"The mission of the Council is to represent the citizens of Cook Inlet in promoting environmentally safe marine transportation and oil facility operations in Cook Inlet."

9 January 2016

Mark Janes
Project Manager
Avoidance Areas
Nuka Research
P.O. Box 191
Seldovia, Alaska 99663

SUBJECT: Avoidance Areas within Preauthorization Area of the Dispersant Use Plan for Alaska

Dear Mr. Janes,

As you know, the mission of the Cook Inlet Regional Citizens Advisory Council (RCAC) is to represent the citizens of Cook Inlet in promoting environmentally safe marine transportation and oil facility operations in Cook Inlet. In that capacity, we have reviewed the Preauthorization Area maps and are providing recommendations via the attached document. We can also work with you or the ARRT Preauthorization Area team to interpret our recommendations onto the electronic maps shown at http://nukadraft.wixsite.com/avoidanceareas.

Thank you for your consideration. If you wish to discuss our concerns or comments further, you can reach me at the number below or our Director of Science and Research may be reached at (907) 398-6214 or via email at saupe@circac.org.

Sincerely,

Michael Munger
Executive Director

Comments

Public Input for Dispersant Avoidance Areas within the Preauthorization Area

Submitted to: Alaska Regional Response Team representatives from the State of Alaska (ADEC), the United States Coast Guard, and the Environmental Protection Agency via Nuka Research and Planning

Submitted by: Cook Inlet Regional Citizens Advisory Council

January 9, 2017

General Comments

Cook Inlet Regional Citizens Advisory Council (CIRCAC) provides these comments to representatives of the Alaska Regional Response Team (ARRT) in response to the public notice issued by the Alaska Department of Environmental Conservation (ADEC), the United States Coast Guard (USCG), and the Environmental Protection Agency (EPA). We appreciate the opportunity to provide these comments based on our experience studying the oceanography and ecosystem components of Cook Inlet and the western Gulf of Alaska, as well as our knowledge of oil spill response planning in the region.

Our comments are based on the descriptions and maps provided in the Dispersant Use Plan for Alaska (Plan) dated 27 January 2016 and are specific to our areas of concern within the Cook Inlet and Kodiak Subareas. Following is a written description of our recommendations regarding potential Avoidance Areas in the Preauthorization Area of the Plan. We have also filled out and electronically submitted the appropriate Areas to be Avoided Public Input Forms obtained from http://nukadraft.wixsite.com/avoidanceareas.

We commend the ARRT for including a Preauthorization Area that is further offshore than in the previous Dispersant Use Plan (Plan) for Alaska. The 24-mile inner boundary provides additional distance and time before a dispersed oil plume would reach the typically more sensitive nearshore areas and increased the boundary 8x the distance offshore from the previous Plan. Despite this greater offshore distance, however, there are areas within the Preauthorization Area that are seasonally extremely productive at the surface, and areas that have very high benthic and lower water column fish biomass year-round. The bathymetry along much of the Preauthorization Area is complex, and as described below, influences the nutrient dynamics and productivity of the area.

We understand that a preauthorization area is the mechanism for the USCG to require certain vessel and facility response plan holders in Alaska to maintain a minimum dispersant use capability in accordance with a USCG August 31, 2009 rulemaking, 33 CFR Parts 154 and 155 "Vessel and Facility Response Plans for Oil: 2003 Removal Equipment Requirements and Alternative Technology Revisions; Final Rule (Final Rule)." However, with this requirement comes great responsibility on decision-makers when responding to hydrocarbon spills.

We know that decisions regarding dispersant use are based on evaluations of environmental trade-offs and, thus, a decision to disperse or not can have lasting impacts on the ultimate fate and effects of a crude oil (or other petroleum product) spill. CIRCAC has not taken a formal stance for or against dispersant use in our areas of concern (though we have taken a stance in favor of *in situ* burning during broken ice conditions in Cook Inlet) and have recognized that dispersants are a potential tool in certain scenarios where other cleanup methods are inadequate and the risk to sensitive habitats or populations from oil transported from offshore to nearshore environments is expected to be greater than the risk of dispersed oil in the water column. However, these trade-off decisions can be extremely complex, especially in an area of the world where there are large data gaps in our understanding of surface and subsurface currents, nutrient dynamics, and primary and secondary productivity.

