2022 EFH 5-Year Review - Approach

Review and Revision of EFH Components within the Council's Fishery Management Plans, and an Update on EFH Consultations

Prepared for the North Pacific Fishery Management Council
by the National Marine Fisheries Service
Alaska Region, April 2019

The North Pacific Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) are required to review the Essential Fish Habitat (EFH) components within each fishery management plan (FMP) every five years. The objective of the review is to evaluate and synthesize new information on habitat, determine whether changes to the FMPs are warranted, and present this evaluation in a summary report to the Council. If the Council chooses to update its FMPs based on the report, for example to revise EFH descriptions or management measures, FMP amendments will subsequently be prepared, along with the appropriate analytical documents. This document identifies a high-level approach proposed for consideration as part of the 2022 EFH 5-year Review.

Brief History

In 1996, the Sustainable Fisheries Act amended the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to require each federal FMP to describe and identify EFH, minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. The MSA defines EFH as "those waters and substrate that are necessary to fish for spawning, breeding, feeding, or growth to maturity."

The final rule implementing the EFH provisions of the MSA specifically requires each FMP to contain the following EFH components:

1) EFH descriptions and identification;
2) Fishing activities that may adversely affect EFH;
3) Non-MSA fishing activities that may adversely affect EFH;
4) Non-fishing activities that may adversely affect EFH;
5) Cumulative impacts analysis;
6) EFH Conservation Recommendations;
7) Prey species list and any locations;
8) Habitat Areas of Particular Concern (HAPC) identification;
9) Research and information needs; and
10) Review EFH every five years

The Council initially described EFH for its FMPs in 1999, in an environmental assessment that outlined human-induced effects on EFH. In 2000, a nationally-organized legal challenge of the EFH provisions within the MSA ensued. In response, all Regions (including Alaska) re-evaluated their EFH information. The Alaska Region and the Council completed a more comprehensive EFH description and effects analysis, referenced as the 2005 EFH Environmental Impact Statement (EIS), which described EFH, identified EFH conservation measures, and identified HAPCs.

In 2010, an EFH 5-year Review evaluated new information on EFH since the EFH EIS, assessed information gaps and research needs, and identified whether any revisions to EFH were needed or suggested. Acting on this report, the Council initiated FMP amendments for all six Council FMPs, which

updated several species descriptions, changed the HAPC process timing to occur simultaneously with each 5-year review, and revised EFH research priorities (implemented Oct 2012).

The 2015 EFH 5-year Review (completed in 2017 and implemented in 2018, and hereafter referred to as the 2017 Review), evaluated new analytical modeling methods to describe and map EFH, established a new fishing effects (FE) model and analysis of potential stock-level impacts of fishing within EFH, and investigated non-fishing effects on EFH (Simpson et al. 2017). Acting on this review, the Council recommended several FMP amendments (Table 1) to:

> 1) Refine EFH descriptions and maps in five FMPs using the best available science, including new spatial-predictive models of species distribution and density applied to the most recent information (excluding the FMP for the Scallop Fishery off Alaska);
>
> 2) Use the best available science and a newly developed FE model to determine that changes in management with regard to fishing within EFH was not recommended at that time; and
>
> 3) Update the non-fishing impacts analysis and its advisory EFH Conservation Recommendations, with the most current level of information, including new sections on ocean acidification, climate change, and ecosystem processes (Limpinsel et al. 2017).

The associated EFH Omnibus Amendment package was approved and implemented in May 2018 (83 FR 31340, July 5, 2018).

EFH Regulations

Federal regulations implementing the EFH provisions of the MSA require that a review and revision of EFH components of the FMPs be completed every five years (50 C.F.R. 600.815(a)(10)). The last comprehensive review of EFH was completed in 2017. In order to comply with this condition, NMFS is initiating work on the next 5-year review, in order to work with Council staff to produce a summary report for the Council in 2020 (a tentative timeline is included in Table 4).

The regulations also state that EFH information should be reported annually in the Stock Assessment Fishery Evaluation (SAFE) Reports. The SAFE Reports compile the most recent scientific assessment and research for groundfish, crab, and scallop managed species. This scientific information, including catch and survey data by species, are the current basis for EFH descriptions.

