, vessel incentives, and discard caps, as required by the PMCC decision.

Since the early 1990s the FMP required fishing vessels to carry observers at the request of NMFS. In August 2001, a mandatory observer program was begun under these regulations. This program is conducted by the Fishery Resource Analysis and Monitoring Division of the NMFS Northwest Fisheries Science Center. Later, the Council and NMFS adopted a mandatory observer program in FMP Amendment 16-1. NMFS approved this amendment on November 14, 2003.

The Groundfish FMP covers more than 80 species of groundfish, many of which are caught together with a variety of fishing gears that are used to target groundfish. Groundfish are also caught incidentally in fisheries for non-groundfish species such as pink shrimp and California halibut. As of January, 2004, nine groundfish species have been declared overfished. These are darkblotched rockfish, canary rockfish, lingcod, yelloweye rockfish, bocaccio rockfish, cowcod (also a rockfish species), widow rockfish, Pacific ocean perch (another rockfish), and Pacific whiting. The Council has prepared (or is in the process of preparing) a plan to rebuild each of these species.

The groundfish fishery off the West Coast of the United States is executed from the Canadian to Mexican borders. Multiple vessel types participate in this fishery. They range in size from 8 foot long kayaks to 120 foot trawlers, and vessels fish in nearshore to offshore waters. The vessels use various types of gear including bottom trawls, midwater trawls, pots, longlines and other hook and line gear. Trawlers take the majority of groundfish. The catch can be incredibly diverse in species and fish size and overall catch size can vary widely as well. In many cases, a portion of the catch is retained and another portion of the catch, that may be of the wrong size, species, or is over management retention limits, is discarded at sea. Discarded fish are called "bycatch."

Figure ES.1 illustrates the meaning of bycatch and other catch-related terms as they are defined and used in the Magnuson-Stevens Act and Groundfish FMP. Some fish encounter fishing gear but escape alive. However, there will almost always be some unobserved mortality resulting

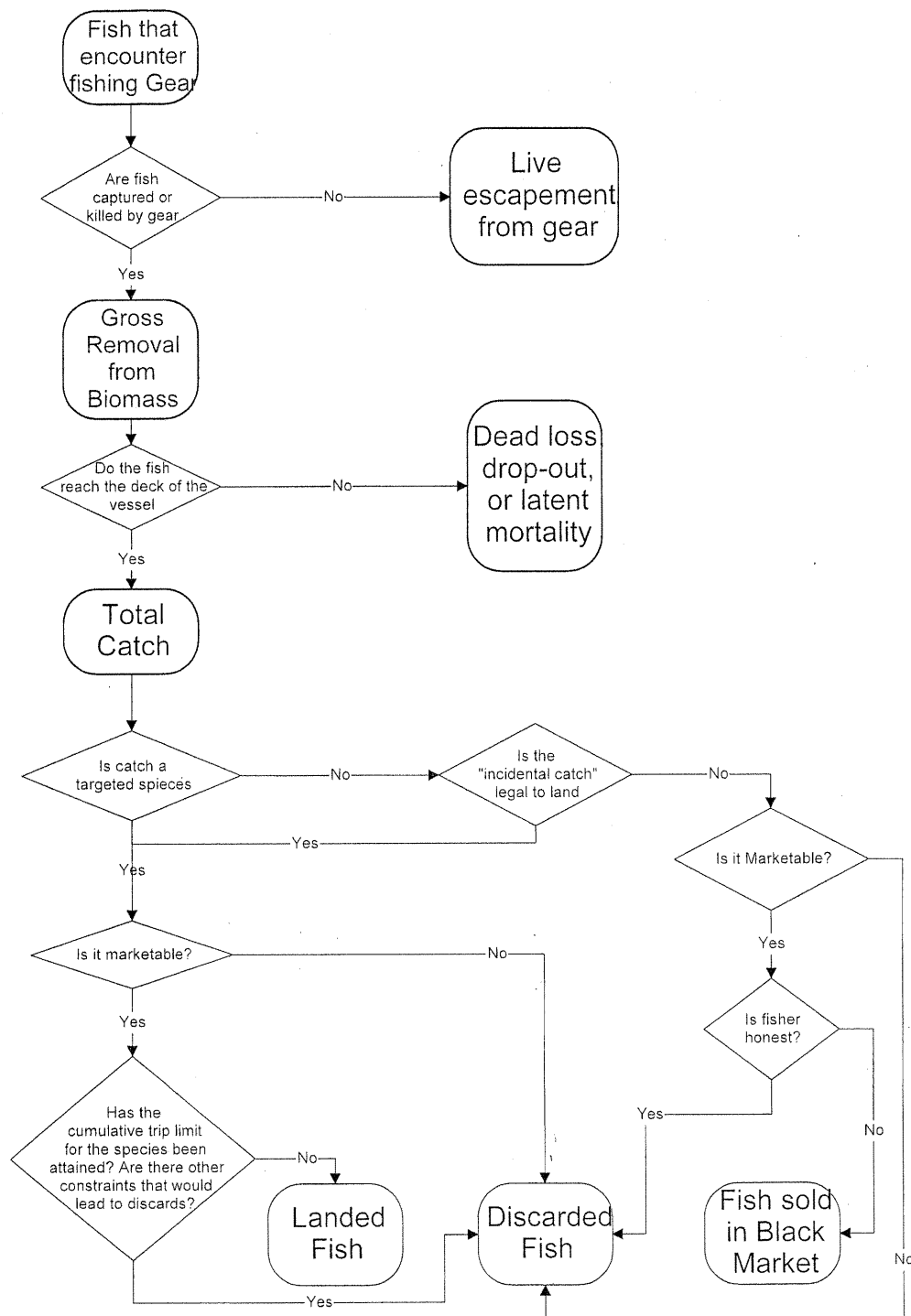
from injury when fish encounter fishing gear, especially mass-contact types of gear, such as trawl gear. The latent or “pass-through” mortality of fish escaping from a trawl net may be quite high, depending on the design and manner in which the gear is fished as well as its mesh size. Additional delayed mortality may occur after fish escape gear. This type of mortality may be related to the stress of capture and physiological injuries which subsequently turn out to be fatal. There may also be mortality associated with gear that is lost or abandoned — the bycatch resulting from this “ghost fishing.” NMFS considers this unobserved fishing-related mortality included in the definition of bycatch because it constitutes a harvest of fish that are not sold or kept for personal use (63 FR 24235 May 1, 1998).