Though significant research has been conducted following the Deep Water Horizon dispersant applications, the study results have not been "black and white" regarding dispersed oil toxicity and fate, and the results have pointed to the need for further research. Indications of surface-dispersed oil has been detected at great depths and distance from application, so further research is required to fully understand the transport mechanisms, biodegradation, and the ultimate fate of this dispersed oil. A large body of research on Marine Oil Snow Sedimentation and Flocculent Accumulation (MOSSFA) has shown that dispersed oil was transported from the surface (not just from dispersed oil at the sub-surface blow-out location) to the benthic environment. Researchers documented bioaccumulation of hydrocarbons into the benthic food web and assert that the long residence times of the MOSSFA-oil on the seafloor could result in prolonged exposure by benthic organisms and economically important fish. Major surface processes that governed the described MOSSFA event included an elevated and extended Mississippi River discharge, which enhanced phytoplankton production and suspended particle concentrations, zooplankton grazing, and enhanced microbial mucus formation[1]. These processes are not unlike those that occur along Alaska's continental shelf.

Comments on Avoidance Areas with the Preauthorization Area

Although the Preauthorization Area has been pushed significantly offshore compared to the earlier Plan, it includes wide areas of the relatively shallow (<200m) continental shelf and encompasses known areas of high primary and secondary productivity, Essential Fish habitat, Habitat Areas of Particular Concern, and Endangered and Protected species habitats. Given the uncertainties about the ultimate toxicity and fate of dispersed oil in the water column, as well as its potential for transport to the benthos, there are area/season combinations where the potential risks of chemically dispersing oil into the water column may outweigh the risks for oil being transported ashore.

Our reasoning does not mean that we are minimizing the fact that there are potentially great risks to nearshore environments if an oil spill that occurred >24 miles offshore was not dispersed and was carried to shore. However, the risk may be even greater if dispersed oil is integrated directly into the pelagic food web with the potential for a pathway for deposition to the deep benthos. These areas are known to be extremely productive seasonally due to nutrient upwelling and mixing into the upper stratified layer. Subsequent high phytoplankton production supports secondary production (zooplankton) that is available to higher trophic levels. In these areas, a chemically-dispersed oil plume could potentially impact a significant portion of the phytoplankton standing stock and ultimately be adsorbed or absorbed by phytoplankton; adsorbed, absorbed, or ingested by zooplankton and higher trophic levels, or; incorporated as marine-oil-snow and transported to the deeper water column or benthos where it can be sequestered or impact benthic-feeding species.

[1] Daly, K.L., U. Passow, J. Chanton, and D. Hollander. 2016. *Assessing the impacts of oil-associated marine snow formation and sedimentation during and after the Deepwater Horizon oil spill*. Anthropocene, 13:18–33.

In Figure 1, we combined the detailed maps provided by the ARRT for the Cook Inlet and Kodiak Subareas. By comparing the Preauthorization Area boundaries with high resolution bathymetry that shows offshore continental shelf and slope features (Figure 2) in those Subareas, it shows that there are significant canyon and bank features along the continental shelf – unlike many other areas of the continental shelf that are more uniformly level. The researchers who prepared Figure 2 describe the area as "*The western portion of the study area is almost entirely banks and troughs…On the western side of the CGOA [Central Gulf of Alaska], extending along the south side of the Kodiak archipelago, Albatross Bank is divided into southern, middle, and northern regions by Barnabus and Chiniak Troughs, respectively. Northern Albatross Bank is separated from Portlock Bank by Stevenson Trough, which extends between the Kodiak Archipelago and the Barren Islands. Kennedy Entrance divides the Barren Islands from the Kenai Peninsula and is loosely connected to Amatuli Trough, which bounds the north side of Portlock Bank. Small banks extending southerly from the Pye Islands, the Chiswell Islands, Cape Junken, and Montague Island are separated by troughs that are partially occluded with semi-circular arcs, presumably glacial moraines*." The banks are isolated by the deep troughs or canyons which are often greater than 150m and banks can shallow to less than 50 m.

