

Oregon Marine Fisheries Management Plan Framework

Oregon Department of Fish and Wildlife
Marine Resources Program
2040 SE Marine Science Drive
Newport, OR 97365
(541) 867 – 4741

<http://www.dfw.state.or.us/MRP/>



Table of Contents

Acronyms and Abbreviations vi

Definitions vii

Oregon Marine Fisheries Management Plan Framework 1

 A. Introduction 1

 B. Goals 1

 C. Scope 3

 C.1. Oregon’s Marine Fishes, Invertebrate Species and Associated Habitats 3

 C.2. Definition of a “Marine Fishery” 3

 C.3. Definition of a “Fishery Management Plan” 3

 C.4. Oregon’s Marine Fisheries Management Plans in the Larger Context of Marine Fisheries Management 3

 C.5. Other Benefits and Uses Taken into Consideration 4

 D. State of Oregon Marine Fisheries Management 4

 D.1. State Jurisdiction over Marine Fisheries 4

 D.2. State Marine Fisheries Management Infrastructure and Roles 5

 D.2.1. Oregon Fish and Wildlife Commission 5

 D.2.2. Oregon Department of Fish and Wildlife 5

 D.2.3. Oregon State Police 5

 D.2.4. Public Involvement 5

 a. Oregon Department of Fish and Wildlife Advisory Committees 6

 b. Department Public Meetings 6

 c. Commission Meetings 6

 D.2.5 Partners to State Fisheries Management 6

 D.3. The Oregon Department of Fish and Wildlife Mission and Guiding Principles 6

 D.3.1. The Oregon Department of Fish and Wildlife Mission 7

 D.3.2. Sustainability 7

 D.3.3. Ecosystem Approaches to Fisheries Management 7

 D.3.4. Precautionary Approach 7

 D.3.5. Access to Public Resources 7

 D.3.6. Proactive Management 8

 D.4. Major State Policies 8

 D.4.1. Food Fish Management Policy (1975) 8

D.4.2. Wildlife Policy (1973)	8
D.4.3. Native Fish Conservation Policy (2003).....	9
D.4.4. Oregon Nearshore Strategy (2005).....	9
D.4.5. Oregon Territorial Sea Plan (1994).....	10
D.4.6. Statewide Planning Goals.....	10
D.4.7. Incorporation of Future Policies	11
E. Structure for State Marine Fisheries Management Plans.....	11
E.1. Resource Analyses	11
E.2. Harvest Management Strategies	13
F. Marine Fisheries Management Considerations	16
F.1. Fishing Activities that Impact Fishery Resources	16
F.1.1. Extraction.....	16
F.1.2. Biological Impacts to Targeted Species	16
F.1.3. Bycatch.....	16
F.1.3. Habitat Alteration or Loss.....	17
F.2. Other Human Activities that Impact Fishery Resources	17
F.3. Ecosystem Factors that Impact Fishery Resources	17
F.3.1. Environmental Variation.....	17
F.3.2. Ecological Interactions.....	18
F.3.3. Climate Change and Ocean Acidification.....	18
F.4. Ecosystem Services	18
F.5. Research and Education.....	19
F.6. Non-fishing Recreation and Tourism	19
F.7. Renewable Energy.....	19
F.8. Mariculture	20
G. Development, Adoption and Review of Marine Fisheries Management Plans	20
G.1. Evaluate Current Management of Fisheries.....	20
G.2. Resource Analysis Development	21
G.3. Harvest Management Strategy Development	21
G.4. Adoption of MFMP by Oregon Fish and Wildlife Commission.....	21
G.5. Review and Revision of MFMPs	21
Figure 1.	22
H. Fishery Analysis and Management Tools	23

H.1. Resource Analysis Tools	23
H.2. Fishery Management Tools	23
I. Implementing Marine Fisheries Management Plans through Adaptive Management	23
I.1. Managing the Fishery	23
I.1.1. Adaptive Management	23
I.2. Review of Marine Fisheries Management Plans.....	24
I.2.1. Periodic Reports on State of the Fishery	24
I.2.2. Ten-year Review of each Resource Analysis and Harvest Management Strategy	24
J. Summary.....	25
K. Literature Cited	26
Appendix A: International and Federal Management Affecting Oregon Fisheries.....	31
1. International Fisheries Management	31
1.1. United Nations Fishing Agreement	31
1.2. International Pacific Halibut Commission	31
1.3. The Inter-American Tropical Tuna Commission	31
1.4. Pacific Coast Albacore Tuna Vessels and Port Privileges Treaty	32
1.5. Pacific Whiting Treaty.....	32
2. Federal Fisheries Management	33
2.1. Federal Legislation Integral to the Development of MFMPs.....	33
a. Presidential Proclamation 5030 (1983).....	33
b. Submerged Lands Act (1953)	33
c. Magnuson-Stevens Fishery Conservation and Management Act (1976).....	33
d. Endangered Species Act (1973).....	34
e. Marine Mammal Protection Act (1972)	34
f. Migratory Bird Treaty Act (1918)	34
g. Coastal Zone Management Act (1972).....	35
2.2. Federal Fishery Management Bodies	35
a. National Marine Fisheries Service (NMFS also known as NOAA Fisheries).....	35
b. Pacific Fishery Management Council	35
Appendix B: Overview of Analysis and Management Tools.....	37
Table 1.	37
Table 2.	39



TABLE 1

TABLE 2

Acronyms and Abbreviations

ACL	Annual Catch Limit
CCLME	California Current Large Marine Ecosystem
CZMA	Coastal Zone Management Act
Commission	Oregon Fish and Wildlife Commission
Council	Pacific Fishery Management Council
CPUE	Catch Per Unit Effort
Department	Oregon Department of Fish and Wildlife
DOC	Department of Commerce
EEZ	Exclusive Economic Zone
ESA	Endangered Species Act
FMP	Fishery Management Plan
IPHC	International Pacific Halibut Commission
IATTC	Inter-American Tropical Tuna Commission
JTC	Joint Technical Committee
MBTA	Migratory Bird Treaty Act
MFMP	Marine Fisheries Management Plan
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NFCP	Native Fish Conservation Policy
NMFS	National Marine Fisheries Service (NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ORS	Oregon Revised Statutes
SCUBA	Self-Contained Underwater Breathing Apparatus
TAC	Total Allowable Catch
TSP	(Oregon) Territorial Sea Plan
UNFA	United Nations Fishing Agreement
USFWS	United States Fish and Wildlife Service
WCPF Convention	Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

Definitions

The following definitions are used in this document. Many are drawn from international, federal, or state treaties, legislation, or rules related to fishery management.

Bycatch: discarded catch of any living marine resource plus retained incidental catch and unobserved mortality due to a direct encounter with fishing gear.

Catch per unit effort (CPUE): the quantity of catch divided by a clearly defined measure of fishing effort undertaken to obtain the catch. For the purposes of studying fish stocks fishing effort includes both a time component and a fishing power component specifically defined for a gear type utilized in a fishery.

Coastal baseline: the low-water line along the coast marked on large-scale charts officially recognized by the coastal state.

Commercial fishery: the harvest of food fish in a legal manner where the catch is utilized for commercial purposes.

Commercial purposes: taking food fish with any gear unlawful for angling, or taking or possessing food fish in excess of the limits permitted for personal use, or taking, fishing for, handling, processing, or otherwise disposing of or dealing in food fish with the intent of disposing of such food fish or parts thereof for profit, or by sale, barter or trade, in commercial channels.

Conservation: managing for sustainability of native fish so present and future generations may enjoy their ecological, economic, recreational, and aesthetic benefits.

Continental shelf: the seabed and subsoil of the submarine areas adjacent to the coast, but outside the area of the territorial sea, of the United States, to a depth of 200 meters or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of such areas.

Ecosystem: a functional unit consisting of a collection of plants, animals including humans, micro-organisms and non-living components of the environment, and the interactions between them.

Ecosystem services: Benefits people obtain from ecosystems. These fall into four categories that include: Provisioning services such as food and product materials; regulating services that affect climate, floods, disease, wastes and water quality; cultural services that provide recreational, aesthetic and spiritual benefits; and supporting services such as photosynthesis and nutrient cycling.

Endangered: a species that is in danger of extinction throughout all or a significant portion of its range.

Essential fish habitat: waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.

Exclusive Economic Zone (EEZ): the ocean zone out to 200 nautical miles offshore of a sovereign nation's baseline coast. For the purposes of the Magnuson-Stevens Fisheries Conservation and Management Act, the U.S. EEZ has an inner boundary that is coterminous with the territorial sea of a coastal state. The inner boundary of the U.S. EEZ along the Oregon coast is coterminous with Oregon's territorial sea which extends out to 3 nautical miles from shore.

Fishery: all entities and activities involved in the harvest of a living marine resource.

Fishery management plan (FMP): comprehensive documents which the Oregon Department of Fish and Wildlife regards both as a means to implement policy and as an explanation of the intent and rationale of management direction. Plans contain factual background material,

statements of the rationale for selection of objectives, strategies to be applied to attain objectives, and statements of general priorities for various actions.

Fishing: any activity other than scientific research that involves the catching, taking, or harvesting of any aquatic animal including, but not limited to fish, mollusks, and crustaceans; or any attempt to do so.

Food fish: any animal over which the Oregon Fish and Wildlife Commission has jurisdiction pursuant to Oregon Revised Statute 506.036. These include all fish, shellfish, and all other animals living intertidally on the bottom.

Harvest: to take, fish for, hunt, pursue, catch, capture, or kill; or attempt to do so.

High seas: all waters beyond the EEZ of the United States and beyond any foreign nation's EEZ, to the extent that such EEZ is recognized by the United States.

Incidental catch: catch that is not part of the targeted catch. This includes retained non-targeted catch and discarded catch.

Marine waters: estuaries, waters of the estuarine zone, including wetlands, any other waters seaward of the historic height of tidal influence, the territorial seas, the contiguous zone, and the ocean.

Maximum sustainable yield (MSY): the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions.

Nautical mile (nm): a unit of length approximately one minute of arc measured along any meridian. One nm = 1,852 meters \approx 6076 feet = 1.15 miles (statute).

Optimum level: population levels that provide self-sustaining species as well as taking, non-consumptive and recreational opportunities.

Optimum yield (OY): the amount of fish that will provide the greatest overall benefit to the state, particularly with respect to food production and recreational opportunities, while taking into account the protection of the marine ecosystem. Optimum yield is prescribed on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and, in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overfished: status of a stock or stock complex when its biomass has declined below a level that jeopardizes the capacity of the stock to produce maximum sustained yield on a continuing basis.

Overfishing: a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis.

Personal use: harvesting food fish by angling or by such other means and with such gear as the Oregon Fish and Wildlife Commission may authorize for fishing for personal use, or possessing the same for the use of the person fishing for, taking or possessing the same and not for sale or barter.

Recreational fishery: any harvest of living marine species in a legal manner for personal use or enjoyment that does not include any sale, barter, or trade of all or any part of the catch.

Serious depletion: significant likelihood the species management unit will become threatened or endangered under either state or federal Endangered Species Acts.

Species complex: a group of stocks sufficiently similar in geographic distribution, life history, and vulnerabilities to a fishery such that the impact of management actions on the stocks is similar.

Stock: a species, subspecies, geographical grouping, or other category of fish capable of management as a unit.

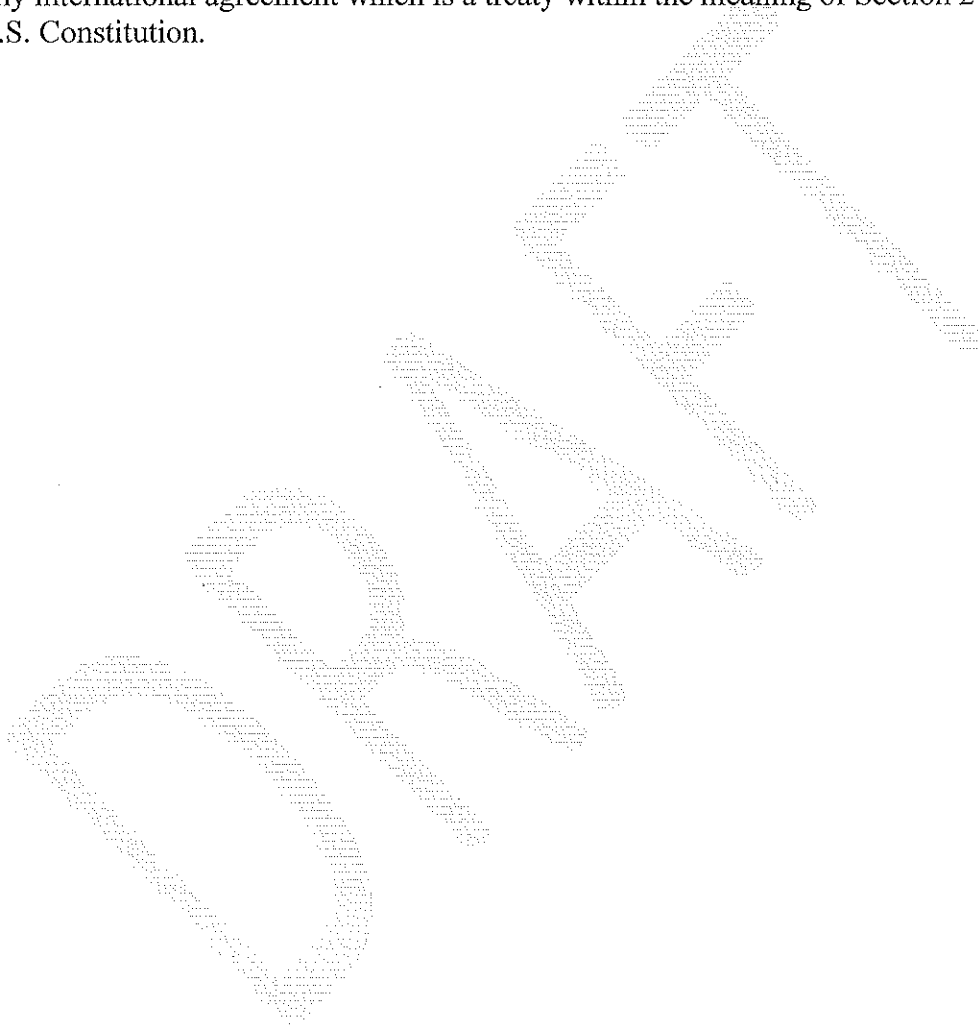
Straddling fish stocks: fish stocks whose distributions cross either multiple EEZs or EEZs and the high seas.

Sustainable: using, developing and protecting resources in a manner that enable people to meet current needs and provides that future generations can also meet future needs, from the perspective of environmental, economic and community objectives.

Sustainable population: a populations that is persistent over time; that is to say the ability of a population or a species management unit to maintain temporal, spatial, genetic, and ecological coherence while withstanding demographic, environmental, and genetic variation and catastrophic events from natural and human induced causes.

Threatened: a species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Treaty: any international agreement which is a treaty within the meaning of Section 2 of Article II of the U.S. Constitution.



1 **Oregon Marine Fisheries Management Plan Framework**

2 **A. Introduction**

3 The marine environment along the Oregon coast provides many opportunities for commercial
4 and recreational use that bring substantial economic benefits to Oregon. The harvest of living
5 marine resources in fisheries comprises a significant portion of these activities. Oregon manages
6 all the state's marine fishery resources, some in conjunction with international and/or federal
7 management, while other species or species complexes are entirely under state management. The
8 purpose of this Marine Fisheries Management Plan Framework (Framework) is to guide the
9 development of balanced Marine Fisheries Management Plans (MFMPs) intended to optimize
10 commercial fisheries, recreational fisheries, new fisheries, and other harvest of marine resources
11 while maintaining ecosystem integrity.

12
13 Marine Fisheries Management Plans should be designed to maintain access to and to sustain
14 harvests of marine fish and shellfish stocks for current and future generations of Oregonians.
15 Marine Fisheries Management Plans developed by Oregon are intended to ensure orderly,
16 optimal and equitable utilization of marine resources by different user groups. Although MFMPs
17 provide for economic considerations, management practices that provide for sustainable fisheries
18 and protection of ecosystem services shall take precedence. Marine fishery management policies
19 formulated in the MFMPs should be founded on and facilitate the implementation of these
20 overlying values.

