

PACIFIC SALMON AMENDMENT 18, INCORPORATING CHANGES TO ESSENTIAL FISH HABITAT: OVERVIEW OF ALTERNATIVES

Introduction

The 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) included requirements to identify, describe, and protect essential fish habitat (EFH). EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The MSA and EFH regulations require Regional Fishery Management Councils (RFMC) to describe and identify EFH by life-stage, evaluate potential adverse impacts to habitat and develop measures to protect EFH, and identify major prey species, among other provisions. These items must be included in all Fishery Management Plans (FMPs).

EFH for Pacific salmon was originally described in Appendix A to Amendment 14 of the Pacific Coast Salmon FMP (Amendment 14) (PFMC 1999), which identified Pacific salmon EFH as “all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon in Washington, Oregon, Idaho, and California. In estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (EEZ) offshore of Washington, Oregon, and California north of Point Conception.” Pacific Coast salmon EFH also includes those areas off Alaska designated as salmon EFH by the North Pacific Fishery Management Council (NPFMC). Freshwater EFH excludes areas above longstanding naturally impassable barriers and certain man-made barriers representing the current upstream extent of Pacific salmon access. The Pacific Fishery Management Council (Council) made minor revisions during the EFH codification process in 2008 (2008 Final Rule)(78 FR 60987).

The Council and NMFS initiated a review of salmon EFH in 2009. In the years since Pacific Coast salmon EFH was first identified and described in 1999, NMFS has taken steps to clarify the process for identifying, describing, and refining EFH. In 2002, NMFS published a final rule to implement the EFH provisions of the MSA (50 CFR Part 600), and, in 2006, issued a memorandum providing additional guidance to refine the description and identification of EFH (NMFS 2006). This review was guided by these two clarifying documents.

The Environmental Assessment (Agenda Item E.2.a, Attachment 1; [available electronically only](#)) analyzes alternatives that were developed to reflect new and newly-available information generated during the recent EFH periodic review. Section 1 contains background, purpose and need, the Council’s FMP amendment schedule, and a summary of related documents. Section 2 contains the detailed description of the alternatives; Section 3 contains a description of the affected environment; Section 4 is the analysis of alternatives; Section 5 describes consistency with applicable laws; and Section 6 contains literature cited.

Appendix A (Agenda Item E.2.a, Attachment 2; [available electronically only](#)) is an update of the EFH provisions originally described in Amendment 14 of the Salmon FMP issued in 2000. It provides detailed information regarding the EFH identification and description and other information, and is envisioned as a standalone appendix to the FMP itself. Appendix A includes the detailed description and identification of Pacific salmon EFH, the fishing and non-fishing

activities that may adversely affect EFH, and recommended conservation measures. Appendix A may be updated periodically and made available on the Council's website. It will not necessarily require an FMP amendment to be updated, as per the process outlined in Alternative 12B of the EA.

Detailed descriptions and discussion of the alternatives and the expected environmental impacts resulting from each of the alternatives, as well as any cumulative impacts, are provided in Section 4 of the EA. While there are potential minor impacts associated with some of the alternatives, none of the alternatives were found to have significant impacts to the biological, socioeconomic, or physical environment. In some cases, positive impacts were identified, and are described in Section 4. Based on this, NMFS will make a final determination about the significance of impacts, after the EA, Appendix A, and associated materials are transmitted, following the September 2012 Council meeting.

Description of Alternatives

The suite of alternatives address the potential revisions to salmon EFH identified during the periodic review process. These revisions are based on the required elements of EFH contained in the regulatory guidance (50 CFR 600.815). None of the alternatives are mutually exclusive, with the exception of Alternatives 6C and 6D, which are mutually exclusive with each other; and the No Action Alternatives, which are mutually exclusive with the other alternatives in each category. Therefore, the Council could select more than one action alternative in a given category. For example, the Council could select both Alternatives 3B (add coho EFH to specific hydrologic units [HUs]) *and* 3C (remove EFH designation from one HU).

Selection of any of the action alternatives would modify the existing EFH provisions in the FMP and Amendment 14. The No Action Alternative in each category is equal to status quo. In other words, a decision by the Council to not take action means that the existing EFH provisions would remain in place. Table 2-1 provides an overview of the alternatives, reflecting changes made by the Council at the September 2012 and April 2013 Council meetings.

Table 2-1: Summary of Alternatives

Subject Area	Alternatives
Identification of Pacific salmon EFH	<p>1A. No Action</p> <p>1B. Revise the identification of EFH, clarifying that EFH is designated only for stocks included in the fishery managed by the PFMC.</p>
Chinook salmon freshwater EFH	<p>2A. No Action</p> <p>2B. Add four hydrologic units (HUs) as Chinook salmon EFH: 17060108 (Palouse), 17060308 (Lower NF Clearwater), 18050005 (Tomales-Drakes Bay), and Lake Chelan (17020009); and remove one HU as Chinook salmon EFH: 17100207 (Siltcoos).</p> <p>2C. Designate the mainstem Columbia River and side channels as EFH for Chinook salmon, in HU 17070101.</p> <p>2D. Update EFH designations and maps to be consistent with new USGS California Central Valley 4th field hydrologic units.</p>
Coho salmon freshwater EFH	<p>3A. No Action</p> <p>3B. Add six HUs as coho salmon EFH: 17070103 (Umatilla), 17060305 (South Fork Clearwater), 17060304 (Middle Fork Clearwater), 17060302 (Lower Selway), and 17060301 (Upper Selway), 18060002 (Pajaro).</p> <p>3C: Remove coho salmon EFH from one HU: 18060006 (Central California Coast).</p>
Puget Sound pink salmon freshwater EFH	<p>4A. No Action</p> <p>4B. Designate HU 17110013 (Duwamish) and HU 17110017 (Skokomish) as PS pink salmon EFH.</p>
ESA Section 10(j) experimental population reintroduction efforts	<p>5A. No Action</p> <p>5B. Amend Amendment 14 to add a statement that efforts to reintroduce Pacific salmon as an experimental population into historically occupied habitats under Section 10(j) of the Endangered Species Act will be considered when designating EFH.</p>
Impassable barriers	<p>6A. No Action</p> <p>6B. Update and correct the list of impassable dams, including correct names, other minor corrections, removing dams from the list that are upstream of other impassable barriers, and removing barriers that are now passable from the list: [Dexter Dam (HU 17090001, Middle Fork Willamette River); Big Cliff Dam (HU 19070005, North Santiam River); Cougar Dam (HU 17090004, McKenzie River); Soda Springs Dam (HU 17100301, North Umpqua River)].</p> <p>6C. Revise the criteria for designating a dam as the upstream extent of EFH, and update the list based on the new criteria and new information.</p> <p>6D. Revise the criteria for designating a dam as the upstream extent of EFH, update the list based on the new</p>