These troughs are areas where nutrient-rich deep ocean water can be upwelled onto the shelf and transported towards shallower waters. When conditions are right (e.g. light, temperature, and stratification), the nutrients support phytoplankton blooms, typically peaking in May, though intermittent mixing and fall storms can bring additional nutrients to the surface for later season or fall blooms. Figure 3 is a satellite image that illustrates the high primary production in the water column above the continental shelf. Zooplankton blooms (secondary production) follow the phytoplankton blooms. Figure 4 shows plots of phytoplankton abundance and zooplankton abundance and biomass measured from continuous plankton recorders onboard ships transiting across the continental shelf north of Kodiak and south of the Kenai Peninsula[2]. Phytoplankton typically peaks in May, though there are significant blooms later in the summer and fall. Despite the lower standing stocks of phytoplankton in the summer, it does not mean that primary production is not still significant; the zooplankton that followed the initial plankton bloom can "crop" the plankton such that standing stock is low while production can still be high.

Though production can be high across the entire shelf at times, key upwelling areas are above the troughs. Several areas where whales are known to concentrate and feed on plankton blooms that benefitted from nearby nutrient upwelling are the areas towards the heads of Stevenson, Chiniak, and Barnabus troughs. **Cook Inlet RCAC recommends that dispersant use in these major troughs and nearby banks be avoided from mid-April through the end of September.** Although it is likely that there would be natural dispersion and that surface oil slicks are also a risk factor for plankton and higher trophic levels, the uncertainties of dispersing oil into high standing stocks of plankton (both phyto- and zoo-plankton) should preclude the assumption that a dispersed plume would be "transient." If dispersed oil is incorporated into the very base of the food chain, it would not be transient and has the potential to transfer risk throughout the food-web over a longer period of time. As well, the dispersed oil droplets can also interact with the

[2] From http://www.gulfwatchalaska.org/monitoring/environmental-drivers/continuous-plankton-recorder/.

high biomass of plankton and any suspended sediments, mucus, and associated microbes to potentially be transferred through the water column to the benthic environment, as well as being transported towards shore. If so, especially in shallower areas such as the Albatross and Portlock Banks, the marine oil snow could be a mechanism for introducing surface-dispersed oil to Essential Fish Habitat (examples of which are shown Figures 5 and 6) and benthic foodwebs.