21
22 This Framework is developed under the umbrella of Oregon's Native Fish Conservation Policy
23 (NFCP; see section 4.3) and is intended to provide resource managers with a consistent approach
24 for evaluating the marine component of our resources. Conservation plans are implemented
25 under the NFCP for anadromous salmonid stocks as needed, so MFMPs will not be developed
26 for salmonids. Each MFMP should be tailored to fit the specific resources and the fisheries it
27 addresses. The Framework establishes the goals and the scope of marine fishery resources for
28 which state MFMPs should be developed. It articulates the policies and guidelines applied by the
29 Oregon Department of Fish and Wildlife (Department) in the management of marine fisheries.
30 The Framework recognizes other benefits and uses of these resources. It places MFMPs into the
31 context of existing international, federal and state fisheries management and summarizes the
32 entities, principles, and processes involved.

33
34 This Framework also identifies a number of important considerations and challenges that
35 managers should take into account when developing MFMPs. This Framework sets the structure
36 for the components of MFMPs, Resource Analyses and Harvest Management Strategies, which
37 provide the biological, ecological, and socio-economic context for managing marine fisheries
38 and identifies some of the tools useful for analysis and management. Finally, the Framework
39 establishes the process for developing, updating, reviewing, and revising MFMPs.

40

41 **B. Goals**

42 Oregon has identified six main goals for MFMPs developed under this Framework. These goals
43 are based on Oregon statutes, rules, and major state policies (see section D). These goals may
44 evolve over time and will be updated as needed. Individual MFMPs developed under this

45 Framework will evaluate fishery resources and articulate management strategies necessary for
46 achieving these goals in their Resource Analyses and Harvest Management Strategies (see
47 section E).
48

49 **Goal 1: *Provide for access to marine resources for present and future generations***

50 This goal recognizes the mission of the Department: “To protect and enhance Oregon’s fish
51 and wildlife and their habitats for use and enjoyment by present and future generations.”
52 Providing for and maintaining access to state resources is also a goal of Oregon’s Food Fish
53 Management Policy. In order to manage fishery resources sustainably, managers should strive
54 to manage harvest for optimum population levels and maintain ecosystem integrity.
55

56 **Goal 2: *Minimize bycatch, incidental catch, and mortality related to fishery interactions***
57 ***with non-target marine organisms***

58 This goal seeks to minimize bycatch of species that are not targeted by the fishery. It strives to
59 minimize both incidental catch of protected species and mortality to non-target organisms
60 interacting with marine fisheries to the extent practicable.
61

62 **Goal 3: *Coordinate the management of commercial and recreational fisheries***

63 The management of multiple marine fishery sectors utilizing the same resource should be
64 coordinated to share knowledge of the resource, and to avoid or minimize conflicts between
65 uses to the extent possible without favoring one user group over another.
66

67 **Goal 4: *Minimize complexity of management***

68 This goal seeks to minimize the complexity of marine fisheries management to the extent
69 practicable to allow the public to understand enforceable regulations more easily, to provide
70 stability in the harvest levels, and to limit in-season management measures. However, it is
71 recognized there are tradeoffs between management complexity and maintaining fishery
72 access.
73

74 **Goal 5: *Consider the socioeconomic needs of local communities, including both***
75 ***consumptive and non-consumptive uses and values***

76 This goal encompasses both consumptive and non-consumptive uses of marine resources
77 within the community and can include considerations for the commercial and recreational
78 fishing industries, tourism, cultural or aesthetic qualities, and other types of recreation such as
79 boating, surfing, SCUBA diving, and photography. This goal recognizes the socioeconomic
80 importance of all marine resource uses and directs managers to take these uses into
81 consideration.
82

83 **Goal 6: *Involve the public in the fisheries management process***

84 Involving the public in the management process is a priority for the Department. The
85 Department is committed to keeping the public informed about opportunities for participation
86 through media outlets, the Department website, and offering subscriptions to subject-specific e-
87 mail and text alerts. The Department may take steps to widen public involvement in fisheries
88 management if necessary.
89
90
91

92 **C. Scope**

93 The scope of marine resources and associated fisheries encompassed by this Framework and
94 individual MFMPs developed under these guidelines is addressed in this section. Conservation
95 plans are developed for salmonids as needed under the Native Fish Conservation Policy.
96 Fisheries and management plans are defined. While MFMPs focus on managing sustainable
97 harvest for fisheries, they also consider other benefits and uses of marine resources that may not
98 fall directly within the scope of managing fisheries (see section F).

99
100 **C.1. Oregon’s Marine Fishes, Invertebrate Species and Associated Habitats**

101 Oregon’s marine environment is home to a vast array of fish, invertebrates, marine mammals,
102 reptiles, birds, algae, and plants. This area hosts a diversity of habitats, provides important
103 ecosystem services, and is critical to multiple life stages of many valuable commercial and
104 recreational fishery species. Marine habitats range from open waters to submerged bottoms
105 composed of soft sediments, gravel, cobble, shell, bedrock, or high-relief rocky reefs; from
106 tidepools to broad expanses of intertidal sandy beaches; from salt marshes to estuarine mudflats.
107 All of these components are integral parts of a complex marine ecosystem and are interconnected
108 through food webs, nutrient cycling, habitat usage, ocean currents, and a multitude of other
109 biological, physical, chemical, geological and human use factors. The sustainability of Oregon’s
110 marine fishery resources is directly connected to the interactions of these ecological components
111 and processes (ORS 506.755.1¹); therefore, all of these interconnections will be considered when
112 developing Oregon’s MFMPs for any given species or species complex.

113
114 **C.2. Definition of a “Marine Fishery”**

115 For purposes of this document, a “marine fishery” constitutes all entities involved in the harvest
116 of living marine resources. Marine fisheries in Oregon’s MFMPs are defined in terms of one or
117 more of the following: the people and communities involved, the species or species complex
118 targeted, the ecosystem inhabited by harvested species, the geographic area of water or seabed
119 fished, the method of fishing, and/or the purpose of the harvest activity.

120
121 **C.3. Definition of a “Fishery Management Plan”**

122 A fishery management plan (FMP) is defined as a comprehensive document which the
123 Department regards both as a means to implement policy and as an explanation of the intent and
124 rationale of management direction. Fishery management plans contain factual background
125 material, statements of rationale for selection of objectives, strategies to be applied to attain
126 objectives, and statements of general priorities for various actions (OAR 635-500-0002²).

127
128 **C.4. Oregon’s Marine Fisheries Management Plans in the Larger Context of Marine
129 Fisheries Management**

130 Marine Fishery Management Plans developed by Oregon cover specific species or species
131 complexes, and complement and build upon numerous principles, agreements, policies, and
132 treaties established by organizations managing fisheries at international, federal, regional, and
133 state levels. An overview of those most pertinent to the development of Oregon’s MFMPs is
134 summarized in Appendix A. Oregon manages some marine fisheries in conjunction with
135 international and federal management authorities, but many marine fisheries fall entirely under
136 state management. The state will develop MFMPs under guidelines set forth in this Framework

¹ Oregon Revised Statutes (ORS) mentioned in the Framework are available at <http://www.leg.state.or.us/ors/>

² Oregon Administrative Rules (OARs) mentioned in the Framework are available online at <http://www.dfw.state.or.us/OARs/index.asp>.

137 to regulate the harvest of marine stocks as Department resources allow. Stock prioritization
138 criteria that consider existing management and available staff resources guide the state MFMP
139 development process (see section G.1). These MFMPs apply to all harvest and collection
140 activities for living marine resources including commercial fisheries (as defined in ORS
141 506.006.4), recreational fisheries (as defined in ORS 506.006.10), new fisheries that may
142 develop, and other forms of harvest that require special permits (ORS 508.111) such as for
143 research, education, and aquaria. Specific exceptions to the harvest of marine resources with
144 respect to United States' treaties with Indian tribes are detailed in ORS 506.045 and other
145 documents related to specific Indian tribes.

146 147 **C.5. Other Benefits and Uses Taken into Consideration**

148 The development of Oregon MFMPs should consider other uses of and benefits provided by the
149 state's marine environment while recognizing that the scope of MFMPs is limited to managing
150 the harvest of living marine resources. Taking these benefits and uses into consideration should
151 help minimize or eliminate conflict among user groups. These other benefits and uses of fishery
152 resources are among the many considerations that should be taken into account when developing
153 MFMPs for Oregon (see sections D, E and G).

154 155 **D. State of Oregon Marine Fisheries Management**

156 Oregon has authority over all marine fish, shellfish and other animals harvested in state waters,
157 or transported into or landed in the state, regardless of the location of harvest (ORS 506.036(2)).
158 Oregon follows federal harvest specifications for species managed under federal FMPs, but may
159 set more conservative harvest measures in state rule for these species if deemed appropriate and
160 necessary. The extent of Oregon's jurisdiction over marine fisheries, the scope of fisheries for
161 which MFMPs may be developed, the fundamental principles guiding MFMP development,
162 existing policies germane to developing MFMPs, and mechanisms for public involvement in the
163 MFMP process are described below.

164 165 **D.1. State Jurisdiction over Marine Fisheries**

166 Oregon manages all living marine resources within the state's territorial sea extending seaward
167 three nautical miles from the low water baseline of either the coast or from state offshore islands
168 and rocks, as authorized by the Submerged Lands Act (see Appendix A). The adoption of
169 Oregon's Fisheries Conservation Zone (ORS 506.755) expands the state's discretionary
170 jurisdiction over all marine fisheries resources seaward 50 statute miles from the state's mean
171 high water mark. The federal Magnuson-Stevens Fishery Conservation and Management Act
172 (MSA) grants Oregon management authority over the Dungeness crab fishery out 200 nautical
173 miles to the Exclusive Economic Zone (EEZ) boundary (MSA P.L. 109-479, sec. 302, NMFS
174 2010a). Furthermore, MSA authorizes Oregon to regulate fishing activity of vessels outside state
175 boundaries when such vessels are registered with Oregon and no federal fishery management
176 plan or regulations are in place for the fishery in which vessels are operating (MSA P.L. 104-
177 297, sec. 306, NMFS 2010a). Oregon also has jurisdiction over many fisheries in its estuaries
178 including those for species dependent on marine waters.

179
180 The primary state statutes governing Oregon's jurisdiction over living marine resources are the
181 Wildlife Code (ORS Chapters 496 - 501) and the Commercial Fishing Code (ORS Chapters 506
182 - 513). Statutes are created and passed by the Oregon State Legislature. The Wildlife Code sets
183 laws for managing all the state's wildlife including mammals, birds, fish, amphibians, reptiles

184 and shellfish. Recreational fisheries are governed by the Wildlife Code. The Commercial Fishing
185 Code provides law and policy for managing commercial fisheries.
186

187 **D.2. State Marine Fisheries Management Infrastructure and Roles**

188 The infrastructure for marine fisheries management in Oregon includes a number of entities that
189 play separate but interrelated roles. Described here are several of these key organizations and
190 their roles in state marine fisheries management.
191

192 **D.2.1. Oregon Fish and Wildlife Commission**

193 Oregon Revised Statue 496.090 establishes the Oregon Fish and Wildlife Commission
194 (Commission). The Commission consists of seven members appointed by the Governor for
195 four-year staggered terms. The Commission is charged with protecting fish in Oregon and has
196 jurisdiction over fish, shellfish and all other animals both living within state territorial waters,
197 and transported into or landed within state boundaries even if harvested outside state waters
198 (ORS 506.036). The Commission formulates general state programs and policies concerning
199 management and conservation of fish and wildlife resources. It establishes seasons, methods,
200 harvest caps, bag limits, size limits, and other management measures for recreational and
201 commercial harvest through Oregon Administrative Rules (OARs). The Commission will
202 evaluate and adopt MFMP's along with rules needed for implementation.
203

204 **D.2.2. Oregon Department of Fish and Wildlife**

205 The Oregon Department of Fish and Wildlife, authorized by ORS 496.080, is the executive
206 branch of state government responsible for managing fish and wildlife resources through
207 policies enacted by the Commission. The Department implements fish and wildlife laws, rules,
208 policies and Commission actions through programs staffed by fishery managers, biologists,
209 technical experts, and others. Primary programs within the Department include the Fish
210 Division, Wildlife Division, and Administrative Services Division. The Marine Resources
211 Program within the Fish Division carries out state management actions for Oregon's marine
212 and estuarine fish and wildlife resources. The Marine Resources Program focuses on:
213

- 214 • Marine resource policy, management, and regulation
 - 215 • Marine fisheries monitoring and data collection
 - 216 • Research on marine fisheries, species, and habitats
- 217

218 **D.2.3. Oregon State Police**

219 Enforcement of marine fisheries regulations is administered through Oregon State Police's
220 Fish and Wildlife Enforcement Services Division.
221

222 **D.2.4. Public Involvement**

223 Public involvement in fishery management is important. It helps shape management practices
224 that work from the socioeconomic perspective. Public involvement in the development of
225 MFMPs may be accomplished through multiple established channels. Opportunities to provide
226 public testimony are listed below.
227

228 **a. Oregon Department of Fish and Wildlife Advisory Committees**

229 The Department has established Fish and Wildlife Advisory Committees comprised of
230 people interested in sustaining Oregon’s marine fisheries resources. Advisory committees
231 allow for the general public, resource user groups, non-governmental organizations, Indian
232 tribes, and/or other agencies the opportunity to communicate with and advise the Department
233 on approaches to managing marine fisheries for sustainability.

234
235 **b. Department Public Meetings**

236 The Department holds public meetings related to fisheries and fishery resources for
237 stakeholders. The meetings are designed to provide information and to obtain public input.
238 All members of the public are welcome at Department public meetings.

239
240 **c. Commission Meetings**

241 Oregon Fish and Wildlife Commission meetings are open to the public as part of the Oregon
242 form of government. Oregon’s policy is that decision making bodies such as the Commission
243 arrive at decisions openly (ORS 192.620). Public notices of Commission meetings are widely
244 distributed, meeting agendas and materials are available prior to meetings, and recorded
245 minutes are published. The Commission values public input and has procedures in place to
246 receive information provided by the public at its meetings. The public may provide both
247 written summaries of information to be considered and oral testimony. Details on
248 Commission meetings and how the public may provide input to the Commission can be
249 found at: <http://www.dfw.state.or.us/agency/commission/>. Adoption of MFMPs will take
250 place at Commission meetings (see section G).

251
252 **D.2.5 Partners to State Fisheries Management**

253 Several other agencies and commissions play important roles related to fisheries. The Oregon
254 Department of Agriculture (ODA) tests Dungeness crab, coastal clams, and mussels for
255 biotoxins to ensure these resources are safe for human consumption and can close specific
256 areas to harvest when toxins are found in levels of concern. The ODA has jurisdiction over
257 bivalve cultivation (e.g., oysters and mussels) and works closely with the Department on
258 permitting and natural resources issues related to mariculture activities. Commodity
259 commissions that represent fishery industry sectors including albacore tuna, Dungeness crab,
260 salmon, and trawl fisheries have also been set up through ODA. Members of the commodity
261 commissions serve as advisors and collaborators on Department and industry initiatives. The
262 Department of Environmental Quality tests water quality and can close areas to harvest when
263 problems that impact harvested resources are identified. The Pacific States Marine Fisheries
264 Commission serves as a forum for consultation on interstate fisheries issues of mutual concern
265 (e.g., Dungeness crab), fisheries data collection and information management and sharing.
266 Member states include Oregon, California, Washington, Idaho, and Alaska. State fisheries
267 management is undertaken in concert with both federal and international management bodies,
268 which are described in Appendix A.

269
270 **D.3. The Oregon Department of Fish and Wildlife Mission and Guiding Principles**

271 The development of MFMPs for Oregon’s marine fisheries is guided by the mission and
272 principles of the Department including:

273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318

D.3.1. The Oregon Department of Fish and Wildlife Mission

The mission statement of the Department is:

“to protect and enhance Oregon’s fish and wildlife and their habitats for use and enjoyment by present and future generations.”

This mission is the primary intent of MFMPs developed by Oregon.

