

# Ecosystem & Socioeconomic Profile Overview and Update

KALEI SHOTWELL, ERIN FEDEWA, CRAB PLAN TEAM, MAY 2023



ESP Definition: A standardized framework that facilitates the integration of ecosystem and socioeconomic factors within the stock assessment process and acts as a proving ground for use in management advice.



# ESP Progression



## Groundfish Plan Team

Scientific and Statistical Committee

Crab Plan Team

Center Workshops

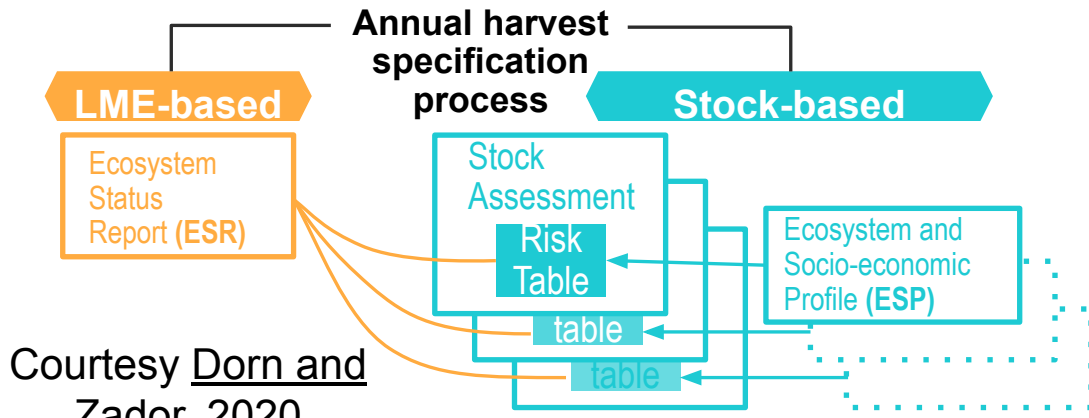
Council

National

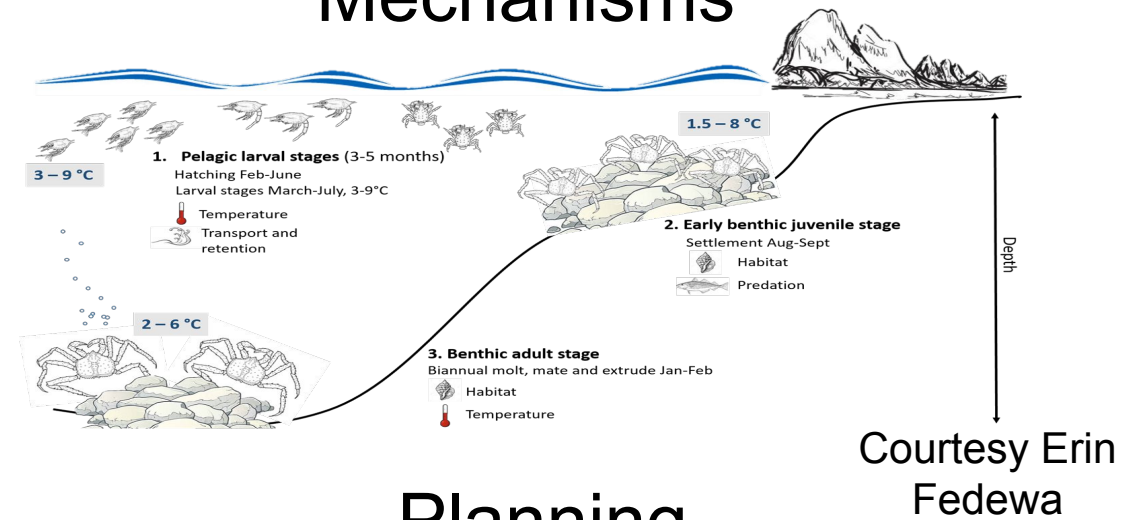


# ESP Decisions

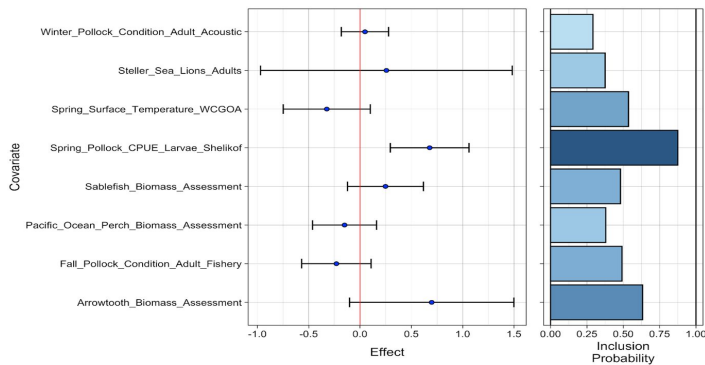
## Context



## Mechanisms

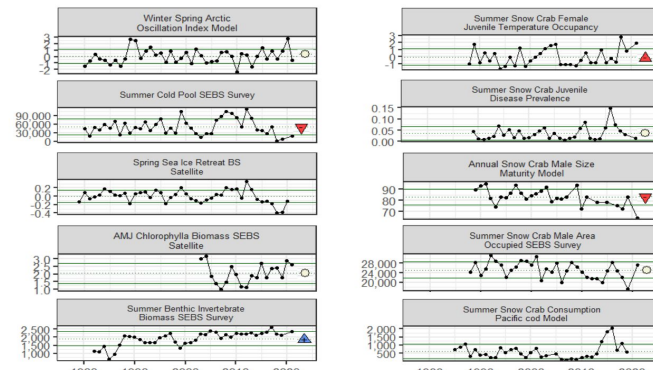


## Models



Courtesy  
C. Cunningham

## Planning



# ESP Workflow

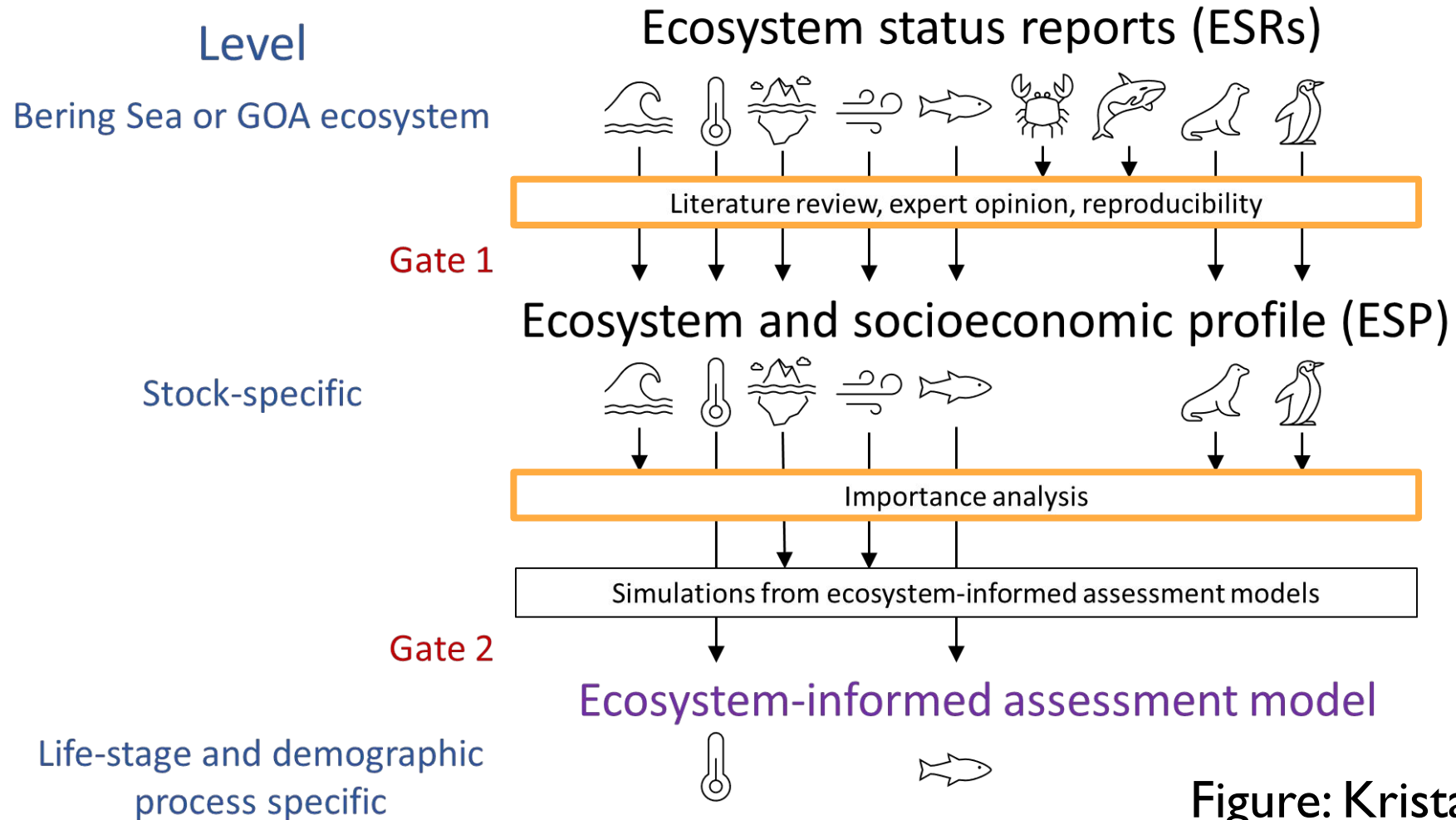


Figure: Krista Oke