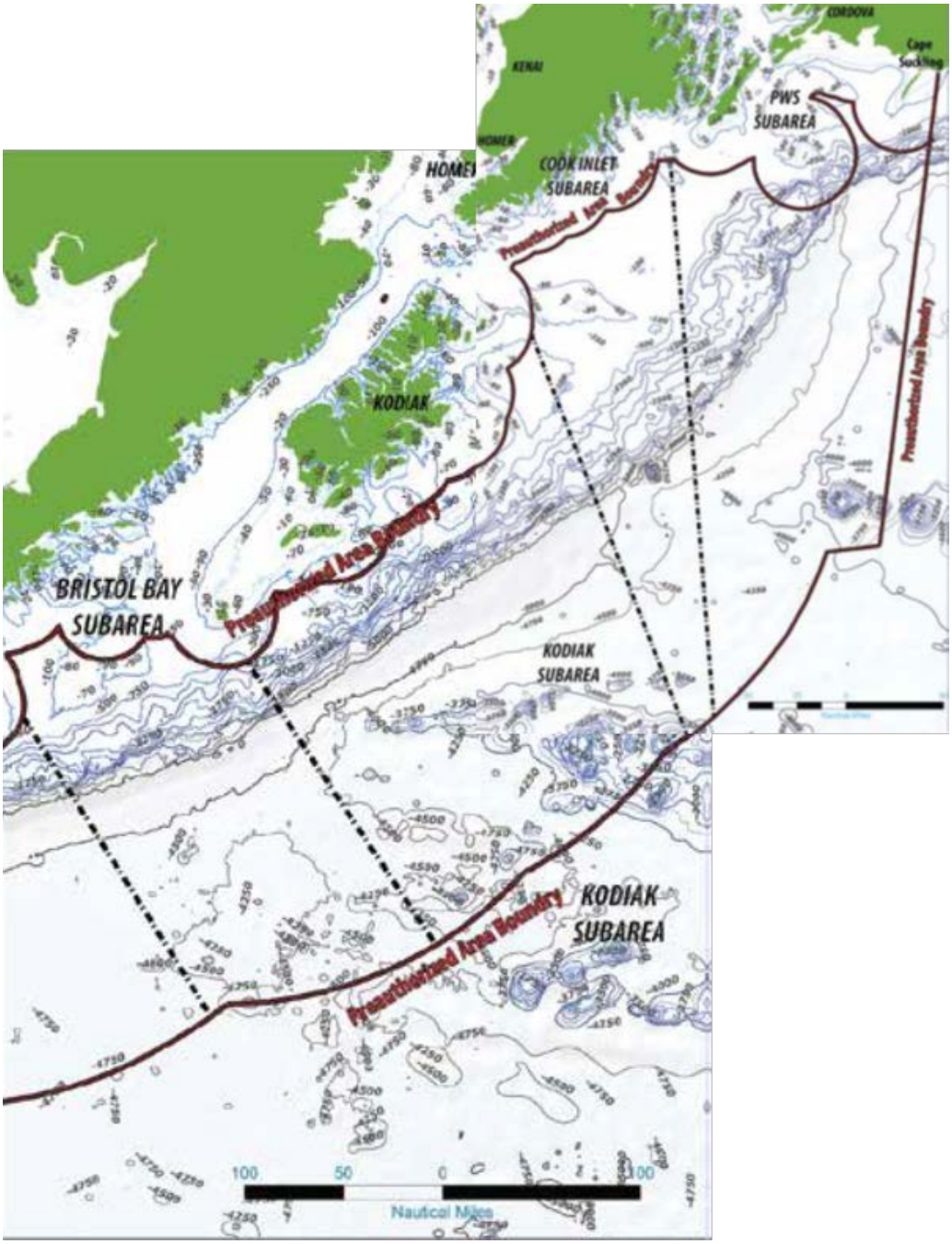

Figure 1. Overlap of Subareas with the Preauthorization Area. Details are for Cook Inlet and Kodiak Subareas. Maps from Alaska Regional Response Team.

