Alaska EFH Mapper User Guide

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Overview

The maps included in the Alaska EFH Mapper were largely developed from species distribution model (SDM) ensembles in the 2023 EFH 5-year Review (Harris et al. 2022, Laman et al. 2022, Pirtle et al. 2023). These maps are required by 50 CFR 600.815(a)(1), which states that Fishery Management Plans (FMPs) must include maps of the geographic locations of EFH or the geographic boundaries within which EFH for each species and life stage is found. The EFH regulations provide an approach to organize the information necessary to describe and identify EFH, which should be designated at the highest level possible—

- Level 1: Distribution data for some or all portions of the geographic range of the species
- Level 2: Habitat-related densities or relative abundance
- Level 3: Growth, reproduction, or survival rates within habitats
- Level 4: Production rates by habitat [Not available at this time]

Map Development

BSAI Groundfish

Maps of habitat-related abundance EFH Level 2 maps were developed using ensemble SDMs for groundfish in the summer from their distribution and abundance in 1991-2019 in the Aleutian Islands (AI) (Harris et al. 2022) and in 1982-2019 in the eastern Bering Sea (EBS) (Laman et al. 2022). These maps have replaced the summer SDM EFH maps for species' life stages from the 2017 EFH 5-year Review.

EFH Level 3 maps of habitat-related vital rates for settled early juveniles were mapped in the 2023 Review by combining spatial projections of temperature dependent growth and lipid accumulation (condition) rates with SDMs (Harris et al. 2022, Laman et al. 2022).

EFH Level 1 maps for summer egg and larvae, and adults in other seasons (fall, winter, and spring) were developed in the 2017 Review.

BSAI Crab

Maps of habitat-related abundance EFH Level 2 maps were developed using ensemble SDMs for subadults/adults combined for crabs in the summer from their distribution and abundance in 1991-2019 in the Aleutian Islands (AI) (Harris et al. 2022) and in 1982-2019 in the eastern Bering Sea (EBS) (Laman et al. 2022). These maps have replaced the summer SDM EFH maps for species' life stages from the 2017 EFH 5-year Review.

EFH Level 1 maps for adult crabs in other seasons (fall, winter, and spring) were developed in the 2017 Review.

GOA Groundfish

EFH Level 2 summer maps were developed in the 2023 EFH 5-year Review using ensemble SDMs for subadult and adult groundfish abundance between 1993-2019 (Pirtle et al. 2023). These maps have replaced the summer SDM EFH maps for species' life stages from the 2017 EFH 5-year Review. EFH Level 1 maps of settled early juveniles were developed in the 2023 EFH 5-year Review from their distributions in 1989-2019 (Pirtle et al. 2023). EFH Level 3 maps of habitat-related vital rates for settled early juveniles were developed by combining spatial projections of temperature dependent growth and lipid accumulation (condition) rates with SDMs (Pirtle et al. 2023).

EFH Level 2 maps of habitat-related density for pelagic early life stages were predicted by combining biophysical individual-based models (IBMs) and SDMs for Pacific cod and sablefish as case studies (Hinckley et al. 2019, Gibson et al. 2023). Additionally, EFH Level 3 maps of habitat-related vital rates were developed for each pelagic early juvenile mapped by the combined IBM and SDM approach.

EFH Level 1 maps for summer egg and larvae, and adults in other seasons (fall, winter, and spring) were developed in the 2017 Review.

Arctic

EFH Level1 summer maps were developed for distributions of Arctic cod, saffron cod, and snow crab life history stages, including larvae, settled early juveniles, juveniles, and adults between 2000-2018 in the U.S. Chukchi and Beaufort Seas (Marsh et al. 2023). The EFH Level 1 maps were also developed separately in warm and cold years between 2000 and 2018 to compare the area of occupied habitat for Arctic species' life stages under different climate scenarios (Marsh et al. 2023).

Salmon

Level 1 maps of Chinook, coho, pink, chum, and sockeye salmon by life history stage (immature, juvenile, and mature) were developed by Echave et al. (2012).

Scallop

Level 1 maps of adult and late juvenile weathervane scallop were developed by the North Pacific Fishery Management Council (NPFMC) Scallop Plan Team (NPFMC 2024).

Visualization

The definition of EFH area in Alaska is the area containing 95% of the occupied habitat (NMFS 2005). The 2023 EFH maps are presented using percentile areas containing 95%, 75%, 50%, and 25% of the occupied habitat. Each of the EFH subareas are inclusive of the subareas above it (Figure 1) and describe a more focused partition of the total EFH area. The area containing the upper 95% of the occupied habitat based on SDM predictions is referred to as the "EFH Area". The area containing 75% of the occupied habitat based on SDM predictions is referred to as the "principal EFH area". The area containing 50% of the occupied habitat is termed the "core EFH area". The areas containing the top 25% of the occupied area are referred to as "EFH hot spots". Mapping habitat percentiles for EFH subareas like these helps demonstrate the heterogeneity of fish distributions over available habitat within the larger area identified as EFH. The Level 3 maps are scaled by a simple high to low degree of importance.