# ESP Report Summary

Stock	Year initiated	Full ESP	Partial update	Report card
Sablefish	2017	2017 - <u>2019</u>	<u>2020</u>	<u>2021</u> , <u>2022</u>
Gulf of Alaska Pollock	2019	<u>2019</u>	<u>2020</u>	<u>2021</u> , <u>2022</u>
EBS Pacific Cod	2020	<u>2021</u>		<u>2021</u> , <u>2022</u>
GOA Pacific Cod	2020	<u>2021</u>		<u>2021</u> , <u>2022</u>
St Matthew Blue King Crab	2019	<u>2019</u>	<u>2020</u>	<u>2022</u>
Bristol Bay Red King Crab	2020	<u>2020</u>		<u>2021</u> , <u>2022</u>
Bering Sea Snow Crab	2021	<u>2022</u>		

Note: Report cards are produced annually unless no SAFE



# Update

## This Year

Overview of ESPs for 2023, progress on importance methods, report streamlining

## Next Year

Plans for 2024 ESPs, data complexity advances, initiating Request For Information (RFI)

## National

Developing National ESP Initiative including creating, sharing, synthesis workshops



# Current (2023) ESPs

- ESP updates to Crab and Groundfish Plan Team (May, September)
- Report Card ESPs
  - Bristol Bay Red King and EBS Snow Crab in September
  - Sablefish, GOA pollock, GOA Pacific cod, and EBS Pacific cod in November
  - Only updated indicator data or minor changes (e.g., data updates)
- No full ESPs but testing request process (potential sablefish summer)



# Importance Methods Project

- Evaluating five different statistical methods (sablefish case study)
  - Bayesian adaptive sampling (BAS)
  - Boosted regression trees (BRT)
  - General additive models (GAMs)
  - Dynamic factor analysis (DFA) + robust regression
  - Structural equation modeling (SEM)
- Preliminary results presented this summer