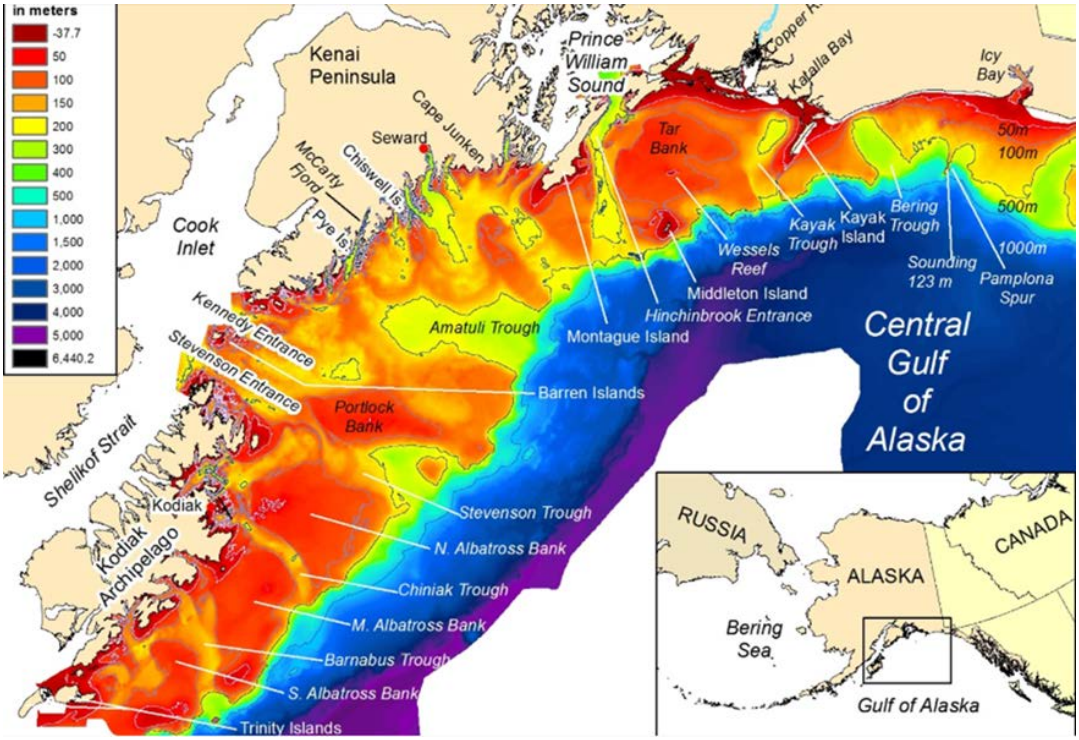

Figure 2. Bathymetry and prominent seafloor features in the western Gulf of Alaska. Map from NOAA, National Marine Fisheries, Alaska Fisheries Science Center[3].

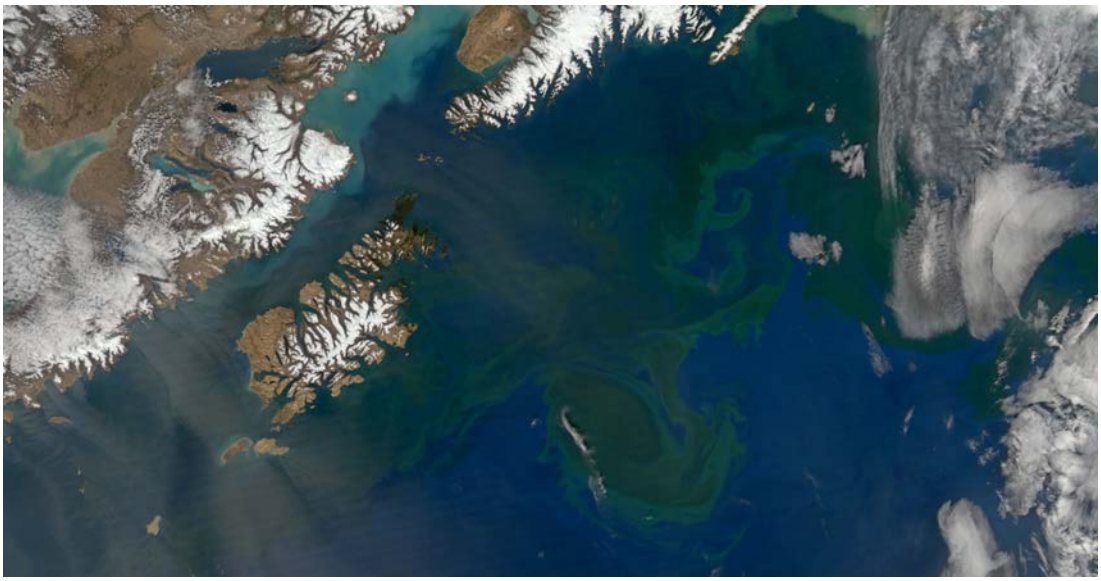

Figure 3. Image taken by SeaWiFS satellite on 20 May 2002 showing plankton bloom in the Gulf of Alaska. Note the high concentrations above the continental shelf and slope and within circulating eddies. From OrbImage.

[3] Zimmermann, M., and M. M. Prescott. 2015. Smooth sheet bathymetry of the central Gulf of Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-287, 54 p. doi:10.7289/V5GT5K4F.