Federal regulations at 50 CFR 600.815 (a)(10) state:

Councils and NMFS should periodically review the EFH provisions of FMPs and revise or amend EFH provisions as warranted based on available information. FMPs should outline the procedures the Council will follow to review and update EFH information. The review of information should include, but not be limited to, evaluating published scientific literature and unpublished scientific reports; soliciting information from interested parties; and searching for previously unavailable or inaccessible data. Councils should report on their review of EFH information as part of the Annual Stock Assessment and Fishery Evaluation (SAFE) report prepared pursuant to § 600.315(e). A complete review of all EFH information should be conducted as recommended by the Secretary, but at least once every 5 years.

Proposed Approach

The 2022 EFH 5-year Review will evaluate EFH components in the six Council FMPs, with respect to new information. The Council's six FMPs are the following:

- Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI Groundfish)
- Groundfish of the Gulf of Alaska (GOA Groundfish)
- Bering Sea/Aleutian Islands King and Tanner Crab (BSAI Crab)
- Scallop Fishery off Alaska (Scallop)
- Salmon Fisheries in the EEZ off Alaska (Salmon)
- Fish Resources of the Arctic (Arctic)

As a thorough and relatively major update was completed in 2017, **the approach to the 2022 EFH Review is to broadly evaluate all EFH components in the Council's FMPs and solicit input from the Council on which of these components warrant updates or a more detailed review.** Once the summary report is prepared, the Council will be able to determine what action, if any, is warranted based on the report. If the Council decides to initiate FMP amendments to update EFH components in the FMPs or consider additional EFH mitigation measures, the amendments and associated analysis will proceed through the normal Council process.

The Council revised the HAPC process in 2012, with the intent to allow the EFH 5-year Review process to inform the designation of HAPC priorities. The Council has a formalized process identified in its FMPs for selecting HAPCs. Under this process, the Council periodically considers whether to set priority habitat types (every five years, or on a schedule established by the Council). Once the draft summary report is prepared, the Council can also use the report to identify habitat priorities regarding a request for HAPC proposals. No new HAPCs were identified in the 2017 EFH Review.

1. EFH Descriptions and Identification

EFH descriptions for all managed species within the Council's six FMPs may be re-evaluated as part of the 5-year review. The EFH final rule identified four types of information on which to base EFH descriptions, categorized into levels:

- Level 1 – distribution data are available for some or all portions of the geographic range of the species
- Level 2 – Habitat-related densities of the species are available
- Level 3 – Growth, reproduction, or survival rates within habitats are available
- Level 4 – Production rates by habitat are available

As an outcome of the 2017 Review, the Council adopted a species distribution modeling (SDM) approach for EFH descriptions (Laman et al. 2018) with an update to EFH information levels and maps for many species life history stages (Simpson et al. 2017). The new EFH maps are available on the Alaska EFH Mapper, which may be accessed at https://www.fisheries.noaa.gov/resource/map/alaska-essential-fish-habitat-efh-mapper. The Alaska EFH Mapper is an ArcGIS Web Application with EFH maps and spatial data for species in the FMPs. The Alaska EFH Mapper identifies EFH by species life history stage and information level with several tools. This new online map interface provides an improved, efficient, and effective way to view, search, and query Alaska EFH map information. Information on individual map development is available in the following three NMFS Technical Memorandums: Laman et al. 2017, Turner et al. 2017, and Rooney et al. 2018.

The 2017-2022 Alaska EFH Research Plan identified two research objectives following the 2017 Review: 1) Develop EFH Level 1 information (distribution) for life stages and areas where missing (e.g. juveniles); and 2) Raise EFH information level from Level 1 or 2 (habitat-related densities) to Level 3 (habitat-related growth, reproduction, or survival rates) (Sigler et al. 2017). We anticipate that several projects funded since 2017 will make progress on these objectives to support a possible update to EFH

descriptions and maps within the 2022 Review. Table 2 provides the EFH research projects NMFS has funded in 2017 and 2018, and the projects NMFS proposes to fund in 2019 if funds are available.

NMFS Alaska Fisheries Science Center (AFSC) and Alaska Region staff will review the EFH descriptions and maps to determine if an update to EFH information is possible for a set of species life stages. As a first step, NMFS held a workshop on Alaska EFH SDM at the AFSC in Seattle, February 13-14, 2019. The workshop brought together NMFS researchers to present and discuss the current EFH modeling efforts and research development goals to ensure that we make long-term progress to improve SDM for Alaska EFH descriptions. NMFS also discussed opportunities to extend habitat information developed from SDM to support stock assessment (e.g. Ecosystem-Socioeconomic Profiles), climate reporting (e.g. Bering Sea Fishery Ecosystem Plan Climate Action Module), and other ecosystem-based management information needs (e.g. ecosystem assessment and Ecosystem Status Reports).

