

Ecosystem Socioeconomic Profile (ESP) Update

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.



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FISHERIES

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ESP Update Overview

- New Update Document (Agenda)
 - Information on ESPs since the 2018 PT document
 - Reviews new SSC/PT comments, ESP developments
- Overview and Plan Team Feedback
 - ESP process, SSC/PT recommendations and responses
 - Review ESP workshops, one-day discussion agenda
 - Introduce new data accessibility options for ESPs
 - Update on 2020 ESPs (full and partial) with indicators

ESP Process

Grade

- Descriptive Metrics
- Processes and Mechanisms

Report

- Standard Templates
- Timely Update

STEP 1



Focus

- National Initiatives
- Regional Priorities

STEP 2



STEP 3



Analyze

- Indicator Suite
- Monitor and Test





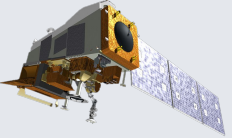









STEP 4



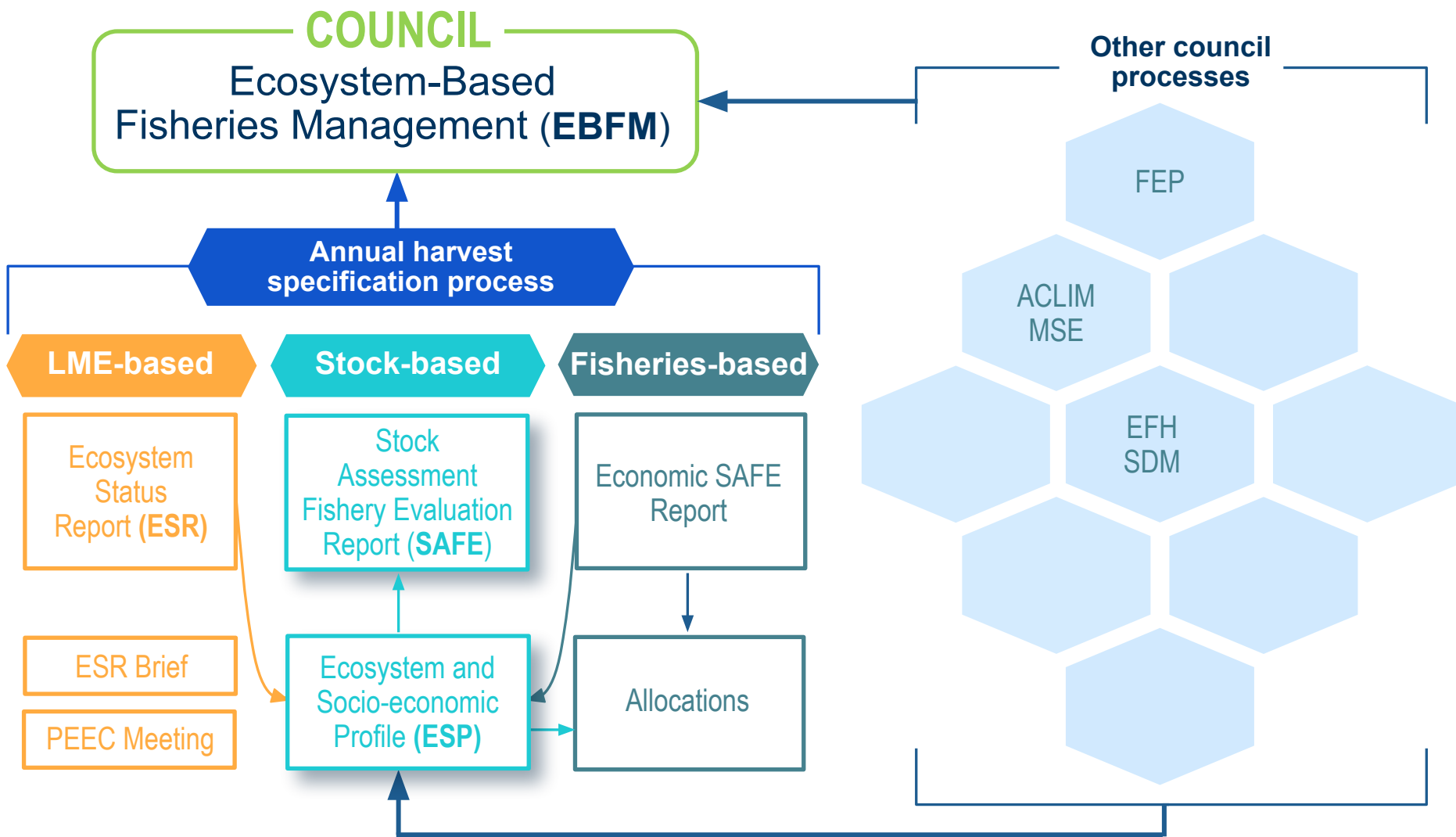
SSC/PT Comments

- 2018** September Plan Team provides recommendations for ESP workshop, October SSC supports recommendations and hopes for SSC participation in workshops
- 2019** April SSC suggests ESPs as on-ramp for ACLIM info, June SSC suspends OK-ness and impending decline as ESP, ESR, PEEC, and risk table should inform on ecosystem change, December SSC requests clarification on human dimensions sections in reports to avoid redundancy
- 2020** February SSC recommends aggregate score method to compare to stock history, June SSC supports ESP development including uncertainty and commitment to process that leads to incorporating in the SAFE