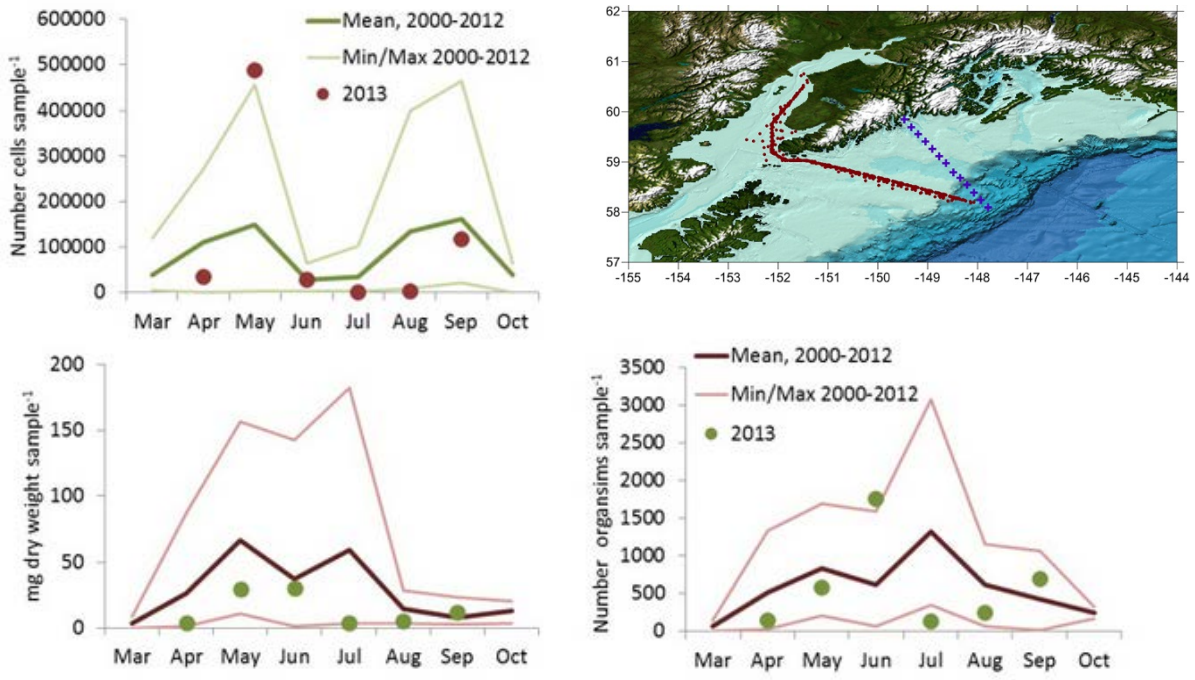

Figure 4. Results from continuous plankton recorder sampling by Dr. Sonia Batten along the transect shown in dark red that bisects the continental shelf east of Kodiak and south of the Kenai Peninsula. Monthly means from 2013 are overlaid on the long-term time series of CPR observations between 2000-2012.. Upper graph shows mean diatom abundance; lower graphs show zooplankton biomass (left) and abundance (right).