The current effort to describe EFH using the SDM approach is an extension of the direction put forth by the Council in 2017, where one of three types of SDM methods (Generalized Additive Models (GAM), hurdle GAM, and MaxEnt) were developed for species life stages given the available species catch and survey data, including pelagic early life stages (egg, larvae, early juvenile), settled older juveniles, and adults (e.g. Laman et al. 2018). NMFS researchers will refine and extend the modeling approach of 2017 to include an additional SDM method (Random Forest, e.g. Rooper et al. 2017), and apply all four SDM to each species life stage where a model will be developed, where the most appropriate model for a species life stage will be determined using model-skill testing methods (e.g. Rooper et al. 2017, Laman et al. 2018). This refined SDM approach intends to ensure that the EFH SDM are current with the state of the best available science. NMFS will conduct the bulk of the modeling in 2019-2020, as a subset of the current Alaska EFH Research Plan projects. In summary, SDM that may inform updates to EFH descriptions and maps in the 2022 Review are planned for the following: BSAI Groundfish (14 stocks); BSAI Crabs (4 stocks); GOA Groundfish (25 stocks), Arctic Fish Resources (3 species). Refer to Table 3 for a summary of species or stocks that will receive revised SDM leading to a potential update to EFH information within the 2022 Review. This effort will:

- Refine and extend the accepted SDM methods to be current with the state of the science;
- Apply additional years of AFSC bottom-trawl survey data and new data sources, such as the Alaska Department of Fish and Game small-mesh bottom-trawl survey and update to the AFSC Nearshore Fish Atlas of Alaska (Johnson et al. 2012; Lindeberg et al. *in progress*);
- Split the demersal juvenile life stages into settlement and older juvenile stages;
- Apply updated maturity schedules for adults and older juveniles;
- Develop the first examples of EFH Level 3 SDM maps; and
- Raise EFH information levels for stock life history stages to Level 1, 2, or 3.

2. Fishing Activities that May Adversely Affect EFH

As a thorough assessment and update to effects of fishing activities was completed in the 2017 Review with the development and implementation of the FE model, potential considerations for the 2022 EFH Review may include: re-run the model using updated information, model localized impacts (corals/sponges, crab), or validation of the FE model. Any FE model updates will be provided to stock assessment authors to consider whether any substantial new information is available to augment the 2017 Review's analysis of whether managed fish stocks show any evidence of adverse effects caused by fishing.

3. Non-Magnuson Stevens Act Fishing Activities that May Adversely Affect EFH

The effects of non-Magnuson-Stevens Act fishing activities are covered within the discussion of fishing

effects on habitat in the 2005 EFH EIS. Although the EIS discussion remains valid, the 2022 Review may consider any possible changes or new information regarding the impacts of these activities on EFH. Non-MSA fishing activities include State-parallel fisheries, State-water fisheries, recreational fisheries, and halibut fisheries managed under the Northern Pacific Halibut Act of 1982. The types of gear used by the non-MSA fisheries in Alaska are discussed in detail in the 2005 EFH EIS, as well as their distribution.

4. Non-Fishing Activities that May Adversely Affect EFH

The EFH review will reassess non-fishing activities that have an adverse effect on EFH. Potential considerations include updating EFH Conservation Recommendations, reviewing sections in the *2017 Impacts to Essential Fish Habitat from Non-Fishing Activities in Alaska* (Limpinsel et al. 2017) report that warrant further examination, and linking the non-fishing effects discussion with efforts from the Council Coordination Committee Habitat Working Group.

5. Cumulative Impacts Analysis

As noted in the 2017 non-fishing effects report, the cumulative effects from multiple non-fishing anthropogenic sources are increasingly recognized as having synergistic effects that may degrade EFH and associated ecosystem processes that support sustainable fisheries. For fishing impacts to EFH, the FE model allows for an assessment of cumulative effects from fishing activities.

6. EFH Conservation and Enhancement Recommendations

Potential revisions to EFH Conservation and Enhancement Recommendations during the 2022 Review will be dependent on conclusions reached in items 2 through 5 above.

7. Prey Species List and Any Locations

The major prey of managed species in the FMPs are reviewed in the individual species sections for each FMP. This information is updated as necessary when new information becomes available. The 2022 Review may evaluate new prey species information and consider linkages to ecosystem based management efforts.