Timelines

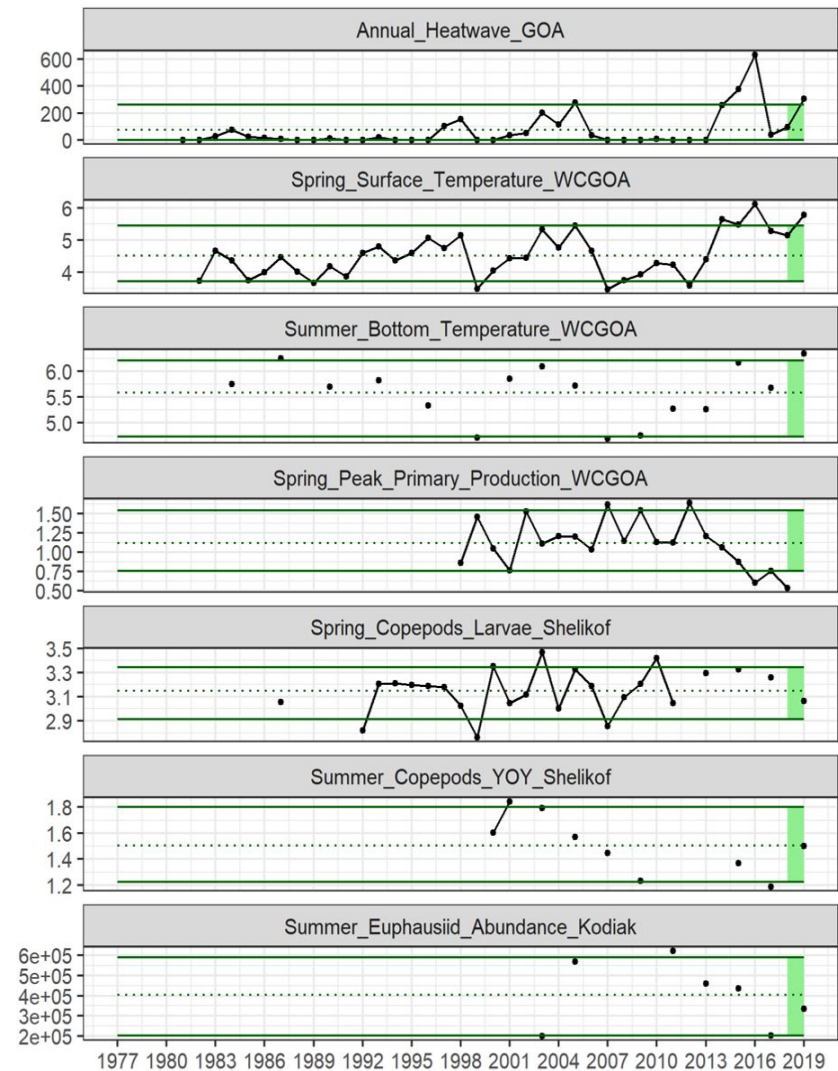
	January-March	April	May-August	September-October	November - December
Data gathering	 <p>Winter Surveys & Early Ecosystem Monitoring</p>	 <p>Early Spring Ecosystem Surveys, Tagging</p>	 <p>Late Spring and Summer Surveys</p>	 <p>Fall Ecosystem Surveys</p>	<p>Satellite or Model Alternatives</p> 
Reports		 <p>Econ Full Update of Year-1</p>	 <p>Early Warning (PEEC) Update, New Crab ESPs</p>	 <p>Surveys/ESR Update, Crab SAFEs, Crab ESPs, New Groundfish ESPs</p>	 <p>Econ Update, ESR Full Report, Groundfish SAFEs, Groundfish ESPs</p>
Meetings	 <p>Jan Crab Plan Team, February Council</p>	 <p>April Council</p>	 <p>May Crab Plan Team, PEEC, June Council</p>	 <p>Sept Crab & Groundfish Plan Team, Oct Council</p>	 <p>Nov Groundfish Plan Team, Dec Council</p>

Coordination



Indicator Analysis Stages

- 1) Simple scoring of indicator suite in addition to traffic light (SSC)
- 2) Importance methods to weight indicators by relevance to process
- 3) Summary output of research ecosystem model



Indicator Analysis - Stage 1

- **Traffic Light Score**

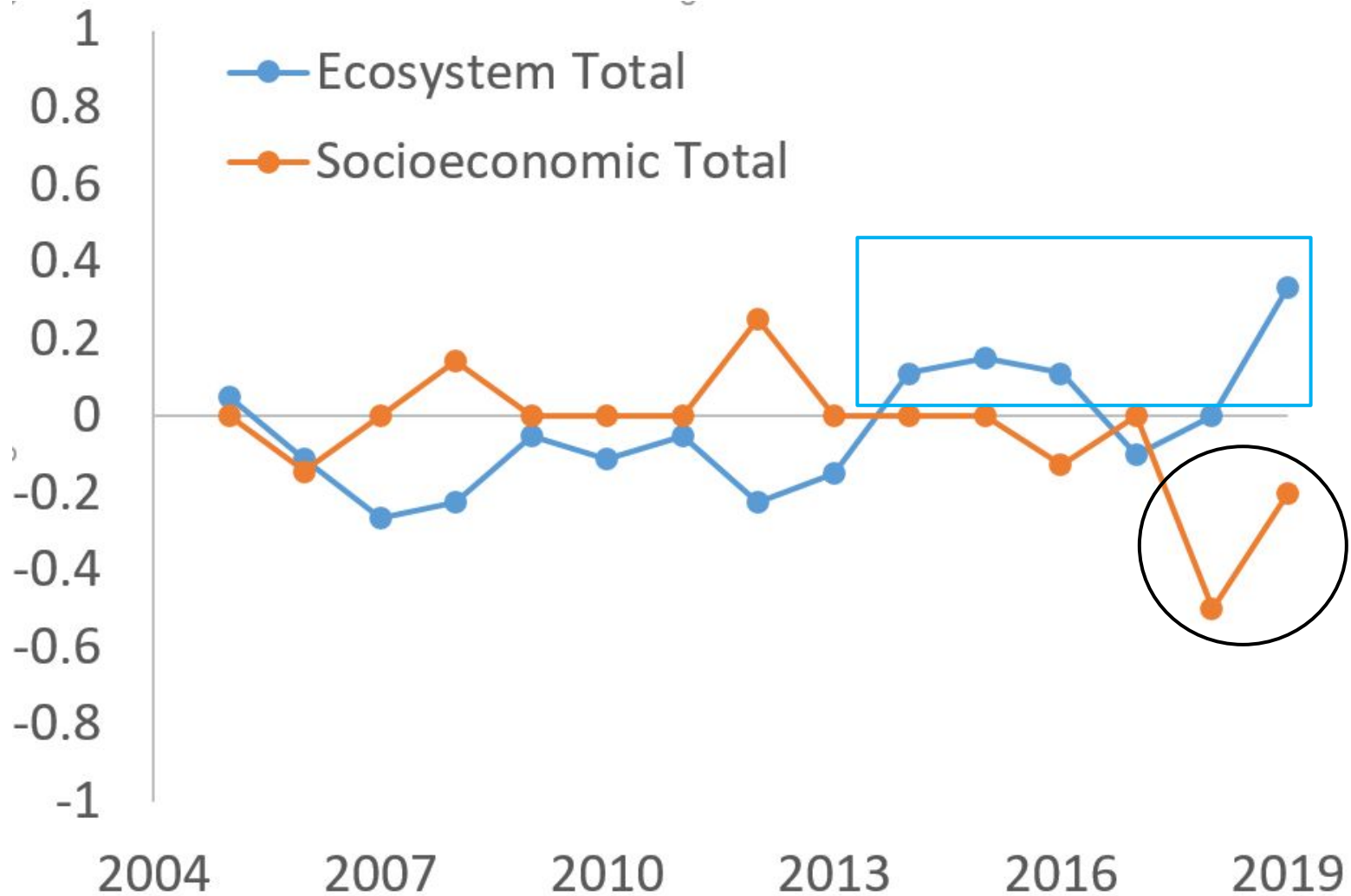
- Evaluate for the current year
- Use +1, -1, 0 to count G/P/S then / by total indicators
- Evaluate for all categories and provide total ecosystem and socioeconomic score