D.3.2. Sustainability

Sustainability is defined in Oregon law as, “using, developing and protecting resources in a manner that enables people to meet current needs and provides that future generations can also meet future needs, from the joint perspective of environmental, economic and community objectives” (ORS 184.421(4); Oregon Sustainability Act 2001). Sustainability is a fundamental principle guiding management of Oregon’s marine fisheries and the development of MFMPs.

D.3.3. Ecosystem Approaches to Fisheries Management

Ecological interconnections within Oregon’s territorial sea and adjacent ocean waters are essential for sustainable marine fisheries, and help guarantee the well-being of the economy and the people of the state (ORS 506.750). Oregon’s MFMPs will incorporate Ecosystem Approaches to Fisheries in the management of the state’s living marine resources (FAO 2005). This principle implies that management of individual fish stocks should consider the effects of harvest activities on both other fisheries and on the overall ecosystem to the extent practicable (see section F).

D.3.4. Precautionary Approach

The precautionary management approach favors constraining harvest activities when there is high scientific uncertainty regarding the effects of such activities on the resource and on the natural environment until proof of no significant negative impact is obtained (National Research Council 2001). Oregon should apply the precautionary approach in the absence of sufficient scientific information as specified in the Native Fish Conservation Policy (OAR 635-007-0504; ODFW 2003). The Department should proceed with precautionary strategies for the harvest of marine resources that are scaled to the conservation risk, and proceed with less precautionary strategies only if monitoring, evaluation and responsive management keep biological risks within acceptable limits or the Department implements specific research programs to address management uncertainties.

D.3.5. Access to Public Resources

Oregon’s fish and wildlife are managed and protected by the Department and are held in trust for all Oregonians. Providing continued public access to these resources is an important guiding concept, as outlined in the Food Fish Management Policy (ORS 506.109) and the Native Fish Conservation Policy (ODFW 2003). The concept of “access” includes both harvest, and non-consumptive uses of the resource. However, access may come secondary to significant biological or ecological concerns or to uncertainties regarding the sustainable harvest of the resource.

319 **D.3.6. Proactive Management**

320 When possible, a proactive approach to marine fisheries management should be taken in
321 MFMPs. A proactive approach to fisheries management means identifying and taking action to
322 avert or resolve potential problems and issues with fisheries before they occur, rather than
323 applying management actions after a problem has already arisen.

324

325 **D.4. Major State Policies**

326 Several current state policies establishing regulations germane to the development of Oregon
327 MFMPs are summarized below.

328

329 **D.4.1. Food Fish Management Policy (1975)**

330 Food fish are defined as all fish, shellfish and all other animals living intertidally on the bottom
331 over which the Commission has jurisdiction in ORS 506.036. It is Oregon policy that food fish
332 shall be managed to provide the optimum economic, commercial, recreational and aesthetic
333 benefits for present and future generations of the citizens of this state. This policy was codified
334 into state of Oregon law with the creation of the Food Fish Management Policy (ORS
335 506.109). The goals of food fish management are:

336

337 • To maintain all species of food fish at optimum levels in all suitable waters of the state and
338 prevent the extinction of any indigenous species;

339 • To develop and manage the lands and waters of this state in a manner that will optimize the
340 production, utilization and public enjoyment of food fish;

341 • To permit an optimum and equitable utilization of available food fish;

342 • To develop and maintain access to the lands and waters of the state and the food fish
343 resources thereon;

344 • To regulate food fish populations and the utilization and public enjoyment of food fish in a
345 manner that is compatible with other uses of the lands and waters of the state and provides
346 optimum commercial and public recreational benefits;

347 • To preserve the economic contribution of the sports and commercial fishing industries in a
348 manner consistent with sound food fish management practices; and

349 • To develop and implement a program for optimizing the return of Oregon food fish for
350 Oregon's recreational and commercial fisheries.

351

352 **D.4.2. Wildlife Policy (1973)**

353 It is Oregon policy that wildlife, which is defined to include fish and shellfish, shall be
354 managed to prevent serious depletion of any indigenous species and to provide the optimum
355 recreational and aesthetic benefits for present and future generations of the citizens of the state
356 (ORS 496.012). Nothing in Oregon's wildlife laws is intended to affect the provisions of the
357 state's commercial fishing laws. Oregon adopted the Wildlife Policy to implement the
358 following coequal goals in wildlife management:

359

360 • Maintain all species of wildlife at optimum levels;

361 • Develop and manage the lands and waters of the state in a manner that will enhance the

- 362 production and public enjoyment of wildlife;
- 363 • Permit an orderly and equitable utilization of available wildlife;
- 364 • Develop and maintain public access to the lands and waters of the state and the wildlife
- 365 resources thereon;
- 366 • Regulate wildlife populations and the public enjoyment of wildlife in a manner that is
- 367 compatible with primary uses of the lands and waters of the state;
- 368 • Provide optimum recreational benefits; and
- 369 • Make decisions that affect wildlife resources of the state for the benefit of the wildlife
- 370 resources and to make decisions that allow for the best social, economic and recreational
- 371 utilization of wildlife resources by all user groups.

372 **D.4.3. Native Fish Conservation Policy (2003)**

373 The Native Fish Conservation Policy (NFCP; OAR 635-007-0502 through 635-007-0509;

374 ODFW 2003) was adopted to ensure the conservation and recovery of the native fish of

375 Oregon. The NFCP is implemented through individual conservation plans adopted by the

376 Commission. The three goals of the NFCP are to:

- 377
- 378
- 379 • Prevent the serious depletion of native fish species by protecting natural ecological
 - 380 communities, conserving genetic resources, and managing consumptive and non-
 - 381 consumptive (i.e., catch and release) fisheries;
 - 382 • Maintain and restore naturally produced native fish species in order to provide substantial
 - 383 ecological, economic and cultural benefits to the citizens of Oregon; and
 - 384 • Foster and sustain opportunities for sport, commercial, and tribal Indian fishers consistent
 - 385 with the conservation of naturally produced fish and responsible use of hatcheries.

386

387 Conservation plans are based on the concept that locally adapted populations provide the best

388 foundation for maintaining and restoring sustainable, naturally-produced native fish

389 populations. Oregon's MFMPs will incorporate these guiding principles. The NFCP's

390 guidelines for the content of conservation plans will be followed and incorporated into MFMP

391 Resource Analyses and Harvest Management Strategies (see sections E), as applicable. The

392 criteria established in the NFCP (see OAR 635-007-0505) will be evaluated during the MFMP

393 development to determine if the MFMP for the species should be a full conservation plan.

394 Development of MFMPs is designed to promote the goals of the NFCP and fulfill the need for

395 conservation plans when they are warranted.

396 **D.4.4. Oregon Nearshore Strategy (2005)**

397

398 The Oregon Nearshore Strategy (Nearshore Strategy, ODFW 2006) was adopted by the

399 Commission as a part of the larger Oregon Conservation Strategy. The Nearshore Strategy

400 provides recommendations for the Department's management of nearshore fish and wildlife.

401 The Nearshore Strategy also identifies opportunities for public and/or private actions and

402 partnerships that can contribute to the sustainable use of Oregon's marine resources. The

403 priorities established in the Nearshore Strategy guide the Department's strategic investment of

404 time and funding for management of marine resources.

405

406 Sixteen recommended Department actions are presented in the Nearshore Strategy that address
407 priority marine issues in need of immediate or timely attention, are feasible to implement given
408 appropriate funding, and have received some level of public support. Recommendations related
409 to MFMPs include:

- 410
- 411 • *Recommendation 5:* Improve and expand the capabilities of research and monitoring
412 programs for nearshore living marine resources to meet the requirements of the Native Fish
413 Conservation Policy and other nearshore resource management programs.
- 414 • *Recommendation 6:* Develop stock assessment and/or stock status indicator strategies for
415 priority nearshore groundfish and shellfish species.
- 416 • *Recommendation 7:* Map and characterize nearshore rocky reefs, and determine species-
417 habitat associations. Use this information to improve stock assessments and to provide
418 information for management.
- 419 • *Recommendation 11:* Review the Nearshore Strategy species list to identify priority
420 species in need of conservation plans under Oregon’s Native Fish Conservation Policy.
- 421 • *Recommendation 12:* Review and update the Interim Management Plan for Oregon’s
422 Nearshore Commercial Fishery.
- 423 • *Recommendation 13:* Evaluate immediate and long-term management needs for Oregon’s
424 recreational groundfish fishery.
- 425 • *Recommendation 15:* Develop conservation and harvest management plans for
426 commercially and recreationally harvested shellfish.
- 427

428 These recommendations will be partially or entirely addressed through the creation of MFMPs.
429

430 **D.4.5. Oregon Territorial Sea Plan (1994)**

431 The Oregon Territorial Sea Plan (TSP, Ocean Policy Advisory Council 1994) was created
432 through a multi-year public process by the Ocean Policy Advisory Council and was adopted by
433 the Oregon Coastal Management Program. This plan focuses on the integration of ocean
434 management and sets procedures and standards for decision makers to balance competing uses
435 of the ocean. The decision making standards in the TSP are intended to protect areas that are
436 important to renewable living marine resources.

437

438 Part One of the TSP is an ocean management framework that describes the history of ocean
439 planning, defines Oregon’s territorial sea boundaries, and outlines the laws and policies
440 affecting ocean management. Part Two describes a process for making resource use decisions,
441 and Part Three introduces a rocky shores management strategy. Part Four was adopted in 2000
442 and deals with underwater utilities. Part Five of the TSP, approved in 2013, describes the
443 process for making decisions regarding renewable energy development.

444 **D.4.6. Statewide Planning Goals**

445 Oregon’s statewide planning goals and guidelines (OAR 660-015) include guidance on land
446 use as it relates to natural resources. Two goals specifically relate to management of marine
447 fishery resources. Goals 16 and 19 (OAR 660-015-0010) address estuarine and ocean
448 resources, respectively. These goals provide guidance that management of these resources
449

450 should ensure long-term ecological, economic, and social values and benefits of these
451 resources to future generations. Living resources and ecosystem integrity are given the highest
452 priority in these goals. More information on statewide planning goals can be found at
453 <http://www.oregon.gov/LCD/Pages/goals.aspx>.

454 **D.4.7. Incorporation of Future Policies**

455 Future state of Oregon and Department policies, applicable to marine fisheries resource
456 management, should be incorporated into future versions of MFMPs. The adoption of new
457 policies may trigger review and, where necessary, require updates to the Framework, Resource
458 Analyses, and Harvest Management Strategies (see section G).

459 **E. Structure for State Marine Fisheries Management Plans**

460 Oregon MFMPs developed for any given species or species complex will be guided in structure
461 by this Framework. As such the Framework is a common component of all MFMPs. Additional
462 components of individual MFMPs, for single species or species complexes, includes both a
463 Resource Analysis and a Harvest Management Strategy. The Resource Analysis and Harvest
464 Management Strategy should strive to include the information outlined below. By design the
465 components of the Resource Analysis and Harvest Management Strategy are aligned with the
466 elements addressed by the NFCP's Conservation Plans, where applicable. Planning and
467 implementation shall proceed incrementally, consistent with available funding, according to
468 priorities established by the Department with collaboration and input from stakeholders (see
469 section G). The Resource Analysis and the Harvest Management Strategy are formal documents
470 that will be adopted by the Commission.

471 **E.1. Resource Analyses**

472 The Resource Analysis summarizes information about the species or species complex. Resource
473 Analyses are created to guide Harvest Management Strategies for individual fisheries.

474 Resource Analyses should include current and historical biological and ecological information
475 on the specific resource, including any stock assessments, alternative stock trend assessments, or
476 population indices. In addition to harvest impacts, natural and anthropogenic factors that may
477 affect the resource should be considered (see section F). Data and information gaps important to
478 consider when Harvest Management Strategies are developed should also be identified. It is
479 recognized that the information available to develop the Resource Analysis will vary, as will the
480 time and staff resources need to develop it. The Resource Analysis is intended to provide a
481 comprehensive status report on the resource given the information and staff resources available.
482 Basic information that Resource Analyses should strive to include if available are:

- 483 I. A description of the species or species complex.
- 484 II. The best available biological and ecological information on the species or species
485 complex including:
 - 486 A. Range, distribution, and stock structure
 - 487 B. Life history characteristics such as age, growth, maturity, fecundity and natural
488 mortality
 - 489 C. Movement and/or migratory patterns

- 496 D. Biotic and abiotic habitat information such as associated substrates, temperatures,
 497 salinity, pH, etc.
- 498 E. Biological relationships including prey, predators, competitors and symbionts
- 499 F. Variability in recruitment and the main causes if known
- 500 G. Climate and/or oceanographic interactions known to affect reproduction, recruitment,
 501 growth, and natural mortality
- 502
- 503 III. Catalog and description of available fishery-independent and fishery-dependent data such
 504 as:
- 505 A. Fishery independent survey data
- 506 B. Catch or landings data including incidental catch in all fisheries
- 507 C. Age, length, weight data
- 508 D. Logbook data
- 509 E. Discard data
- 510
- 511 IV. Analysis of stock status and trends or indicators such as:
- 512 A. Stock assessments
- 513 i) Data-rich integrated stock assessment (e.g., Appendix B Table 1 complexity levels
 514 3 and 4)
- 515 ii) Data-limited stock assessment (e.g., Appendix B Table 1 complexity levels 2 and
 516 3)
- 517 B. Analyses of fishery data
- 518 i) Information on size and/or age trends over time
- 519 ii) Information on catch per unit effort (CPUE) over time
- 520 iii) Information on catch trends over time if CPUE information is not available
- 521 C. Synthesis/analysis of available fishery-independent survey data
- 522 D. Biological Reference Points for potential use in management
- 523 i) Target reference points
- 524 ii) Limit reference points
- 525 iii) Precautionary reference points
- 526
- 527 V. Identification of known threats to the resource
- 528 A. Non-fishery sources of mortality
- 529 B. Threats to habitat
- 530 i) Fishery related
- 531 ii) Non-fishery
- 532
- 533 VI. Recommendations on sustainable harvest levels given the available information
- 534 A. Appropriate biological reference points for management
- 535 B. Other types of limits that ensure sustainable harvest levels (e.g., size, sex, season)
- 536 C. Identification of known factors that may change the sustainable harvest levels (see
 537 section F)
- 538
- 539 VII. Identification of information gaps and research needs, including prioritized lists for future
 540 research and data collection
- 541

542 VIII. Literature cited section that documents sources of information utilized

543
544 The Resource Analysis should examine available data for the species or species complex,
545 provide the rationale for the tools chosen to analyze stock status, and identify prioritized
546 informational needs for improving the quality of future analyses. The Resource Analysis should
547 also discuss assumptions made in conducting the analysis, any models used, and how results
548 would differ if underlying assumptions are not met.

549
550 The level of information available for any given species or species complex will vary.
551 Consequently, the specificity of information in the Resource Analysis for each stock will vary.
552 For example, a species with a well-known distribution, life history, ecological information, and
553 extensive fishery data with a current full age-structured stock assessment under the federal
554 management system may have very specific biological reference points mandated by MSA.
555 Other species may not require any MSA mandated biological reference points because the
556 species are not under federal management. Some species may have very little information
557 available other than limited life history information.

558
559 A variety of biological reference points, including target, limit, and precautionary reference
560 points are utilized for fisheries management (e.g., Caddy and Mahon 1995). For many fisheries,
561 the availability of information and technical capacity will limit or preclude the use of data
562 intensive, complex models to set allowable harvest levels and reference points. Developing
563 methods for examining stock status trends or indicators for what have been termed “data-poor”
564 or “data-limited” fisheries is an active area of research. A wide variety of tools are currently
565 available for use (see Appendix B Table 1) and a suite of modeling software is also available
566 (e.g., see <http://nft.nefsc.noaa.gov/>). The requirements for these tools and models range from
567 data-poor to data-rich. The choice of tools utilized will depend, in part on the information and
568 data available. For species that have limited information it may be necessary to utilize several
569 empirical measures to develop a simple “traffic light” system that indicates where current or
570 proposed harvest levels stand (e.g., Caddy 1998). A productivity and susceptibility analysis
571 (Patrick et al. 2010) is a useful option for evaluating risk assessments and for developing relative
572 harvest levels for some species, especially for those with relatively little information available.
573 The recommended reference points or harvest limitations may differ depending on the Harvest
574 Management Strategy that is implemented.