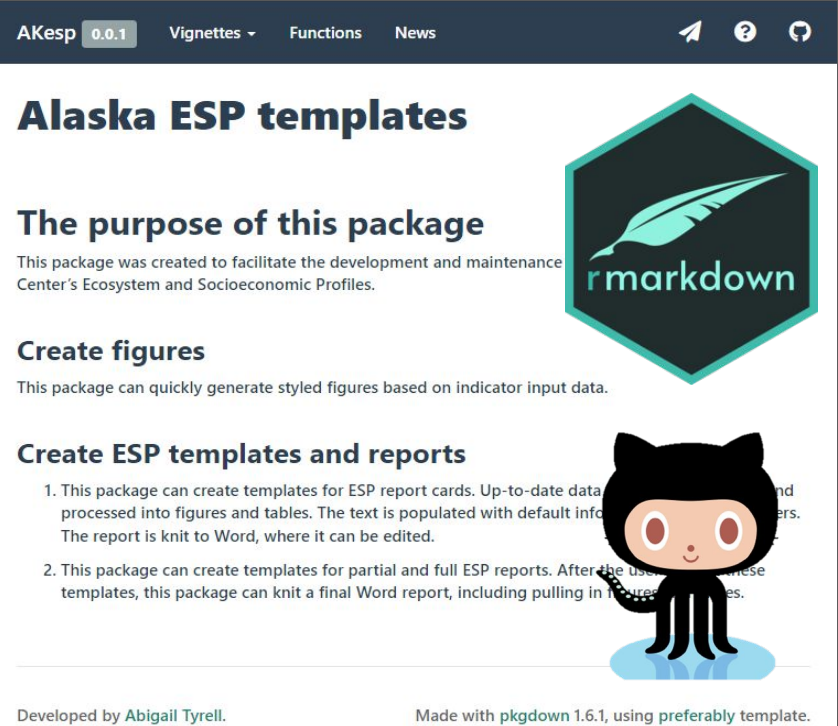


Team: Oke, Siddon, Shotwell, Cunningham, Goethel, Lunsford, Arimitsu



# Reproducibility Project

- Developed [AKESP](#) R package
  - Provided through GitHub
  - Connects to AKFIN web service
  - ESP database has all ESP indicators
  - Standard set of graphics available (updating)
  - Report templates in R Markdown (updating)
- Expanding for National ESP, 2-pager



AKesp 0.0.1 Vignettes Functions News

## Alaska ESP templates

**The purpose of this package**  
This package was created to facilitate the development and maintenance of Alaska Center's Ecosystem and Socioeconomic Profiles.

**Create figures**  
This package can quickly generate styled figures based on indicator input data.

**Create ESP templates and reports**

1. This package can create templates for ESP report cards. Up-to-date data is pulled from AKFIN and processed into figures and tables. The text is populated with default information. The report is knit to Word, where it can be edited.
2. This package can create templates for partial and full ESP reports. After the user selects these templates, this package can knit a final Word report, including pulling in figures.

Developed by Abigail Tyrell. Made with pkgdown 1.6.1, using preferably template.



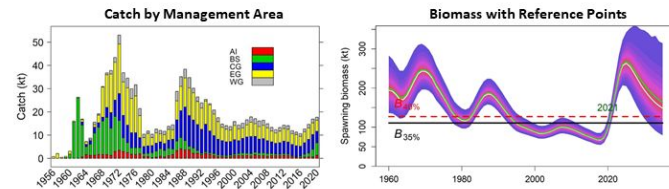
# Reproducibility Project



Sablefish (*Anoplopoma fimbria*)

### Stock Assessment & Status

- Bering Sea/Aleutian Islands and Gulf of Alaska stock with custom statistical catch-at-age model
- Benchmark assessment in 2016 included CIE recommendations to 1) account for whale depredation on the survey and fishery, and 2) propagate more structural uncertainty of management quantities.



Year	ABC	OFL	Total Biomass	B/B <sub>MSY</sub>	F/F <sub>MSY</sub>	Recruits (mill #s)	Total Catch	Ex-Value (mill \$)
2015	13,657	16,128	188,000	0.66	0.78	26.63	10,970	100.6
2016	11,795	13,397	170,000	0.63	0.78	163.65	10,257	98
2017	13,083	15,485	206,000	0.60	0.88	123.44	12,270	123.5
2018	14,957	29,507	515,000	0.59	0.77	12.47	14,341	93.7
2019	15,068	32,798	414,000	0.66	0.58	17.5	16,624	73.6

This stock is not subjected to overfishing, currently overfished, nor approaching an overfished condition.

### Research Priorities

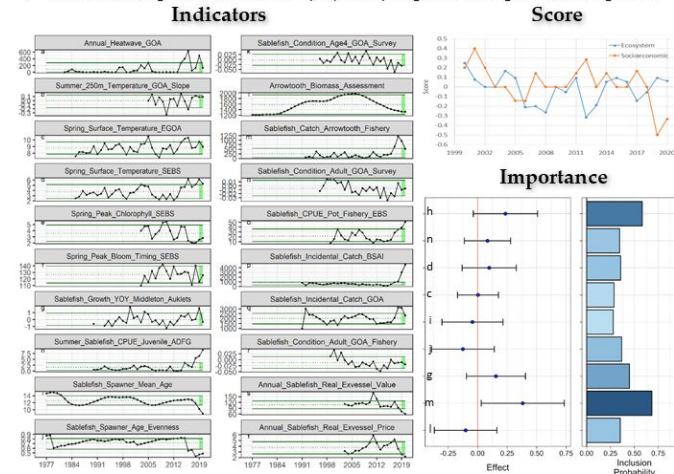
- Evaluate apportionment strategies for ABC, use spatially explicit research model
- Explore integration of ecosystem data to understand highly variable recruitment
- Refine fishery abundance index, identify covariates that affect catch rates

Assessment: <https://www.afsc.noaa.gov/REFM/Docs/2019/GOAsablefish.pdf> Contact: [Dana.Hanselman@noaa.gov](mailto:Dana.Hanselman@noaa.gov)