	criteria and new information, and include consideration of efforts to reintroduce experimental populations of salmon into historically occupied habitats under Section 10(j) of the Endangered Species Act.										
Marine and estuarine EFH	7A. No Action 7B. Clarify that PS pink salmon marine EFH includes U.S. EEZ waters north of Cape Flattery, Puget Sound/Strait of Juan de Fuca, and Alaskan waters that are designated salmon EFH by the NPFMC.										
EFH descriptions	8A. No Action 8B. Update the text for EFH summaries and descriptions for each species of Pacific Coast salmon, based on best available science. Provide new references as an appendix to Amendment 18; and update EFH descriptions, life history, and habitats, based on new information including habitat needs and life history.										
HAPCs	9A. No Action 9B. Designate channels and floodplains as a HAPC. 9C. Designate thermal refugia as a HAPC. 9D. Designate spawning habitat as a HAPC. 9E. Designate estuaries as a HAPC. 9F. Designate marine and estuarine submerged aquatic vegetation as a HAPC.										
Fishing activities that may adversely affect EFH	10A. No Action 10B. Revise description of MSA fishing activities. 10C. Revise description of non-MSA fishing activities.										
Non-fishing activities that may adversely affect EFH	11A. No Action 11B. Update the information on the existing 21 non-fishing activities that may adversely affect EFH. 11C. Add new non-fishing activities that may adversely affect EFH: <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">11C1. Activities causing high intensity acoustic or pressure waves</td> <td style="width: 50%;">11C6. Power plant intakes</td> </tr> <tr> <td>11C2. Over-water structures</td> <td>11C7. Pesticide use</td> </tr> <tr> <td>11C3. Alternative energy development</td> <td>11C8. Flood control maintenance</td> </tr> <tr> <td>11C4. Liquefied natural gas projects</td> <td>11C9. Culvert construction</td> </tr> <tr> <td>11C5. Desalination</td> <td>11C10. Coal export terminal facilities</td> </tr> </table>	11C1. Activities causing high intensity acoustic or pressure waves	11C6. Power plant intakes	11C2. Over-water structures	11C7. Pesticide use	11C3. Alternative energy development	11C8. Flood control maintenance	11C4. Liquefied natural gas projects	11C9. Culvert construction	11C5. Desalination	11C10. Coal export terminal facilities
11C1. Activities causing high intensity acoustic or pressure waves	11C6. Power plant intakes										
11C2. Over-water structures	11C7. Pesticide use										
11C3. Alternative energy development	11C8. Flood control maintenance										
11C4. Liquefied natural gas projects	11C9. Culvert construction										
11C5. Desalination	11C10. Coal export terminal facilities										
Information and research	12A. No Action 12B. Identify and prioritize new information and research needs.										
Procedures for changing EFH	13A. No Action 13B. Develop process for future changes to EFH.										
Alternatives considered but	4D. Designate HU 17110021 (Crescent-Hoko) as PS pink salmon EFH. 4E. Designate HU 17120102 (Queets-Quinault) as PS pink salmon EFH.										

rejected*	5C. Update the list of dams based on the existing Amendment 14 criteria. 10C10. Add “activities that contribute to climate change” to list of non-fishing activities that may adversely affect EFH.
-----------	--

**These alternatives were numbered differently when considered in September 2012, and therefore do not necessarily align with the new numbering.*

Identification of EFH for Pacific Coast salmon

FMPs are required to identify and describe EFH for all managed species. In very general terms, Amendment 14 to the Pacific Coast Salmon FMP identifies EFH as “those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem.” It goes on to provide additional factors that the Council uses to identify EFH. Based on the review, the Council considered a minor revision to the general description of salmon EFH, to clarify that EFH can only be designated for salmon species that are federally managed and included in a fishery management unit (FMU).

Alternative 1A: No Action

This alternative would retain the existing language on identification of Pacific Coast salmon EFH.

Alternative 1B: Revise the identification of EFH

This alternative would add language to clarify that EFH may only be designated for federally-managed stocks that are included in an FMU. The alternative language would be modified to avoid confusion about which salmon have EFH; and would provide better clarity regarding the identification of EFH and whether EFH can be designated for a particular stock of Pacific salmon.

Freshwater Essential Fish habitat

Freshwater EFH for each of the three managed species is currently designated by 4th field HUs, and is based on the information available at the time of Amendment 14, which was published in May 2000. Continuing to apply an inclusive, watershed-based description of EFH using U.S. Geological Survey (USGS) HUs is appropriate, because it (1) recognizes the species' need to use diverse habitats and underscores the need to account for all of the habitat types supporting the species' freshwater and estuarine life stages, from small headwater streams to migration corridors and estuarine rearing areas, (2) considers the variability of freshwater habitat as affected by environmental conditions (droughts, floods, etc.) that make precise mapping difficult, and (3) reinforces important linkages between aquatic and adjacent upslope areas. Habitat available and utilized by salmon changes frequently in response to floods, landslides, woody debris inputs, sediment delivery, and other natural events.

The periodic review noted a number of potential revisions to the freshwater EFH designations for the three species of salmon managed under the Salmon FMP (See Stadler et al. 2011). These revisions included changes to the 4th field HUs that are designated as EFH for each species, and changes to the dams that mark the upstream extent of EFH.

ALTERNATIVES FOR REVISING CHINOOK SALMON FRESHWATER EFH

As described in Stadler et al. (2011), the 4th field HUs were updated by the USGS, resulting in changes to the names, codes, and boundaries of HUs in the California Central Valley and coast (Amendment 14, Figures 4 and 5). The changes, which pertain primarily to the California Central Valley, typically result in larger, consolidated HUs. The EFH designations in this area should be updated to reflect the current classification system.

The alternatives for revising Chinook salmon EFH in freshwater incorporate new distributional data found during the periodic review and revisions to the numbers, names, and boundaries of the 4th field HUs in the California Central Valley and coast. With the exception of Alternative 2A, these are not mutually exclusive. The Council may elect to implement some or all of these alternatives.