8. HAPC Identification

The Council may consider initiating a HAPC proposal process to coincide with the 2022 Review. Should new information arise, the Council may initiate a HAPC proposal process at any time. The Council may also consider ideas for existing HAPC monitoring and management.

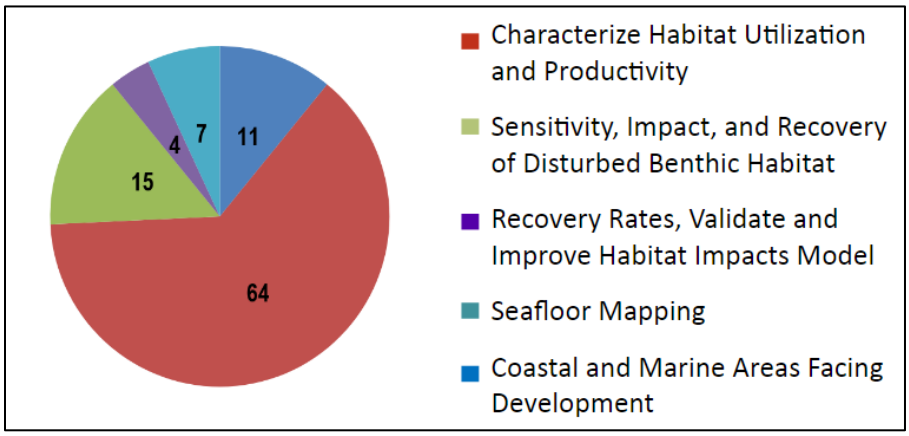
9. Research and Information Needs

In addition to Council Research Priorities, the NMFS Alaska EFH Research Plan was outlined in the 2005 EFH EIS and included in five of the Council's FMPs (excludes Arctic). The EFH Research Plan identified five long-term EFH research themes: Characterize habitat utilization and productivity; Validate and improve habitat impacts model; Sensitivity, impact and recovery of disturbed benthic habitat; Low-cost seafloor mapping; and Coastal areas facing development. The Council considers revising or updating these research priorities during the 5-year review process. The Council made changes to this research plan as part of the 2010 5-year review.

Each year, NMFS allocates approximately $350,000 to fund EFH research. In Fiscal Year (FY 2018), we funded top-ranked EFH research proposals for a total of $355,560, and the Office of Habitat Conservation

funded an additional proposal for $88,318. Thus, a total of $443,878 was directed to EFH research in Alaska. As of FY 2018, 103 projects have been funded through this process, with cumulative funding exceeding $5.8 million (Figure 1). A summary of research priorities identified in the *2017-2022 Alaska EFH Research Plan* (Sigler et al. 2017), and projects funded since 2017 is provided Table 3. For the 2022 Review, the Council may identify additional needs and update current research objectives to fill gaps in EFH knowledge for FMP species.

Figure 1. EFH Research Fund Projects by Research Priority, 2005-2018



10. Review EFH Component Every Five Years

NMFS will develop written recommendations to assist the Council in the identification of EFH, adverse impacts to EFH, and actions that should be considered to ensure the conservation and enhancement of EFH for each FMP. If the 2022 Review indicates that substantial new information is available, the summary report will recommend potential revisions for each relevant FMP. The Council will then consider this information, and initiate action (proposed FMP amendments) if it is warranted, or conclude that no further action is needed. A tentative timeline for this process is proposed in Table 4.

Potential outcomes of the 2022 5-year Review

Based on direction received from the Council during the 2017 Review, NMFS has broadly identified potential 2022 Review updates for each EFH component in Table 5. NMFS is seeking input from the Ecosystem Committee on specific components that may warrant more attention than others, and additional updates that the committee would like to pursue, if any. Discussions with Council staff suggest, at the Council's request, the following components may be explored for potential updating:

- New or revised SDM and habitat information on stocks in the FMPs
- Run FE model with updated fishing data, validate model outputs
- Updated non-fishing activities information and associated EFH Conservation Recommendations
- Identify HAPC priorities, and initiate a call for HAPC proposals
- Update research priorities and information needs

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Table 1. Summary of Council actions resulting from the 2017 EFH Review