Sablefish (*Anoplopoma fimbria*)

- Data rich stock, high recruitment variability, rapid early life growth, shifting distribution, high value



- Presence of 2016 and 2019 year class in ADF&G survey, age 4 fish generally in poor condition, higher spatial overlap with arrowtooth in fishery, physical + but < from 2019, lower stable, upper slight >
- Incidental catch < in GOA, > in BSAI indicates expanding habitat, ex-vessel value and price/pound on recent decline, community analysis in progress

### Research Model Performance (hypothetical)

Model	ABC	OFL	Cross Validation	Retrospective	Recruitment Comparison	SSB Comparison
SAFE	26,250	30,000	28% +/- 6%	+0.19	0.5	0.5
Eco	23,625	27,000	46% +/- 12%	+0.07	0.65	0.3

ESP: <https://www.afsc.noaa.gov/REFM/Docs/19EAR1/GOAsablefish.pdf> Contact: [Kalei.Shotwell@noaa.gov](mailto:Kalei.Shotwell@noaa.gov)



Team: Tyrell, Shotwell, Fedewa, AKFIN

# Update

## This Year

Overview of ESPs for 2023, progress on importance methods, report streamlining

## Next Year

Plans for 2024 ESPs, data complexity advances, initiating Request For Information (RFI)

## National

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# Future (2024) ESPs

## ■ Full ESPs

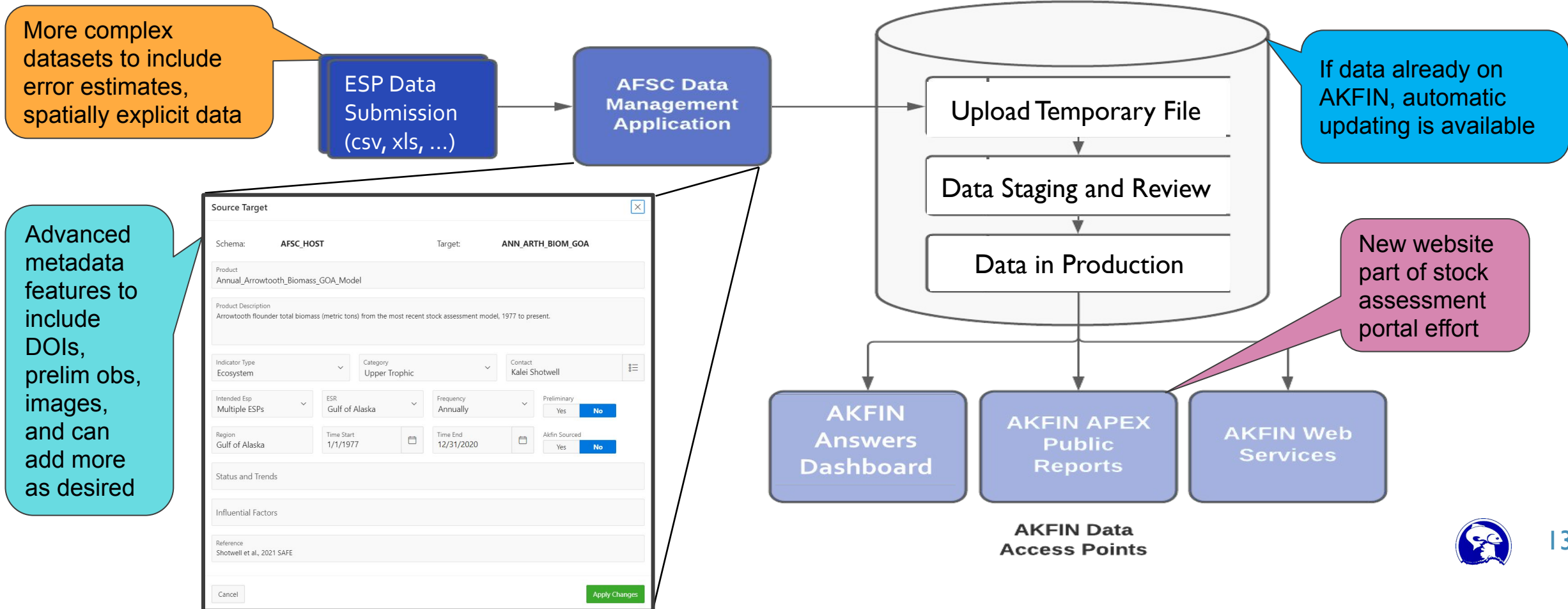
- Initiate EBS Tanner Crab ESP, present progress report in May
- Initiate EBS Pollock ESP, present progress report in September
- Potentially update full Sablefish ESP, present in September