575
576 **E.2. Harvest Management Strategies**
577 Harvest Management Strategies articulate general management practices (see Appendix B Table
578 2) for each marine fishery and are developed utilizing both the relevant Resource Analysis and
579 public input.

580
581 The Harvest Management Strategy articulates the goals for the fishery both in terms of the
582 resource and the people utilizing it. It examines the fishery in terms of the issues and practices
583 involved with its management. Each Harvest Management Strategy should address the
584 following:

585
586 I. The species or species complex included

587

- 588 II. Management goals for the resource and fishery including:
589 A. Biological/ecological goals
590 B. Socio-economic goals
591 C. Goals related to interactions with federal and adjacent state fishery management
592 D. Metrics used to measure goal achievement
593 E. Monitoring strategies designed collect data needed to track those metrics
594
- 595 III. Current issues related to the resource such as:
596 A. Concerns over stock status or harvest
597 B. Differing concerns among stakeholders
598 C. Known or suspected fishery related habitat impacts
599
- 600 IV. Description and analysis of fisheries and sectors harvesting those species
601 A. Description of gear types utilized
602 B. Harvest history including economic, social, cultural, and spatial components
603 C. Current and historical management practices including:
604 i) Specific tools (such as those listed in Appendix B Table 2) used to manage the
605 fishery
606 ii) Rationale for use of the management tools selected
607 iii) Analysis of fishery practices resulting from management actions
608 iv) Programs used to monitor, track, and/or sample harvest
609 D. Evaluation of any known interactions among sectors
610 E. Known interactions species listed as threatened or endangered by Oregon or the US,
611 marine mammals, and/or migratory birds
612 F. Known incidental catch and bycatch information
613 G. Examination of any emerging technologies that may affect harvest in the foreseeable
614 future
615 H. Threats to fishery from anthropogenic sources
616
- 617 V. Description of other social and/or cultural uses of the resource
618 A. Wildlife viewing (e.g. SCUBA photography)
619 B. Educational uses (e.g. tidepooling)
620 C. Traditional cultural uses (e.g. tribal ceremonies)
621
- 622 VI. Description of Biological Reference Points utilized for management
623 A. Rationale for any biological reference points chosen for use
624 B. Harvest control rules
625 C. Triggers and management actions
626
- 627 VII. Evaluation of feasible and appropriate management tools (see Appendix B Table 2) to
628 apply to the fisheries and sectors to achieve the management goals
629 A. Examination and analysis of historical management successes and/or failures for the
630 fishery or similar fisheries in other areas
631 B. Policy choices specific to the fishery that influence management
632 C. Recommended actions and management tools that could be applied to the fishery to
633 achieve management goals

634

635 VIII. Recommended actions to help resolve specific issues related to the fishery such as:

636 A. Allocations among fishery sectors

637 B. Incidental catch and/or bycatch

638 C. Threats to habitat from fishery

639 D. Interactions with ESA listed species, marine mammals and/or migratory birds

640

641 The degree to which individual components of the Harvest Management Strategy need to be or
642 can be addressed will vary depending on the fishery. The outline of Harvest Management
643 Strategy components above specifically includes elements to address the major state policies
644 discussed earlier and the management considerations discussed below (see section F) while
645 allowing flexibility to address the specific challenges likely to be faced by any given fishery. For
646 example, fisheries that are more susceptible to the effects of other human factors such as water
647 quality issues or to environmental factors such as natural variability can specify how those
648 challenges can best be addressed.

649

650 Some marine fisheries may already have extensive management in place at the federal level that
651 effectively addresses Harvest Management Strategy components, while other fisheries may have
652 far less information available to draw from. There is a growing body of literature that can assist
653 with how to approach developing a Harvest Management Strategy, especially for data-poor
654 fisheries (e.g., Honey et al. 2010). Use of decision trees or management strategy evaluations
655 should be considered.

656

657 Defining the metrics used to evaluate the specific management goals for the fishery is an
658 important step. Often these metrics will be developed from fishery-dependent data that the
659 Department can collect. A substantial portion of the Department's efforts is devoted to programs
660 that monitor both commercial and recreational fisheries along the Oregon coast. Fishing effort,
661 species harvested, amounts harvested, areas of catch, biological information, bycatch information
662 and prices for commercial fisheries catch are all important components of the information
663 collected. Port biologists and seasonal technicians monitor the catch of commercial fishers and
664 recreational anglers and gather biological information including length, weight, sex, stage of
665 maturity, and age samples from the catch. Federal and/or state regulations require logbooks from
666 commercial fishers for most fisheries, purchase records from commercial fish buyers, and access
667 to catch for purposes of collecting biological data and samples. This information can be used in-
668 season, as a basis for tracking fish landings for catch quotas, and to ensure regulatory control of
669 Oregon's fisheries. On a long-term basis, data collected provide state and federal managers with
670 information needed for assessing stocks and developing management measures intended to meet
671 management goals. Much of these data become part of a west coast data system to inform
672 Oregon, Washington, and California regional fisheries management. In this capacity, the public
673 plays a highly significant role in the collection of fishery-dependent data used to manage
674 Oregon's marine fisheries. Harvest Management Strategies should detail what data will be used
675 as metrics for the fishery and how those metrics will be used to evaluate if management goals are
676 being met and what measures can be taken if the targets are not being met.

677

678 Evaluating management of a fishery will be an ongoing process. Periodic reports will provide
679 updated information on the state of the fishery to assist these ongoing evaluations (see section I).

680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725

F. Marine Fisheries Management Considerations

The harvest of marine resources can have direct and indirect impacts on Oregon’s marine ecosystem and human communities that create challenges for resource managers. Direct impacts to marine resources or to habitats associated with fisheries can include effects on abundance, size structure, age structure, genetic composition of stocks, and damage to bottom habitats. Indirect effects can include altering the abundance of a predator, prey or competitor, or activities that interrupt important life history stages of organisms in the ecosystem (FAO 2005). Additional considerations to managing fisheries may be posed by both non-fishing human activities and ecosystem factors that can affect fishery resources. These factors should be considered and addressed during the development of MFMPs to the extent practicable.

F.1. Fishing Activities that Impact Fishery Resources

Managing marine fishery resources poses many challenges. Some are related directly to the effects of fishing, but others include non-fishery effects on fishery resources. Fishing activities that directly impact the marine ecosystem are recognized through both qualitative and quantitative patterns based on data collected for fisheries management. Resource managers look for ways to minimize or to prevent negative impacts to the ecosystem created by fishing activities through proactive, reactive and adaptive use of management tools. The implementation of management tools often involves the modification of the fishing activity. This can include using management tools such as closing areas or seasons to certain fishing activities, modification of gear, or gear restrictions, among others.

F.1.1. Extraction

The simplest impact of any fishing activity is the extraction of biomass from the ecosystem and the fish population. Excessive harvest of species can result in declines of populations, and can have effects that cascade through the marine ecosystem, affecting habitats and other species. Such impacts can affect the ecosystem services provided to human communities.

F.1.2. Biological Impacts to Targeted Species

Fishing can affect targeted species by reducing their abundance, spawning potential, and by altering population parameters, such as growth and maturation (Olsen et al. 2004). Fishing can modify age and size structure (Berkeley et al. 2004), sex ratios (Coleman et al. 1996), and species composition of the target resources and other associated non-target species (Pope et al. 2000).

F.1.3. Bycatch

Bycatch is currently a major factor affecting fisheries management. The policy of the U.S. Congress in the MSA “encourages development of practical measures that minimize bycatch and avoid unnecessary waste of fish”. Bycatch may occur because the fishing method used may not be selective enough to catch only marketable size target species or because other species are commonly associated with targeted species in the same habitat. Bycatch is often discarded at sea for regulatory or economic reasons, and may be injured, dying, or dead. Bycatch can negatively impact the sustainability of fisheries and the use of other marine resources. Opportunities to harvest species with healthy populations can be restricted by regulations put in place to reduce bycatch.

726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771

F.1.3. Habitat Alteration or Loss

Harvest of marine resources can result in loss or alteration of marine habitats. Excessive harvest of key predators or habitat-forming organisms can lead to alterations in habitat, shifts in the composition of associated biological communities, and collapse of ecosystems (Jackson et al. 2001). Certain gears and fishing methods may come in direct contact with bottom habitat, resulting in loss, damage, or alteration of physical or biogenic structure (Freese et al. 1999). Fishing gear abandoned or lost, and left unattended in the marine environment can also result in the loss or alteration of marine habitats (U.S. State Department 2014). Loss or alteration of habitats necessary for growth and continued reproduction of marine resources can cause significant reductions in the level of sustainable fishery harvest.

Managing fishery activities is the focus of MFMPs. Identifying fishery impacts that are significant and potentially adverse should be a primary consideration when developing a MFMP. Once identified the MFMP should provide practicable management measures designed to avoid and mitigate those impacts.

F.2. Other Human Activities that Impact Fishery Resources and Fisheries

Many human activities may impact the marine ecosystem, and specifically fishery resources and fisheries (Andrews et al. 2012). Dredging, disposal of dredge materials, installation/maintenance/removal of underwater cables and pipelines, and siting of renewable energy platforms or mariculture facilities are some examples of activities that may affect fishery resources or fisheries. Coastal development, storm runoff, industrial pollution, and agricultural practices can affect the habitat, reproduction and survival of fishery resources. Regulation of these activities falls outside the scope of MFMPs. The Department works with other agencies, both state and federal, to examine and understand the effects of activities that can affect both fishery resources and fisheries. The Department may review and advise these agencies on proposed regulations, permits or activities that affect fisheries. Spills of oil, toxic chemicals, or sewage can disrupt fisheries and pose additional challenges for fishery management. Fishery management needs to adapt to these types of emerging situations. Marine Fisheries Management Plans should examine known issues for human factors as they relate to fisheries and identify agency partners that the Department works with on these issues.

F.3. Ecosystem Factors that Impact Fishery Resources

Natural occurrences or changes in a marine ecosystem can impact fishery resources. For example, natural shifts in ocean conditions can result in changes to productivity, to abundance of certain species, or to the composition of species in an area. Ecosystem factors can have negative or positive effects on any given fishery resource. Changes in the status of fishery resources due to naturally occurring events or changes in an ecosystem may warrant modifications of harvest levels or to certain fishing practices. Ecosystem factors resulting in impacts to fishery resources are often hard to predict, but some linkages are known and may be factored into MFMPs.

F.3.1. Environmental Variation

Oregon's marine environment is part of a dynamic marine ecosystem called the California Current Large Marine Ecosystem (CCLME) that varies on seasonal, annual, and decadal time

772 scales (McKinnell and Dagg 2010). This ecosystem is characterized by seasonal coastal
773 upwelling events that can vary in timing, intensity, and duration which can have dramatic
774 effects on marine resources (Barth et al. 2007). Influences from equatorial waters, such as El
775 Niño events, also contribute to the interannual variability in ocean temperatures, wind patterns,
776 and atmospheric conditions in the Northeast Pacific (Schwing et al. 2002). Decadal scale
777 patterns in North Pacific sea level pressure, sea surface temperatures, air temperatures, and
778 precipitation, termed the Pacific Decadal Oscillation, have been observed to be punctuated by
779 abrupt climate regime shifts that appear to impact a variety of components of the marine
780 ecosystem including fishery resources (Mantua and Hare 2002). Variable freshwater inputs
781 from local sources also alter Oregon's nearshore marine environment. All of these climate
782 factors can contribute to variation in Oregon's fish stocks and fisheries (Lehodey et al. 2006).

784 **F.3.2. Ecological Interactions**

785 The dynamic ecological interactions among various elements of Oregon's marine ecosystem
786 are not well understood but can potentially affect fishery resources. For example, the rapid
787 expansion of the Humboldt squid into the northern California Current caused concern among
788 fishery managers, as these squid have been shown to prey on adult groundfish and multiple
789 types of forage fishes including commercially important species (Field et al. 2007). Both
790 predator-prey interactions and ocean conditions may play a role in the range expansion of these
791 squid (Litz et al. 2011). Kelp forests, which support numerous finfish and invertebrate
792 fisheries, are vulnerable to significant shifts in both grazer and predator abundances (Tegner
793 and Dayton 2000). The introduction of invasive marine species can change community
794 composition, degrade ecosystem function, and induce substantial economic damage
795 (Stachowicz et al. 1999). Disruptions to ecological interactions such as these can cause
796 cascading effects throughout marine ecosystems that impact fisheries (Jackson et al. 2001).

798 **F.3.3. Climate Change and Ocean Acidification**

799 Climate change and ocean acidification may significantly affect Oregon's marine environment
800 and fishery resources (Hixon et al. 2010, ODFW 2012). As global climate change alters wind,
801 precipitation, and temperature patterns, the world's oceans are changing in response
802 (Environmental Protection Agency 2010). Climate change and ocean acidification are already
803 affecting Oregon's marine environment. The ocean off the west coast of North America is
804 becoming more acidic from the uptake of atmospheric carbon dioxide (Feely et al. 2008).
805 There have been increases in the severity and the frequency of hypoxic (low-oxygen) and
806 anoxic (zero-oxygen) events in Oregon waters (Chan et al. 2008), and there is evidence that
807 climate change is a contributing factor (PISCO 2009; Keeling et al. 2010). There is also
808 evidence that ocean currents and seasonal upwelling that make the Oregon coast so productive
809 are changing (Barth et al. 2007). Northward expansions of fish spawning areas have already
810 been observed (Phillips et al. 2007) and additional effects on fishery resources are anticipated.

812 **F.4. Ecosystem Services**

813 Ecosystem services are the benefits people obtain from ecosystems (Millennium Ecosystem
814 Assessment 2005). Oregon's marine environment is an important ecosystem that provides many
815 types of services. Primarily, MFMPs focus on sustaining provisioning services, such as food and
816 product materials, that marine resources provide in the form of commercial and recreational
817 fisheries. In addition to provisioning services, other services the marine ecosystem provides

818 include supporting services, regulating services, and cultural services. Supporting services are
819 those ecosystem processes prerequisite to all other ecosystem services. Examples of supporting
820 services provided by Oregon's marine ecosystem include nutrient cycling, photosynthesis,
821 primary production, and fish nursery areas. Regulating services are benefits for people resulting
822 from natural ecosystem processes. Examples include maintaining healthy air quality, weather,
823 climate, water quality and quantity, erosion, waste decomposition, disease, and natural hazard
824 regulation. Cultural services are ecosystem services that provide immaterial benefits for people.
825 Cultural services provided by Oregon's marine ecosystem include cultural diversity and heritage
826 values, knowledge systems, educational values, spiritual and religious benefits, aesthetic values,
827 and inspiration. All of these services are vital. The continued integrity of the marine ecosystem
828 contributes to sustainable marine fisheries and coastal communities.

829 **F.5. Research and Education**

831 Research and education about marine resources is critical for a well-informed public and well-
832 informed decision making processes. Marine resources are often collected for scientific research
833 and educational purposes. Since the late 1980's, the Department has required a special permit for
834 research and education harvests. Individual permits are issued through the Fish Division and the
835 Wildlife Division of the Department, separately. Research results are often incorporated into
836 management decisions. Continuing with and expanding on current research programs, both by
837 Department staff and other researchers, is essential for successful fisheries management.
838 Collection of marine resources for educational purposes is typically very limited. Harvest
839 Management Strategies should factor in both research and educational collection activities.
840 Although there is no direct harvest, the marine environment is also commonly utilized as an
841 outdoor classroom. Some areas may be extensively utilized for this purpose while other areas
842 may not. Harvest Management Strategies should take these needs and uses into consideration.

843 **F.6. Non-fishing Recreation and Tourism**

844 Both coastal residents and visitors enjoy the marine environment. Oregon's waters provide
845 sightseeing, whale watching, tidepooling, and birding opportunities. Reefs have extensive kelp
846 beds and outcrops. The marine environment is also enjoyed by joggers, beach walkers, kite
847 boarders, surfers, wind surfers, sea kayakers, sailors and other boaters. Common activities that
848 take place in Oregon's marine waters include SCUBA diving and underwater photography.
849 Tourism is a significant source of local income for coastal communities. The Oregon Parks and
850 Recreation Department has documented a general increase in visitation to rocky shore areas at
851 state parks (Hillmann 2006). All of these activities bring people to the coast and contribute to its
852 aesthetic appeal and economy.