## **ES.2 Measuring Environmental Consequences**

Short-term effects are mortalities resulting from fisheries, including harvest and incidental mortality that occurs when fishers capture and then release groundfish and other species. Long-term effects are changes in the abundance of successive generations of the affected stock that may occur as a result of reductions in short-term impacts and the consequent increase in the species’ populations. These effects are qualitatively described.

Cumulative effects are changes to groundfish stocks and other marine animal populations that may result from a combination of short- and long-term effects of the actions in the groundfish fisheries, along with the effects of other past, present, or foreseeable future actions. Changes to the human environment stem from modifying management measures and the conduct of fisheries. These are described in terms of bycatch mitigation tools: changes in harvest specifications, season duration and structure, harvest, fishing effort, commercial fisheries, and angler benefits. Social and cultural effects are qualitatively described for the communities of commercial and recreational fishers and for coastal communities and Tribes.

Figure ES.1. Diagrammatic representation of bycatch and other catch-related terms.



### **ES.3 The Alternatives**

The Council's ad hoc EIS Committee developed five alternatives to the current bycatch management program. Each of these alternatives would use many of the current mitigation tools, but may use different combinations or may apply some differently. Alternative 1 is the no action/status quo. It describes the current bycatch program. Alternative 2 would emphasize capacity reduction, which means reducing the size of the commercial groundfish fleet. Specifically, it would reduce the trawl fleet by half (50%) from the number permitted to fish in 2002-2003. Since this alternative was proposed, a federal buyback program was approved, resulting in 91 trawl vessels being permanently eliminated. That buyback program "watered down" the effects of Alternative 2. Alternative 3 would reduce fishing effort by reducing the amount of groundfish fishing time for every commercial vessel. This might be through shorter seasons, establishing fishing "platoons," or other methods to limit fishing. Alternative 4 would revise the definition of the term "trip limit" to include a requirement that vessel stop fishing when the limit is reached. Specifically, it would use a combination of catch limits and trip limits, and each fishing sector would be held to a specified limit or cap of overfished species. If vessels in a sector reached the limit, all vessels in the sector would be closed. Alternative 5 would replace trip limits with individual fishing quotas, which would be defined as catch or mortality limits. Quota holders would be allowed to buy and sell shares. Discard caps for overfished species would be established also. Alternative 6 would focus on reducing bycatch to near zero by establishing no-take marine reserves, individual vessel catch quotas, and prohibiting discard of most groundfish. The details of these alternatives are spelled out in Chapter 2 and further described in Chapter 4.



Table ES.1. Bycatch reduction methods (bycatch mitigation tools) included in the alternatives.

	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>	<b>Alternative 4</b>	<b>Alternative 5</b>	<b>Alternative 6</b>
<b>Goals and Objectives</b>	No action: Control bycatch by trip (retention) limits that vary by gear, depth, area; long season. Use marine protected areas (RCAs)	Same as Alt. 1 but reduce trawl fleet and increase trip limits to match smaller fleet.	Same as Alt 1 but reduce commercial fishing time by seasons or other method, and increase trip limits.	Similar to Alt 1, but establish vessel and sector catch limits for overfished groundfish. Trip limits for other groundfish.	Establish individual catch limits (individual quotas) for groundfish species. Set discard caps for overfished species.	Establish no-take reserves, individual vessel catch limits (individual quotas). Prohibit all groundfish discards.
<b>FISHERY MANAGEMENT TOOLS</b>						
<b>Harvest Levels</b>						
ABC/OY	Y	Y	Y	Y	Y	Y
Set overfished groundfish catch caps	N	N	N	Y	N	Y
Use trip limits	Y	Y	Y	Y	N	N
Use catch limits	N	N	N	Y	Y	Y
Set individual vessel/permit catch	N	N	N	Y	Y	Y
Set groundfish discard caps	N	N	N	N	Y	Y
Establish IQs	N	N	N	N	Y	Y
Establish bycatch performance standards	N	N	N	N	Y	Y
Establish a reserve	N	N	N	Y	N/Y	Y
<b>Gear Restrictions</b>						
Rely on gear restrictions	Y	Y	Y	Y	N	Y
<b>Time/Area Restrictions</b>						
Establish long term closures for all groundfish fishing	N	N	N	N	N/Y	Y
Establish long term closures for on-bottom fishing	N	N	N	N	N/Y	Y
Capacity reduction (mandatory)	Y	Y(50%)	Y	Y	Y	Y
<b>Monitoring/Reporting</b>						
Trawl logbooks	Y	Y	100%	Y		
Fixed-gear logbooks	N	N	100%	Y		
CPFV logbooks	N	N	N	Y		
Commercial port sampling	Y	Y	Y	>Y	N/Y	Y
Recreational	Y	Y	Y	>Y	Y	>>x
Observer coverage (commercial)	10%	10%	10%+logbook verification	increased, by sector	100%	100%
CPFV observers	N	N	N	Y	Y	100%
VMS	Y	Y	Y	Y	Y	Y
Post-season observer data OK	Y	Y	Y	N	N	N
Inseason observer data required	N	N	N	Y	Y	Y
Rely on fish tickets as the primary monitoring device for groundfish landings	Y	Y	Y	N	N	N