Fig. 1. Image showing the layered nature of EFH area percentages.

Introduction

Welcome to the Alaska EFH Mapper User Guide. The guide will help you through the process of logging into the new Alaska EFH Mapper and going through the steps of querying, downloading, and displaying the various EFH layers.

The Alaska EFH Mapper consists of one user interface but allows you to view EFH data in three different maps including:



1. The EFH Point Search Map

The EFH Area Search Map

2.



The EFH Layers Map



Search by Point Map

Click Here to go to the Alaska EFH Mapper

The initial landing page brings you to the about tab in the Search by Point Map and has several

tools that can be used to get EFH information. There is a brief summary of each tool in gray. Select the white query tool at the top.



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Here are some example results. Above the results in the picture below are four icons. The icon with the down arrow allows you to download the results as ".csv" files. Select the download icon and when prompted select the download button. The results will be downloaded and appear in the bottom left corner of your browser.

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The query results will also let the user know if they have searched an area of Unmapped EFH (1) and provides weblinks for other sources of EFH information in the results dropdown.

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Search By Area Map

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You are now using the Search by Area function. Use the line or the polygon draw mode icon to select an area on the map (Double click to finish polygon). Please note the warning in the second tab Area Search Info.



Below are some example results. The same steps can be taken to download the results using the download icon used in the Point Search.

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Visualize EFH Layers Map

Select the Layers icon. This brings you to the following layers tab with a warning that the EFH layers can take several minutes to load. Select the Click Here link.



You are now using the EFH Layers Map. Select the expand icon to view the layers.



The layers are organized by Fishery Management Plans (FMPs). Select an FMP to expand.



Select the layer you would like to display.

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Select the back button to open the link to return to the main landing page and select Click Here.



References

Echave, K., M. Eagleton, E. Farley, and J. Orsi. 2012. A refined description of essential fish habitat for Pacific salmon within the U.S. Exclusive Economic Zone in Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-236, 104 p. <u>https://www.arlis.org/docs/vol1/E/798846363.pdf</u>

Gibson, G.A., Stockhausen, W.T., Shotwell, S.K., Deary, A.L., Pirtle, J.L., Coyle, K.O., and Hermann, A.J. 2023. Can seamounts in the Gulf of Alaska be a spawning ground for sablefish settling in coastal nursery grounds? Fisheries Research, 261:106625. <u>https://doi.org/10.1016/j.fishres.2023.106625</u>

Harris, J., E. A. Laman, J. L. Pirtle, M. C. Siple, C. N. Rooper, T. P. Hurst, and C. L. Conrath. 2022. Advancing model-based essential fish habitat descriptions for North Pacific species in the Aleutian Islands. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-458, 406 p. https://doi.org/10.25923/ffnc-cg42

Hinckley, S., Stockhausen, W., Coyle, K., Laurel, B., Gibson, G., Parada, C., Hermann, A., Doyle, M., and Hurst., T. 2019. Connectivity between spawning and nursery areas for Pacific cod (Gadus macrocephalus) in the Gulf of Alaska. Deep Sea Res. Pt. II. 165: 113–126. https://doi.org/10.1016/j.dsr2.2019.05.007

Laman, E. A., J. L. Pirtle, J. Harris, M. C. Siple, C. N. Rooper, T. P. Hurst, and C. L. Conrath. 2022. Advancing model-based essential fish habitat descriptions for North Pacific species in the Bering Sea. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-459, 538 p. <u>https://doi.org/10.25923/y5gc-nk42</u>

Marsh, J., J. L. Pirtle, F. J. Mueter, and J. Harris. Model-Based Essential Fish Habitat Descriptions for Fish Resources of the Arctic Management Area. 86 pgs. NPFMC February 2023 Meeting, C4 EFH. <u>https://meetings.npfmc.org/Meeting/Details/2975</u>

National Marine Fisheries Service (NMFS). 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. March 2005. NMFS, P.O. Box 21668, Juneau, AK 99801. <u>https://repository.library.noaa.gov/view/noaa/17391</u>

North Pacific Fishery Management Council (NPFMC). 2024. Fishery management plan for the Scallop Fishery Off Alaska. Anchorage, Alaska, North Pacific Fishery Management Council.<u>https://www.npfmc.org/wp-content/uploads/ScallopFMP.pdf</u>

Pirtle, J. L., Laman, E. A., Harris, J., Siple, M. C., Rooper, C. N., Hurst, T. P., Conrath, C. L., and Gibson, G. A. 2023a. Advancing model-based essential fish habitat descriptions for North Pacific species in the Gulf of Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-468, 541 p. https://doi.org/10.25923/ygdf-5f65