## ■ Report Card ESPs

- St Matts blue king, Bristol Bay red king, and EBS snow crab in September
- Sablefish, GOA pollock, GOA Pacific cod, and EBS Pacific cod in November



# AKFIN Data Management Application



# Request For Information (RFI)

## Four main elements ([example](#))

1. **Description:** process, cycle
2. **Request:** stock research priorities, ecosystem and socioeconomic pressures, can be indicators or information
3. **Contributions:** data fields and submission instructions
4. **Review and Responsibilities:** teams and contributor roles, use and credit

### Request for Indicators: Ecosystem and Socioeconomic Profile of the Myfish stock in the Myarea

[List of ESP team who wrote the RFI request]  
[Current Year]

[Picture of stock, if desired]

#### Description of Process

Short description of ESP process and justification for conducting the Request for Indicators for this stock (this will likely be consistent text for all RFIs)

Reference to Plan Team and SSC Recommendations, author request, and/or research priorities to conduct an ESP for this stock

Table of stepwise plan and cycle for review of indicator submissions in response to this RFI

Initial Recommendation	December [year]
Request Opening	First Week of January [year]
Proposed Indicators Due	First Week of February [year]
Notification of Selected Indicators	Last Week of February [year]

#### Stock Request

Description of main ecosystem and socioeconomic indicator needs for recommended ESP

##### Ecosystem Processes

- Summary of ecosystem processes that identify dominant pressures on the stock, evaluate by life history stage where possible
- Include conceptual model if available
- List of needed indicators based on dominant drivers

##### Socioeconomic Processes

- Summary of socioeconomic processes that identify dominant pressures on the stock, evaluate by life history stage where possible
- Include conceptual model if available
- List of needed indicators based on dominant drivers



# Request For Information (RFI)

## Stock/Complex:

1

### Outline for Request for Indicators (RFI)

#### Description of Process

- Short description of the ESPs and need for the RFI process
- Reference to Plan Team and SSC Recommendations to conduct ESP
- List of ESP team members for RFI review
- Table of stepwise plan and cycle for RFI review

## Stock Request

2

Description of main ecosystem and socioeconomic indicator needs for ESP

#### Ecosystem Processes

- Summary of ecosystem processes that identify dominant pressures on the stock, evaluate by life history stage where possible
- List of needed indicators based on dominant drivers

#### Socioeconomic Processes

- Summary of socioeconomic processes that identify dominant pressures on the stock, evaluate by life history stage where possible
- List of needed indicators based on dominant drivers

#### Contributions

General requirements for indicator contributions responding to the request

#### Data Fields

- List of required metadata for contribution entry
- Description of indicator, status and trends, relevance to stock
- Criteria met for either ESP Gate 1 or Gate 2 (checkbox, references)

#### Data Submission

- Upload data fields and indicator data to AKFIN submission tool
- Review indicator data and resolve any validation conflicts
- Submit by specified due dates (initial and current year update)

#### Review and Responsibilities

Description of the review process by the ESP team, how the data will be used in the ESP, acknowledgement for use, and responsibilities

## Team Review

3

- Evaluation of evidence that the indicator met the criteria specified
- Evaluation of completeness and timeliness of contribution

#### Use and Credit

- Data will only be used for the intended ESP and can be made available to the public if approved by the contributor
- Depending on level of contribution, credit is through acknowledgement as contributor or authorship of the ESP report

#### Responsibilities

- ESP teams and contributors commit to annual ESP process of review and indicator submission
- ESP teams provide short summary of indicator review and feedback for contributors
- ESP contributors provide contact, be available for questions and follow up, and commit to producing indicator if selected for ESP

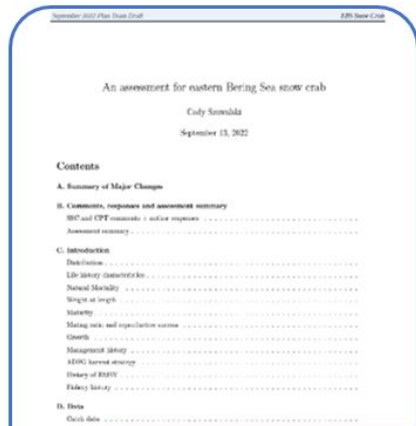
#### Attachments & Literature Cited

Include links to relevant references, reports, webpages, etc. for indicator evaluation by ESP team