Amendment 16 to the Salmon FMP removed the mid-Columbia River spring Chinook salmon stocks from the FMU. EFH had been identified for these stocks in Amendment 14 to Amendment 14. However, the action of removing them from federal management means that they are no longer eligible to have EFH identified and described for them. While this is not considered an alternative in the context of Amendment 18, the HUs that will lose EFH coverage are listed here for informational purposes:

- Walla Walla River (17070102)
- Upper John Day River (17070201)
- North Fork John Day River (17070202)
- Middle Fork John Day River (17070203)
- Lower John Day River (17070204)
- Upper Deschutes River (17070301)
- Lower Crooked River (17070305)
- Trout Creek (17070307)
- Willow (17071004)

Alternative 2A: No Action

This alternative would retain the existing EFH description and geographic distribution for Chinook salmon, as contained in Amendment 14. As a result, the EFH designation would not be based on the latest distribution data, and would rely, especially in the California Central Valley, on outdated HU codes, names, and boundaries.

Alternate 2B: Add four HUs and remove one as Chinook salmon EFH

- Current distribution data show that Chinook salmon occupy four 4th field HUs that are not currently designated as EFH for this species. These HUs are:
 - 17020009 (Lake Chelan)
 - 17060108 (Palouse)
 - 17060308 (Lower North Fork Clearwater)
 - 18050005 (Tomales-Drakes Bay)
- Current and historic distribution data show that Chinook salmon have not occupied one HU that is currently designated as Chinook salmon EFH:
 - 17100207 (Siltcoos)

Alternative 2C: Designate the mainstem Columbia River and side channels as EFH for Chinook salmon, in HU 17070101

This alternative was intended to ensure that the mainstem Columbia and off channels would retain their designation as EFH for Chinook salmon, despite the fact that the HU would no longer have EFH. However, it is now understood that Council-managed fall-run Chinook salmon

spawn in the tributaries to this HU. This alternative is no longer supported by NMFS and Council staff.

Alternative 2D: Update EFH identification and maps to be consistent with new USGS HU designations

Many 4th field HUs in California were updated by the USGS, resulting in changes to the names, codes, and boundaries of several HUs in the California Central Valley and coast.

This alternative would update the tables and maps of the 4th field HUs designated as EFH for Pacific salmon to reflect the changes in the California Central Valley and coast HU classifications. In some cases, this would result in expansion of EFH into some areas that were not previously designated as EFH. However, much of the new area encompassed by the revised HUs is above impassable barriers, and therefore is excluded from EFH on that basis. In addition, all but the lower reaches of western tributaries to the San Joaquin River would be excluded because of a lack of current or historical salmon distribution.

Table 2-2. Changes to HUs in the California Central Valley and Coast Based on USGS Data Revisions and Necessary Updates to EFH Designations as a Result.

Current HUs to Designate as EFH	Previous HU(s) Designated as EFH with Boundary Overlap	FMP Species
18010109 (Gualala-Salmon)	18010109 (Gualala-Salmon), 18010111 (Bodega Bay)	Chinook, coho
18020104 (Sacramento-Stone Corral)	18020104 (Sacramento-Stone Corral)	Chinook
18020111 (Lower American)	18020111 (Lower American), 18020109 (Lower Sacramento)	Chinook
18020115 (Upper Stony)	18020103 (Sacramento-Lower Thomes)	Chinook
18020116 (Upper Cache)	18020109 (Lower Sacramento), 18020110 (Lower Cache)	Chinook
18020125 (Upper Yuba)	18020107 (Lower Yuba), 18020125 (Upper Yuba)	Chinook
18020126 (Upper Bear)	18020108 (Lower Bear), 18020126 (Upper Bear)	Chinook
18020151 (Cow Creek)	18020101 (Sacramento-Lower Cow-Lower Clear), 18020118 (Upper Cow-Battle)	Chinook
18020152 (Cottonwood Creek)	18020102 (Lower Cottonwood), 18020113 (Cottonwood Headwaters)	Chinook

18020153 (Battle Creek)	18020101 (Sacramento-Lower Cow-Lower Clear), 18020118 (Upper Cow-Battle)	Chinook
18020154 (Clear Creek-Sacramento River)	18020101 (Sacramento-Lower Cow-Lower Clear), 18020112 (Sacramento-Upper Clear), 18020118 (Upper Cow-Battle)	Chinook
18020155 (Paynes Creek-Sacramento River)	18020101 (Sacramento-Lower Cow-Lower Clear), 18020103 (Sacramento-Lower Thomes), 18020114 (Upper Elder-Upper Thomes), 18020118 (Upper Cow-Battle), 18020119 (Mill-Big Chico)	Chinook
18020156 (Thomes Creek-Sacramento River)	18020103 (Sacramento-Lower Thomes), 18020114 (Upper Elder-Upper Thomes), 18020119 (Mill-Big Chico)	Chinook
18020157 (Big Chico Creek-Sacramento River)	18020103 (Sacramento-Lower Thomes), 18020119 (Mill-Big Chico)	Chinook
18020158 (Butte Creek)	18020105 (Lower Butte), 18020120 (Upper Butte)	Chinook
18020159 (Honcut Headwaters-Lower Feather)	18020106 (Lower Feather)	Chinook
18020161 (Upper Coon-Upper Auburn)	18020109 (Lower Sacramento)	Chinook
18020162 (Upper Putah)	18020109 (Lower Sacramento)	Chinook
18020163 (Lower Sacramento)	18020109 (Lower Sacramento)	Chinook
18040001 (Middle San Joaquin-Lower Chowchilla)*	18040002 (Middle San Joaquin-Lower Merced-Lower Stanislaus); 18040001 (Middle San Joaquin-Lower Chowchilla)	Chinook
18040002 (Lower San Joaquin River)*	18040002 (Middle San Joaquin-Lower Merced-Lower Stanislaus)	Chinook
18040003 (San Joaquin Delta)	18040002 (Middle San Joaquin-Lower Merced-Lower Stanislaus), 18040003 (San Joaquin Delta), 18040004 (Lower Calaveras-	Chinook

	Mormon Slough), 18040005 (Lower Cosumnes-Lower Mokelumne)	
18040007 (Fresno River)	18040001 (Middle San Joaquin- Lower Chowchilla)	Chinook
18040008 (Upper Merced)	18040001 (Middle San Joaquin- Lower Chowchilla), 18040002 (Middle San Joaquin-Lower Merced-Lower Stanislaus)	Chinook
18040009 (Upper Tuolumne)	18040002 (Middle San Joaquin- Lower Merced-Lower Stanislaus)	Chinook
18040010 (Upper Stanislaus)	18040002 (Middle San Joaquin- Lower Merced-Lower Stanislaus)	Chinook
18040011 (Upper Calaveras)	18040003 (San Joaquin Delta); 18040004 (Lower Calaveras- Mormon Slough), 18040011 (Upper Calaveras)	Chinook
18040012 (Upper Mokelumne)	18040003 (San Joaquin Delta), 18040005 (Lower Cosumnes- Lower Mokelumne), 18020109 (Lower Sacramento)	Chinook
18040013 (Upper Cosumnes)	18040003 (San Joaquin Delta), 18040005 (Lower Cosumnes- Lower Mokelumne), 18040013 (Upper Cosumnes)	Chinook
18060015 (Monterey Bay)		Coho

