STOCK AUTHOR ANALYSIS OF EFFECTS OF FISHING ON ESSENTIAL FISH HABITAT

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CRAB PLAN TEAM MEETING

MAY 17, 2022

OUTLINE

- Brief overview of EFH 5-Year Review

- Stock author analysis of Fishing Effects

- NEW Google form

- Your analysis and review will build our report to the Council
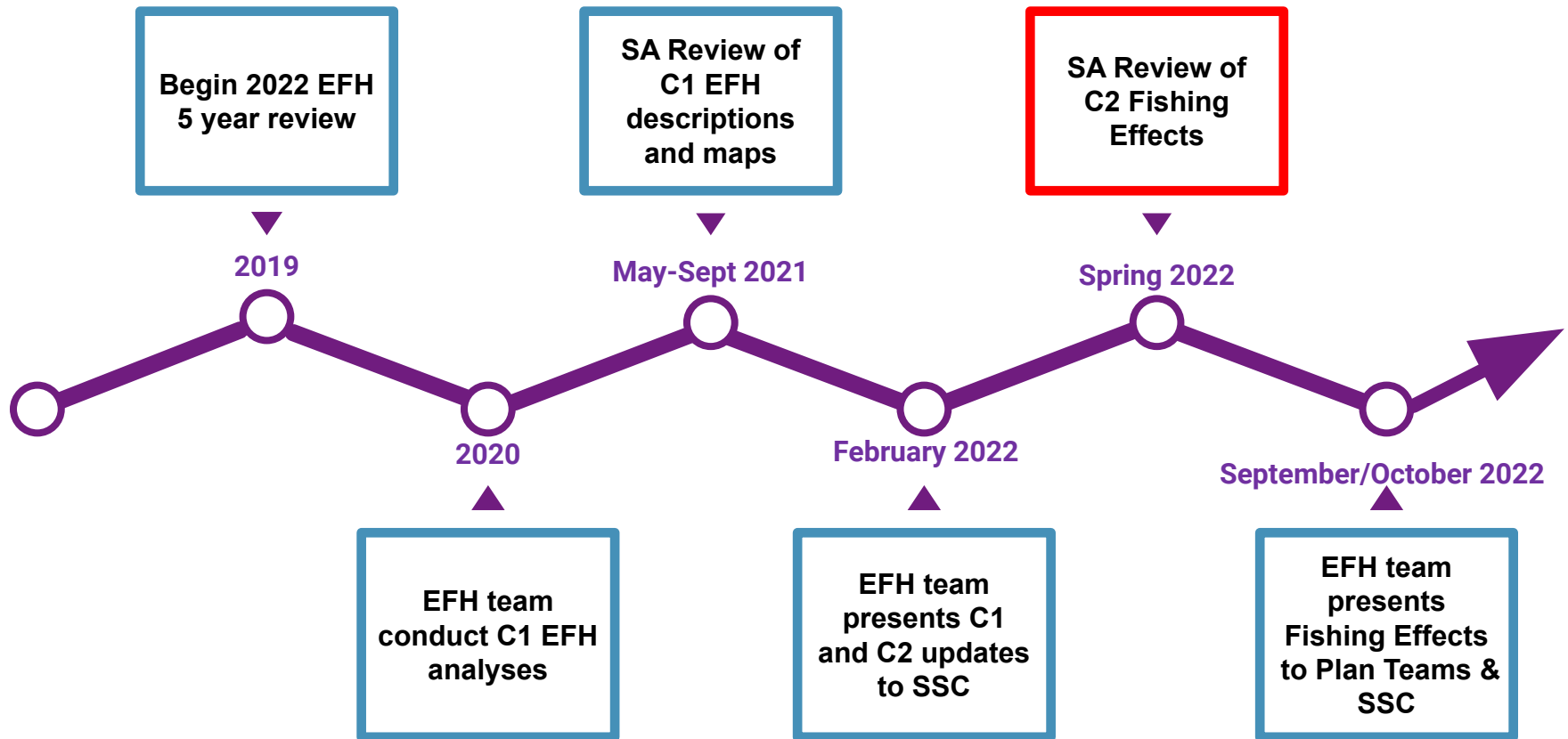
EFH 5 YEAR REVIEW

1. **EFH descriptions and identification(maps)**
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 and enhancement recommendations**
7. **Prey species list and locations**
8. Habitat areas of particular concern (HAPC) identification
9. **Research and Information needs**
10. **Review EFH every 5 years**