- **Potential Use of Score**

- Evaluate ESP considerations section, risk table, SSC

Category	Good	Poor	Stable	Score
Physical	3		1	0.75
Zooplankton			1	0
Larval & YOY	1			1
Juvenile	1	1	1	0
Adult	2	1	3	0.17
Total (8 NA)	7	2	6	0.33

Historical Traffic Light Score



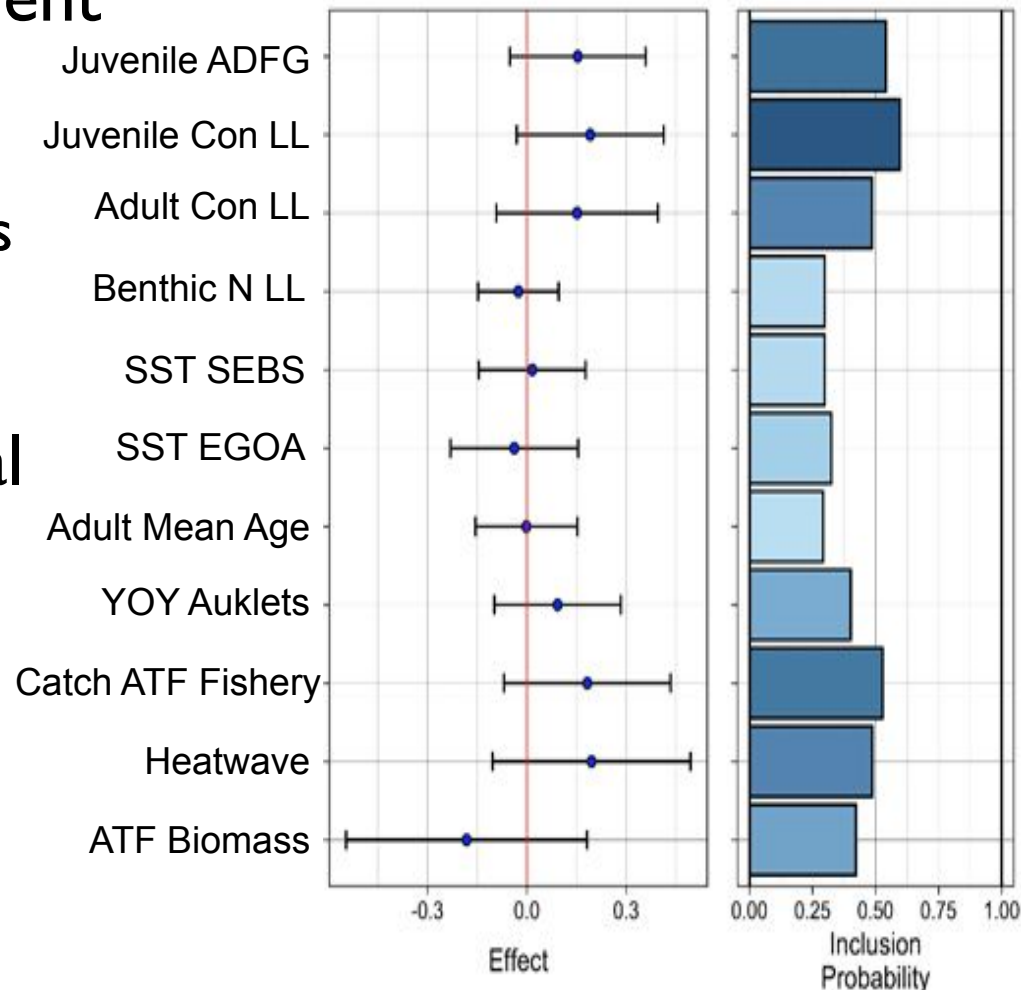
Indicator Analysis - Stage 2

- Modeling outside assessment

- Inclusion probabilities
- Weighting in stage 1 scores
- Priorities for assessment

- 5 indicators have potential

- Juvenile index stand alone
- Use together to inform recruitment deviations and lower uncertainty



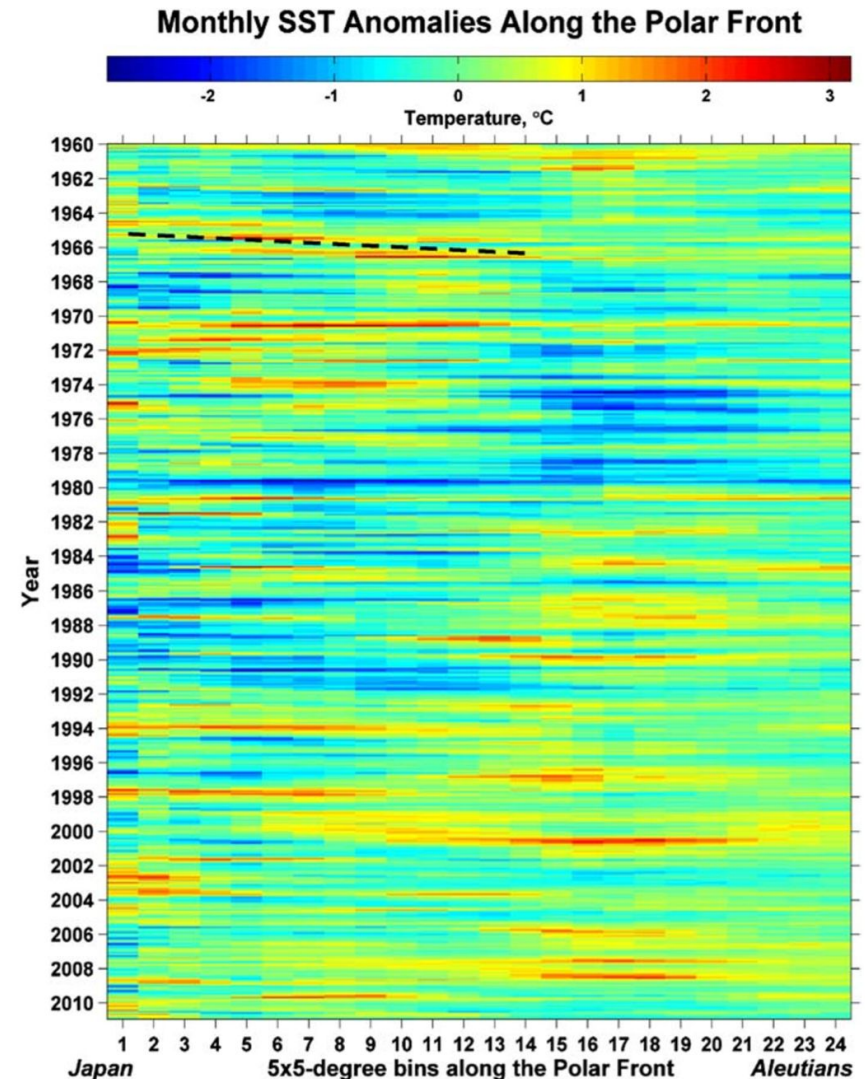
Indicator Analysis - Stage 3

- Modeling within assessment

- Improve model parameters
- Improve forecasting
- Provide decision tables

- Polar Front example

- Wintertime conditions in central NP important
- Improvement in medium-term
- Compare with current model