* *EFH for Chinook salmon in the Middle San Joaquin- Lower Chowchilla HU (18040001) and Lower San Joaquin River HU (18040002) includes the San Joaquin River, its eastern tributaries, and the lower reaches of the western tributaries. Although there is no evidence of current or historical Chinook salmon distribution in the western tributaries (Yoshiyama et al. 2001), the lower reaches of these tributaries could provide juvenile rearing habitat or refugia from high flows during floods as salmon migrate along the mainstem in this area*

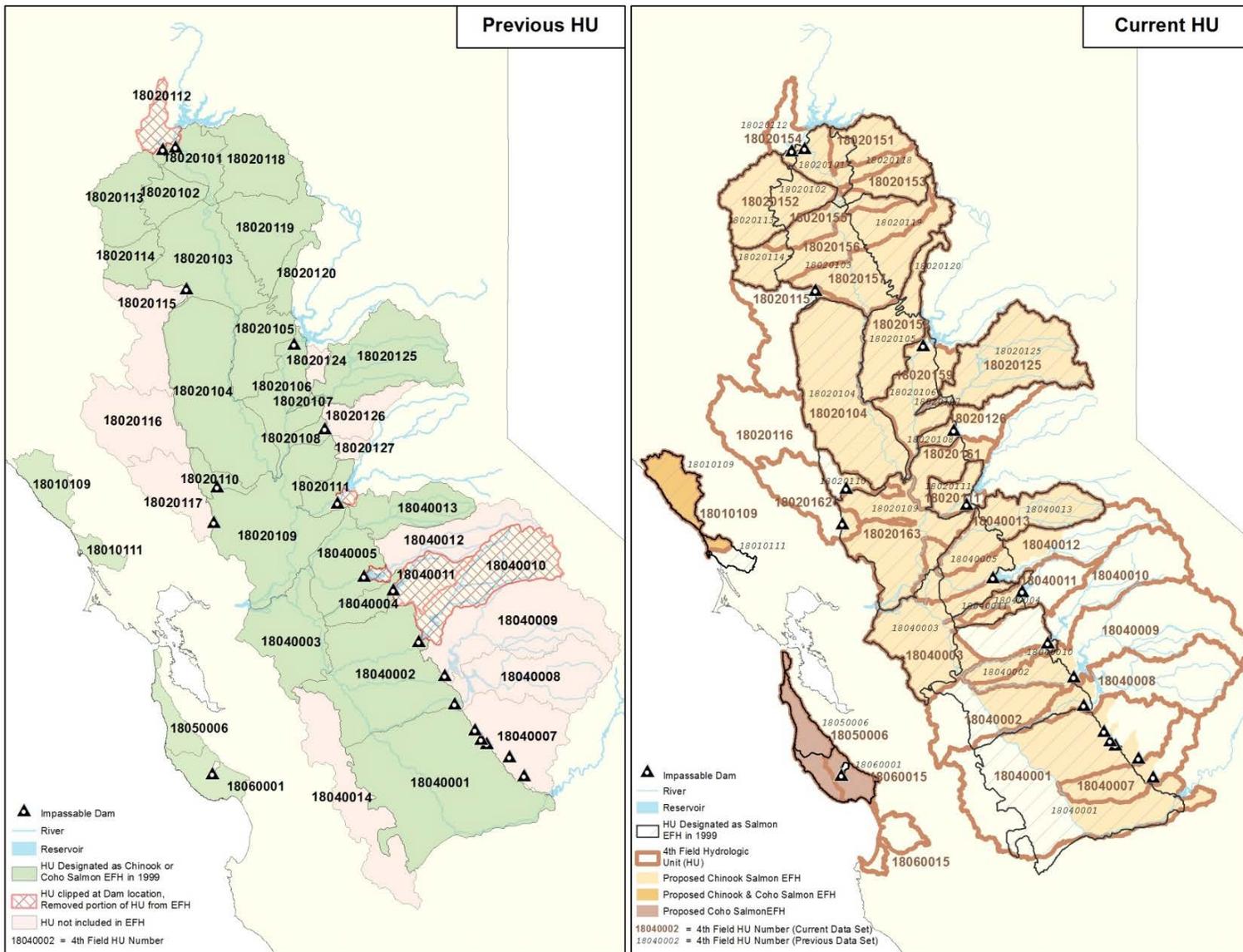


Figure 2-1. Changes in USGS 4th field hydrologic unit number, names, and boundaries between 1999 and 2013.

ALTERNATIVES FOR REVISING COHO SALMON FRESHWATER EFH

The alternatives to revise the designations of coho salmon EFH in freshwater incorporate new distributional data found during the periodic review and recognize that some historical data may not be accurate. With the exception of Alternative 3A, these are not mutually exclusive. The Council may elect to implement some or all of these alternatives.

Alternative 3A. No Action

This alternative would retain the existing EFH description and geographic distribution for coho salmon, as contained in Amendment 14. As a result, the EFH designation would not be based on the latest distribution data, and some HUs with coho salmon would not be designated as EFH.

Alternative 3B. Add six HUs as coho salmon EFH

This alternative would designate six HUs as EFH for coho salmon, and therefore follow the regulatory guidelines for designating EFH based on presence/absence data. Additional 4th field HUs may be designated as EFH for coho salmon under Alternatives 6C and 6D (impassable dams). The Pajaro River HU (18060002) was proposed as coho salmon EFH, but subsequent investigation revealed that there is virtually no documentation of coho presence.

Current distributional data show that coho salmon occupy six 4th field HUs that are not currently designated as EFH for this species. These HUs are:

- 17070103 (Umatilla)
- 17060305 (South Fork Clearwater)
- 17060304 (Middle Fork Clearwater)
- 17060302 (Lower Selway)
- 17060301 (Upper Selway)
- 18060002 (Pajaro River)

Alternative 3C: Remove coho salmon EFH from HU 18060006 (Central California Coast)

The EFH review found that inclusion of this HU as EFH was based on sparse, unsubstantiated information that suggested presence only in the extreme northern portion of that HU.

ALTERNATIVES FOR REVISING PS PINK SALMON FRESHWATER EFH

There are two 4th field HUs that indicate presence of pink salmon but are not currently designated as EFH. The Duwamish (17110013) has experienced dramatic returns of pink salmon in recent years (Stadler et al. 2011), and the Skokomish (17110017) is shown in StreamNet (2012) as being occupied by pink salmon.