EFH 5 YEAR REVIEW

| Begin 2022 EFH 5 year review | SA Review of C1 EFH descriptions and maps | SA Review of C2 Fishing Effects |

2019   **May-Sept 2021**   **Spring 2022**

2020   **February 2022**   **September/October 2022**

| EFH team conduct C1 EFH analyses | EFH team presents C1 and C2 updates to SSC | EFH team presents Fishing Effects to Plan Teams & SSC |

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FISHING EFFECTS ANALYSIS

3 Steps to FE Analysis:

1. Run the Fishing Effects model to determine benthic habitat disturbance from commercial fishing (gear-specific)

2. Use the upper 50% core EFH area (CEA) from the SDM maps with the Fishing Effects model to determine species- and region-specific habitat disturbance
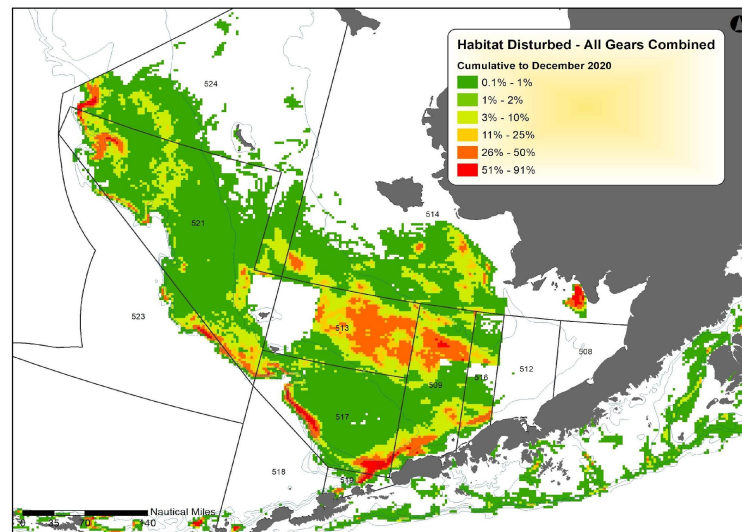
FISHING EFFECTS ANALYSIS

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3. **Stock authors review the Fishing Effects model output and analyze for any possible impacts to their species from those effects, especially:**

   - **If stock is below MSST; or**

   - **If ≥ 10% of the core EFH area has been reduced**

   - **If you have concerns with the FE model representation**

STOCK AUTHOR ANALYSIS

Launched April 5th:

- You received an email with:

  - The Stock Author Fishing Effects Analysis folder for each species

  - Instructions document & Decision Tree

  - EFH Summary Table

  - The Stock Author Analysis Google form

STOCK AUTHOR ANALYSIS

Launched April 5th: EFH Summary Table snapshot

|	A	B	C	D	E	F	G	H	I	J	K	L	M	N
						SDM Performance Metrics			SDM Performance Metrics	EFH	CEA (upper 50th percentile of EFH area km2)	≥10% CEA Habitat	SA raised a concern and/or provided a future recommendation during their SDM review that distribution data in addition to the RACE GAP bottom trawl survey should be used to map EFH for this species (Checked box = Yes)	SA SDM Review Report page
	Region	Species Common Name	Life Stage	N	RMSE	ρ	AUC	PDE	Overall Score*	Level		Disturbed		reference
5	AI	arrowtooth flounder	adult	3,118	42.9	0.49	0.75	0.29	good	2	40,900	☐	☑	21
6	AI	flathead sole	adult	1,374	13.5	0.56	0.86	0.48	good	2	35,700	☐	☐	
7	AI	Greenland turbot	adult	359	11.6	0.41	0.96	0.70	excellent	2	14,000	☐	☐	
8	AI	Kamchatka flounder	adult	918	19.4	0.54	0.90	0.75	excellent	2	27,300	☐	☐	
9	AI	northern rock sole	adult	2,923	58.8	0.72	0.88	0.47	good	2	39,300	☐	☐	
10	AI	other flatfish complex	adult	-	-	-	-	-	-	2	40,900	☐	☐	
11	AI	Dover sole	adult	232	1	0.27	0.88	0.43	good	2	15,400	☐	☐	
12	AI	English sole	adult	50	1	0.23	0.98	0.82	good	2	5,500	☐	☐	
13	AI	rex sole	adult	1,891	23	0.56	0.82	0.43	good	2	40,600	☐	☐	
14	AI	southern rock sole	adult	763	11	0.63	0.97	0.81	excellent	2	22,200	☐	☐	
15	AI	Atka mackerel	adult	2,030	1,190	0.52	0.65	0.36	fair	2	40,900	☐	☑	22
16	AI	Pacific cod	adult	3,084	40.4	0.50	0.76	0.37	good	2	40,800	☐	☐	
17	AI	sablefish	adult	368	8	0.40	0.95	0.67	good	2	17,400	☐	☑	30
18	AI	walleye pollock	adult	2,773	447	0.50	0.71	0.28	good	2	40,900	☐	☐	
19	AI	northern rockfish	adult	2,063	779	0.56	0.68	0.42	fair	2	40,900	☐	☐	
20	AI	Pacific ocean perch	adult	2,908	1,570	0.72	0.68	0.46	good	2	40,900	☐	☐	
21	AI	rougheye blackspotted complex	adult	711	19.4	0.52	0.94	0.76	excellent	2	18,300	☐	☐	
22	AI	shortraker rockfish	adult	514	6.14	0.48	0.96	0.76	excellent	2	14,400	☐	☑	32
23	AI	other rockfish complex	adult	-	-	-	-	-	-	2	40,900	☐	☐	
24	AI	dusky rockfish	adult	380	9.17	0.27	0.78	0.45	fair	2	34,100	☐	☐	
25	AI	harlequin rockfish	adult	111	23.4	0.18	0.86	0.40	fair	2	32,600	☐	☐	