EFH Component	*Council FMP*	*Final Action*
EFH description of individual species	*BSAI Groundfish*	***Amendment implemented for all 22 species or complexes** whose habitat is described in the FMP, revising some aspect of the EFH description and maps, as described in the summary report*
EFH description of individual species	*GOA Groundfish*	***Amendment implemented for all 23 species or complexes** whose habitat is described in the FMP, revising some aspect of the EFH description and maps, as described in the summary report*
EFH description of individual species	*BSAI Crab*	***Amendment implemented for all 5 species or complexes** in the FMP, revising general EFH and fishery information for each species, as described in the summary report*
EFH description of individual species	*Scallop*	***No amendments warranted***
EFH description of individual species	*Salmon*	***Amendment implemented for all 5 species** in the FMP, revising some aspect of the EFH description and maps, as described in the summary report.*
EFH description of individual species	*Arctic*	***Amendment implemented for 2 of 3 species in the FMP**, revising some aspect of the EFH descriptions.*
Fishing activities that may adversely affect EFH	*All Council FMPs*	***The FE model represented a substantial improvement from the Long-term Effects Index approach.** None of the stock assessment authors concluded that habitat reduction within the core EFH areas for their species was affecting their stocks in ways that were more than minimal or not temporary. None of the authors recommended any change in management with regards to fishing within EFH.*
Non-fishing activities that may adversely affect EFH	*All Council FMPs*	***Amendments implemented to update EFH Conservation Recommendations for non-fishing activities.***
HAPC	*All FMPs*	***No action; status quo**. The Council may initiate a call for proposals at any time using the HAPC nomination process.*
Research and information needs	*All FMPs*	***No action, status quo.** Many of the Council and NMFS research questions are still valid and remain to be investigated.*

Table 2. EFH Research Fund projects funded in 2017 and 2018, and proposed projects for 2019

Year Funded	Project Title	Principal Investigators	Research Priority*
2017	Optimal overwintering thermal habitat of juvenile walleye pollock from the Bering Sea and the Gulf of Alaska (3-year project)	Laurel, Heintz, Copeman, Hurst, Pirtle	Characterize habitat utilization and productivity
2017	A pilot study for assessing deep-sea corals and sponges as nurseries for fish larvae in the western Gulf of Alaska (1-year project)	Rooper, Wilborn, Goddard	Characterize habitat utilization and productivity
2017	Using habitat characteristics and prey abundance to predict distribution, abundance, and condition of groundfish in the Gulf of Alaska (1-year project)	Ressler, Simonson, Rooper, Punt	Validate and Improve Habitat Impacts Model
2017	Essential fish habitat of flatfish early life stages in the Chukchi Sea (3-year project)	Cooper, Logerwell, Heintz, Cianelli	Characterize habitat utilization and productivity
2017	Juvenile flatfish habitat in the northern Bering Sea (1-year project)	Yeung, Cooper, Copeman, Matta, Yang	Characterize habitat utilization and productivity
2018	Developing a novel approach to estimate habitat-related survival rates for early life history stages using individual-based models (2-year project)	Shotwell, Stockhausen, Gibson	Characterize habitat utilization and productivity
2018	Optimal overwintering thermal habitat of juvenile walleye pollock from the Bering Sea and the Gulf of Alaska (3-year project)	Laurel, Heintz, Copeman, Hurst, Pirtle	Characterize habitat utilization and productivity
2018	Essential habitat of flatfish early life stages in the Chukchi Sea (3-year project)	Cooper, Logerwell, Heintz, Cianelli	Characterize habitat utilization and productivity
2018	A unified nearshore catch database to refine juvenile EFH models and maps for Alaska (2-year project)	Lindeberg, Pirtle, Neff	Characterize habitat utilization and productivity
2018	Is nearshore habitat essential to overwintering YOY Pacific cod? (1-year project)	Kastelle, Helser, Litzow, Laurel	Characterize habitat utilization and productivity
2018	Spatial variation in early juvenile flatfish growth and condition in relation to thermal phases in the eastern Bering Sea Shelf (1-year project)	Yeung, Copeman, Matta, Rooper, Yang	Characterize habitat utilization and productivity
2018	Age effects on thermal habitat requirements on commercial flatfishes (1-year project)	Hurst, Copeman	Characterize habitat utilization and productivity
2019	*Optimal overwintering thermal habitat of juvenile walleye pollock from the Bering Sea and Gulf of Alaska (3-year project)*	*Laurel, Heintz, Copeman, Hurst, Pirtle, Gibson*	*Characterize habitat utilization and productivity*
2019	*Developing a novel approach to estimate habitat-related survival rates for early life history stages using individual-based models (2-year project)*	*Shotwell, Stockhausen, Gibson*	*Characterize habitat utilization and productivity*
2019	*Advancing EFH species distribution modeling descriptions and methods for the North Pacific Fishery Management Plan species (2-year project)*	*Laman, Pirtle, Rooper, Hurst, Conrath*	*Characterize habitat utilization and productivity*
2019	*A unified nearshore catch database to refine juvenile EFH Models and maps of Alaska (2-year project)*	*Lindeberg, Pirtle*	*Characterize habitat utilization and productivity*
2019	*Essential fish habitat of juvenile flatfish and Pacific cod early life stages in the Chukchi Sea (3-year project)*	*Cooper, Logerwell, Heintz, Ciannelli*	*Characterize habitat utilization and productivity*
2019	*Spatial variation in early juvenile flatfish growth and condition in relation to habitat quality in the Bering Sea (1-year project)*	*Yeung, Copeman, Matta, Pirtle, Yang*	*Characterize habitat utilization and productivity*