ESP Developments

- **Dedicated ESP Workshops, 2019-2021**
 - Three workshops funded by regional work plan
 - Used to develop and implement ESPs for the AFSC
 - Allows for program awareness, innovation, collaboration
- **ESP Data and Documents**
 - New data accessibility option for ESP data list
 - Reporting templates: full and partial
 - 2020 ESP summary: 3 full ESPs for newly recommended stocks, 3 partial ESPs based on 2019 full documents

Workshop Organization

<h2>Data</h2>	<p>Review ESP Process</p> 	<p>Collect</p> 	<p>Coordinate</p> 	<p>Create</p> 
<h2>Model</h2>	<p>Review ESP</p> 	<p>Discuss</p> 	<p>Perform</p> 	<p>Improve</p> 
<h2>Advice</h2>	<p>Update ESP</p> 	<p>Forecast</p> 	<p>Evaluate</p> 	<p>Provide</p> 

* See ESP update document for 2019 Data workshop and 2020 Model Workshop agendas

Cross-cutting Programs

Pacific Marine Environmental Laboratory EcoFOCI

Lead: Phyllis Sabote

Sharon Bell, Nick Boud, Neal Colwell, Carol Lask, Geoff Lohos, Calista Monte, Peter Probst, Peggy Sabinas, Dana Steiner

PMEL EcoFOCI IFAO UNIVERSITY OF WASHINGTON

Ecosystems & Fisheries-Oceanography Coordinated Investigations (EcoFOCI)

Or within AFSC: the Recruitment Processes Program

Supervisors: Janet Duffy-Anderson (PM), Libby Lagerwell

Employees: Ali Deary, Lauren Rogers, Dave Kimmel, Matt Wilson, Steve Porter, Adam Spear, Melanie Patten, Morgan Bailey, Dan Coover, Colleen Harpold, Jose Lamb, Kathy Mier, Kimberly Bahl, Annelle Dougherty

Post-doctoral Researchers: Esther Goldberg, Jens Nielsen

Ecosystem Monitoring and Assessment (EMA)

Auke Bay Labs Division

Supervisors: Ed Farley (PM), Andy Gray (RO)

Employees: Alex Andrews, Andrew Diamond, Charlie Waters, Elizabeth Suddon, Ellen Yamamoto, Kristin Cecel, Lisa Eganer, Jenna Moss, Jennifer Kama, Jim Murphy, John Elser, Jordan Watson, Scott Valasek, West Strasburger

Recruitment, Energetics, and Coastal Assessment (RECA)

Supervisors: Todd Miller, Mandy Lindeberg (acting)

Employees: Emily Ferguson, Corey Fugate, Larry Holland, Jacob Maselko, Michele Masuda, Katharine Miller, John Moran, Matthew Rogers, Fletcher Sewal, Rob Suryan, Johanna Volleweider

Science Support: Bryan Comack, Taylor Jarvis, Darcie Neff, Halia Schultz, Ashwin Sreenivasan, Courtney Weiss, Spender Lunda

The FBEP science team in Newport, OR

Officer: Jeffery Young, NOAA-OR

Supervisor: Mandy Lindeberg

Employees: Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg, Mandy Lindeberg

Midwater Assessment and Conservation Engineering (MACE)

Supervisors: Chris Wilson, Patrick Resler

Employees: Alex De Roberto, Scott Furnish, Taina Honkaniemi, Darin Jones, Nathan Kniffenburger, Matt Levine, Aisling McCarthy, Denise Madueeny, Sarah Stennessen, Rick Towler, Kresimir Williams, Noelle Yochum

Shellfish Assessment Program

Former supervisor: Robert Foy

NOAA employees: Dan Urban, Leah Zacher, Pam Jensen, Allie Conrad, Jennifer Gardner, Erin Fedawa, Jon Richar and Chris Long

Contractors: Connor Cleary, Swigard Duesterloh and Kelly Champagne

Groundfish Assessment Program

Program Lead: Stan Koticki

Supervisors: Bob Lauth, Wayne Palston

Employees: Lewis Barnett, Lyle Bell, Jason Corner, Christina Corvino, Elizabeth Dawson, Rebecca Innes, Jerry Huff, Steve Inman, Elnora Jorgensen, Heather Kennedy, Neil Larnen, Bill MacCrimmon, Peter Munro, Dan Quinn, Jay Cline, Steve Haff, Steve Inman, Nancy Robertson, Steve Rooney, Kathryn Sobolewski, Dana Swanson, Alison Vigen, Paul Von Steyer, Cynthia Young, Marc Zimmerman

Age and Growth Program

Supervisors: Tom Heber and Debra Arndt

Employees: Irina Benson, John Brogan, Chris Churski, Betty Goetz, Charles Halvorsen, Craig Kestelle, Beth Matta, Dustin Nadjokic, Sandi Nedelcher, Julie Pearce, Charlie Platon, Jon Short, Kai Stone, Todd Terribin

ESRP Workshop May 2019

Presented by Beth Matta

AFSC Age and Growth Program

REEM: Resource Ecology and Ecosystem Modeling Program

Products

- Adult groundfish food habits data and indices POC: K. Aydin
- Model-based estimates of predation POC: K. Aydin, K. Halvorsen

NOAA-FERRET

Fisheries data collection by the AFSC

Alaska Fisheries Science Center

May 19 2019 Seattle, WA

CEMELI, Franika Per
AFSC Workshop on Data Collection and Analysis
Alaska Fisheries Science Center

Fisheries Monitoring and Analysis

Status of Stocks and Multispecies Assessment (SSMA)

Supervisors: Anne Holward, Sandra Lovie

Employees: Steve Rubenstein, Meghan Ryan, Martin Dunn, Jim Inaudi, Corey McCullough, Greg Osmund, Ingrid Sines, Paul Spencer, Jack Stockmann, Cody Szwabicki, Grant Thompson

Non-afsc contractors: A. Havron, C. Mounlan, C. Turpey, M. Torre, T. Wolden

Marine Ecology and Stock Assessment (MESA)

Division: Auke Bay Laboratories

Supervisors: Chris Lunzford, Pat Malocha

Employees: Katy Echavez, Kari Fencko, Dana Hanselman, Pete Hulson, Cara Rodegaster, Aalen Showell, Kevin Strickus, Emily Trisheno