This is a helpful combination of SDM performance metrics, noted concerns from stock authors on their previous SDM review (2021), and Fishing Effects model results for core EFH area (CEA) disturbance.
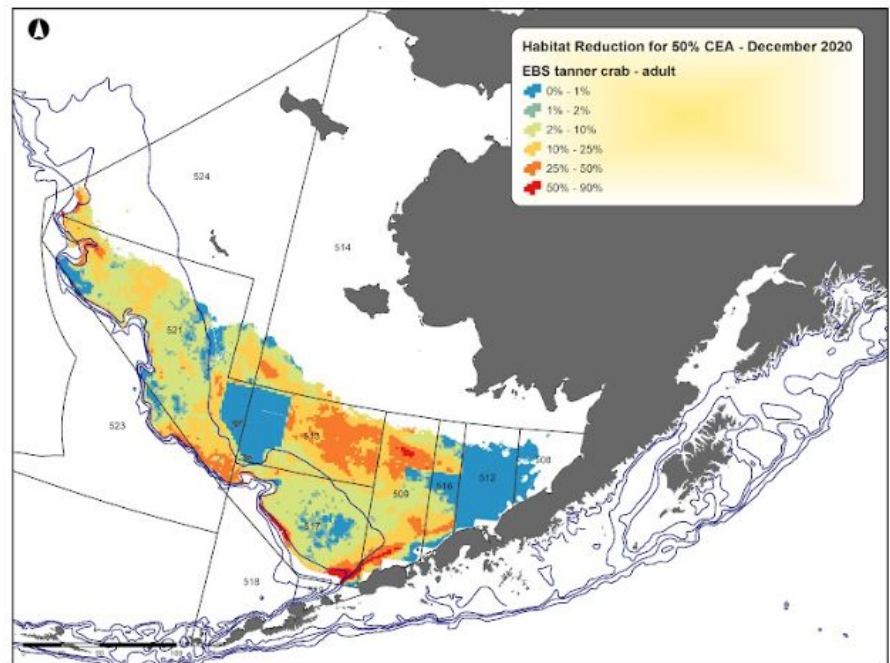
TANNER CRAB EXAMPLE

EBS Tanner EFH Map:

EBS Tanner Habitat Disturbance Map:
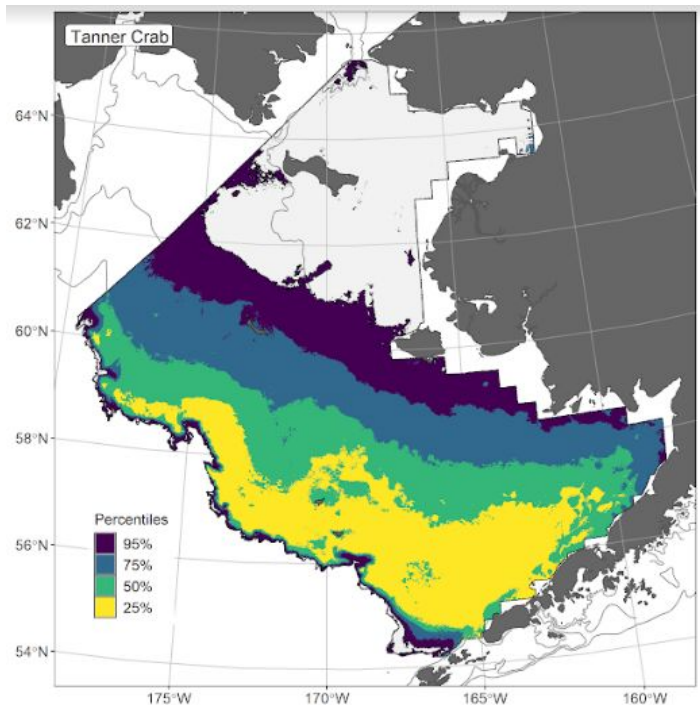
All shaded areas are EFH; upper 50% core EFH area (CEA) is the green and yellow areas
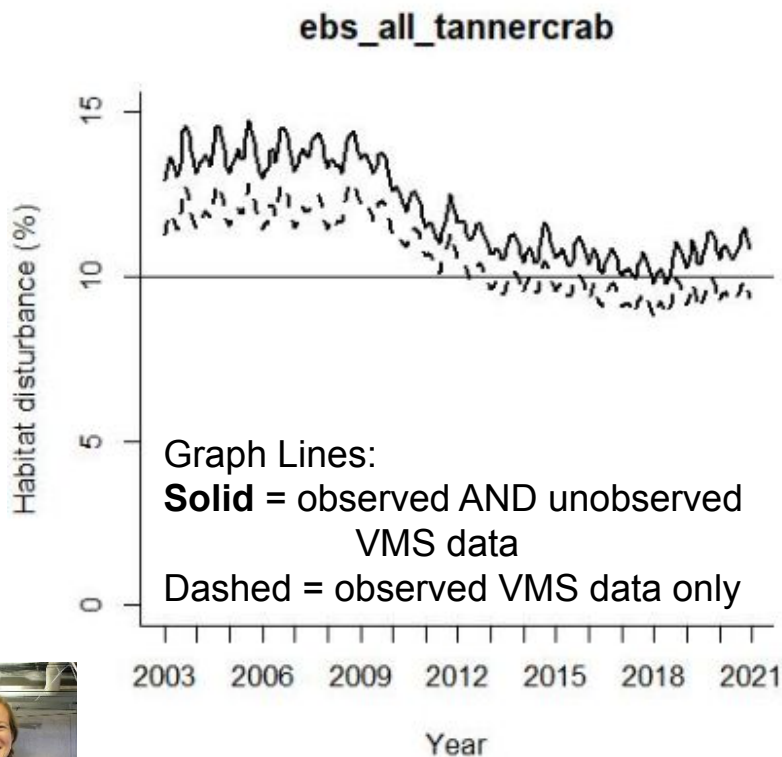
% habitat disturbance within the upper 50% CEA for December 2020:
Observed data only: 9.4%
Unobserved-added: 10.9%

TANNER CRAB EXAMPLE

Time series comparison of habitat disturbance using observed-only and unobserved-added VMS data:

ebs_all_tannercrab

Graph Lines:
Solid = observed AND unobserved
            VMS data
Dashed = observed VMS data only

|	A	B	C
1		disturb.full	disturb.noUnobs
204	Nov-19	0.111587167	0.097892894
205	Dec-19	0.108082296	0.0943431
206	Jan-20	0.105540379	0.092252391
207	Feb-20	0.108518747	0.094649765
208	Mar-20	0.109756369	0.09512368
209	Apr-20	0.108713489	0.094663272
210	May-20	0.106548929	0.092287372
211	Jun-20	0.10520722	0.091847413
212	Jul-20	0.107226169	0.09387631
213	Aug-20	0.108884603	0.094975143
214	Sep-20	0.112642492	0.097494545
215	Oct-20	0.114996657	0.098857526
216	Nov-20	0.112361659	0.096674002
217	Dec-20	0.10873181	0.093639584

The time series is offered as both a JPEG and a CSV file in the species folders.