Alternative 4A: No Action

The No Action alternative would retain the existing EFH designation for PS pink salmon, as contained in Amendment 14. As a result, the EFH designation would not be based on the most up-to-date information on historical and current distribution.

Alternative 4B: Add HU 17110013 (Duwamish) and HU 17110017 (Skokomish) to PS pink salmon EFH

Current distributional data show that PS pink salmon occupy HU 17110013 (Duwamish) and HU 17110017 (Skokomish), but these HUs are not currently designated as EFH for this species (Figure 2-2). This alternative would designate these HUs as EFH for PS pink salmon, and therefore follow the regulatory guidelines for designating EFH based on presence/absence data.

ALTERNATIVES FOR CONSIDERING ESA SECTION 10(J) EXPERIMENTAL POPULATION REINTRODUCTIONS

Throughout their historical range, salmon have been extirpated from many freshwater habitats that once supported self-sustaining populations. Construction of impassable barriers, such as dams and culverts, blocked access to a significant portion of the historically-occupied areas. In some areas that remain accessible, the habitats have been so degraded by anthropogenic activities that they no longer support salmon. Although these areas are currently unoccupied, they are recognized as important, and reestablishing populations in most of these areas is necessary for maintaining a sustainable salmon fishery and the contribution of salmon to a healthy ecosystem. Section 10(j) of the ESA offers a way to introduce listed Pacific salmon into such areas, but it frequently depends on positive cooperative relationships between federal and state agencies, and landowners. In some such cases, it may be of more benefit to proceed with reintroduction efforts and forego describing the habitat as EFH, since the EFH designation could potentially jeopardize reintroduction efforts.

The Council and NMFS propose consideration of these areas, on a case-by-case basis, to determine whether it is ultimately beneficial to the conservation and management of the population to designate EFH in areas where those experimental populations have been, or are proposed to be, reintroduced.

Alternative 5A: No Action

The No Action alternative would retain the existing approach to designating EFH, and would not accommodate consideration of ESA Section 10(j) experimental reintroduction efforts in determining the extent of EFH.

Alternative 5B: Consider ESA Section 10(j) reintroductions in determining EFH identification

This alternative would amend Amendment 14 to state that efforts to reintroduce Pacific salmon under Section 10(j) of the ESA into historically occupied habitats will be considered when designating EFH. This Alternative would allow the Council and NMFS to include consideration of reintroduction of an experimental population when making a decision to designate EFH in such areas.

IMPASSABLE BARRIERS DESIGNATED AS THE UPSTREAM EXTENT OF EFH

The geographic extent of freshwater EFH as defined in the Salmon FMP and in Amendment 14 includes all currently occupied waters and most of the habitat historically accessible to salmon. It excludes areas above longstanding naturally impassable barriers, but includes areas above all artificial barriers, except those specifically listed as the upstream extent of EFH in Table A-2 in

Amendment 14. Both the EFH regulations and Amendment 14 include justification for designating EFH above impassable barriers. The regulations state that if degraded or inaccessible aquatic habitats have contributed to reduced yields, and if those conditions can be ameliorated through fish passage or other technologically and economically feasible measures that improve water quality or quantity, then EFH should include those habitats needed to obtain increased yields [50 CFR 600.815(a)(1)(iv)(F)].

Section 1.2 of Amendment 14 includes criteria for determining whether a dam should mark the upstream extent of EFH and be listed in Table A-2. The four criteria address whether: 1) the dam is of sufficient size, permanence, and impassability to be considered; 2) the dam is upstream of another impassable dam; 3) fish passage is under consideration or construction at the facility; and 4) NMFS has determined the dam blocks access to habitat that is key for the conservation of the species. This section also notes that currently accessible habitat may not be sufficient to support sustainable salmon fisheries and a healthy ecosystem, and that subsequent analyses may conclude that inaccessible habitat should be made available to the species. Recovery planning, ESA consultations, and hydropower relicensing proceedings are examples of the types of analyses that may be used to make this determination, especially when evaluating a dam using criterion 4. Emphasis is placed on the Federal Energy Regulatory Commission (FERC) relicensing process and the determination whether fish passage facilities will be required to provide access above currently impassable barriers. The section concludes that EFH would be designated above an impassable barrier if salmon access or reintroduction above that barrier became feasible.

ALTERNATIVES FOR DESIGNATING IMPASSABLE BARRIERS AS THE UPSTREAM EXTENT OF EFH

Alternative 6A: No action

The status quo alternative would retain the existing list of dams that represent the upstream extent of EFH as contained in the 2008 Final Rule. The current list contains errors, including unintentionally omitted and misnamed dams, and is based on outdated and incomplete data. This Alternative would not provide for updates to the list of barriers, based on new and corrected information.

Alternative 6B: Update and correct the list of impassable barriers

This alternative would make necessary updates, including correcting misnamed dams, adding erroneously omitted dams, and removing dams from the list that are no longer impassable to salmon. As described above, Amendment 14 includes four criteria for determining whether an artificial barrier should mark the upstream extent of EFH. Amendment 14 states that when an impassable dam is removed or fish passage is implemented, that dam will be removed from the list. In addition, as a result of the list of HUs designated as EFH being updated to reflect the revised USGS 4th field HU names, boundaries, and codes in Alternative 2D, some of the dams marking the upstream extent of EFH in those areas are now located in an HU with a different number and/or name. Those dams and the new HU information, along with the other proposed changes under this alternative, are detailed below.

The following dams were inadvertently omitted from the 2008 Final Rule and should be included on the list of dams marking the upstream extent of EFH unless otherwise noted.

- Bull Run Dam #2 (HU 17080001, Lower Columbia-Sandy River).
- Dwinnell Dam (HU 18010207, Shasta).
- Camp Far West Dam (HU 18020126, Upper Bear).
- Oroville Dam (HU 18020159, Honcut Headwaters-Lower Feather).
- Friant Dam (HU 18040006, Upper San Joaquin).

Remove from the list, the following dams that have been removed or which now have fish passage:

- Dexter Dam (HU 17090001, Middle Fork Willamette River).
- Cougar Dam (HU 17090004, McKenzie River).
- Big Cliff Dam (HU 19070005, North Santiam River).
- Soda Springs Dam (HU 17100301, North Umpqua River).

Other housekeeping type changes would be made as well, such as deleting dams from the list, if they are upstream of another impassable dam, and updating names and HUs.