# ESP Timeline

## Step 1

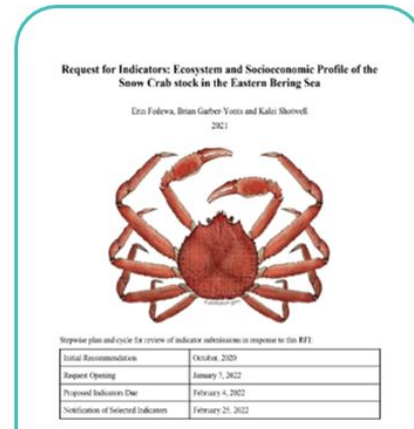


### SAFE (Fall)

- Plan Team
- Priorities
- Request ESP



## Step 2

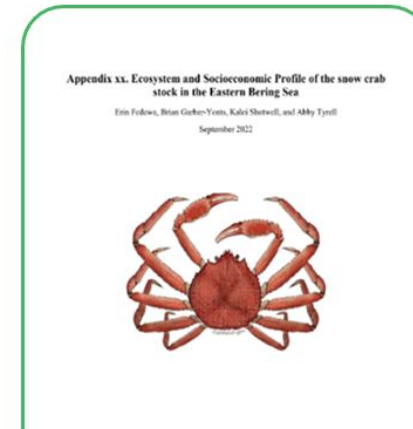


### RFI (Winter)

- Submissions
- Team Review
- Decision



## Step 3

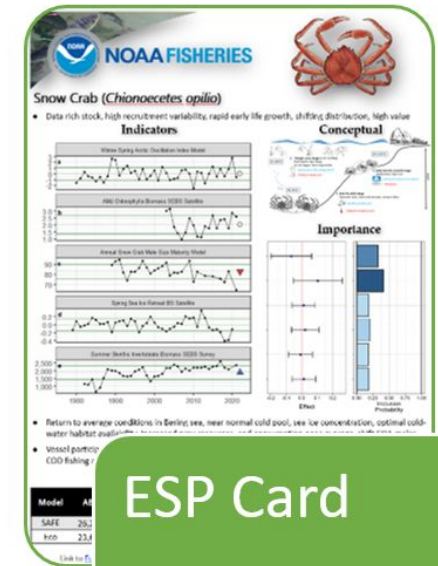


### ESP Full

- Mechanisms
- Indicators
- May Final



## Step 4



### ESP Card

- Current Yr
- Sept PT
- Oct Council



# Update

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## National

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# National ESP Initiative

- Preliminary Workshop July 2022 ([agenda](#))
  - 40+ person workshop included reps from all centers, RO, HQ offices
  - Reviewed ESP progress, center share out, brainstorming discussions
- National ESP Proposal ([CA/MSA 2023 RFP](#))
  - Series of focused workshops to develop ESP programs at different centers
  - Special sessions at existing conferences to communicate ESP progress
  - Working group to create and refine National ESP Initiative elements



# National ESP Workshop Series ([survey](#))

## Creating

Conceptual and technical brainstorming session (virtual or hybrid) on implementation, data access, workflow, coding demonstrations

## Sharing

Round robin virtual share out on progress since last workshop and defining scope, avenues for management advice, support options

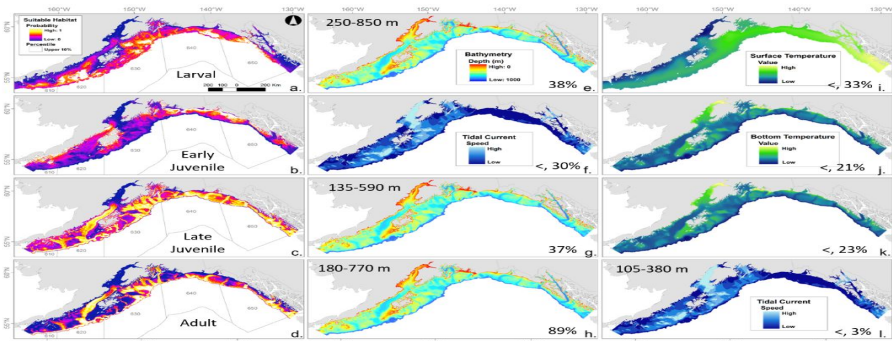
## Synthesizing

Working group that synthesizes creation and share out workshops, ID common barriers, discuss support and future workshops