853 **F.7. Renewable Energy**

854
855 The marine waters off Oregon have been identified as an ideal location for the development of
856 renewable energy facilities on the west coast. As a result, companies have expressed interest in
857 developing facilities off the Oregon coast. Developing renewable energy facilities in the ocean
858 may affect living marine resources and fisheries. Oregon amended its Territorial Sea Plan in
859 2013 (Oregon Coastal Management Program 2013) with the addition of Part Five: Use of the
860 Territorial Sea for the Development of Renewable Energy Facilities or Other Related Structures,
861 Equipment or Facilities. Part Five outlines the state's policies, required inventory and effects
862

863 evaluation, and process for permit application review that will be implemented for proposed
864 developments of renewable energy facilities in Oregon’s territorial sea.

865
866 There are both state and federal permitting processes for energy facility development in ocean
867 waters off Oregon. Although the processes may differ if the facility is located in state or federal
868 waters, the Department is a significant participant in these processes by providing scientific
869 input and reviewing permit applications. The Department focuses on providing permitting
870 agencies with information on potential effects of proposed projects on living marine resources
871 and fisheries and suggesting appropriate measures that can be taken to monitor and mitigate
872 those effects as needed.

873
874 **F.8. Mariculture**

875 Mariculture is the farming of marine aquatic organisms, such as fish, mollusks or crustaceans
876 (FAO 2010). In Oregon, the mariculture industry is currently limited to Pacific oyster production
877 in several estuaries, such as Coos, Yaquina, Netarts, and Tillamook bays (Oberrecht 2009).
878 Methods for growing oysters vary with local conditions, but can include bottom and longline
879 culture as well as cultivation from floating rafts and buoys. The oyster, clam, and mussel
880 mariculture industry is regulated by ODA and in some cases counties or Port districts. The
881 Department works with ODA to review submitted applications for potential ecological effects
882 including those on fisheries. The culture of fish and invertebrates other than oysters, clams and
883 mussels in Oregon is under the jurisdiction of the Department (ORS 497.252). In addition to the
884 Department’s permitting authority, other state agencies and regional governing bodies (i.e.,
885 counties, Port districts) may have permitting or leasing jurisdiction for a particular mariculture
886 facility or activity. Federal agencies have jurisdiction over mariculture in federal waters. The
887 Department would work with these agencies to review any proposed mariculture permit and its
888 potential effects on fish and wildlife resources and fisheries.

889
890 **G. Development, Adoption and Review of Marine Fisheries Management Plans**

891 One of the main objectives of this Framework is to formalize the processes involved in
892 developing, adopting and reviewing Oregon MFMPs. Detailed below are the processes and
893 guidelines for developing, adopting, reviewing, and revising Resources Analyses and Harvest
894 Management Strategies for individual species and species complexes.

895
896 **G.1. Evaluate Current Management of Fisheries**

897 Prior to proceeding with a Resources Analysis, Department managers should evaluate the
898 implementation and effectiveness of existing harvest management of any given species or
899 species complex to determine if a MFMP is needed. Evaluations assist in prioritizing fisheries on
900 which to focus limited staff resources. Characteristics of high priority candidate fisheries and
901 species/species complexes may include:

- 902
903 • Active fishery harvest
904 • No current stock assessment
905 • Differing priorities among stakeholders
906 • Biological or ecological concerns regarding harvest
907 • Limited or no federal management

- Fishery interactions with ESA listed species, marine mammals, and/or migratory birds

909

910 **G.2. Resource Analysis Development**

911 The development of each Resource Analysis entails a systematic assessment of the candidate
912 resource based on the processes outlined below:

913

- Formation of a focus group of Department staff and additional experts, as appropriate
- Focus group develops the Resource Analysis
- Internal Department review
- Technical expert, industry, and public review
- Revisions to the Resource Analysis

919

920 **G.3. Harvest Management Strategy Development**

921 Following the development of a Resource Analysis for a species or species complex, a Harvest
922 Management Strategy for the marine resource is developed through the processes outlined
923 below.

924

- Formation of a focus group of Department staff, additional experts and representative stakeholders
- Focus group develops a draft of the Harvest Management Strategy
- Internal review of the Harvest Management Strategy by Department staff
- Public meetings to present the Resource Analysis and the Harvest Management Strategy, and to take public comments
- Revisions to the Harvest Management Strategy and Resource Analysis as needed

932

933 **G.4. Adoption of MFMP by Oregon Fish and Wildlife Commission**

934 Following the development of a Harvest Management Strategy the MFMP for the fishery is
935 adopted and implemented.

936

- Present the MFMP, composed of the Harvest Management Strategy and associated Resource Analysis, to the Commission for adoption
- Implementation of the MFMP through use of management tools (Table 2) and rule making (see sections H and I)
- Public input is part of the Commission process and continued public input is taken by the Department and the Commission once the MFMP is implemented

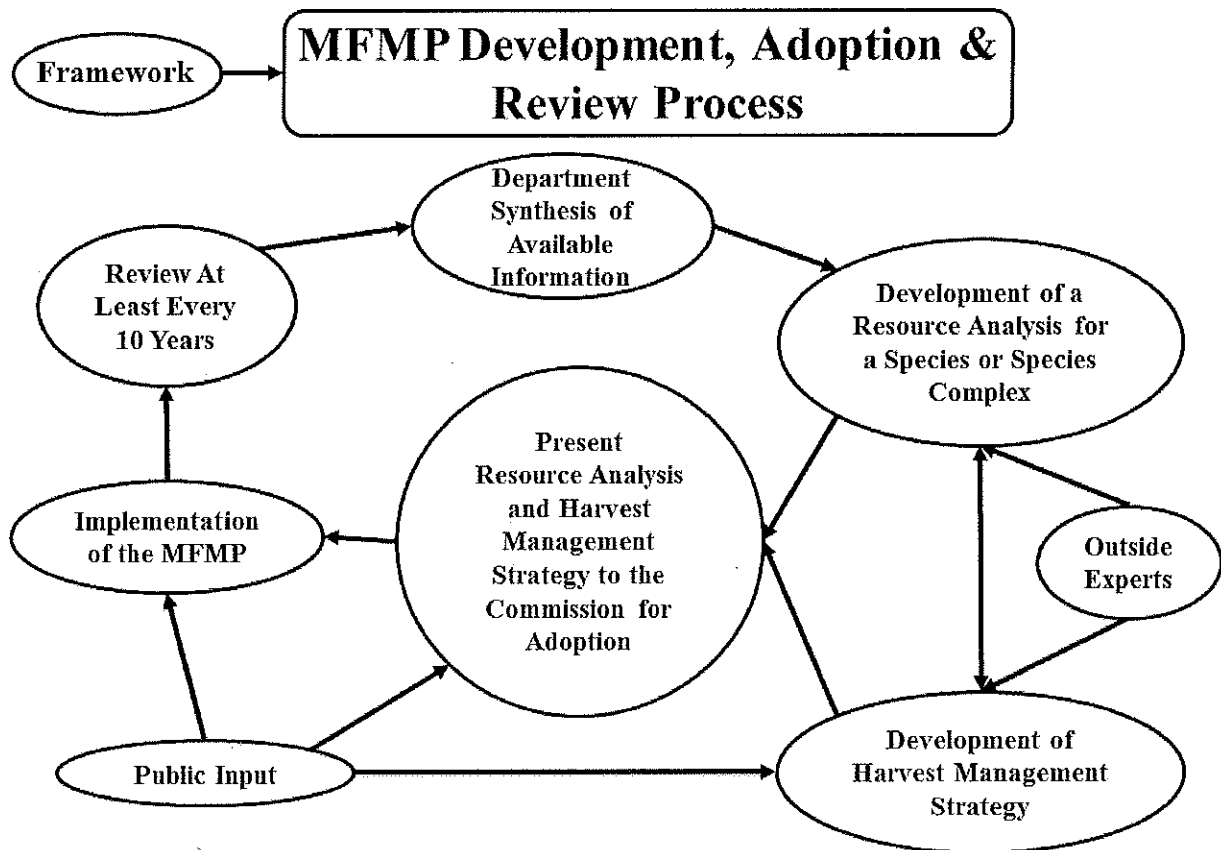
943

944 **G.5. Review and Revision of MFMPs**

945 The Framework will be reviewed at least every ten years to evaluate if it is adequately serving its
946 purpose or is in need of revision. Simple updates such as updating references to keep them
947 current may not trigger a full review, nor necessitate revisions to individual MFMPs that have
948 been adopted. However if the Framework undergoes revisions needed to fulfill its purpose, then
949 plans previously adopted will also likely need to be reviewed and revised accordingly.

950

951 Individual Resource Analyses and Harvest Management Strategies developed and adopted under
 952 the Framework will be reviewed within ten years of their adoption to examine new information
 953 available about the resource and the fishery, and to determine if revisions are needed. Periodic
 954 reports on the fishery produced once a MFMP is implemented will assess if the management
 955 goals are being met and provide guidance on the need for comprehensive review at more
 956 frequent intervals(see section I.2.1). Updates to individual Harvest Management Strategies may
 957 be made without triggering a revision to the entire species' or species complex's MFMP. Harvest
 958 Management Strategy reviews are required if there are major changes in the fishery or
 959 management of the fishery. Major changes that would trigger a review should be defined in the
 960 Harvest Management Strategy and could include such things as technological advances that
 961 increase fishing power and harvest rates, shifts in market demand, and persistent trends in
 962 management measures designed to modify landings or bycatch. A substantial change in an
 963 updated Resource Analysis that results in revised recommendations on sustainable harvest levels
 964 triggers a review process, and if necessary a revision of the corresponding Harvest Management
 965 Strategy. Figure 1 provides an overview of the process.



966
 967 **Figure 1.** A schematic diagram depicting the processes involved in the development, adoption
 968 and review of individual Marine Fishery Management Plans.
 969

970 **H. Fishery Analysis and Management Tools**

971 A variety of tools are available to the Department for assessing marine fishery resources
972 implementing MFMPs. Some of the most common tools and practices utilized to assess fishery
973 resources and to manage fisheries are described below and specific tools are described in
974 Appendix B (Tables 1 and 2). All of these tools are not currently applied in Oregon fisheries
975 management, however, nothing precludes the Department from using such tools in future
976 management, where existing policies allow. As described above, Resource Analyses and Harvest
977 Management Strategies evaluate and recommend which tools should be applied to specific
978 fisheries.

979
980 **H.1. Resource Analysis Tools**

981 Some examples of modeling tools utilized for assessing stock status and the effects of fishing
982 activity on stocks of living marine resources that may be useful for resource analyses are
983 presented in Appendix B Table 1. The table includes the types of data inputs required, a brief
984 description, references that provide more detailed descriptions and a relative complexity rating.
985 There is extensive ongoing work to develop fishery resource analysis tools. Fishery analysts and
986 managers developing MFMPs are encouraged to investigate new modeling tools and use those
987 deemed most appropriate.

988
989 **H.2. Fishery Management Tools**

990 An overview of fishery management tools that could be used to implement MFMPs is provided
991 in Appendix B Table 2. The table is organized by types of controls or tools and provides an
992 outline of the typical purpose of their intended use.

993
994 **I. Implementing Marine Fisheries Management Plans through Adaptive Management**

995 State of Oregon MFMPs are implemented by the Department once adopted by the Commission.
996 The effective implementation of individual MFMPs should be accomplished by applying a broad
997 range of fisheries management tools, and through regular reviews of both the state of the fishery
998 and of individual Harvest Management Strategies. This section details the tools available to the
999 Department for implementing MFMPs, and establishes a process for reviewing individual
1000 fisheries and amending individual Harvest Management Strategies.

1001
1002 **I.1. Managing the Fishery**

1003 The MFMP is implemented by using selected fishery management tools such as those outlined
1004 (Appendix B Table 2). Rules may need to be made through the Commission process. The fishery
1005 should be monitored to see that the management metrics specified in the MFMP are being met.
1006 The rules may need to be adapted to meet the specific management goals set forth in the MFMP
1007 if necessary.

1008
1009 **I.1.1. Adaptive Management**

1010 There are many ways to implement adaptive management. Some of the more frequently used
1011 methods include:

- 1012 • In-season actions that involve public notice and temporary rule making
- 1013 • Regular rule making through the Commission process
- 1014 • Full review and subsequent regulatory changes

1015

1016 **I.2. Review of Marine Fisheries Management Plans**

1017 Regular reviews of MFMPs should occur to determine how prescribed management strategies
1018 are affecting both the resource and the fishery. The review process is composed of two
1019 components: 1) periodic reports on the state of individual fisheries, and 2) ten-year reviews of
1020 the Resource Analyses and Harvest Management Strategies for individual fisheries. Information
1021 obtained from the review process will be used to update and amend individual Resource
1022 Analyses and Harvest Management Strategies to shape MFMPs through the adaptive
1023 management process.

1024
1025 **I.2.1. Periodic Reports on State of the Fishery**

1026 Periodic reports on the state of individual fisheries summarize information and data pertinent
1027 to the harvest of the resource and management of the fishery over one- or two-year increments.
1028 These reports should detail individual fishery harvest specifications, available information on
1029 the number of resource users, effort, landings, bycatch, samples examined, and public input
1030 received over specified time intervals. These reports provide information at the appropriate
1031 level for state fishery management. They may draw from similar information presented in
1032 Status Assessment and Fishery Evaluation documents prepared for federally managed fisheries
1033 that may offer a broader perspective. Periodic reports may provide updates to information
1034 contained in the Resource Analysis. Information in these documents provides data on resource
1035 use essential to both ongoing and ten-year reviews of individual Resource Analyses and
1036 Harvest Management Strategies. These reports are completed by Department staff and should
1037 evaluate if the goals of the management strategy are being met or if adjustments need to be
1038 made. Fishery reports should be posted on the Department website when completed.