**ES.4 Environmental Impacts of the Alternatives**

Chapter 4 describes numerous environmental impacts that may occur if no action is taken or if any of the alternatives is adopted. No regulations would be imposed by any of the alternatives. However, if the Council adopts one of the alternative bycatch mitigation programs, an amendment to the FMP and implementing regulations would be prepared. Further, more detailed environmental analysis might be required at that time. The results of the analyses of impacts are summarized in Tables ES.2 through ES.6 at the end of this section.

Each alternative substantially reduces bycatch compared to an unregulated groundfish fishery. The status quo minimizes bycatch by establishing large marine protected areas that greatly reduce the likelihood that fishers will catch any overfished species within the boundaries. Thus, these MPAs nearly eliminate encounter/bycatch of overfished species within the boundaries, and also bycatch of other fish. The use of trip (retention) limits outside the MPAs will continue to result in regulatory discard/bycatch of groundfish, both overfished and non-overfished species. Economic discard/bycatch of small or otherwise low-value groundfish will continue. The groundfish observer program will monitor a fraction of active commercial fishing vessels.

Alternative 2 would be expected to reduce regulatory bycatch of groundfish. The degree of reduction depends on how constraining current trip limits are; bycatch of species that are typically discarded for economic (non-regulatory) reasons would not be reduced significantly. Bycatch of non-groundfish would not be directly affected. However, reduced commercial trawl fishing effort would be expected to reduce fishing impacts. Because the groundfish trawl fleet has recently been reduced by 91 vessels, the amount of change from Alternative 2 would be substantially less than originally expected. The level of observer coverage would be increased, resulting in a larger fraction of active commercial fishing vessels being observed. This would improve bycatch information.

Alternative 3 would be expected to reduce regulatory bycatch of groundfish to a similar degree as Alternative 2. Groundfish regulatory bycatch would be reduced as a result of larger trip limits. However, shorter fishing periods could result in different bycatch patterns, and could also increase a "race for fish" as fishers would fish harder at the beginning of the season in case of premature season closure. Predicting fishing effort, which is required for developing trip limits, would be severely compromised. While it may be possible to maintain some groundfish product flow to markets over much of the year, no vessels would be permitted to operate for more than a few months.

Alternative 4 would substantially reduce groundfish regulatory discard/bycatch (compared to the status quo) by assigning every commercial limited entry vessel to one or more sectors. Annual catch limits for each overfished species would be established for each sector. All vessels in a sector would be required to stop fishing for the remainder of the year if any of its caps was reached. In addition, individual vessel fishing mortality caps would be established to prevent premature closure due to a few "dirty" vessels with high bycatch rates. These catch limits would be similar to trip limits, except that a vessel reaching any cap must stop fishing for the remainder of the cumulative period. The observer program would be restructured to monitor bycatch in each sector, with data available inseason. Vessels carrying observers would have larger trip

limits for non-overfished groundfish; vessels could provide an observer at their expense to gain access to the larger limits. Non-regulatory bycatch of groundfish and other species would not be significantly affected by this alternative unless all trip limits were defined as catch limits. In that case, vessels would retain a larger proportion of groundfish because all catch would apply towards the vessel limits.

Alternative 5 would establish a "rights-based" program of individual fishing quotas. These would be annual catch limit shares that could be traded or sold. Reaching any quota would require the vessel to stop fishing until it obtained additional quota. The observer program would be expanded to cover all commercial vessels participating in the quota program. The value of restricted species quota (RSQ) shares (for overfished species) would increase; initial shares for some severely depleted species (such as canary and yelloweye rockfish) would be less than 100 pounds. All catch of overfished species must be retained. This alternative would substantially reduce groundfish both regulatory and economic bycatch; encounter/bycatch and discard/bycatch would be reduced. The pace of fishing would likely slow substantially, providing greater opportunity to avoid bycatch of other species also. Catch and bycatch data on all species would be improved substantially. Gear regulations would be relaxed to allow and encourage experimentation and development of gear and techniques that would eventually reduce bycatch as much as technically feasible. Administration costs related to the observer and quota monitoring programs would increase substantially. This would be partially offset by a reduced pre-season process for developing trip limits and other management measures; the process of inseason trip limit adjustments would no longer be needed. Adverse impacts to the marine biological environment would be significantly reduced compared to Alternatives 1, 2, 3 and 4. Social and economic conditions would be significantly affected; some changes would be beneficial, some would be adverse, depending on the individual and the quota program design.