The ESSRP team

Michael Cahan, Ben Fossil, Brian Gardner-Harris, Alan Hayne, Elise Kasperka, Dan Lee, Chang Seung, Margus Szykowiak, Sarah Wan, Alan Chen, Sabrina Demaree, Makera Harsh, Alan Lee, Melissa Rhoads-Rouse, Kim Sparks

Seabird Data: Possible Contributions

William Sydeman, Mayumi Arimitsu, Heather Renner, Sarah Ann Thompson, John Platt, Scott Hatch, Rob Suryan, Stephani Zador

USGS science.karla.dunphy@usgs.gov

Regional Office Fisheries Data

Presented by Anne Marie Eich Sustainable Fisheries Division

<https://www.fisheries.noaa.gov/about/alaska-regional-office>

Westward Region Large-Mesh Bottom Trawl Surveys

Kelly Spahrer
353 Research Court
Kenai, AK 99550
kelly.spahrer@afsc.noaa.gov

The IPHC Fishery Independent Setline Survey

International Pacific Halibut Commission
(<https://www.iphc.int/>)

Essential Fish Habitat Species Distribution Models and Ecosystem Socioeconomic Profiles

Jodi Pirtle
Alaska Fisheries Science Center
Habitat Conservation Division
Juneau, Alaska
jodi.pirtle@noaa.gov

ESRP Workshop NOAA AFSC May 31, 2019

Habitat and Ecosystem Process Research program

James Thorson

Core team: Mike Cameron, Phil Ganz, Tom Hurst, Mandy Lindeberg, Beth Matta

Modeling Awareness

Oceanographic models

Ecotroph and StockRecruit
Personal U.S. Fisheries Assessment
Kelly Kearney & Darren Pinner
University of Washington, IASD
NOAA AFSC, NOAA FWS
March 11, 2020

**Applications of Individual-based models (IBMs):
Early life stage survival & recruitment**

Esther Goldstein & Buck Stockhausen
EcoFOCI & REFM
AFSC, Seattle

fishap 2020
NOAA FISHERIES | ALASKA FISHERIES SCIENCE CENTER

REEM: Resource Ecology and Ecosystem Modeling Program

Products

- Adult groundfish food habits data and indices
- Model-based estimates of consumption and predation

**Species Distribution Modeling (SDM)
to Describe
Essential Fish Habitat (EFH)
in Alaska**

NOAA FISHERIES SERVICE
11 March, 2020
Seattle, WA

Ned Laman, Jodi Pirie, Jeremy Harris, Chris Rooper, Thomas Horn, and Christina Conrath

National Marine Fisheries Service (NMFS)
Alaska Fisheries Science Center (AFSC)
Regional Assessment and Conservation Engineering Division (RACE)
Groundfish Assessment Program (GAP)

**Species Distribution Models:
Temporal Changes in Spatial Indicators**

Lewis Barnett and Jim Thorson
ESP Workshop
3/11/2020

lewis.barnett@noaa.gov
james.thorson@noaa.gov

**Biological metrics for ESPs: early life history
considerations and applications**

NOAA FISHERIES

Ben Lauri, Alison Deery, Lauren Rogers,
Louisa Cooper, Tom Klart

**Using ecosystem data and
mechanistic understanding to
inform management**

Lauren Rogers
RACE/EcoFOCI

With contributions from:
Eben Yasumishi, Lisa Einar, Ben Laurel, Dan Cooper, Susanna McDermott

ESP Workshop
March 11, 2020

EcoFOCI

**Socioeconomic Aspects
in Stock Assessments Workshop
(SEASAW):
Past, Present, and Future**

NOAA FISHERIES
Alaska Fisheries Science Center
Seattle, WA

Alan C. Haynie
ESP
AFSC, March 10, 2020

Disclaimer:
This is the opinion of the authors and
not NOAA, DOC, or the Nation.

**A Conceptual Model for
Social and Economic Indicators**

ESP Workshop
March 11th 2020

Ben Fissel
AFSC – ESSRP

**Sablefish Case Study:
Fleet Performance
Indicator**

Marysia Szymkowiak
NMFS Alaska Fisheries Science Center
Presentation for ESP 2020

Indicator Analysis Stages

- Simple scoring of indicator suite in addition to traffic light (SSC)
- Importance methods to weight indicators by relevance to process
- Summary output of research ecosystem model

**Methods for Estimating Indicator
Importance**

NOAA FISHERIES

Curry Cunningham
University of Alaska Fairbanks
College of Fisheries and Ocean Sciences
Kalei Shotwell
NOAA AFSC

**Enhanced Stock
Assessment Models**

Meaghan Bryan and Carey McGilliard

**CEATTLE:
Climate enhanced Age-based model
with Temperature specific Trophic
linkages & Energetics**

Kerstin Holman
kerstin.holman@noaa.gov

CEATTLE development team (alphabetical):
Grant Adams, Kevin Aydin, Steve Barbeau,
Martin Dorn, Jim Iannelli, André Punt, Kalei Shotwell, Ingrid Spies, Grant Thompson

Multi-area models

Kari Fenske, Nick Tolimieri, Dana Hanselman, Kalei Shotwell

ESP workshop, March 2020

Discussion sessions were limited due to COVID-19

One-Day Discussion

- September 25, 2020, 9am-12pm & 1-3pm (ADT)
 - Continuation of discussions from March workshop
 - Input from ESP participants survey conducted in Apr/May
- Potential Agenda (will include live polling)
 - One presentation for review and survey results
 - Metric/Indicator scoping, testing, and validation methods
 - Socioeconomics in the ESPs, what to use and how
 - Coordinating data for use in ESP, ESR, Econ, and SAFE
 - Indicator analyses and transfer to SAFE

ESP Data

- ESP Data List from 2019 Workshop
 - 130 plus indicators entered from many programs
 - Lots of potential datasets that do not have a home
 - Some indicators listed that are subsets of ESR indicators
- ESP Dashboard on AKFIN
 - Same location as stock assessment dashboard, new tab
 - Allows for increased visibility for these potential datasets
 - Funded through ESP workshops and potentially FIS

ESP Dashboard

ESP Data

This page contains data of interest to generate Ecosystem and Socioeconomic Profiles (ESP's) for groundfish and crab stocks of Alaska.

Ecosystem

Oceanographic

MUR Temperature

[Open](#) Queries for downloading Multi-Resolution sea surface temperature by station and management areas.

CRW Temperature

[Open](#) Queries for downloading Coral Reef Watch, sea surface temperature, anomaly and marine heatwave by station and management area.

BASIS Ocean - Chlorophyll

[Open](#) A query of the BASIS OCEAN database that summarizes average chlorophyll pivoted by CTD filter size.