STOCK AUTHOR ANALYSIS

Instructions:

- **Please read all the way through and review all the provided information before beginning the Google form!**

- Follow the Decision Tree

  - Provided in the Instructions and as a PowerPoint presentation in the Fishing Effects folder

  - Not all questions will necessarily be answered
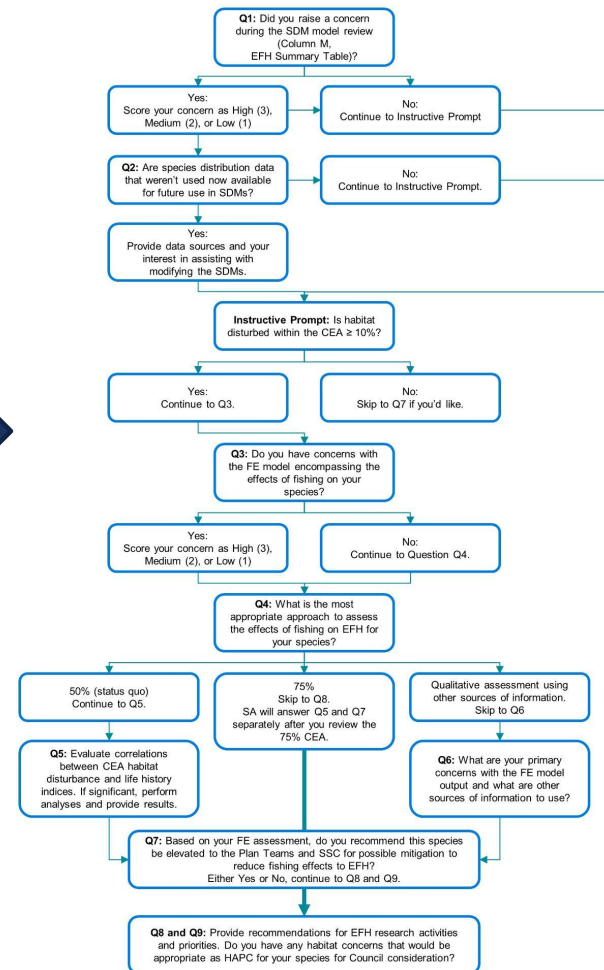
GOOGLE FORM HIGHLIGHTS

Sect. 1:

Q1. Select species or species complex name from dropdown menu *

Choose ▼

Q2: Select species region from dropdown menu *

Choose ▼

Q3: Is the stock is below MSST? *

○ Yes. Continue filling out the rest of the questions even if the habitat disturbance is less that 10% of the CEA.

○ No

○ Stock does not have MSST defined.

GOOGLE FORM HIGHLIGHTS

Sect. 2: Qualitatively score concerns with:

- **SDM maps (previous review)**
- **FE model results**

1. Please qualitatively score your concern (Column M of the EFH Summary Table) that the EFH map does NOT encompass the summer distribution of adults of this species in the fishery management unit as High (3), Medium (2), or Low (1). If you did not report a concern in your earlier review, you can skip to question 3. If you are concerned now, please rank your concern. *

○ High (3)

○ Medium (2)

○ Low (1)

○ No Concern (skip to Q3)

1a. Please briefly explain your concern and qualitative score.

Your answer

3. Please qualitatively score your concerns that the FE model does not encompass the effects of fishing on your species due to FE model data limitations as High (3), Medium (2), or Low (1).

○ High (3)

○ Medium (2)

○ Low (1)

○ No Concern

3a. Please briefly explain your concern and qualitative score.

Your answer

GOOGLE FORM HIGHLIGHTS

Sect. 2: Disturbance in core EFH area:

- The EFH Summary Table column L will be checked if your species is above the 10% threshold