1039
1040 **I.2.2. Ten-year Review of each Resource Analysis and Harvest Management Strategy**

1041 Every ten years, or sooner if needed, a comprehensive review of the Resource Analysis and
1042 Harvest Management Strategy of each MFMP should be conducted by the Department. These
1043 reviews will examine all information material to the harvest of the resource including, but not
1044 limited to:

- 1045
- 1046 • Current Harvest Management Strategies
 - 1047 • Harvest specification history
 - 1048 • Harvest data
 - 1049 • Effort data
 - 1050 • Economic data
 - 1051 • New or updated biological and/or ecological information about the species or species
1052 complex
 - 1053 • New or updated stock assessments
 - 1054 • New or updated analyses of stock trends or indicators
 - 1055 • New technological developments affecting the fishery
 - 1056 • New developments in the socioeconomic factors affecting the fishery
 - 1057 • New or updated information on threats to the resource
 - 1058 • Problems with current strategies or implementation
 - 1059 • Allocation strategies
 - 1060 • New understanding of environmental indicators

1061
1062 If information gathered during the ten-year review indicates a need to alter existing management
1063 strategies for a fishery, such information will trigger the Department to conduct an updated
1064 Resource Analysis and Harvest Management Strategy to amend the MFMP.
1065

1066 **J. Summary**

1067 In summary, this Framework for state of Oregon MFMPs guides the Department through a
1068 consistent and transparent approach to the management of Oregon's marine fishery resources. By
1069 placing Oregon's MFMPs into the context of existing international, federal, and state fisheries
1070 management, unnecessary duplication, contradiction and complication of regulations can be
1071 avoided. By providing a clear and flexible template for managers, MFMPs developed under this
1072 Framework will be able to incorporate the wide range of resources and fisheries under Oregon's
1073 jurisdiction. This Framework and associated MFMPs strive to facilitate the long-term sustainable
1074 use and enjoyment of marine resources for present and future generations of Oregonians.
1075
1076

1077 **K. Literature Cited**

- 1078 Andrews, K. S., Williams, G. D., Gerstseva, V. V. 2012. CCIEA Phase II Report 2012: Drivers and pressures –
1079 anthropogenic. Accessed January 2014.
1080 [http://www.noaa.gov/iea/Assets/iea/california/Report/pdf/Anthropogenic%20Drivers%20and%20Pressures](http://www.noaa.gov/iea/Assets/iea/california/Report/pdf/Anthropogenic%20Drivers%20and%20Pressures%20CCIEA%202012.pdf)
1081 [%20CCIEA%202012.pdf](http://www.noaa.gov/iea/Assets/iea/california/Report/pdf/Anthropogenic%20Drivers%20and%20Pressures%20CCIEA%202012.pdf)
1082
- 1083 Ault, J. S., Smith, S. G., Luo, J., Monaco, M. E., and Appeldoorn, R. S. 2008. Length-based assessment of
1084 sustainability benchmarks for coral reef fishes in Puerto Rico. *Environmental Conservation* 35(3): 221.
1085
- 1086 Balton, D. A., and Koehler, H. R. Fall 2006. Reviwing the United Nations Fish Stocks Treaty. *Sustainable*
1087 *Development Law & Policy* 7(1): 5-9,75.
1088
- 1089 Barth, J., Menge, B., Lubchenco, J., Chan, F., Bane, J., Kirincich, A., McManus, M., Nielsen, K., Pierce, S., and
1090 Washburn, L. 2007. Delayed upwelling alters nearshore coastal ocean ecosystems in the northern
1091 California current. *Proceedings of the National Academy of Sciences* 104: 3719-3724.
1092
- 1093 Berkeley, S. A., Chapman, C., and Sogard, S. M. 2004. Maternal age as a determinant of larval growth and survival
1094 in a marine fish, *Sebastes melanops*. *Ecology* 85(5): 1258-1264.
1095
- 1096 Caddy, J. F. 1998. A short review of precautionary reference points and some proposals for their use in data-poor
1097 situations. *FAO Fisheries Technical Paper*: 347:83.
1098
- 1099 Caddy, J.F. and Mahon, R. 1995. Reference points for fisheries management. *FAO Fisheries Technical Paper*:
1100 347:83.
1101
- 1102 Chan, F., Barth, J., Lubchenco, J., Kirincich, A., Weeks, H., Peterson, W., and Menge, B. 2008. Emergence of
1103 Anoxia in the California Current Large Marine Ecosystem. *Science* 319: 920.
1104
- 1105 Coleman, F., Koenig, and C, Collins, L. 1996. Reproductive styles of shallow-water grouper (*Serranidae*) in the
1106 eastern Gulf of Mexico and the consequences of fishing spawning aggregations. *Environmental Biology of*
1107 *Fishes* 47: 129-141.
1108
- 1109 Cope, J.M. 2012. Extending catch-only Stock Synthesis models to include indices of abundance.
1110
- 1111 Cope, J. M. 2013. Implementing a statistical catch-at-age model (Stock Synthesis) as a tool for deriving overfishing
1112 limits in data-limited situations. *Fisheries Research* 142: 3-14.
1113
- 1114 Cope, J. M., and Punt, A. E. 2009. Length-based reference points for data-limited situations: applications and
1115 restrictions. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*: 1(1): 169-186.
1116
- 1117 Dick, E. J., & MacCall, A. D. 2010. Estimates of sustainable yield for 50 data-poor stocks in the Pacific Coast
1118 groundfish fishery management plan. *NOAA Technical Memorandum*.
1119
- 1120 Environmental Protection Agency. 2010. *Climate Change and Ecosystems*. Accessed January 2011.
1121 http://www.epa.gov/climatechange/downloads/Climate_Change_Ecosystems.pdf
1122
- 1123 Feely, R., Sabine, C., Hernandex-Ayon, J., Ianson, D., and Hales, B. 2008. Evidence for Upwelling of Corrosive
1124 “Acidified” Water onto the Continental Shelf. *Science* 320: 1490-1492.
1125
- 1126 Field, J., Baltz, K., Phillips A., and Walker, W. 2007. Range expansion and trophic interactions of the jumbo squid,
1127 *Dosidicus gigas*, in the California Current. *CalCOFI Report* 48: 131-146.
1128
- 1129 Food and Agriculture Organization (FAO). 1995. *Code of Conduct for Responsible Fisheries*. Food and Agriculture
1130 Organization, Rome. Accessed December 2012. <ftp://ftp.fao.org/docrep/fao/005/v9878e/v9878e00.pdf>
1131

- 1132 Food and Agriculture Organization (FAO). 2005. Putting Into Practice the Ecosystem Approach to Fisheries, Abr.
 1133 Food and Agriculture Organization, Rome. Accessed January 2013.
 1134 <ftp://ftp.fao.org/docrep/fao/008/a0191e/a0191e00.pdf>
 1135
- 1136 Food and Agriculture Organization (FAO). 2010. CWP Handbook of Fishery Statistical Standards, Section J:
 1137 Aquaculture. Accessed January 2011. <http://www.fao.org/fishery/cwp/handbook/J/en>
 1138
- 1139 Fournier, D. A., Hampton, J., and Sibert, J. R. 1998. MULTIFANCL: a length-based, age-structured model for
 1140 fisheries stock assessment, with application to South Pacific albacore *Thunnus alalunga*. *Canadian Journal*
 1141 *of Fisheries and Aquatic Sciences*, 55: 2105-2116.
 1142
- 1143 Freese, L., Auster, P. J., Heifetz, J., and Wing, B. L. 1999. Effects of trawling on seafloor habitat and associated
 1144 invertebrate taxa in the Gulf of Alaska. *Marine Ecology Progress Series* 182:119-126.
 1145
- 1146 Froese, R. 2004. Keep it simple: three indicators to deal with overfishing. *Fish and Fisheries* 5(1): 86-91.
 1147
- 1148 Gedamke, T., and Hoenig, J. M. 2006. Estimating mortality from mean length data in nonequilibrium situations,
 1149 with application to the assessment of goosefish. *Transactions of the American Fisheries Society* 135(2):
 1150 476-487.
 1151
- 1152 Hamel, O., Sethi, S., and Wadsworth, T. 2009. Status and Future Prospects for Lingcod in waters of Washington,
 1153 Oregon, and California as assessed in 2009. SAFE document submitted to the Pacific Fisheries
 1154 Management Council. Accessed February 2011. [http://www.pcouncil.org/groundfish/stock-](http://www.pcouncil.org/groundfish/stock-assessments/archived-stock-assessments/)
 1155 [assessments/archived-stock-assessments/](http://www.pcouncil.org/groundfish/stock-assessments/archived-stock-assessments/)
 1156
- 1157 Hampton, J., and Fournier, D. A. 2001. A spatially disaggregated, length-based, age-structured population model of
 1158 yellowfin tuna (*Thunnus albacares*) in the western and central Pacific Ocean. *Marine and Freshwater*
 1159 *Research*, 52: 937-963.
 1160
- 1161 Hilborn, R., Maunder, M. N., Parma, A., Ernst, B., Payne, J., and Starr, P. J. 2000. Documentation for a General
 1162 Age-structured Bayesian Stock Assessment Model: Code named Coleraine. Fisheries Research Institute,
 1163 University of Washington. FRI/UW00/01.
 1164
- 1165 Hillmann, L.G. 2006. *Rocky Shore Management in Oregon: Status and Trends of Resources, Uses, and*
 1166 *Management*. Oregon Parks and Recreation Department, Salem, Oregon.
 1167
- 1168 Hixon, M., Gregory, S. V. & Robinson, W. D. Oregon's fish and wildlife in a changing climate. In *Oregon*
 1169 *Climate Assessment Report* (eds. Dello, K. D. & Mote, P. W.) Ch.7, 266-358 (2010).
 1170
- 1171 Honey, K. T., Moxley, J. H., and Fujita, R. M. 2010. From rags to fishes: data-poor methods for fishery managers.
 1172 *Managing Data-Poor Fisheries: Case Studies, Models & Solutions* 1: 159-184.
 1173
- 1174 Jackson, J. B. C., Kirby, M. X., Berger, W. H., Bjorndal, K. A., Botsford, L. W., Bourque, B. J., Bradbury, R. H.,
 1175 Cooke, R., Erlandson, J., Estes, J. A., Hughes, T. P., Kidwell, S., Lange, C. B., Lenihan, H. S., Pandolfi, J.
 1176 M.,
 1177
- 1178 Keeling, R. F., Körtzinger, A., and Gruber, N: 2010. Ocean deoxygenation in a warming world. *Annual Review of*
 1179 *Marine Science*. 2:199-229.
 1180
- 1181 Lehodey, P., Alheit, J. Barange, T., Baumgartner T., Beaugrand G., Drinkwater, K., Fromentin, J.-M., Hare, S. R.,
 1182 Ottersen, G., Perry, R. I., Roy, C., van der Lingen, C. D., and Werner, F. 2006. Climate variability, fish,
 1183 and fisheries. *Journal of Climate*. 19:5009-5030.
 1184
- 1185 Litz, M. N., Phillips, A. J., Brodeur, R. D., and Emmett, R. L. 2011. Seasonal occurrences of Humboldt squid
 1186 (*Dosidicus gigas*) in the northern California Current System. *CalCOFI Rep* 52: 97-108.
 1187

- 1188 Mantua, N. J., and Hare, S. R. 2002. The Pacific decadal oscillation. *Journal of Oceanography* 58(1): 35-44.
1189
- 1190 Marine Mammal Commission. 2010. Legislation – the Marine Mammal Protection Act. Accessed December 2010.
1191 <http://www.mmc.gov/legislation/mmpa.html>
1192
- 1193 Martell S. and Froese R. 2013. A simple method for estimateing MSY from catch resilience. *Fish and Fisheries*,
1194 14(4): 504-514.
1195
- 1196 Maunder, M. N. 2001. A general framework for integrating the standardization of catch per unit of effort into stock
1197 assessment models. *Canadian Journal of Fisheries and Aquatic Sciences* 58(4): 795-803.
1198
- 1199 McKinnell, S. and Dagg, M. (eds). 2010. *Marine Ecosystems of the North Pacific Ocean, 2003-2008*. North Pacific
1200 Marine Science Organization, Sidney. British Columbia.
1201
- 1202 Methot, R.D. and Wetzel, C.R. 2013. Stock synthesis: A biological and statistical framework for fish stock
1203 assessment and fishery management. *Fisheries Research* 142: 86-99.
1204
- 1205 Millennium Ecosystem Assessment. 2005. *Millennium Ecosystem Assessment Synthesis Report*. eds., J. Sarukhan
1206 and A. Whyte. Millennium Ecosystem Assessment and Island Press, Washington DC.
1207
- 1208 Musick, J. A. 1999. Criteria to define extinction risk in marine fishes: the American Fisheries Society initiative.
1209 *Fisheries* 24(12): 6-14.
1210
- 1211 Musick, J. A., Harbin, M. M., Berkeley, S. A., Burgess, G. H., Eklund, A. M., Findley, L., Gilmore, R.G., Golden,
1212 J.T., Ha, D.S., Huntsman, G.R., McGovern, J.C., Parker, S.J., Poss, S.G., Sala, E., Schmidt, T.W.,
1213 Sedberry, G.R., Weeks, H. and Wright, S. G. 2000. Marine, estuarine, and diadromous fish stocks at risk of
1214 extinction in North America (exclusive of Pacific salmonids). *Fisheries* 25(11): 6-30.
1215
- 1216 National Marine Fisheries Service. 2010a. Magnuson-Stevens Fishery Conservation and Management Act, As
1217 Amended through January 12, 2007. Accessed December 2010.
1218 http://www.nmfs.noaa.gov/msa2007/docs/act_draft.pdf
1219
- 1220 National Marine Fisheries Service. 2010b. *The Endangered Species Act – Protecting Marine Resources*. National
1221 Marine Fisheries Service, Silver Spring, MD. Accessed January 2013. <http://epw.senate.gov/esa73.pdf>
1222
- 1223 National Marine Fisheries Service. 2010c. Office of Protected Resources and the Marine Mammal Protection Act.
1224 Accessed December 2010. http://www.nmfs.noaa.gov/pr/pdfs/mmpa_factsheet.pdf
1225
- 1226 National Marine Fisheries Service. 2010d. Multivariate El Niño Southern Oscillation Index (MEI). Accessed
1227 January 2011. <http://www.nwfsc.noaa.gov/research/divisions/fed/oeip/cb-mei.cfm>
1228
- 1229 National Research Council. 2001. *Marine Protected Areas: Tools for Sustaining Ocean Ecosystems*. National
1230 Academy Press, Washington DC.
1231
- 1232 Oberrecht, K. 2009. *Native Shellfish & Introduced Species in Oregon Estuaries*. Accessed January 2011.
1233 <http://www.oregon.gov/DSL/SSNERR/docs/EMIPubs/shellfish.pdf>
1234
- 1235 Ocean Policy Advisory Council. 1994. *Oregon Territorial Sea Plan*. Ocean Policy Advisory Council, Portland, OR.
1236 Accessed December 2012. http://www.oregon.gov/LCD/OCMP/pages/ocean_tsp.aspx
1237
- 1238 Ocean Policy Advisory Council (OPAC). 2008. *Oregon marine reserve policy recommendations*. Oregon
1239 Department of Land Conservation and Development. Salem, Oregon.
1240
- 1241 Ocean Policy Advisory Council (OPAC). 2011. *Oregon marine reserve policy recommendations*. Oregon
1242 Department of Land Conservation and Development. Salem, Oregon.
1243

- 1244 O'Farrel, M. R. and Botsford L.W. 2005. Estimation of change in lifetime egg production from length frequency
1245 data. *Canadian Journal of Fisheries Science Aquatics* 62: 1626-1639.
1246
- 1247 O'Farrel, M. R. and Botsford, L.W. 2006. Estimation the status of nearshore rockfish (*Sebastes* spp.) populations
1248 with length frequency data. *Ecological Applications* 16(3): 977-986.
1249
- 1250 Olsen, E., Heino, M., Lilly, M., Morgan, M., Brattey, J., Ernande, B., Dieckmann, U. 2004. Maturation trends
1251 indicative of rapid evolution preceded the collapse of northern cod. *Letters to Nature* 428: 932-935.
1252
- 1253 Oregon Coastal Management Program. 2009. Oregon Coastal Management Program: Territorial Sea Plan Table of
1254 Contents. Accessed March 2011. http://www.oregon.gov/LCD/OCMP/Ocean_TSP.shtml
1255
- 1256 Oregon Department of Fish and Wildlife. 2003. Native Fish Conservation Policy. Oregon Department of Fish and
1257 Wildlife, Salem, OR. Accessed December 2012. <http://www.dfw.state.or.us/fish/CRP/docs/nfcp.pdf>
1258
- 1259 Oregon Department of Fish and Wildlife. 2006. Oregon Nearshore Strategy. Marine Resources Program, Newport,
1260 OR. Accessed December 2012. <http://www.dfw.state.or.us/MRP/nearshore/docs/strategy/Strategy.pdf>
1261
- 1262 Oregon Department of Fish and Wildlife. 2012. Technical Supplement The Oregon Conservation Strategy: Potential
1263 impacts of global climate change in Oregon's ocean. Accessed March 2014.
1264 http://www.dfw.state.or.us/conservationstrategy/docs/climate_change/Climate_Change_Supplemental_pdf_9_25_12.pdf
1265
1266
- 1267 Oregon Sustainability Act. 2001. 71st Oregon Legislative Assembly, House Bill 3948.
1268 <http://www.leg.state.or.us/01reg/pdf/AEHB3948.pdf>
1269
- 1270 Pacific Fishery Management Council. 2007a. Fishery Management Plan for U.S. West Coast Highly Migratory
1271 Species. Pacific Fishery Management Council, Portland, Oregon. Accessed January 2013.
1272 <http://www.pcouncil.org/wp-content/uploads/HMS-FMP-Jul11.pdf>
1273
- 1274 Pacific Fishery Management Council. 2007b. Navigating the Council Process, 2nd Ed. Pacific Fishery Management
1275 Council, Portland, OR. Accessed January 2013. http://www.pcouncil.org/wp-content/uploads/Council_Guide.pdf
1276
1277
- 1278 Pacific Fishery Management Council. 2008. Pacific Coast Groundfish Fishery Management Plan. Pacific Fishery
1279 Management Council, Portland, OR. Accessed January 2013. http://www.pcouncil.org/wp-content/uploads/GF_FMP_FINAL_Dec2011.pdf
1280
1281
- 1282 Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO). 2009. Hypoxia off the Pacific Northwest
1283 Coast. Accessed January 2011. http://www.piscoweb.org/files/hypoxia_general%20low-res.pdf
1284
- 1285 Patrick, W. S., Spencer, P., Ormseth, O. A., Cope, J. M., Field, J. C., Kobayashi, D. R., Gedamke, T., Cortés, E.,
1286 Bigelow, K., Overholtz, W., Link, J. and Lawson, A. 2009. Use of productivity and susceptibility indices to
1287 determine stock vulnerability, with example applications to six US fisheries. US Department of Commerce,
1288 NOAA Technical Memorandum, National Marine Fisheries Service.
1289
- 1290 Patrick, W. S., Spencer, P., Ormseth, O. A., Cope, J. M., Field, J. C., Kobayashi, D. R., Gedamke, T., Cortés, E.,
1291 Bigelow, K., Overholtz, W., Link, J. and Lawson, A. 2010. Using productivity and susceptibility indices to
1292 assess the vulnerability of United States fish stocks to overfishing. *Fishery Bulletin* 108(3): 305-322.
1293
- 1294 Peterson, C. H., Steneck, R. S., Mia J. Tegner, M. J., and Warner, R. R. 2001. Historical overfishing and the recent
1295 collapse of coastal ecosystems. *Science* 293:629-638.
1296
- 1297 Phillips, A., Ralston, S., Brodeur, R., Auth, T., Emmett, R., Johnson, C., and Wespestad, V. 2007. Recent Pre-
1298 Recruit Pacific Hake (*Merluccius Productus*) Occurrences in the Northern California Current Suggest a
1299 Northward Expansion of their Spawning Area. *CalCOFI Report*, Vol. 48: 215 – 229.