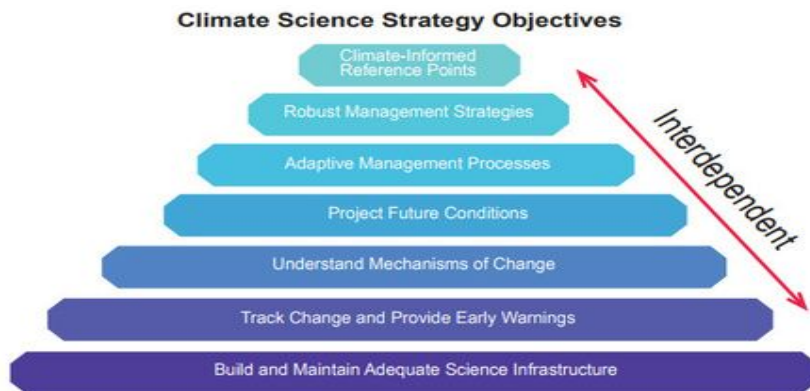
# ESP Scope

## EFH Research Plan

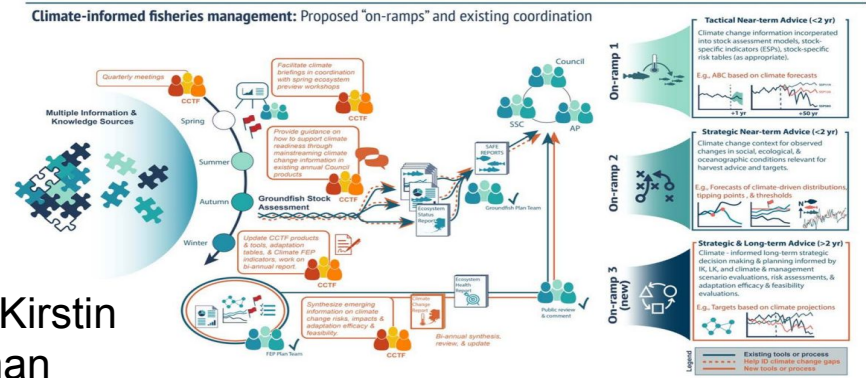


Courtesy Jodi Pirtle

## EBS and GOA RAPs

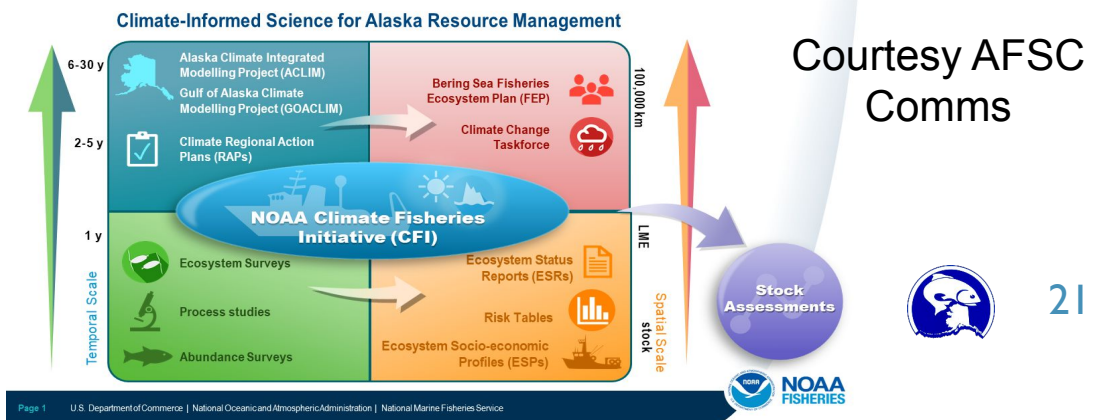


## CLIMs and CCTF



Courtesy Kirstin Holsman

## NOAA Initiatives



Courtesy AFSC Comms



## Discussion

- 1) Are these longer ESP updates useful and do you want them to continue annually during the May CPT meeting?
- 2) Are there any questions or changes regarding the Request For Information (RFI) process?
- 3) Are there any questions or changes regarding indicator submission or other aspects of ESPs?

# Thank You!



Contact:

Kalei Shotwell, AFSC  
[Kalei.Shotwell@noaa.gov](mailto:Kalei.Shotwell@noaa.gov)

[Resources](#)

[Survey](#)