* Long-term research priorities identified in the Alaska EFH Research Plan include: 1) Characterize Habitat Utilization and Productivity, 2) Assess Sensitivity, Impact, and Recovery of Disturbed Benthic Habitat, 3) Validate and Improve Habitat Impacts Model, 4) Map the Seafloor, and 5) Assess Coastal and Marine Habitat Facing Development

Table 3. Summary of species or stocks with planned revised SDM for the 2022 Review

			Fishery Management Plan			
Group	**Stock or Common Name**	**Region**	**BSAI Groundfish**	**BSAI Crabs**	**GOA Groundfish**	**Arctic Fish Resources**
Flatfishes	Alaska plaice	EBS	X			
	Arrowtooth flounder	AI, EBS, GOA	X		X	
	Dover sole	GOA			X	
	Flathead sole	EBS, GOA	X		X	
	Greenland turbot	EBS	X			
	Northern rock sole	GOA			X	
	Rex sole	AI, EBS, GOA	X		X	
	Yellowfin sole	EBS, GOA	X		X	
Roundfishes	Arctic cod	Arctic				X
	Saffron cod	Arctic				X
	Great sculpin	GOA			X	
	Pacific cod	AI, EBS, GOA	X		X	
	Sablefish	AI, EBS, GOA	X		X	
	Walleye pollock	AI, EBS, GOA	X		X	
Rockfishes	Black rockfish	GOA			X	
	Blackspotted rockfish	GOA			X	
	Dark rockfish	GOA			X	
	Dusky rockfish	AI, EBS, GOA	X		X	
	Harlequin rockfish	GOA			X	
	Northern rockfish	AI, GOA	X		X	
	Pacific ocean perch	AI, EBS, GOA	X		X	
	Quillback rockfish	GOA			X	
	Rougheye rockfish	GOA			X	
	Sharpchin rockfish (Slope Complex)	GOA			X	
	Shortspine thornyhead	AI, EBS, GOA	X		X	
	Shortraker rockfish	GOA			X	
Skates	Bering skate	AI, EBS, GOA	X		X	
	Big skate	GOA			X	
	Longnose skate	GOA			X	
Crabs	Snow Crab	Arctic, EBS		X		X
	Blue King Crab	EBS		X		
	Golden King Crab	AI, EBS		X		
	Red King Crab	EBS		X		

Table 4. Tentative timeline for the 2022 EFH Review

Jan-Apr 2019	Alaska Region, Council, AFSC staff identify 2022 plan to evaluate the 10 EFH Review Components (Draft a 2022 EFH Review Roadmap)
Apr 2019	Update to Ecosystem Committee on 2022 EFH Review approach, and Council B Reports (Non-Fishing Activities Update)
Oct 2019	Species distribution modeling update to Ecosystem Committee, if appropriate
April 2020	Update on species distribution modeling to Ecosystem Committee, SSC if appropriate
Apr 2020-Dec 2021	Incorporate feedback and finalize recommendations for EFH Review Updates; formulate Review Draft Summary Report; present to Council/Committees as appropriate
Dec 2021	Updated recommendations complete and distributed to stock authors, if applicable
Feb 2022	Stock assessment authors review EFH for target stocks under the 6 Council FMPs, if applicable
March 2022	Assemble and release Internal Council Review Draft Summary Report
Apr 2022	**Summary Report for Council review** (incl Ecosystem Committee, SSC) Council may consider setting HAPC priorities, and initiating a call for HAPC proposals Council decision as to whether to implement EFH changes and initiate analysis of FMP amendments
Apr-Sep 2022	If the Council decides to amend the FMPs, *staff prepare amendments and analysis for EFH changes* based on Council recommendations.
Oct 2022	*Initial review draft of FMP amendments for EFH changes, Final Summary Report* *Council decision on whether to formulate HAPC proposals into an amendment analysis*
Dec 2022	*Council final action on FMP amendments for EFH changes (if any)*