1300
1301 Pope, J. G. 1972. An investigation of the accuracy of virtual population analysis using cohort analysis. *Int Comm*
1302 *Northwest Atl Fish Res Bull* 9: 65-74.
1303
1304 Pope, J., MacDonald, D., Daan, N, Reynolds, J., and Jennings, S. 2000. Gauging the impact of fishing mortality on
1305 non-target species. *ICES Journal of Marine Science* 57: 689-696.
1306
1307 Rosenberg, A.A., Fogarty, M.J., Cooper, A.B., Dickey-Collas, M., Fulton, E.A., Gutiérrez, N.L., Hyde, K.J.W.,
1308 Kleisner, K.M., Kristiansen, T., Longo, C., Minte-Vera, C., Minto, C., Mosqueira, I., Chato Osio, G.,
1309 Ovando, D., Selig, E.R., Thorson, J.T. & Ye, Y. 2014. Developing new approaches to global stock status
1310 assessment and fishery production potential of the seas. *FAO Fisheries and Aquaculture Circular No. 1086*.
1311 Rome, FAO. 175 pp.
1312
1313 Scandol, J.P. 2003. Use of cumulative sum (CUSUM) control charts of landed catch in the management of fisheries.
1314 *Fisheries Research* 64:19-36.
1315
1316 Schwing, F. B., Murphree, T., DeWitt, L., and Green, P. M. 2002. The evolution of oceanic and atmospheric
1317 anomalies in the northeast Pacific during the El Niño and La Niña events of 1995–2001. *Progress in*
1318 *Oceanography* 54(1): 459-491.
1319
1320 Stachowicz, J. J., Whitlatch, R. B., and Osman, R. W. 1999. Species Diversity and Invasion Resistance in a Marine
1321 Ecosystem. *Science* 286: 1577 – 1579.
1322
1323 Tegner, M. J. and Dayton, P. K. 2000. Ecosystem effects of fishing in kelp forest communities. *ICES Journal of*
1324 *Marine Science* 57: 579 – 589.
1325
1326 United Nations. 1982. United Nations Convention of the Law of the Sea. Accessed January 2013.
1327 http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf
1328
1329 United Nations. 1995. Agreement for the Implementation of the Provisions of the United Nations Convention on the
1330 Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish
1331 Stocks and Highly Migratory Fish Stocks. Sixth session. New York, New York.
1332
1333 United States Department of State. 2014. Marine debris and derelict fishing gear. Accessed January 2014.
1334 <http://www.state.gov/e/oes/ocns/fish/ecosystem/debris/>
1335
1336 United States Fish and Wildlife Service. 2009. *ESA Basics: More than 30 Years of Conserving Endangered Species*.
1337 United States Fish and Wildlife Service, Arlington, Virginia.
1338
1339 Walters, C.J., Martell, S.J.D., and Korman, J. 2006. A stochastic approach to stock reduction analysis. *Canadian*
1340 *Journal of Fisheries and Aquatic Science* 63.

1341

1342

1343

1344

1345

1346 **Appendix A: International and Federal Management Affecting Oregon Fisheries**

1347 The following provides an overview of the numerous principles, agreements, policies, and
1348 treaties established by organizations managing fisheries at international and federal levels most
1349 pertinent to the development of Oregon’s MFMPs

1350

1351 **1. International Fisheries Management**

1352 Sovereign nations have established Exclusive Economic Zones (EEZs) extending from the
1353 nation’s coastal baseline seaward to 200 nautical miles within which the nation has authority for
1354 management and conservation of all living marine resources. The management of certain marine
1355 fisheries within the jurisdiction of the state of Oregon is directed by agreements, treaties, and
1356 overarching policies established by international organizations. Fish stocks that are highly
1357 migratory who are limited in range to the high seas, or whose ranges straddle multiple EEZs are
1358 the focus of international management efforts. Identified in the following are existing
1359 international organizations, agreements, and policies that regulate marine fisheries resources
1360 and/or are material to the development of Oregon’s MFMPs.

1361

1362 **1.1. United Nations Fishing Agreement**

1363 Known formally as the “Agreement for the Implementation of the Provisions of the United
1364 Nations Convention on the Law of the Sea of December 1982 relating to the Conservation and
1365 Management of Straddling Fish Stocks and Highly Migratory Fish Stocks” this treaty,
1366 commonly referred to as the United Nations Fishing Agreement (UNFA) establishes a
1367 framework for the conservation and management of highly migratory species and straddling
1368 stocks. The UNFA recognized a number of general principles for managing these stocks that
1369 led to a concerted effort to implement an ecosystem approach to fisheries management (Balton
1370 and Koehler, 2006). Ratifying nations, of which the United States is one, agree to apply a
1371 precautionary approach to managing the harvest of these stocks (Article 6) and to strive for
1372 compatibility of conservation and management measures (Article 7) both on the high seas and
1373 in the sovereign waters of the ratifying nation.

1374

1375 **1.2. International Pacific Halibut Commission**

1376 In 1923, a convention between the United States and Canada established the International
1377 Pacific Halibut Commission (IPHC). The purpose of the IPHC is to assess, conduct research
1378 on, set policy for, and manage the Pacific halibut stock within United States’ and Canada’s
1379 EEZs by annually setting a total allowable catch (TAC) in the northeast Pacific. Three
1380 government appointed commissioners from the United States, along with three from Canada,
1381 are designated to preside over the IPHC. Pacific halibut, a straddling stock harvested and
1382 landed in Oregon, is managed by this bilateral international organization to the extent that it
1383 sets the TAC for the area that includes the waters off California, Oregon, and Washington, and
1384 issues licenses to commercial and charter vessels that retain halibut caught in these waters. For
1385 more information see <http://www.iphc.int/home.html>.

1386

1387 **1.3. The Inter-American Tropical Tuna Commission**

1388 The United States is a member of the Inter-American Tropical Tuna Commission (IATTC),
1389 established in 1950, which is responsible for the management and conservation of tuna species
1390 in the eastern Pacific Ocean. Each of the twenty-one member nations is represented by up to

1391 four Commissioners appointed by their respective governments. The IATTC forms
1392 recommendations regarding the harvest of tunas, including albacore tuna, landed in the state of
1393 Oregon. These recommendations are then considered and approved by the United States
1394 Department of State. Once approved by the State Department, the National Marine Fisheries
1395 Service implements regulations and management actions to effectuate IATTC
1396 recommendations such as quotas or any other limits on harvest for a particular species.
1397

1398 **1.4 Convention for the Conservation and Management of Highly Migratory Fish Stocks**
1399 **in the Western and Central Pacific Ocean**

1400 The WCPF Convention, as it is commonly known, mirrors the general principles laid out in the
1401 UNFA for managing highly migratory fish stocks such as tuna, billfish and sharks. The WCPF
1402 Convention seeks to address problems in management of high seas fisheries for highly
1403 migratory fish stocks in the region. The WCPF Convention, which became effective in 2004,
1404 established the Western and Central Pacific Fisheries Commission composed of representatives
1405 from members to the Convention, cooperating non-members and territories. As of 2014 there
1406 are twenty-six members of the Commission, eight cooperating non-members and seven
1407 participating territories. The United States is a member. The Commission has established a
1408 memorandum of understanding with the IATTC and other regional fisheries management
1409 organizations. The Commission holds annual meetings to consider conservation and
1410 management measures. Albacore tuna is one of the highly migratory species that the
1411 Commission works with that is relevant to Oregon fisheries. Vessels fishing in the WCPF
1412 Convention area sometimes land their catch in Oregon.
1413

1414 **1.4. Pacific Coast Albacore Tuna Vessels and Port Privileges Treaty**

1415 To specifically facilitate the harvest of the highly migratory albacore tuna stock that ranges
1416 between the United States' and Canada's EEZs, the Pacific Coast Albacore Tuna Vessels and
1417 Port Privileges treaty was signed in 1981 and has subsequently been amended on several
1418 occasions. This agreement establishes each nation's right to harvest albacore tuna in the other
1419 nation's EEZ seaward of 12 miles from the coastal baseline, and allows each nation's vessels
1420 to use certain ports of the other nation for multiple purposes including obtaining crew,
1421 provisioning and vessel maintenance. This agreement does not set limitations on TAC,
1422 however. The United States and Canada have agreed to exchange data pertinent to this fishery.
1423

1424 **1.5. Pacific Whiting Treaty**

1425 The Pacific Whiting Treaty, known formally as the "Agreement Between the Governments of
1426 Canada and the Government of the United States of America on Pacific Hake/Whiting", was
1427 first signed in 2003 and implemented in 2012. Pacific whiting (also known as Pacific hake) is a
1428 straddling stock that ranges within both countries' EEZs. This treaty strengthens cooperation
1429 between the United States and Canada and allocates agreed percentages of the TAC of Pacific
1430 Whiting to each country. The Joint Technical Committee (JTC) conducts an annual stock
1431 assessment to determine potential yield of the whiting fishery, while the Scientific Review
1432 Group independently reviews the work of the JTC. The Joint Management Committee
1433 determines TAC for whiting every year. An industry advisory panel reviews the management
1434 of the fishery and provides input regarding TAC.
1435

1436 **2. Federal Fisheries Management**

1437 Marine fisheries conducted by vessels within the jurisdiction of the United States are managed
1438 by multiple federal agencies, organizations, and legislative acts of Congress. Summarized below
1439 are existing federal legislation and government bodies that provide overarching regulation of
1440 marine fisheries management under which state of Oregon MFMPs will be developed and
1441 operate.

1442

1443 **2.1. Federal Legislation Integral to the Development of MFMPs**

1444 Legislation enacted by the federal government shape Oregon’s jurisdiction over marine
1445 fisheries, and establishes harvest regulations for numerous marine resources under state
1446 purview. Legislative acts pertinent to Oregon’s MFMPs are:

1447

1448 **a. Presidential Proclamation 5030 (1983)**

1449 Presidential Proclamation 5030 authorizes the establishment of the United States’ Exclusive
1450 Economic Zone (EEZ), defined as the area 200 nautical miles seaward of the coastal baseline
1451 and onto the continental shelf of all United States and U.S. Territories. This proclamation
1452 also:

- 1453 • asserts the United States’ sovereign right over the jurisdiction and management of all
- 1454 living natural resources within the EEZ, and;
- 1455 • commits the United States to protecting the marine environment within the EEZ.

1456

1457 **b. Submerged Lands Act (1953)**

1458 The Submerged Lands Act (43 U.S.C. § 1301) grants states title to the seabed, the marine
1459 waters, and the resources contained within the geographic area seaward three nautical miles
1460 from either a state’s coastal baseline or from the low water baseline of offshore islands or
1461 rocks. This area is commonly referred to as a state’s territorial sea.

1462

1463 **c. Magnuson-Stevens Fishery Conservation and Management Act (1976)**

1464 The Magnuson-Stevens Fishery Conservation and Management Act (MSA; NMFS 2010a) is
1465 the primary law governing federal marine fisheries management in United States. The MSA
1466 was amended and reauthorized in 1996 and 2006. The MSA establishes the United States’
1467 jurisdiction over marine fisheries management throughout the EEZ, beyond the EEZ onto the
1468 continental shelf, and over anadromous fisheries throughout the migratory range of these
1469 species beyond the EEZ. The MSA also establishes an inner boundary for the U.S. EEZ that
1470 is coterminous with a coastal state’s territorial sea. The MSA establishes national standards
1471 for fishery resource conservation, fishery management, and the development of fishery
1472 management plans (FMPs) based on the best available science to achieve optimum yields
1473 while preventing overfishing. To manage United States fisheries by region and to promote
1474 the conservation of fish stocks, the MSA created eight regional fishery management councils
1475 authorized to develop and implement FMPs and policy. The MSA gives the Secretary of
1476 Commerce authorization to evaluate, approve, and implement federal FMPs. The original Act
1477 promoted the development of a domestic fishing industry by phasing out foreign fishing
1478 fleets in the United States’ EEZ. The 1996 Sustainable Fisheries Act amendment to the MSA
1479 focused on defining measurable criteria for overfished stocks, rebuilding overfished species,
1480 protecting essential fish habitat, promoting recreational catch and release programs, and
1481 reducing bycatch. The 1996 amendment also gave the states of Oregon, Washington, and

1482 California conditional jurisdiction over the Dungeness Crab Fishery adjacent to these states
1483 out to the 200 nautical mile EEZ boundary. The 2006 amendment strengthens the mandate to
1484 end and prevent overfishing, promotes market-based management approaches, provides a
1485 larger role for science in decision making, and promotes enhanced international cooperation
1486 in fisheries management. Key provisions include annual catch limits based on scientific
1487 advice and accountability measures for all FMP species.
1488

1489 **d. Endangered Species Act (1973)**

1490 The Endangered Species Act (ESA) is one of the primary laws utilized to protect fish,
1491 wildlife and flora within the United States (USFWS 2009). The purpose of the ESA is to
1492 protect any species identified as being in danger of extinction throughout all or a significant
1493 portion of its range (endangered), or likely to become endangered in the foreseeable future
1494 (threatened). The ESA provides a program for conserving these species, and mechanisms to
1495 implement steps necessary to enforce international treaties relevant to the protection of any
1496 threatened or endangered species within the United States. Moratoriums on the harvest of
1497 species listed under the ESA apply to such marine resources occurring in Oregon marine
1498 waters.
1499

1500 The National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife
1501 Service (USFWS), of the Department of the Interior, share the responsibility of administering
1502 the ESA. The NMFS has primary responsibility for protecting marine and anadromous fish
1503 and wildlife species. Marine fisheries that interact with threatened or endangered species may
1504 be subject to management restrictions implemented to protect these species.
1505

1506 **e. Marine Mammal Protection Act (1972)**

1507 All marine mammals occurring in Oregon waters are managed by federal legislation and
1508 agencies. The Marine Mammal Protection Act (MMPA) gives management jurisdiction for
1509 most marine mammals, including pinnipeds and cetaceans, to the NMFS (NMFS 2010c;
1510 Marine Mammal Commission 2010). The USFWS is, however, responsible for the protection
1511 of otters, walruses, polar bears and manatees. A third federal agency, the Marine Mammal
1512 Commission, reviews existing policies and makes recommendations to NFMS and USFWS
1513 for improving the implementation of the MMPA. The MMPA establishes a national policy
1514 for preventing marine mammal species from declining to the point “where they cease to be
1515 significant functioning elements of the ecosystems of which they are a part” (NMFS 2010c).
1516 To this effect, the MMPA establishes a moratorium on killing, capturing, or harassing marine
1517 mammals within United States’ waters, although exceptions are allowed with appropriate
1518 authorization from NMFS. Marine fisheries that interact with marine mammals may be
1519 subject to management restrictions implemented to protect these species.
1520

1521 **f. Migratory Bird Treaty Act (1918)**

1522 The Migratory Bird Treaty Act (MBTA) is legislation implementing agreements, treaties and
1523 conventions between the US, Mexico, Canada, Japan, and the former Soviet Republic (now
1524 its successor state Russia) for the protection of migratory birds. The MBTA prohibits the
1525 harvest, killing, sale or possession of migratory birds, any parts, eggs, or nests. A list of the
1526 birds subject to protection under the MBTA is located at the USFWS Migratory Bird

1527 Program website. Marine fisheries that interact with and incidentally take migratory birds
1528 may be subject to management restrictions implemented to protect these species.