BASIS Ocean - Surface Nutrients

Socioeconomics

Fishery Performance

CPUE

[Open](#) Queries for downloading catch-per-unit-effort from fishery dependent sources.

Effort

[Open](#) Queries for downloading effort from fishery dependent sources.

Condition

[Open](#) Queries for downloading fish condition by sector.

Economics

Value

[Open](#) Queries for downloading price, revenue, and value by sector.

Exploratory

Surveys

BASIS Fish Catch All 0

[Open](#) A query of the BASIS FISH database that includes all stations sampled for a given year for all species juvenile catch records. The empty records are then filled in for all species with 0 catches. Catch includes fish from all life history stages.

BASIS Fish and Ocean

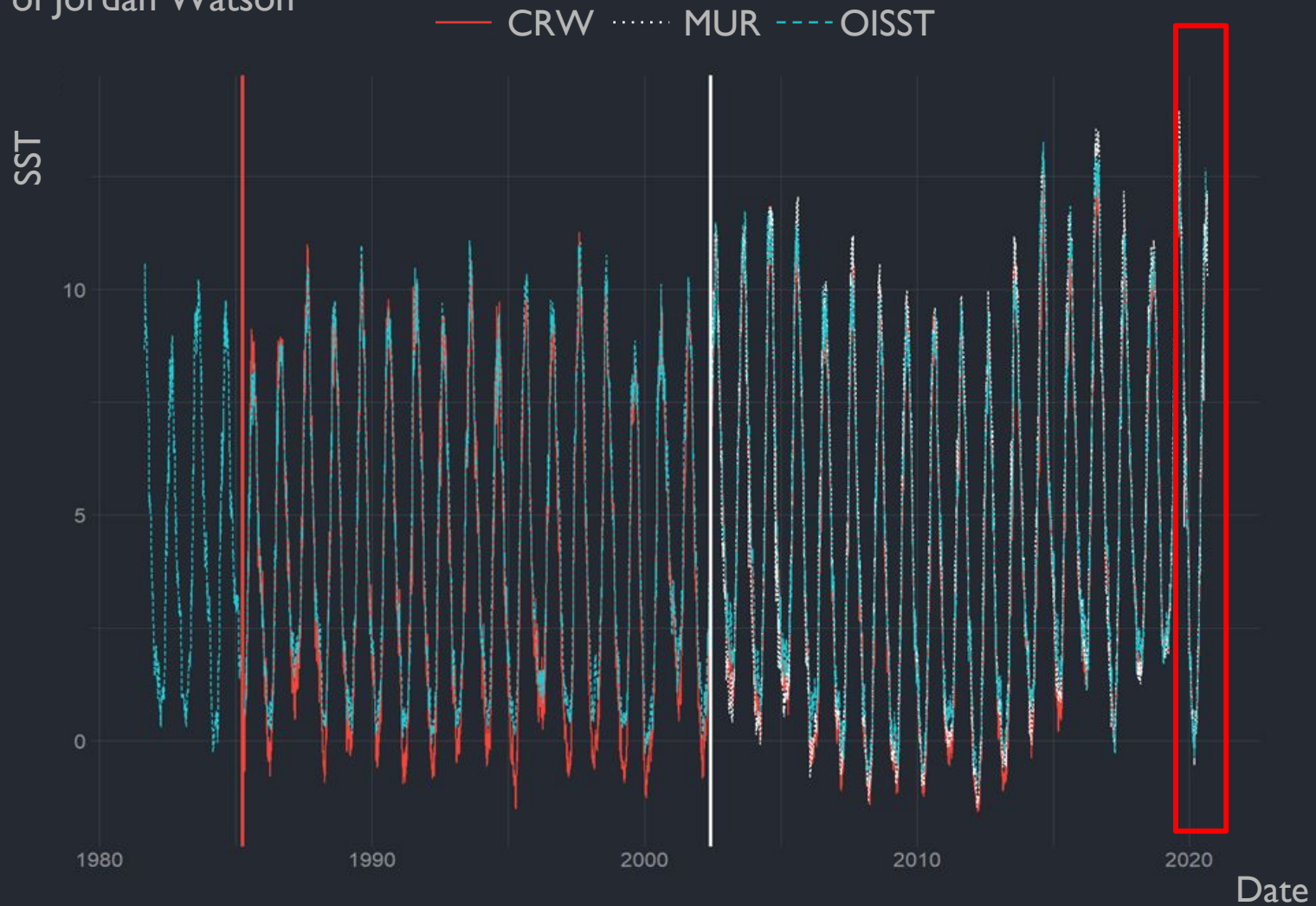
[Open](#) A combination of the BASIS FISH and OCEAN databases that reports on catch with average temperature and salinity along with average nutrients for the first 10 depths. Pivoted by all species.