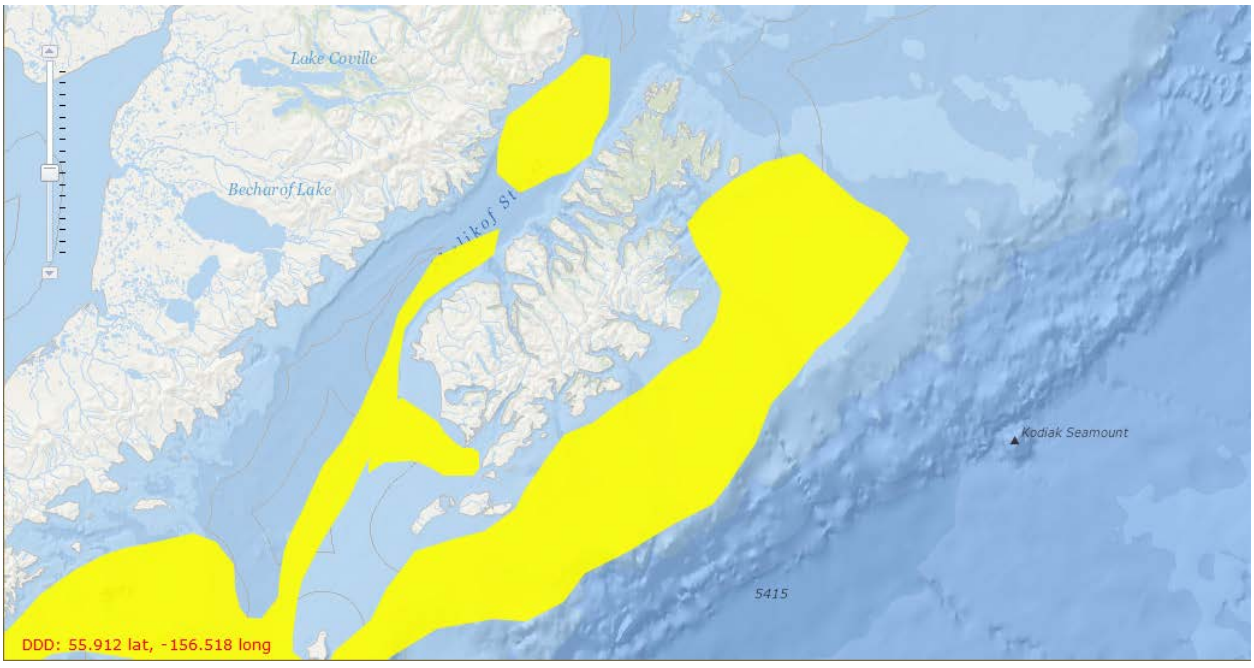

Figure 5. Weathervane scallop Essential Fish Habitat that is shown overlapping the Kodiak Subarea and Preauthorization Area. From http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html.

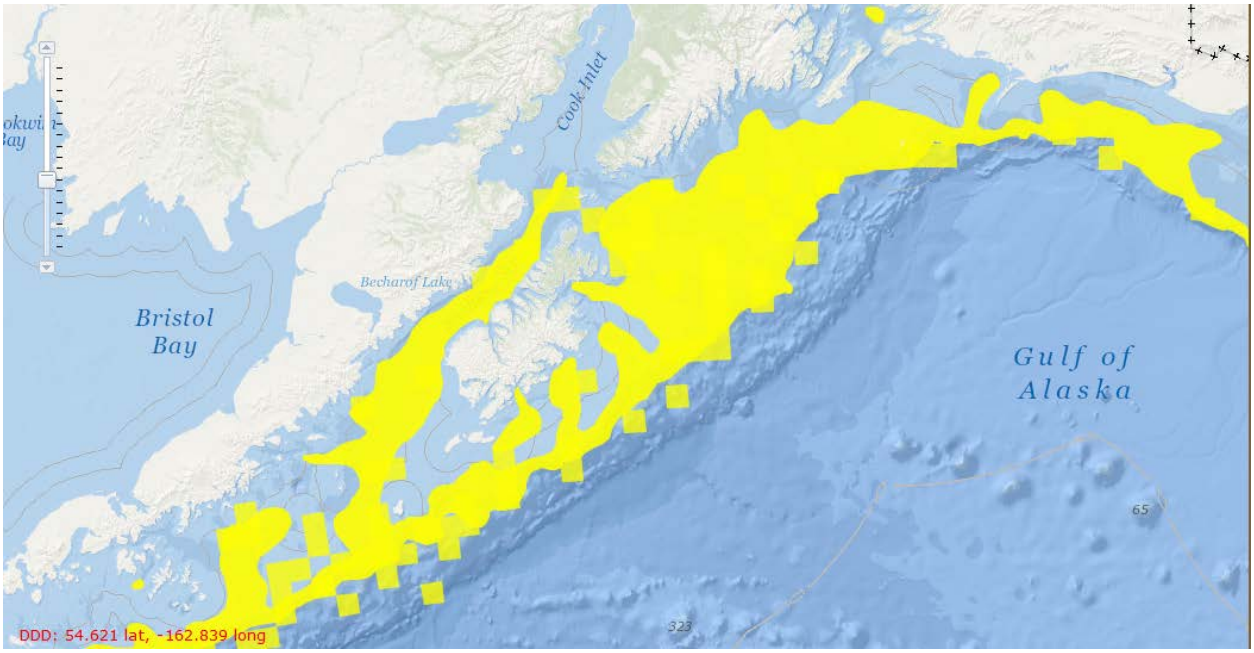

Figure 6. Sablefish (Black Cod) Essential Fish Habitat that overlaps portions of the Preauthorization Area and the Bristol Bay, Kodiak, Cook Inlet, and Prince William Sound Subareas.
From http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html.