1529

1530 **g. Coastal Zone Management Act (1972)**

1531 The Coastal Zone Management Act (CZMA) recognizes the importance of meeting the
1532 challenges of continued growth in the coastal zone. Some of the key goals of the CZMA
1533 include protecting natural resources, providing public access for recreation, managing
1534 development in high-hazard areas, giving development priority to coastal-dependent uses,
1535 and coordinating state and federal actions. Two national programs were created under the
1536 CZMA, the Coastal Zone Management Program and the National Estuarine Research
1537 Reserve System.

1538

1539 **2.2. Federal Fishery Management Bodies**

1540 The following management bodies develop and implement federal fisheries management
1541 policies and FMPs for Pacific Ocean waters of the U.S. west coast including Oregon:

1542

1543 **a. National Marine Fisheries Service (NMFS also known as NOAA Fisheries)**

1544 Fisheries management within the United States' EEZ falls under federal jurisdiction of and is
1545 regulated by NMFS, a line office of the National Oceanic and Atmospheric Administration
1546 (NOAA) which is one of the Bureaus in the Department of Commerce. The NMFS mission is
1547 to provide:

1548

1549 *“stewardship of living marine resources for the benefit of the nation through their science-*
1550 *based conservation and management and promotion of the health of their environment.”*

1551

1552 As mandated by the MSA, NMFS shares responsibility for fisheries management in the
1553 United States' EEZ and out onto the continental shelf with eight Regional Fishery
1554 Management Councils. The Councils advise NMFS. In some instances, NMFS develops
1555 FMPs for fisheries within the EEZ; however, NMFS more often evaluates and approves
1556 FMPs developed by the Regional Fisheries Management Councils. Policies set by NMFS
1557 exercise authority over the harvest of marine resources within United States EEZs and
1558 establish the harvest specifications and management measures for species included in FMPs.
1559 Rule-making by NMFS is announced in the Federal Register.

1560

1561 **b. Pacific Fishery Management Council**

1562 The Pacific Fishery Management Council (Council) is one of the eight regional councils
1563 mandated by MSA. Many marine fish stocks off the state of Oregon are under Council
1564 jurisdiction. The Council is charged with exercising sound judgment in the stewardship of
1565 fishery resources along the west coast of the United States. The Council is comprised of 14
1566 voting members from Oregon, Washington, California, and Idaho. Representatives are from
1567 state fish and wildlife agencies, Indian tribes, or are private citizens who are knowledgeable
1568 about recreational and commercial fishing and conservation (NMFS 2010a). The Council
1569 prepares FMPs for fisheries under the jurisdiction of NMFS and recommends annual catch
1570 limits (ACLs) and management measures for species and species complexes in FMPs. The
1571 Secretary of Commerce approves federal FMPs before plans are implemented. Once a FMP
1572 has been approved, federal regulations are adopted to implement management measures.

1573 Federal FMPs that direct management of some species and species complexes harvested and
1574 landed in Oregon's marine waters include:
1575

- 1576 • *The Pacific Coast Groundfish Fishery Management Plan* (managed species: 64
1577 rockfish, 12 flatfish, 6 roundfish, 6 sharks and skates, and 3 other species);
1578 <http://www.pcouncil.org/groundfish/fishery-management-plan/>
- 1579 • *The Coastal Pelagic Species Fishery Management Plan* (managed species: northern
1580 anchovy, market squid, Pacific sardine, Pacific mackerel, and jack mackerel);
1581 [http://www.pcouncil.org/coastal-pelagic-species/fishery-management-plan-and-](http://www.pcouncil.org/coastal-pelagic-species/fishery-management-plan-and-amendments/)
1582 [amendments/](http://www.pcouncil.org/coastal-pelagic-species/fishery-management-plan-and-amendments/)
- 1583 • *The Highly Migratory Species Fishery Management Plan* (managed species: North
1584 Pacific albacore, yellowfin, bigeye, skipjack, and northern Bluefin tunas; common
1585 thresher, pelagic thresher, shortfin mako, and blue sharks; striped marlin; Pacific
1586 swordfish; and dorado); [http://www.pcouncil.org/highly-migratory-species/fishery-](http://www.pcouncil.org/highly-migratory-species/fishery-management-plan-and-amendments/)
1587 [management-plan-and-amendments/](http://www.pcouncil.org/highly-migratory-species/fishery-management-plan-and-amendments/)
- 1588 • *The Salmon Fishery Management Plan* (managed species: Chinook, coho, and pink
1589 salmon); <http://www.pcouncil.org/salmon/fishery-management-plan/>

1590 These FMPs regulate the harvest of associated fish stocks in Oregon unless the state
1591 determines more specific or conservative regulations are needed to sustain these fisheries.
1592
1593
1594



1595 **Appendix B: Overview of Analysis and Management Tools**

1596 The following two tables provide information about many of the analysis (Table 1) and
 1597 management (Table 2) tools available. These tables are meant to provide an overview with
 1598 examples rather than to be a comprehensive list. It is recognized that there is ongoing innovation
 1599 and development of tools for analyzing and managing fisheries. Fishery analysts and managers
 1600 should evaluate the most current tools available and utilize those that suit the individual fishery
 1601 best.

1602 **Table 1.** Examples of modeling tools utilized for assessing the effects of fishing activity on
 1603 stocks of living marine resources. The relative complexity rating for the model ranges from 1
 1604 (least) to 4 (most).

Method	Data Inputs	Description	References	Complexity
CUSUM (cumulative sum)	catch time series	determines if catch trend is significantly changing	Scandol 2003	1
LBIO (length-based indicators of overfishing)	catch time series; length frequencies and maturity schedule	evaluates current percentages of mature specimens in catches to general goals	Froese 2004, Cope & Punt 2009	1
PSA (productivity and susceptibility analysis of vulnerability)	growth; natural mortality; age at maturity; susceptibility of stock to fishing	produces a relative level of vulnerability of stock to overfishing	Patrick et al. 2009	1
Catch-MSY	catch time series; priors for r and K ; initial and final depletion rates	Schaefer type model that estimates MSY based on catch, life history characteristics and carrying capacity	Martell and Froese 2013; Rosenberg et al. 2014	2
SEINE (survival estimates in non-equilibrium situations)	catch at length series; growth; selectivity at length	uses growth to estimate different mortality at length rates during multiple time periods that can be compared to appropriate fishing mortality rates	Gedamke & Hoenig 2006	2
Length-based Spawning Potential Ratio	natural mortality; growth; catch at length	estimates total mortality (natural and fishing) to incorporate into a simple population dynamics model to estimate spawning potential	Ault et al. 2008	2
AIM (an-index-method)	catchability; exploitation index	uses catch data to infer stock status and estimates a relative mortality at which the population is likely to be stable	NOAA Fisheries Toolbox (http://nft.nefsc.noaa.gov/AIM.html)	2

Method	Data Inputs	Description	References	Complexity
FLEP (fractional lifetime egg production)	two size frequency distributions (one prior to fishing pressure and one current); age-length relationship; length-egg production relationship; natural mortality	compares lifetime egg production between current and unfished state	O'Farrel & Botsford 2005, O'Farrel & Botsford 2006	2
AFS Extinction Risk Criteria	growth; fecundity; age at maturity; maximum age	determines a relative productivity level and uses observed declines to qualitatively assess risk	Musick 1999, Musick et al. 2000	2
In-season depletion estimator	catch time series by week; growth; recruitment; and survival	compares CPUE to real-time abundance estimates to produce an estimator	Maunder 2001	2
DB-SRA (depletion-based stock reduction analysis)	catch time series; age at maturity; natural mortality; annual productivity	uses productivity and derived stock parameters to estimate sustainable yields	Dick & MacCall 2010	2
VPA (virtual population analysis)	catch time series; natural mortality; fishing mortality; catch at age or length	projects cohorts backwards in time using an estimate of survivorship and fishing mortality	Pope 1972	3
SSRA (stochastic stock reduction analysis)	catch time series; relative abundances (CPUE); growth; length and age at maturity; uncertainty in survivorship; uncertainty for maximum sustainable yield; age and length frequencies	uses historical catches to estimate recruitment rates that can produce current stock sizes under different recruitment regimes	Walters et al. 2006	3
SSS (simple stock synthesis)	natural mortality; selectivity; growth; fecundity; depletion; stock-recruitment relationship	uses historical catch, assumptions about selectivity, and fixed life history parameters to estimate initial recruitment and provides an overfishing limit	Cope 2013	3
exSSS (extended simple stock synthesis)	natural mortality; selectivity; growth; fecundity; depletion; stock-recruitment relationship; relative abundances (CPUE); age or length composition	similar to SSS, except that life history parameters are estimated using simulations and abundance indices can be incorporated	Cope 2012	3

Method	Data Inputs	Description	References	Complexity
SS3 (stock synthesis version 3)	for each sub-area within a stock - catch time series; natural mortality; fishing mortality; catch at age or length; growth; spawner-recruitment relationship; selectivity; relative abundances; plus fishery dynamics information	calibrates a statistical population dynamics model primarily using age-structured data from both fishery-dependent and -independent data	Methot & Wetzel 2013	4
Colrairie	sex-specific catch at age and/or at length; from multiple gears/fleets; growth; multiple fishery-dependent or -independent indices of abundance	a generalized age-structure model that provides outputs on vulnerable biomass, recruitment, spawners and harvest rate trends fit to predicted CPUE and indices of abundances	Hilborn et al. 2000	4
MULTIFAN-CL	catch time series from one or multiple fleets; effort; length frequencies; various estimates of biological and fisheries data; can accommodate additional data inputs	a length-based, age-structured model that provides an integrated method of estimating catch age composition, growth parameters, mortality rates, recruitment, and other parameters	Fournier et al. 1998, Hampton & Fournier 2001	4

1605

1606

1607

Table 2. Overview of fishery management tools.

Output (Catch) Controls		Measures that directly control amount of the resource caught.	
Quotas	Maximum catch allowed for an area. Quotas can be allocated to specific user groups, gear types, sub-areas, or seasons. Generally used to allocate total allowable catch, quotas can also be used to allocate fishing effort or biomass.		
Biological			
	Size Limits	Usually a minimum size of an organism that can be retained by a fisherman. May be based on biology to allow the species to grow to reproductive size. Size limits can also be applied as a maximum size limit - fish over a certain size cannot be retained. A minimum size limit in combination with a maximum size limit is termed a slot limit.	
	Sex Restrictions	Only individuals of a certain sex may be retained.	
	Seasons	Harvest restricted during certain times of the year.	
	Non-retention	Harvest of certain species is prohibited.	
Recreational			
	Daily bag limits	Can only catch a specified number of fish/organisms per day.	

	Annual bag limits	Can only catch a specified number of fish/organisms per year or season.
	Catch and release	Allows for the catch, but not retention of a species.
Commercial		
	Trip limits	Total allowable amount of a species or species complex, by weight, or by percentage of fish on board, that may be taken and retained, possessed, or landed per vessel from a single fishing trip.
	Cumulative trip (period) limits	Maximum amount that may be taken and retained, possessed, or landed per vessel in a specified period of time, with or without a limit on the number of landings or trips.
Input (Effort) Controls	Measures used to control the amount of fishing activity occurring on the fishing grounds in a given period of time (fishing effort). Input controls limit the amount of effort through such measures as time fished, vessel size, amount and type of gear. Input controls may be cost-effective management measures and minimize waste; however, it increases incentives to expand uncontrolled inputs and requires adjustment since technological advances result in increases in effectiveness.	
Area-based Management	Fisheries management conducted and implemented on a spatial scale for specific areas. These can include separate quotas for different areas, different limits for areas, permissible or excluded fisheries for specific areas, areas closed to certain gear types, certain fisheries, or fishing activity in general. These tools can also be put in place for biological reasons such as to restrict fishing effort in locations know to be hot spots for certain species.	
	Permanent	Areas closed or restricted permanently to harvest activities.
	Temporary	Area closed or restricted for a temporary period of time to harvest activities.
	Rotating	Areas closed for long periods of time (years, decades) and reopened to allow fishing. Areas may be rotated to offer a mixture of long-term protection of sensitive species and fisheries access.
	Depth	Fishing restricted at or to certain depths
Temporal-based Management	Season	Fishing closures for a defined period of time. Examples include closures used to protect spawning fish, molting crabs, or sensitive species.
Permits and Licenses	Permits and licenses can serve to structure fishing activity and can also be limited in number in order to restrict the total amount of fishing effort.	
	Area endorsements	Some permits limit fishing activity to particular areas or regions.
	Gear endorsements	Some permits place restrictions on the type of gear or specific gear configurations that can be utilized while fishing under that permit.

	Limited entry	Limited entry works by limiting the total amount of fishing effort by restricting the number of licenses or permits sold. Qualification is usually based upon historical fishing patterns.
	Permit stacking	Allows permit owners to register multiple limited entry permits to a single vessel. This tool can be utilized for socioeconomic reasons.
	Species endorsements	Some permits for particular fisheries limit the species that can be landed.
	Commercial Fishing License	License allowing the commercial harvest and sale of marine resources
	Charter boat license	License for charter boats. May be limited entry to control number of charter operators. Can be separate charter licenses for different recreational fisheries.
	Recreational Saltwater Fishing License	License to recreationally harvest marine resources.
	Shellfish License	License to recreationally or commercially harvest shellfish.
	Gear Regulations	Gear restrictions and limits can be used as a method to limit effort or the type of fishing effort. Pot limits and gear type restrictions for harvesting certain species are examples. Prohibition of certain gears or gear specifications can also be used to reduce bycatch, limit fishing power and ghost fishing from derelict gear, and control impacts to habitats. Examples include bycatch reduction devices (BRDs), or devices or gear modifications used to reduce bycatch, often of specific species.
	Limited Access Privileges	Where an individual fisherman, community, or other entity is granted the privilege to catch a specified portion of the total allowable catch. The incentive is to catch the full share at a low cost and sell the best quality fish at the highest obtainable price. Limited access privileges are concerned with: (1) how access to the fishery is restricted, (2) how much fishing effort each participant is allowed, or (3) how much catch each can take.
	Individual Fishing Quotas (IFQs)	IFQs allocate a certain portion of the total allowable catch to individual vessels, fishermen, or other eligible recipients based on initial qualifying criteria.
	Individual Transferable Quotas (ITQs)	IFQ that can be transferred. ITQs typically entail allocations of a certain amount of an established annual catch to individual fishermen or vessel owners. Once distributed, fishermen can buy or sell their share, or individual quota, to other fishermen or vessel owners.
	Territorial Use Rights in Fisheries (TURFs)	TURFs give an individual or group dedicated access to the resource within a specific area of the ocean.
	Community Quotas	Community quotas grant a specific portion of the allowable catch to a community. The community then decides how to allocate the catch.
	Fishing Cooperatives	Cooperatives are assigned a portion of the available quota, which is then split among various fishing and processing entities within the cooperative via contractual agreements.
	Additional Tools	
	Angler Education	Educational programs for both the general public and targeted audiences; examples include to properly identifying fish species, reducing bycatch of prohibited species, and clarifying or gaining input on regulations