Alternative 6 would establish large no-take marine reserves that would eliminate encounter/bycatch of all species (both groundfish and non-groundfish) within the boundaries. Individual catch quotas, similar to those of Alternative 5, would be established. Groundfish discard caps would nearly eliminate groundfish discard/bycatch. However, unless exceptions were established, these discard caps would increase the mortality of bycatch that could not be avoided. In addition, disposal of unusable fish on land would increase. Observers would monitor catch and bycatch of all commercial vessels (except those without adequate space or facilities). Monitoring of recreational fisheries would also be increased. Commercial vessels would be required to use only gears that had been certified as "low bycatch." This would substantially reduce bycatch in the short term compared to all other alternatives. However, Alternative 5 would be expected to develop more effective bycatch avoidance gears and methods over time because innovation would be allowed. Adverse impacts to the marine biological environment would be significantly reduced compared to Alternatives 1, 2, 3 and 4. Adverse impacts may or may not be reduced compared to Alternative 5. Social and economic conditions would be significantly affected, especially short-term adverse impacts resulting from no-take reserves, gear restrictions and discard prohibitions. Long-term beneficial effects would be faster rebuilding of overfished gr stocks, fish habitat renewal and growth, larger and more numerous fish near reserve boundaries, and areas where relatively un-fished ecosystems can develop.

**ES.5 Practicability of Bycatch Minimization Methods**

The Council must determine which bycatch mitigation program is environmentally preferred. That alternative may or may not be the one the Council chooses as its preferred (adopted ) alternative. Part of the decision will be based on a determination of what management tools are “practicable.” The information and analysis provided in Chapters 3 and 4 of this draft EIS will help the Council make that determination.

Table ES.2. Summary of how well alternatives achieve the stated purposes for the proposed action.

Purpose of Proposed Action	Alt 1 (no action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Account for total fishing mortality by species	The current observer program provides statistically reliable estimations of groundfish mortalities.	I+	I+	S+	S+	S+
Establish monitoring and accounting mechanisms to keep total catch of each groundfish stock from exceeding the specified limits	Trip and bag limits, application of the "bycatch model" and inseason tracking of landings are moderately effective but less than 100% successful.	I+	I+	S+	S+	S+
Reduce unwanted incidental catch and bycatch of groundfish and other species	Area closures (Rockfish Conservation Areas), seasons and gear restrictions reduce unwanted catch. Trip limits create regulatory bycatch (discard).	I	I	S+	S+	S+
Reduce the mortality of animals taken as bycatch	Prohibited species must be returned to the sea as quickly as possible with minimum of injury.	U	U	U	U	S-
Provide incentives for fishers to reduce bycatch and flexibility/opportunity to develop bycatch reduction methods	Trip limits reduce the "race for fish" and provide some minimal opportunity and incentives to avoid bycatch.	I+	I-	CS+	S+	CS+
Monitor incidental catch and bycatch in a manner that is accurate, timely, and not excessively costly	The current program minimizes user and agency costs of monitoring catch and bycatch at the expense of precision and timeliness.	I	I	S+/S-	S+/S-	S+/S-
Reduce unobserved fishing-caused mortalities of all fish	Area closures (RCAs), gear definitions and seasons mitigate potential mortalities.	I	I	CS+	S+	S+
Gather information on unassessed and/or non-commercial species to aid in development of ecosystem management approaches.	Over a period of years, information on non-commercial and unassessed stocks will improve.	I	I	CS+	S+	S+

## Performance Ratings, compared to status quo/no action alternative:

Substantial Beneficial (S+): Substantial improvement from status quo expected.

Substantially Adverse (S-): Substantially increased costs or reduced effectiveness expected.

Conditionally Substantial Beneficial (CS+): Substantial improvement expected if certain conditions are met or events occur, or the probability of improvement is unknown.

Conditionally Substantial Adverse (CS-): Substantially increased costs expected if certain conditions met, or the probability of occurrence is unknown.

Insubstantial Beneficial (I+)/Insubstantial Adverse (I-): Changes are anticipated but not expected to be major.

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the direction or magnitude of the impacts.

Table ES.3. Significance of effects on the biological environment.

Resource	Alt 1 (no action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Groundfish	The current bycatch program provides statistically reliable estimations of groundfish bycatch and bycatch mortalities and mitigates many potential impacts. Trip and bag limits, application of the "bycatch model" and inseason tracking of landings are moderately effective but less than 100% successful in preventing overfishing. Trip limits create regulatory bycatch of groundfish.	I+	I+	S+	S+	S+
Other Relevant Fish, Shellfish and Squid	Impacts on species such as Pacific halibut are reduced from recent years due to large area closures to protect overfished groundfish (primarily rockfish).	U	U	S+	S+	S+
Protected Species	Area closures (Rockfish Conservation Areas), seasons and gear restrictions reduce potential catches. Protected species must be returned to the sea as quickly as possible with minimum of injury.	I+	I-	CS+	CS+	CS+
Salmon	Salmon bycatch in the Pacific whiting fisheries is closely monitored. Voluntary bycatch avoidance methods have proven effective, especially in the at-sea sectors	U	U	I+	I+	CS+
Seabirds	Few seabird interactions have been documented; seasons and area closures could increase or decrease interactions.	I+	I-	CS+	CS+	CS+
Marine Mammals	Few marine mammal takings have been documented, and all are within current standards.	I+	I-	S+/ S-	CS+	CS+
Sea Turtles	No sea turtle interactions have been observed in the groundfish fisheries.					
Miscellaneous Species	Area closures (RCAs), gear definitions and seasons mitigate potential mortalities. Little information is available.	U	U	CS+	CS+	S+
Biological Associations	Over a period of years, information on non-commercial and unassessed stocks will improve. Little information is available at this time.	U	U	CS+	S+	S+

## Significance Ratings, compared to status quo/no action alternative:

Significant Beneficial (S+): Significant improvement from status quo expected.