Table 5. EFH Components in FMPs and Potential Updates for the 2022 Review

EFH FMP Component	Text from the EFH final rule (67 FR 2343)	2010 Review	2015 Review (2017)	2022 Review Plan
1. EFH Descriptions and Identification	i. overview ii. habitat information by life stage iii. analysis of habitat information (levels 1-4) iv. EFH determination v. EFH mapping requirements Councils should strive to describe habitat based on the highest level of detail (i.e., Level 4).	Identify and evaluate new scientific literature, and information from other relevant sources, to see whether species-specific EFH description and identification, as written in the FMPs, is correct.	Identify and evaluate new scientific literature and other information. A newly developed model creates model-based EFH definitions. Stock assessment authors review models and outputs. **Major update?** Yes, species distribution models used to make EFH maps.	Identify and evaluate new scientific literature, models, and other information. **Potential actions:** 1. Update EFH descriptions/levels 1-4. 2. Update Arctic, Scallop, and Salmon descriptions and maps. 3. Create model maps for juvenile life stages.
2. Fishing activities that may adversely affect EFH	i. evaluation ii. minimizing adverse effects iii. practicability iv. options for managing adverse effects from fishing	Evaluate the various inputs to the existing LEI model to see how they compare with the model inputs from 2004 (a. distribution of the trawl fisheries, b. species recovery rates, c. gear changes in the fisheries that may affect habitat). This should demonstrate whether the impacts analysis from the 2005 EIS is likely to still be	Review impacts from fishing gears on EFH. Develop a new fishing effects (FE) model to update the prior LEI fishing effects model to examine impacts of fishing on habitat. SSC review model design, implementation, parameters, and outputs. **Major update?** Yes, new Fishing Effects model.	Do we need to revise fishing impacts on EFH from last 5-yr review? **Potential actions** 1. Re-run model with new data. Minor change, may decrease size of impacts, #s are low 2. Model localized impacts 3. Analyze patch size of habitat

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		valid, or whether it warrants revision.		
3. Non-Magnuson-Stevens Act fishing activities that may adversely affect EFH	FMPs must identify any fishing activities that are not managed under the MSA that may adversely affect EFH. Such activities may include fishing managed by state agencies or other authorities.	Review whether there have been changes in halibut and State water fisheries. Identify sources of new information that may shed light on analysis of the impact of these fishing activities.	Review changes to halibut and State water fisheries. Identify sources of new information that may shed light on analysis of the impact of these fishing activities. **Major update?** No.	Do we need to review changes to halibut and State water fisheries and revise analysis from 2005 EIS? **Potential actions:** 1. Identify sources of new information that may shed light on analysis of the impact of these fishing activities. 2. Salmon fishery impacts to EFH, include sport and personal use fishing 3. Halibut fishery impacts to EFH, include sport and personal use fishing 4. State water groundfish fishery impacts to EFH.
4. Non-Fishing activities that may adversely affect EFH	FMPs must identify activities other than fishing that may adversely affect EFH. For each activity, the FMP should describe known and potential adverse effects to EFH.	Review whether there have been changes to non-fishing activities affecting habitat since the EFH analysis. Identify sources of new information that may shed light on analysis of the impact of non-fishing activities.	Review changes to non-fishing activities affecting EFH. Identify sources of new information that may shed light on analysis of the impact of non-fishing activities. Update EFH Conservation Recommendations; add new sections on warming trends off Alaska, ocean acidification and marine traffic (in the Arctic); and a more thorough bibliography.	Do we need to revise the 2017 non-fishing report? **Potential actions:** 1. Update EFH Conservation Recommendations. Look at sections and add specific Conservation Recommendations. 2. Ecosystems graphic being done with designers. 3. Review sections that did not get a great look;