Alternative 6C: Revise the criteria for designating a dam as the upstream extent of EFH and update the list based on the new criteria and new information

The criteria in Section 1.2 of Amendment 14 for determining whether a dam should be designated as the upstream extent of EFH can be interpreted in different ways. This alternative would revise the criteria into a sequential list of “yes” or “no” questions to provide clearer guidance when making that determination. This revision is not a substantive change to the criteria, but is meant to avoid differing interpretation of how to apply the criteria. New information would then be used to update the list of barriers using the revised criteria. The revised criteria are:

1. Is the dam federally owned or operated, licensed by FERC, state licensed, or subject to state dam safety supervision? Is the dam of sufficient size, permanence, impassability, and legal identity to warrant consideration for inclusion in this list?
 - If yes to both questions, go to 2.
 - If no, then the dam is not the upstream extent, and the habitat above the dam should be designated as EFH.
2. Is the dam upstream of any other impassable dam that is designated as the upstream extent of EFH?
 - If yes, then the upstream extent of EFH is, by definition, downstream of the dam, and it should not be included in the list of impassable barriers.
 - If no, then go to 3.
3. Is fish passage in the construction or planning phase by a state or Federal agency or facility operator?
 - If yes, then the dam should not be considered the upstream extent, and the habitat above the dam should be designated as EFH.
 - If no, then go to 4.
4. Has NMFS or the Council determined that restoration of passage and conservation of the habitat above the dam is necessary for the long-term survival of the species and sustainability of the fishery? In making this determination, NMFS or the Council should

consider information contained in official NMFS documents such as a biological opinion, critical habitat designation, NMFS recovery plan, fish passage prescription under the Federal Power Act, or other formal NMFS policy position. This criterion provides for designation of habitat upstream of dams that would otherwise be listed as the upstream extent of EFH, and reflects the fact that the habitats in many portions of watersheds have not previously been formally evaluated.

- If yes, then the dam should not be considered the upstream extent and the habitat above the dam should be designated as EFH.
- If no, then the dam should be designated as the upstream extent of EFH.

Criteria 1 and 2 under this alternative are the same as those in Amendment 14. Therefore, the changes associated with these criteria would be the same as those described in Alternative 6B above.

Criterion 3 asks whether fish passage is in the construction or planning phase, while criterion 4 determines whether conservation of habitat above an impassable dam is necessary for the long-term survival of the species and sustainability of the fishery. In some cases, evaluating a dam using these criteria and determining that it should mark the upstream extent of EFH is straightforward. These dams, for which the answers to the questions in criteria 3 and 4 are “no,” are addressed first under this alternative. Other dams require a more thorough evaluation and are discussed in more detail later in this section.

Alternative 6D: Revise the criteria for designating a dam as the upstream extent of EFH, update the list based on the new criteria and new information, and include consideration of efforts to reintroduce experimental populations of salmon into historically occupied habitats under Section 10(j) of the ESA.

Alternative 6D would include language specifying that efforts to designate experimental populations under Section 10(j) of the ESA should be considered as part of the criteria for determining whether a dam should mark the upstream extent of EFH. Otherwise, the criteria in this Alternative are identical to those in Alternative 6C. Section 10(j) of the ESA provides for authorizing the reintroduction of a listed species to historic, but currently unoccupied, habitat by designating them as an experimental population. This designation is done through rulemaking and is contingent upon NMFS determining, among other things, that it would further the conservation of the species. The success of an effort to reintroduce salmon into historical habitat depends, in part, on the support of involved stakeholders, including government agencies and private citizens. Congress specifically added Section 10(j) to the ESA in 1982 to encourage cooperative reintroduction efforts where reintroduction of listed species is perceived to conflict with human activities. The intent is to encourage stakeholders to support these efforts by easing certain potential ESA liabilities within the reintroduction area. Under some specific circumstances, the EFH consultation requirement could create a perceived regulatory burden that may cause both Federal and private stakeholders to oppose the reintroduction.

The only case in which this alternative would currently apply would be if EFH was designated above the Shasta-Keswick dam complex, where the Section 10(j) process was recently initiated. Reintroduction of an experimental population is being pursued there with the understanding that there would be no additional regulatory burden.

Table 2-3. Potential changes to the upstream extent of EFH under Alternatives 6C and 6D.

State	4th Field HUC	Dam(s)	Action under Alternative 6C	Action under Alternative 6D	Next upstream dam(s) that meet the criteria	Addl. HU(s) to be designated as Chinook salmon EFH	Addl. HU(s) to be designated as coho salmon EFH
CA	18010206	Iron Gate Dam	Remove from list	Remove from list	Keno Dam	None	None
CA	18020154	Keswick Dam	Remove from list	Retain on list	Box Canyon Dam (Upper Sacramento River); McCloud Dam (McCloud River)	18020005; 18020004	None
OR	17070103	McKay (on McKay Creek)	Add to list	Add to list	N/A	N/A	N/A
OR	17100308	Emigrant	Add to list	Add to list	N/A	N/A	N/A

MARINE AND ESTUARINE ESSENTIAL FISH HABITAT

Current EFH for Pacific Coast salmon includes all estuarine and marine waters from the nearshore and tidal submerged environments within state territorial waters out to the U.S. EEZ north of Point Conception, California, to the U.S. – Canada border (Figure 2-3). EFH also includes the marine areas of Alaska that are designated as salmon EFH by the NPFMC. Marine EFH for Pacific Coast salmon is necessarily broad and based on presence/absence data, as provided in the regulatory guidelines, because the data that was available in 1999 was not sufficient to allow for a more narrowly-defined description of marine EFH. Some recent information was described in Stadler et al. (2011). However, there remains a paucity of definitive information on ocean distribution and habitat associations. Because of this lack of information, the OP concluded that it would be better to continue to rely on the presence/absence data, and wait to refine marine EFH until more information becomes available. Therefore, both the potential for re-visiting the inclusion of marine waters off Alaska, as well as the possibility of refining specific marine EFH descriptions, were not included as alternatives. For PS pink salmon, Amendment 14 defines marine EFH as “all nearshore marine waters north and east of Cape Flattery, Washington, including Puget Sound, the Strait of Juan de Fuca, and the Strait of Georgia.” This is slightly inconsistent with the general description of marine EFH for Pacific salmon that includes the marine waters beyond Cape Flattery, as described above. The Council should clarify the extent of PS pink salmon marine EFH.

ALTERNATIVES FOR REVISING MARINE EFH

These alternatives are mutually exclusive.

Alternative 7A: No Action

The No Action alternative would retain the existing description of marine EFH for Pacific Coast salmon, including marine waters off Alaska as designated by the NPFMC. It would not clarify the extent of marine EFH for PS pink salmon.