Significant Adverse (S-): Significantly increased adverse impacts or reduced effectiveness expected.

Conditionally Significant Beneficial (CS+): Significant beneficial impacts expected if certain conditions are met or events occur (such as full observer coverage), or the probability of impacts is unknown.

Conditionally Significant Adverse (CS-): Significantly increased adverse impacts expected if certain conditions met, or the probability of occurrence is unknown.

Insignificant Beneficial (I+)/Insignificant Adverse (I-): Minor impacts, if any, are anticipated.

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the significance of the impacts.

Table ES.4(a). Summary of effects of Alternatives 1, 2 and 3 on the social and economic environment. (Alternatives 4, 5 and 6 are addressed in the following table.)

	Alternative 1	Alternative 2	Alternative 3
Incentives to Reduce Bycatch	Quota-induced discards can occur when fishers continue to harvest other species when the harvest guideline of a single species is reached and further landings of that species are prohibited. As trip limits become more restrictive and as more species come under trip-limit management, discards are expected to increase. In addition, discretionary discards of unmarketable species or sizes are thought to occur widely. However, in comparison to a "race for fish" allocation system, the current management regime provides harvesters a considerable amount of flexibility to reduce unwanted catch and discards.	Reducing the level of effort in the groundfish fisheries and increasing trip limits would likely reduce the level of groundfish bycatch (discard).	If trip limits increase, the level of groundfish bycatch (discard) would be expected to decline.
Commercial Harvesters	By spreading out fishing more evenly over the year, the current management regime helps maintain traditional fishing patterns. However, landings of major target species (other than Pacific whiting) are expected to continue to decline as OYs are reduced to protect overfished species. Declining harvests lead to significant decreases in total groundfish ex-vessel value.	Further fleet reduction would be expected to reduce (but not eliminate) extra capacity in the fishery and to restore the fleet to some minimum level of profitability.	A combination of higher trip limits and a reduction in the length of the fishing season would be expected to lead to an overall reduction in variable fishing costs. With larger trip limits, revenues per trip are expected to increase. However, the overall impact of this alternative on costs and revenues would depend on when individual participants were allowed to fish. For example, fishers may be unable to fish for certain species at optimal times.
Recreational Fishery	Landings of major target species are not expected to increase and may decline further if OYs are reduced to protect overfished species. Decreased harvests lead to significant decreases in recreational value.	Changes in landings of major species targeted in the recreational fishery would be expected to be insignificant.	Effects as described in Alternative 2
Tribal Fishery	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant.	Effects as described in Alternative 1	Effects as described in Alternative 1
Buyers and Processors	The current management regime reduces the likelihood that processing lines will be idle by fostering a regular flow of product to buyers and processors. However, decreased deliveries of groundfish to processors and buyers will result in significant decrease in groundfish product value.	No significant changes in the total amount of fish delivered to processors would be expected. Processors in ports that experience a reduction in fleet size may be negatively affected if they are unable to obtain supplies of fish from alternative sources	Larger trip limits would not be expected to affect the total amount of fish that harvesters deliver to processors. However, with vessels taking longer and potentially fewer trips, processors would have fewer boats to schedule for landings and unloading, reducing their average costs. On the other hand, costs could increase if processors were unable to control the flow of product throughout the year and capital is idle during closed periods.

Table ES.4(a). Summary of effects of Alternatives 1, 2 and 3 on the social and economic environment. (Alternatives 4, 5 and 6 are addressed in the following table.)

	Alternative 1	Alternative 2	Alternative 3
<b>Communities</b>	By maintaining year-round fishing and processing opportunities, the current management regime promotes year-round employment in communities. However, groundfish employment and labor income are expected to continue to decline, resulting in economic hardship for businesses involved in the groundfish fisheries. These businesses are expected continue to diversify to reduce dependence on groundfish fisheries.	The direction and magnitude of many of the economic effects on particular coastal communities are uncertain, as the distribution of the post-buyback fleet is uncertain. If further reduction in fleet capacity with higher trip limits were successful in increasing net revenues or profits to remaining commercial fishers, positive economic impacts on the communities where those fishers land their fish, home port and reside would be expected. On the other hand, some communities may experience a significant loss of vessels and a consequent decrease in income, jobs and taxes.	The impacts are uncertain, as community patterns of fishery participation vary seasonally based on species availability as well as the regulatory environment and oceanographic and weather conditions. If higher trip limits were successful in increasing net revenues or profits to fishers, positive economic impacts on the communities where those fishers land their fish, home port, and reside would be expected. On the other hand, seasonal closures could leave crew members at least temporarily unemployed.
<b>Consumers</b>	The current management regime allows buyers and processors to provide a continuous flow of fish to fresh fish markets, thereby benefiting consumers. Consumers of fresh or live groundfish may be adversely affected by reduced commercial landings. However, changes in benefits to most consumers of groundfish products would be expected to be insignificant due to availability of substitute products.	Effects as described in Alternative 1	Consumers of fresh or live groundfish could be unable to obtain fish from the same sources for half of the year unless the harvest sectors are split into two groups, with one group of vessels active at any given time.
<b>Fishing Vessel Safety</b>	Some gains in fishing vessel safety are at least partially realized under the current management regime, as fishers are able to fish at a more leisurely pace and avoid fishing in dangerous weather or locations. However, safety of human life at sea may decrease if reduced profits induce vessel owners to forgo maintenance, take higher risks or hire inexperienced crews.	Increases in net revenue to harvesters resulting from increases in trip limits may enhance their ability to take fewer risks and use their best judgment in times of uncertainty, thereby increasing vessel safety.	The effects on vessel safety may be mixed. Increases in net revenue to harvesters resulting from increases in trip limits may lead to reductions in injury and loss of life because of harvester's enhanced ability to take fewer risks and use their best judgment in times of uncertainty. However, set seasons make it more difficult for harvesters to make wise decisions as to when and where to fish.
<b>Management and Enforcement Costs</b>	The management regime is expected to continue to be contentious, difficult and expensive. Technological developments such as VMS may mitigate the rate at which management costs escalate.	Costs are expected to decrease, as fewer vessels are generally easier and less expensive to monitor.	Effects will vary depending on the way the seasonal closure is structured. Costs are expected to decline if there is no fishing activity to monitor for 6 months of the year. However, there will be increased costs if permit holders are divided into groups.