Laboratory

RECA Energetics

Temperature Example

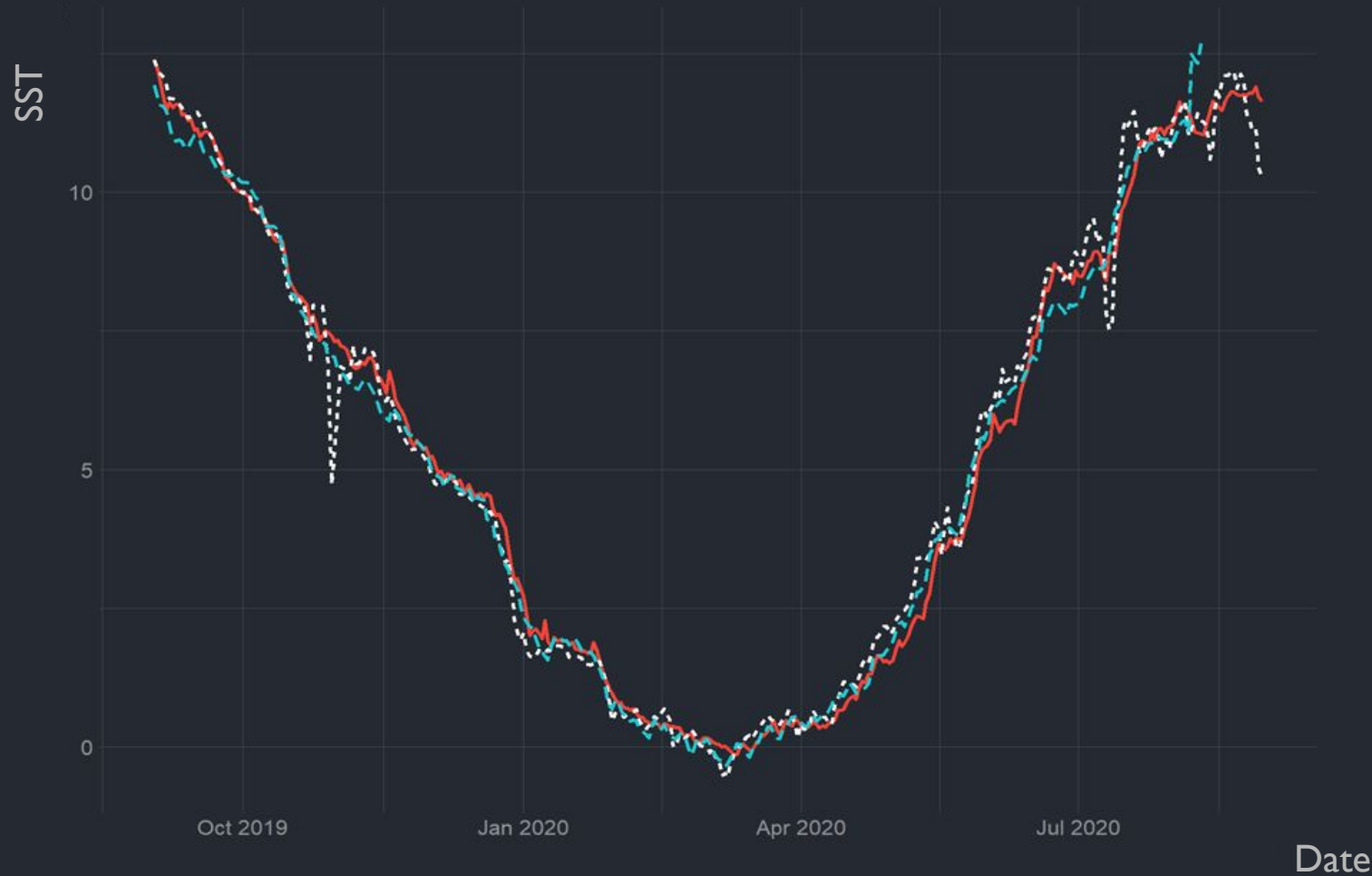
Courtesy of Jordan Watson



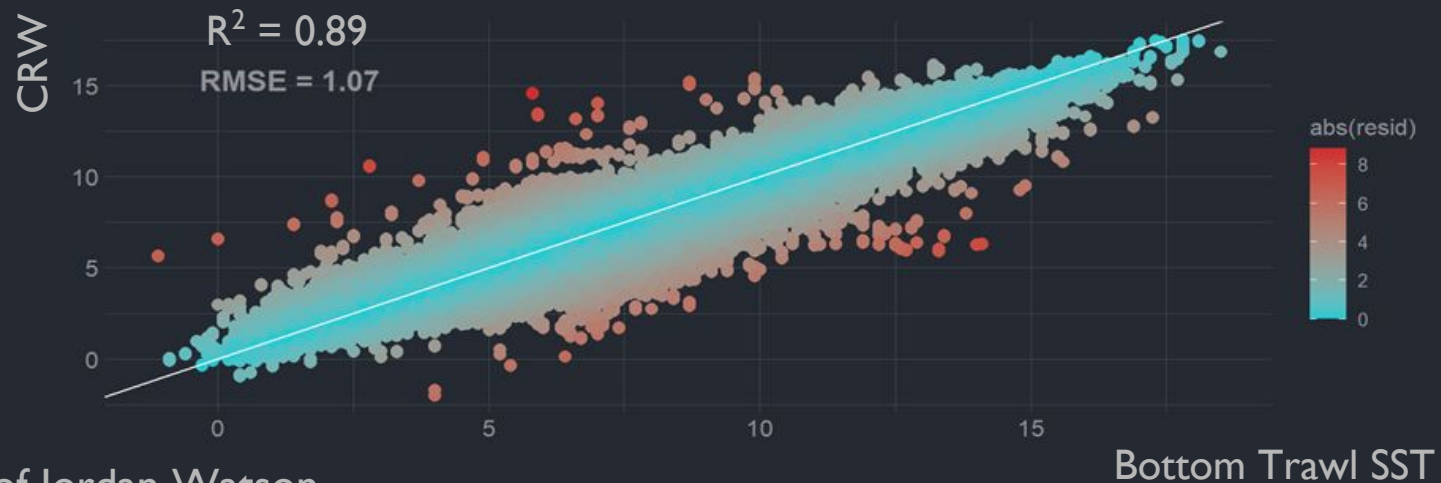
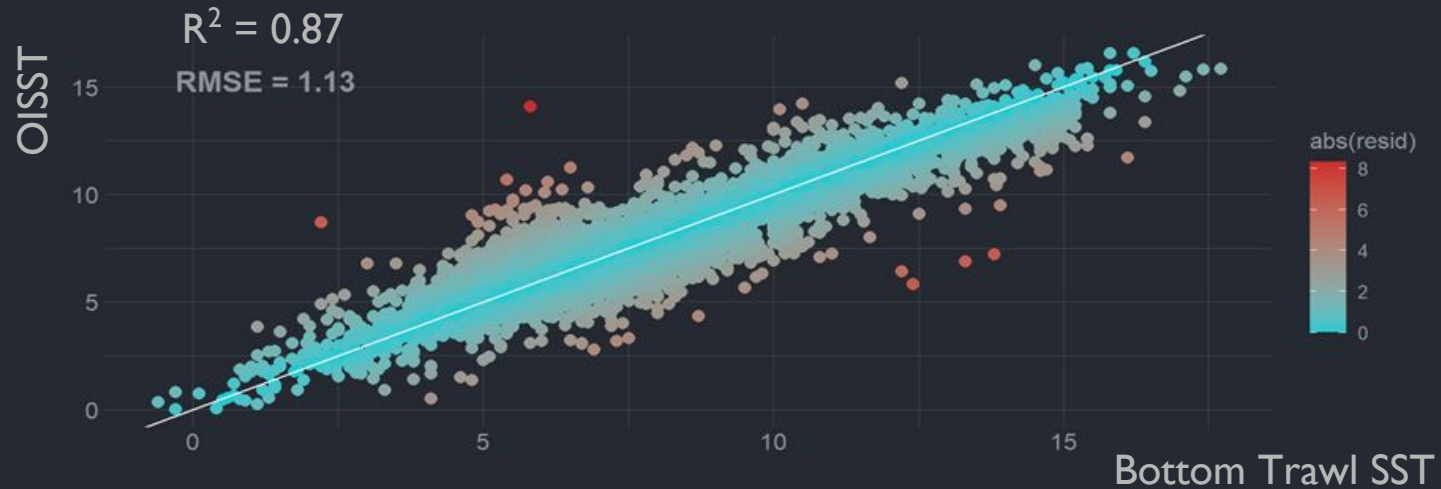
Temperature Example

Courtesy of Jordan Watson

— CRW MUR - - - - - OISST



Temperature Example



ESP Document

Appendix in SAFE report*

- 1) Intro: justification, data
- 2) Metrics assessment: baseline, processes
- 3) Indicators assessment: time series, analyses
- 4) Considerations; data gaps, future priorities