Alternative 7B: Clarify PS pink salmon marine EFH

This alternative would clarify the extent of EFH for PS pink salmon in the West Coast EEZ and the waters off Alaska. The result would be better clarity regarding the extent of PS pink salmon marine EFH. Selection of this alternative implies that the Council’s intent under Amendment 14 was to include those marine areas west and north of Cape Flattery to be EFH for PS pink salmon, as well as for Chinook and coho salmon.

ESSENTIAL FISH HABITAT DESCRIPTIONS

The descriptions of the habitats by life stage determined to be EFH in Amendment 14 were developed through an extensive review and synthesis of the literature available in 1999. While much of that information remains accurate and relevant today, this review compiled a significant amount of new and newly-available information that needs to be used to refine, and improve upon, the life history characteristics and habitat parameters described in Amendment 14.



Figure 2-3. Proposed coast-wide geographical extent of EFH for Pacific Coast salmon.

ALTERNATIVES FOR UPDATING EFH DESCRIPTIONS

Alternative 8A: No change

This alternative would retain the EFH descriptions in Amendment 14 and would not expand upon the body of literature that was available in 1999. As a result, the analysis of Federal actions that may adversely affect EFH could be based on outdated or incomplete information.

Alternative 8B: Update the EFH summaries for each species of Pacific Coast salmon

This alternative would update the EFH descriptions in Amendment 14 using the new information, which can be used by the public, consultants, and state and Federal agencies to assess the potential effects on EFH from a proposed action. As a result, the analysis of Federal actions during the EFH consultation process would be based on more up-to-date information, which will result in improved EFH Conservation Recommendations.

HABITAT AREAS OF PARTICULAR CONCERN

The implementing regulations for the EFH provisions of the MSA (50 CFR part 600) recommend that the FMPs include specific types or areas of habitat within EFH as HAPCs based on one or more of the following considerations: (1) the importance of the ecological function provided by the habitat; (2) the extent to which the habitat is sensitive to human-induced environmental degradation; (3) whether, and to what extent, development activities are, or will be, stressing the habitat type; and (4) the rarity of the habitat type. The intended goal of identifying such habitats as HAPCs is to provide additional focus for conservation efforts, although it does not require any additional regulatory activity during the EFH consultation process.

As part of the periodic review, the OP developed five potential HAPCs (Stadler et al. 2011). Habitat types were initially identified using the best available information and the collective professional knowledge and experience gained by the OP through scientific research and conducting EFH and ESA consultations. These habitats were then evaluated according to the four considerations listed above.

ALTERNATIVES FOR CONSIDERING HAPCs FOR PACIFIC SALMON

Each potential HAPC is presented as an independent alternative for consideration by the Council. As a result, Alternative 9A (No Action) is mutually exclusive with the other alternatives, but Alternatives 9B through 9F are not mutually exclusive with each other, and the Council may decide to proceed with some or all of them.

Alternative 9A: No change

This alternative would maintain the current status of having no HAPCs designated as part of Pacific Coast salmon EFH. As a result, these important habitats would not receive any special focus during the EFH consultation process.

Alternatives 9B through 9F. Designate HAPCs

This suite of alternatives would each designate one type of habitat as a HAPC. The Council may select some or all of these alternatives.

Alternative 9B: Designate complex channels and floodplain habitat as a HAPC

Alternative 9C: Designate thermal refugia as a HAPC

Alternative 9D: Designate spawning habitat as a HAPC

Alternative 9E: Designate estuaries as a HAPC

Alternative 9F: Designate marine and estuarine SAV as a HAPC

ACTIVITIES THAT MAY ADVERSELY AFFECT EFH

FMPs are required to identify and describe three categories of activities that may adversely affect EFH: fishing activities managed under the MSA, fishing activities not managed under the MSA (typically managed by states), and human activities not associated with fishing.

ALTERNATIVES FOR UPDATING FISHING ACTIVITIES THAT MAY ADVERSELY AFFECT PACIFIC SALMON EFH

There are no known new fishing activities that could potentially adversely affect Pacific salmon EFH. However, the Council may wish to update the descriptions of the fishing activities and gear contained in Amendment 14. With the exception of Alternative 10A, the alternatives described below are not mutually exclusive.

Alternative 10A: No Change

This alternative would retain the description of the effects from fishing activities in Amendment 14. Doing so would disregard the new information on the potential effects of fishing activity on EFH as well as the measures that the Council has taken that have reduced the level of these effects.

Alternative 10B: Revise the description of the potential adverse effects of fishing managed under the MSA.

This alternative would incorporate the new information since Amendment 14 into the description of the fishing activities and potential adverse effects on Pacific Coast salmon EFH from fishing activities. It does not imply a determination of adverse effects and would not include minimization measures.

Alternative 10C: Revise the description of the potential adverse effects of fishing not managed under the MSA

This alternative would incorporate new information into the identification of non-MSA fishing activities that may adversely affect Pacific salmon EFH.

ALTERNATIVES FOR REVISING NON-FISHING ACTIVITIES THAT MAY ADVERSELY AFFECT PACIFIC SALMON EFH

Amendment 14 identified 21 non-fishing activities (Table 2-4) that may adversely affect EFH; and potential conservation recommendations to avoid, minimize, mitigate, or otherwise offset those adverse impacts. However, information available after Amendment 14 indicates that some of these descriptions and conservation measures are out of date and should be updated. During the periodic review of EFH, 10 additional activities that may adversely affect EFH were identified (Table 2-4).

Table 2-4. Non-fishing activities that may adversely affect Pacific Coast salmon EFH.

Threats Identified in Amendment 14 (1999)	New Activities Identified During EFH
Agriculture	Activities causing high intensity acoustic or pressure waves
Artificial Propagation of Fish and Shellfish	Over-water structures
Bank Stabilization	Alternative energy development
Beaver removal and Habitat Alteration	Liquefied natural gas projects
Construction/Urbanization	Desalination
Dam Construction/Operation/Removal	Power plant intakes
Dredging and Dredged Spoil Disposal	Pesticide use
Estuarine Alteration	Flood control maintenance
Forestry	Culvert construction
Grazing	Coal terminal export facilities
Habitat Restoration Projects	
Irrigation/Water Management	
Mineral Mining	
Introduction/Spread of Nonnative Species	
Offshore Oil and Gas Drilling	
Road Building and Maintenance	
Sand and Gravel Mining	
Vessel Operation	
Wastewater/Pollutant Discharge	
Wetland and Floodplain Alteration	
Woody Debris/Structure Removal	

Alternative 11A is mutually exclusive with the other two alternatives, but Alternatives 11B and 11C are not mutually exclusive of each other.