Table ES.4(b). Summary of effects of Alternatives 4, 5 and 6 on the social and economic environment. (Alternatives 1, 2 and 3 are addressed in the preceding table.)

	Alternative 4	Alternative 5	Alternative 6
Incentives to Reduce Bycatch	While it would be in the best interest of all vessels within a sector to reduce the catch of overfished species, a "race for fish" could develop in which individual vessels eschew fishing practices that reduce bycatch in order to attain their landing limits as quickly as possible. Setting individual catch limits would prevent that. In addition, if cooperative patterns of behavior emerge, decreases in bycatch would be expected.	The amount of fish discarded by each vessel would be counted against the vessel's limit. This measure provides strong economic incentives to reduce the catch of unwanted fish because it "internalizes" the costs of discarding fish.	MPAs would prohibit fishers from fishing in certain areas in order to reduce the probability that fish will be caught and discarded, while the 100% retention requirement would be the primary means of reducing groundfish bycatch (discard) outside of MPAs. Prohibiting discard would produce a strong incentive to avoid unwanted catch because the costs of sorting, storing, transporting and disposing of fish that cannot be sold may be substantial. If vessel groundfish quotas are transferable, Alternative 6 would be similar to Alternative 5; if not transferable, negative effects would be much more significant and more similar to Alternative 4.
Commercial Harvesters	A reduction in harvest and exvessel revenues could result from early attainment of overfished species sector caps. However, the total amount of fish available for retained harvest would be expected to increase, as vessels would increase retention of groundfish, and the level of bycatch would be measured more accurately through expanded observer coverage. The economic benefit of increased landings must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage. The allocation of catch limits to individual sectors could lead to economic benefits if private agreements allocating transferable harvesting privileges were negotiated.	Current vessel owners as a group would likely benefit from a system that allocates freely transferable and leaseable quota shares to vessel owners on the basis of catch histories. Moreover, the total amount of fish available for harvest would increase, as bycatch would be measured more accurately through expanded observer coverage. Not all vessel owners would benefit equally, and the relative benefits would depend on the allocation formula. In addition, the economic benefits must be weighed against the additional operating costs that vessel owners would incur from the expanded observer coverage.	Some measures would significantly increase fishing costs, while other would reduce them. For example, 100% groundfish retention, full observer coverage, and establishment of MPAs would increase average costs, whereas the establishment of ITQs for groundfish species would reduce costs.
Recreational Fishery	This alternative may have a negative economic effect on recreational fishers if its sector catch limit were exceeded. The ability to detect excessive catches within the recreational sector would be enhanced by a CPFV observer program and expanded port/field sampling. The ability of the recreational sector to avoid a fishery closure by controlling catch of overfished species through an incentive program is likely to be limited, as there are many and diverse participants. Dividing the recreational sector into geographical (e.g., state-based) subsectors could mitigate some of the negative effects.	The creation of tradable quota shares for the commercial fishing/processing sectors is not expected to apply to the recreational fishery. The possibility of creating ITQs for recreational fishers may exist, but any discussion of how such a allocation would be achieved or its effects on recreational fishers would be speculative.	Rights-based system effects would be as described in Alternative 5. MPAs could benefit recreational fishers over the long term if local catch rates and fish size increased due to spillage of adults out of the MPAs. On the other hand, if MPAs resulted in geographic redistribution of the commercial and recreational fleets, the concentration of fishing effort in the areas that remain open could lead to localized stock depletion, reduced recreational catch per unit effort, and reduction in the quality of the fishing experience.

Table ES.4(b). Summary of effects of Alternatives 4, 5 and 6 on the social and economic environment. (Alternatives 1, 2 and 3 are addressed in the preceding table.)