  - Note: only EBS species had ≥10% CEA disturbance

  - For crabs, this only applies to EBS Tanners

|	A	B	C	D	E	F	G	H	I	J	K	L
			Life Stage	N	SDM Performance Metrics				SDM Performance Metrics	EFH Level	CEA (upper 50th percentile of EFH area km2)	≥10% CEA Habitat Disturbed
	Region	Species Common Name			RMSE	ρ	AUC	PDE	Overall Score*			
46	EBS	deepsea sole	all	110	0.3	0.45	0.99	0.87	excellent	2	5,700	☐
47	EBS	Dover sole	adult	91	0.37	0.30	0.99	0.73	good	2	7,000	☑
48	EBS	longhead dab	all	2,307	54	0.61	0.97	0.68	excellent	2	203,300	☐
49	EBS	rex sole	adult	2,171	10	0.57	0.96	0.77	excellent	2	122,700	☑
50	EBS	Sakhalin sole	adult	225	2.1	0.22	0.97	0.68	good	2	105,200	☐
51	EBS	starry flounder	adult	1,619	19.2	0.51	0.96	0.58	good	2	187,900	☐
52	EBS	Atka mackerel	adult	72	0.69	0.09	0.85	0.28	fair	2	13,800	☑
53	EBS	Pacific cod	adult	11,853	20.5	0.48	0.79	0.15	good	2	355,600	☐
54	EBS	sablefish	adult	544	1.77	0.39	0.99	0.77	good	2	35,700	☑
55	EBS	walleye pollock	adult	13,506	1,020	0.63	0.63	0.24	fair	2	362,900	☐
56	EBS	northern rockfish	adult	89	9.08	0.15	0.97	0.71	good	2	44,100	☑
57	EBS	Pacific ocean perch	adult	561	308	0.34	0.99	0.39	fair	2	101,000	☑
58	EBS	rougheye blackspotted complex	adult	105	0.15	0.36	0.99	0.75	good	2	7,000	☑
59	EBS	shortspine thornyhead	adult	696	16	0.55	0.99	0.92	excellent	2	25,100	☑
60	EBS	shortraker rockfish	adult	142	1.65	0.33	0.99	0.85	good	2	7,200	☑
61	EBS	skate complex	adult	-	-	-	-	-	-	2	362,100	☐
62	EBS	Alaska skate	adult	5,162	5	0.55	0.78	0.29	good	2	354,600	☐
63	EBS	Aleutian skate	adult	207	0.44	0.30	0.96	0.57	good	2	31,000	☑

GOOGLE FORM HIGHLIGHTS

Sect. 2: Assessing fishing effects

4. What is the most appropriate approach to assess the effects of fishing on EFH for your species? If you have concerns that the SDM map underestimates EFH, you can choose using the FE model with a 75% CEA or qualitative assessment using other sources of information.

○ Use the FE model with a 50% CEA (status quo) - Move to Q5

○ Use the FE model with a 75% CEA (We will provide these results and maps to the SA upon request)- Move to Q8

○ Qualitative Assessment using other sources of information - Skip to Q6

Red King Crab

Percentiles
- 95%
- 75%
- 50%
- 25%
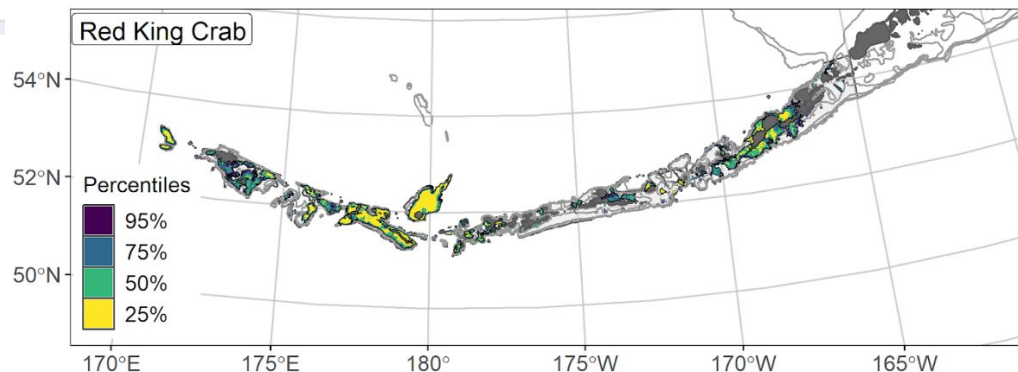
GOOGLE FORM FINISH

Sect. 2:

- Elevate species?
- Research priorities for effects of fishing?
- HAPC considerations?

- Your answers will populate the written report we provide to the Council
- **Due June 30th**

7. Based on your FE assessment, do you recommend this species be elevated to the Plan Teams and SSC for possible mitigation to reduce fishing effects to EFH?

○ No further action

○ Elevate for possible mitigation

○ Insufficient information to make this decision

8. Provide recommendations for EFH research activities and priorities to understand fishing effects on EFH.

Your answer

9. Do you have any habitat concerns that would be appropriate as Habitat Areas of Particular Concern (HAPC) for your species for Council consideration?

Your answer

SUBMIT

THANK YOU!

QUESTIONS?

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