Alternative 11A: No Action

This alternative would retain the current descriptions and potential conservation measures for non-fishing activities that may adversely affect EFH. The descriptions of the existing 21 activities would not be updated, and the 10 new activities would not be described. EFH consultations would be conducted as they are now, without the benefit to consulting agencies, the public, and NMFS for additional information on these activities. However, NMFS would still be able to provide EFH Conservation Recommendations for any activities that may adversely affect EFH, regardless of whether the activity is on the list.

Alternative 11B: Update the existing 21 non-fishing activities that may adversely affect EFH

By updating the description of non-fishing activities that may adversely affect Pacific Coast salmon EFH, as well as updating the potential conservation recommendations, Amendment 18 would be providing relevant new information to assist consulting agencies, the public, and NMFS staff when considering these activities. These updates to the FMP would not represent any net change in the consultation process. However, there would be an increased level of consistency in how those activities are evaluated during the consultation process.

Alternative 11C: Add new non-fishing activities that may adversely affect EFH

This alternative includes options to include any or all of the 10 new non-fishing activities, and associated conservation measures, identified by the periodic review. The options under this alternative are:

- **11C1: Activities causing high intensity acoustic or pressure waves (e.g., pile driving, ordnance detonation, seismic surveys)**
- **11C2: Over-water structures**
- **11C3: Alternative energy development**
- **11C4: Liquefied natural gas projects**
- **11C5: Desalination**
- **11C6: Power plant intakes**
- **11C7: Pesticide use**
- **11C8: Flood control maintenance**
- **11C9: Culvert construction**
- **11C10: Coal terminal export facilities**

INFORMATION AND RESEARCH NEEDS

The EFH regulatory guidance states that each FMP should contain recommendations, preferably in priority order, for research efforts that the RFMCs and NMFS view as necessary to improve upon the description and identification of EFH, the identification of threats to EFH, and the development of conservation recommendations. Numbers 1 through 3 (below) are summaries of those contained in Amendment 14, and numbers 4 and 5 are new, as identified by the OP. The priority order has not been established.

1. Improve fine scale mapping of salmon distribution to inform future reviews of EFH for Pacific Coast salmon and aid in more precise and accurate designation of EFH and the consultation process. Potential approaches include, but are not limited to:
 - a. Develop freshwater distribution data at the 5th or 6th field HUs, across the geographic range of these species.
 - b. Develop habitat models that can be used to predict suitable habitat, both current and historical, across the geographic range of these species.
 - c. Develop seasonal distribution data at a 1:24,000 or finer scale.

2. Improve data on habitat conditions, including how they affect salmon survival, across the geographic range of Pacific Coast salmon to help refine EFH in future reviews and focus restoration efforts.
3. Improve data on marine (seasonal) distribution of Pacific Coast salmon, especially during early ocean residence, and develop models that incorporate oceanic conditions to predict marine distribution to inform revisions to EFH in future reviews.
4. Improve data on the possibility of adverse effects of fishing gear on the EFH of Pacific Coast salmon.
5. Advance the understanding of how a changing climate can affect Pacific Coast salmon EFH.

ALTERNATIVES FOR UPDATING INFORMATION AND RESEARCH NEEDS

Alternative 12A: No action

This No Action alternative would retain the three information and research needs identified in Amendment 14. The two new information and research needs identified by the five-year review would not be added.

Alternative 12B: Identify and prioritize new information and research needs

This alternative would include the information and research needs identified in Amendment 14 and would add two more, related to improving information on the adverse effects of fishing gear and climate change on salmon EFH. By establishing the Council's information and research needs priorities, this alternative would meet the requirements of the MSA.

PROCEDURES FOR CHANGING EFH

The EFH regulations state that the EFH provisions of FMPs should be reviewed and updated periodically, based on available information, and at least once every five years. The regulations also state that FMPs should outline the procedures they will use to update the EFH information. Currently, EFH updates are done through an FMP amendment. However, there are many types of changes that could be made periodically, and this may warrant consideration for a mechanism to update EFH outside of an FMP amendment process.

ALTERNATIVES FOR CHANGING EFH

13A: No Action

This alternative would maintain the status quo and require that all changes to Pacific Coast salmon EFH be accomplished through an FMP amendment.

13B: Develop procedures to address future changes to EFH

The EFH regulations require periodic review and update of EFH provisions, as appropriate. The regulations also require FMPs to outline the procedures the Council will follow to review and update EFH information. The Pacific Salmon FMP does not currently describe a process for reviewing and updating EFH provisions, meaning that any changes to Pacific Salmon EFH, no matter how minor, can only be accomplished via an FMP amendment.

This alternative would allow the Council to modify the information in Amendment 14 to reflect new information developed during periodic EFH reviews or in response to any other information

as warranted. Amending the FMP would not be required to make these changes, as long as the changes are consistent with the overall identification and description of EFH contained in the FMP itself. Examples of the type of changes to Pacific salmon EFH that can be made outside of an FMP amendment are:

1. Changes to the 4th field HUs that are designated as EFH for any of the three species of salmon managed under the plan (this could result from new information on current or historic distribution, newly accessible habitat, removal/addition of stocks from/to the FMP, or other information);
2. Modifications, additions, or removals HAPCs;
3. Changes to the impassable dams that represent the upstream extent of EFH (this could result from new information on fish passage, or a Council determination that upstream habitat should be designated as EFH);
4. Changes to the detailed EFH descriptions for any of the three species of salmon managed under the plan (this could be based on new information regarding habitat requirements by life stage, prey species, or other information);
5. Changes to recommended conservation or enhancement measures;
6. Changes to the descriptions of activities, both fishing and non-fishing, that may adversely affect EFH; and the conservation measures to avoid, minimize, mitigate, or otherwise avoid those adverse effects; and
7. Changes to the research and information needs.

Some changes to Pacific salmon EFH would still require an FMP amendment, for example:

1. Changes to the overall description and identification of Pacific salmon EFH that is in the FMP; and
2. Inclusion of fishing management measures designed to minimize, avoid, or mitigate adverse impacts to salmon EFH.

Process for Making Framework Changes to EFH

Revisions to Pacific salmon EFH can be made when the Council determines that such action is warranted by new information, including during the periodic review. The process is as follows, and can typically be accomplished via a three-meeting Council process:

1. Council advisory bodies, particularly the Habitat Committee (HC) should develop proposals to revise Amendment 14 after relevant new information becomes available that indicates a change is warranted.
2. The HC will present a report of their assessment and make recommendations to the Council.
3. The Council will review the report and, if appropriate, direct staff to revise the EFH Appendix.

4. At a subsequent meeting, the Council will adopt the revised EFH Appendix. The revised EFH Appendix will supersede the previous version, and will be posted in a format that allows the reader to identify changes, on the Council's website.