	Alternative 4	Alternative 5	Alternative 6
	Changes in landings of major species targeted in tribal fisheries are expected to be insignificant.	Effects as described in Alternative 1	Effects as described in Alternative 1
<b>Tribal Fishery</b>			
<b>Buyers and Processors</b>	The economic effects on buyers and processing companies are uncertain because of the uncertainty as to how well vessel owners within sectors can successfully manage bycatch. To the extent that commercial harvesters adopt bycatch-reducing fishing tactics, processors and buyers would be expected to benefit from higher catches. On the other hand, if an entire fishing sector is shutdown, buyers and processors may experience significant shortages of fish.	Buyers and processors would be expected to benefit from the anticipated increases in fish landings. The overall level of benefits and the distribution of benefits across processors may depend largely on the formula for allocating quota shares. Arguments have been made that harvester-only ITQ programs may result in stranded capital in the processing sector and a shift in the balance of bargaining power toward harvesters. These potential adverse effects could be mitigated if processors were also allocated quota shares.	The net economic effect on buyers and processors is uncertain. In general, buyers and processors would be expected to benefit from the anticipated increases in fish landings that result from the implementation of a rights-based system. The 100% retention requirement could also result in a large increase in landings. However, it is uncertain how much of the additional fish retained would be marketable. Because of their lack of mobility, buyers and processors may be especially negatively affected by MPAs. However, the effects of MPAs on specific buyers and processing companies will depend in part on changes in local supply and how processors have adapted to current supply situations.
<b>Communities</b>	To the extent that harvesting sectors are not shut down, no significant economic impact on communities is likely. However, if sector closures occurred, there would likely be negative impacts in fishing communities, particularly if processing plants were also closed.	Consolidation of fishing and processing activities to fewer vessels and plants would likely result in reductions in the numbers of crew members and processing workers employed. Granting quota shares to community groups could help maintain existing harvesting and processing patterns and serve to meet concerns about employment in communities.	Effects of a right-based management system as described in Alternative 5. MPAs would be expected to help ensure harvests for future generations and the sustained participation of communities in groundfish fisheries. If, however, MPAs resulted in substantial decreases in groundfish catches over the short term, the economic hardships that fishing families and other members of communities are experiencing under Alternative 1 (no action) would be exacerbated.
<b>Consumers</b>	If no early closures of major harvesting sectors occur, the impact on consumers would be expected to be negligible. However, if major fishing sectors were shut down, consumers of fresh or live groundfish could be adversely affected.	Consumers would be expected to benefit from the anticipated increases in fish landings. There is some chance that consumers could be negatively affected, if a rights-based system leads to a decrease in the overall competitiveness of markets for certain groundfish products (e.g., live fish). The likelihood of this occurring would depend both on the level of consolidation that might occur and the elasticity of demand for particular products.	Consumers would benefit from the anticipated increased landings that result from a rights-based system. In addition, over the long term, MPAs that effectively increase the size and variety of seafood species could make consumers better off. On the other hand, large MPAs could substantially decrease seafood supply enough to make consumers worse off, at least in the short term. MPAs could have a positive effect on those consumers who derive non-consumptive benefits from marine ecosystems, including non-market benefits (e.g., existence value).
<b>Fishing Vessel Safety</b>	The effects on vessel safety are uncertain. Possible increases in the profitability of harvesting operations could lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty. Without	Possible increases in the profitability of harvesting operations would likely lead to reductions in injury and loss of life because of harvesters' enhanced ability to maintain equipment, take fewer risks and use their best judgment in times of uncertainty.	The net effect of the various measures included in this alternative on fishing vessel safety is uncertain. The establishment of ITQs for groundfish species is expected to promote vessel safety by reducing the pressure to fish under dangerous conditions. On the other hand, the establishment of MPAs may result in a

Table ES.4(b). Summary of effects of Alternatives 4, 5 and 6 on the social and economic environment. (Alternatives 1, 2 and 3 are addressed in the preceding table.)

	Alternative 4	Alternative 5	Alternative 6
Management and Enforcement Costs	<p>individual vessel catch limits, if an intense "race for fish" could develop. The increased competition among fishers would likely increase the risks they would be willing take to harvest fish.</p> <p>Costs would be expected to increase as catch limits were allocated over an increasing number of sectors. It would be necessary to obtain precise and reliable estimates of the quantities of target and non-target catches within each sector. An expanded port/field sampling program to improve estimates of recreational catch would entail a larger budget for the state and federal agencies currently involved in data collection.</p>	<p>The costs of monitoring, enforcement and administration would be expected to increase significantly. Cost recovery measures such as a fee on quota holders would be expected.</p>	<p>reduction in fishing vessel safety if the closure of fishing grounds results in vessels fishing farther from port and possibly in more hazardous areas.</p> <p>Full (100%) observer coverage would be required, which would facilitate enforcement of a full retention regulation. The enforcement costs of establishing MPAs vary with several factors, including the location, number, size, and shape of the MPAs and types of activities restricted and allowed.</p>

Table ES.5. Significance of effects on the social and economic environment.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Incentives to Reduce Bycatch	CS+/CS-	CS+	CS+	S+	S+	S+
Commercial Harvesters	S+	S+	CS+	CS+/CS-	S+/S-	S+/S-
Recreational Fishery	S-	I	I	CS-	I	S+/S-
Tribal Fishery	I	I	I	CS-	I	CS-
Buyers and Processors	S+/S-	I/CS-	I/CS-	CS+/CS-	CS+	CS+/CS-
Communities	S+/S-	CS+/CS-	CS+/CS-	CS-	CS+	CS+/CS-
Consumers	S+/S-	I	CS-	CS-	CS+	CS+/CS-
Fishing Vessel Safety	S+/S-	S+	S+/S-	CS-	S+	S+/S-
Management and Enforcement Costs	S-	S+	CS+/CS-	S-	S-	S-

## Significance Ratings:

Significantly Adverse (S-): Significant adverse impact based on ample information and the professional judgment of the analysts.

Conditionally Significant Beneficial (CS+)/Conditionally Significant Adverse (CS-):

Conditionally significant is assigned when there is some information that significant impacts could occur, but the intensity of the impacts and the probability of occurrence are unknown.

Insignificant Impact (I): No significant change based on information and the professional judgment of the analysts..