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			Major update? Yes, new non-fishing report.(Limpinsel et al. 2017, TM-NMFS-FAKR-14)	review others for current relevancy. 4. Link with recent Council Coordination Committee – Habitat Working Group non-fishing discussion.
5. Cumulative impacts analysis	To the extent feasible and practicable, FMPs should analyze how the cumulative impacts of fishing and non-fishing activities influence the function of EFH on an ecosystem or watershed scale. An assessment of the synergistic effects of multiple threats, and an assessment of the ecological risks resulting from the impact of those threats on EFH, also should be included.	Review cumulative impacts discussion in FMPs, and evaluate against new information.	Review cumulative impacts analysis discussion in FMPs, and evaluate against new information. **Major update?** No.	Do we need to revise the cumulative impacts analysis discussion in FMPs and evaluate against new information?
6. EFH Conservation and Enhancement Recommendations	FMPs must identify actions to encourage the conservation and enhancement of EFH, including recommended options to avoid, minimize, or compensate for the adverse effects identified pursuant to paragraphs (a)(3)-(5) (i.e. non-MSA fishing effects, non-fishing effects, and cumulative impacts), especially in habitat areas of particular concern.	Review EFH recommendations for fishing and non-fishing activities, and evaluate against new information to see whether updates are warranted.	Review EFH recommendations for fishing and non-fishing activities and evaluate against new information to determine whether updates are warranted. **Major update?** No.	Do we need to review any EFH recommendations for fishing and non-fishing activities and evaluate against new information to determine whether updates are warranted? **Potential actions:** 1. Revisions to 6 depended on conclusions in #s 2-5 above.
7. Prey species list and any locations	Actions that reduce the availability of a major prey species or their habitat may be considered adverse effects on EFH if such actions reduce the quality of EFH. FMPs should list the major prey species for the species in the fishery management unit and discuss the location of prey species' habitat. Adverse effects on prey species and their	Review prey species information and determine whether updates are warranted.	Review prey species information and determine whether updates are warranted. **Major update?** No.	Review prey species information and determine whether updates are warranted. Habitat Assessment Reports (HAR) updates from Stock Experts

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	habitats may results from fishing and non-fishing activities.			Prey items through the lens of the Ecosystem Based Fisheries Management Umbrella
8. HAPC identification	FMPs should identify specific types or areas of habitat within EFH as habitat areas of particular concern based on one or more of the following considerations: importance of ecological function, habitat sensitivity to human-induced degradation, whether development activities are or will be stressing the habitat, and rarity of the habitat.	Summarize Council's progress on HAPC priorities. Based on species-specific review of EFH, stock assessment authors or Plan Teams may suggest candidate HAPC areas that could be considered by the Council in the next HAPC priority cycle.	Council determines whether to initiate a new call for HAPC proposals. **Major update?** No.	Does the Council want to initiate a new call for HAPC proposals or change HAPC management? **Potential actions:** 1. Evaluate skate HAPCs 2. Form a Skate Monitoring Team and include fisherman and NMFS scientists. 3. HAPC Process
9. Research and Information needs	Each FMP should contain recommendations, preferably in priority order, for research efforts that the Councils and NMFS view as necessary to improve upon the description and identification of EFH, the identification of threats to EFH from fishing and other activities, and the development of EFH conservation and enhancement measures for EFH.	Review research and information needs, and determine whether updates to EFH research needs identified in the FMPs are warranted.	Identify research necessary to fill gaps in EFH knowledge. Stock Assessment authors recommended items to research for many EFH species. **Major update?** Yes, as part of the new Research Plan (Sigler et al. 2017, AFSC-PR-2017-05)	Update and identify research necessary to fill gaps in EFH knowledge. Stock Assessment authors recommend items to research for EFH species. Look at Council and AFSC Research priorities and compare items. Big picture items move towards the EFH Research Plan.
10. Review EFH components every 5 years.	Councils and NMFS should ***periodically review the EFH provisions of FMPs and revise or amend EFH provisions as***	Summary report represents EFH 5-year review.	Summary report represents EFH 5-year review.	Develop Draft Summary Report based on Council and Committee Feedback

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	warranted based on available information. FMPs should outline the procedures the Council will follow to review and update EFH information. The review of information should include, but not be limited to: evaluating published scientific literature and unpublished scientific reports; soliciting information from interested parties; and searching for previously unavailable or inaccessible data. ***NMFS will develop written recommendations to assist each Council in the identification of EFH, adverse impacts to EFH, and actions that should be considered to ensure the conservation and enhancement of EFH for each FMP.*** The NMFS EFH recommendations may be provided either before the Council's development of a draft EFH document, or later as a review of a draft EFH document as developed by the Council.		2017 Summary Report	