*Shotwell et al., In Review

Appendix xx. Ecosystem and Socioeconomic Profile of the Myfish stock in the Myarea

[List of authors who wrote the ESP assessment]
Draft 2019

[Picture of stock, if desired]

With Contributions from:
[List of names who contributed data to the ESP]

Executive Summary

Short description of national initiative and regional recommendations to produce ESP
Short description of ESP process type (e.g., general, stage-based)

Ecosystem Considerations

- Summary conclusions from metric assessment
- Summary conclusions from indicator assessment

Socioeconomic Considerations

- Summary conclusions from metric assessment
- Summary conclusions from indicator assessment

Introduction

Summary of regional ecosystem considerations priorities

Description of four-step ESP process and reference, include metric and indicator definition

Metrics = quantitative stock-specific measures that identify vulnerability or resilience of the stock with respect to biological or socioeconomic processes. Where possible, evaluating these metrics by life history stage can highlight potential bottlenecks and lead to mechanistic understanding of ecosystem or socioeconomic pressures on the stock.

Indicator = time-series data that represent the critical processes identified by metrics and useful for stock assessment (regularly updated, reliable, consistent, and long-term).

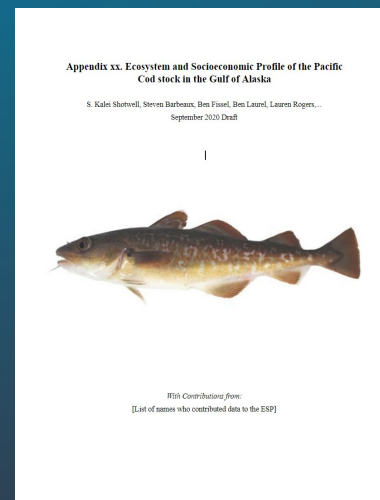
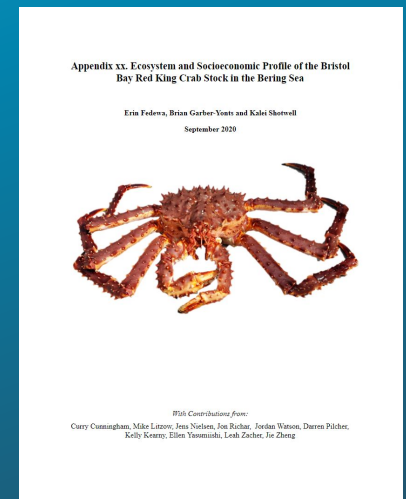
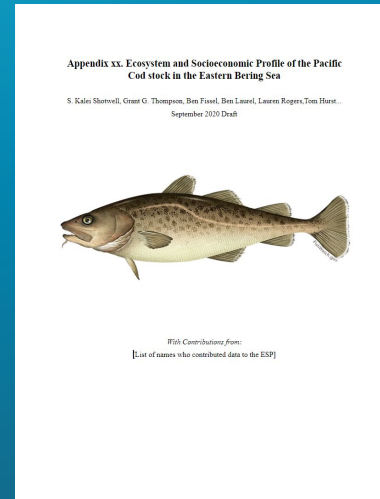
Justification

Scores in relevant national initiatives, stock assessment classification results

Stock-specific regional research priorities (e.g., annual guidance memo, strategic plans, etc.)

Full ESPs

- Benchmark document
 - First ESP, request, author wants
- SSC/PT Recommendations
 - All Pacific cod stocks: develop ESPs as resources/timing allow
 - EBS Pacific cod: organize risk table indicators by ESR and ESP
 - BBRKC: develop OA indicators by stock extent, refine socioeco indicators for TAC setting use



EBS Pacific Cod
GOA Pacific Cod
Bristol Bay
Red King Crab

Pacific Cod ESP Progress

- Team Process

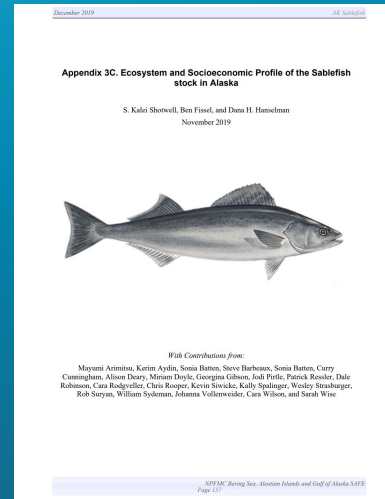
- Pacific cod ESP team started in Jan 2020, all stocks
- Decided EBS and GOA this year, AI possibly next year

- Document Status

- National metrics completed, ecosystem/socioeconomic processes drafted, life history table and graphics drafted
- Indicator suite partially identified, coordinating with ESR
- ACLIM, ROMS/NPZ model output included in EBS
- Spawning habitat analysis included in GOA

Partial ESPs

- Condensed, indicator update
 - Based on partial SAFE template
- SSC/PT Recommendations
 - Sablefish: engaged communities, mechanism for < size of 2014 yc
 - GOA Pollock: WG community indicators, executive summary
 - SMBKC: include OA and habitat vulnerability indicators, more community engagement analysis



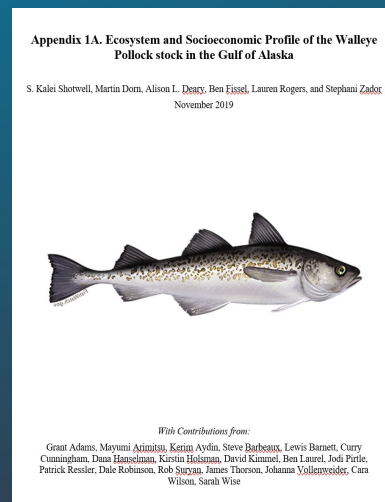
Sablefish ESP

Pollock ESP

St. Matthew

Blue King

Crab ESP



ESP Decisions

Risk

ESP summary used in contextual manner to identify additional uncertainty not in model

Rebuilding

Indicator suite used to define regime for rebuilding plans

Readiness

Metrics highlight bottlenecks and indicators provide early warning system for extreme change

Next Steps

- Data and Documents

- Continue developing dashboard on AKFIN
- Identify standard suite of indicators for ESP at stock-specific level (e.g., ECSA at NEFSC)
- Automate full and partial report templates

- Workshops

- One day discussion, Advice Workshop 2021
- Tech memo for each workshop and overall manuscript for other regions to implement ESPs

Plan Team Feedback

- 1) Do you support the 3-stage indicator analyses concept and scoring methods? Other ideas?
- 2) Are the one-day ESP discussion topics sufficient? Other priority topics?
- 3) Do you like the ESP dashboard? Other ideas?
- 4) Are the standard templates (full and partial), and timing of reports reasonable?



Questions?