Unknown (U): This determination is characterized by the absence of information sufficient to adequately assess the significance of the impacts.

Table ES.6(a). Summary of direct, indirect and cumulative effects of Alternatives 1, 2 and 3.

Resource Issue or Category	Alternative 1	Alternative 2	Alternative 3
<b>Habitat:</b> Trawl and other gear contacting the bottom damage benthic organisms and physical structure			
Direct/Indirect	No change from baseline	No change from baseline	No change from baseline
Cumulative	No change from baseline	No change from baseline	No change from baseline
<b>Ecosystem/Biodiversity:</b> Lowered abundance of particular species changes ecosystem structure, stock declines lead to local/regional extinction.			
Direct/Indirect	No change from baseline	No change from baseline	No change from baseline
Cumulative	No change from baseline	No change from baseline	No change from baseline
<b>Groundfish:</b> Bycatch and bycatch mortality of overfished and other groundfish			
Direct/Indirect	Catch rates of overfished species such as canary and bocaccio rockfish may delay or prevent rebuilding. Discard/bycatch of other groundfish could remain high due to constraints for overfished species.	Reduced fishing effort expected to reduce bycatch and bycatch mortality of overfished and other groundfish. Latent capacity remains and could negate any savings.	Effects may be similar to Alternative 1 if shortened season does not result in larger trip limits.
Cumulative	Canary and bocaccio rockfish may not be sustainable.	Higher probability of rebuilding overfished species. Reduced bycatch and bycatch mortality of other groundfish may allow fuller resource utilization but not necessarily increased abundance.	Effects may be similar to Alternative 1 if shortened season does not result in larger trip limits.
<b>Protected species:</b> Bycatch and bycatch mortality of Pacific halibut, Pacific salmon, marine birds and mammals.			
Direct/Indirect	No change from baseline	No change from baseline	Interactions are thought to be low, but may be completely absent during seasonal closures. Halibut bycatch depends on timing of seasonal closures.
Cumulative	No change from baseline	No change from baseline	Interactions with birds depend on timing of seasonal closures.
<b>Accountability:</b> Increased monitoring bycatch and bycatch mortality improves accountability.			
Direct/Indirect	Provides for statistically reliable measures of bycatch on an annual basis, but not inseason.	Marginal improvement in monitoring coverage of trips.	Marginal improvement in monitoring coverage of trips
Cumulative	Lack of timely inseason data may lead to unsustainable fisheries for some overfished species.	Similar to Alternative 1 - data cannot be used in-season.	Similar to Alternative 1 - data cannot be used in-season

Table ES.6(b). Summary of direct, indirect and cumulative effects of Alternatives 4, 5, and 6 for West Coast groundfish fisheries.

Resource Issue or Category	Alternative 4	Alternative 5	Alternative 6
-------------------------------	---------------	---------------	---------------

**Habitat:** Trawl and other gear contacting the bottom damage benthic organisms and physical structure

Direct/Indirect	No change from baseline	Reduction in closed areas	Reduction in closed areas
Cumulative	No change from baseline	Increased growth of living benthic habitat (sponges and corals) in closed areas.	Increased growth of living benthic habitat (sponges and corals) in closed areas.

**Ecosystem/Biodiversity:** Lowered abundance of particular species changes ecosystem structure, stock declines lead to local/regional extinction.

Direct/Indirect	No change from baseline	Increased growth and abundance of some species in closed areas	Increased growth and abundance of some species in closed areas
Cumulative	No change from baseline	Increased biodiversity in closed areas	Increased biodiversity in closed areas

**Groundfish:** Bycatch and bycatch mortality of overfished and other groundfish

Direct/Indirect	Reduces bycatch and bycatch mortality of overfished species in particular - due to RSQ caps for overfished species.	Reduces bycatch and bycatch mortality of overfished and other groundfish through use of MPAs, RSQs and IFQs for overfished and other groundfish.	Reduces bycatch and bycatch mortality of all groundfish through use of no-take reserves, RSQs, IFQs, and 100% groundfish retention requirement.
Cumulative	Higher likelihood and rate of rebuilding, with possible exception of bocaccio rockfish.	Higher likelihood and rate of rebuilding of overfished groundfish, possible increases in other groundfish populations.	Highest likelihood and rate of rebuilding of overfished groundfish. Increased size and diversity of groundfish within closed areas.

**Protected species:** Bycatch and bycatch mortality of Pacific halibut, Pacific salmon, marine birds and mammals.

Direct/Indirect	No change from baseline.	Small reductions in bycatch and bycatch mortality within protected areas.	Small reductions in bycatch and bycatch mortality within protected areas.
-----------------	--------------------------	---	---

Cumulative No change from baseline. No change from baseline.

**Accountability:** Increased monitoring bycatch and bycatch mortality improves accountability.

Direct/Indirect	Significantly improved monitoring coverage. In-season data can be used to make in-season adjustments. Accurate in-season accounting of overfished stocks of groundfish.	Significantly improved monitoring coverage with 100% observer coverage of commercial fleet. Real-time accounting of groundfish. Discard/ bycatch of overfished groundfish nearly eliminated.	Significantly improved monitoring coverage with 100% observer coverage of commercial fleet. Real-time accounting of all groundfish catch. No groundfish discard/bycatch.
Cumulative	Reduced risk and higher likelihood of rebuilding overfished stocks of groundfish.	Reduced risk and higher likelihood of rebuilding overfished groundfish stocks.	Reduced risk and higher likelihood of rebuilding overfished groundfish stocks.