

Ecosystem Socioeconomic Profile (ESP)

GOA Pacific Cod (Report Card)

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Overview

Appendix in SAFE report

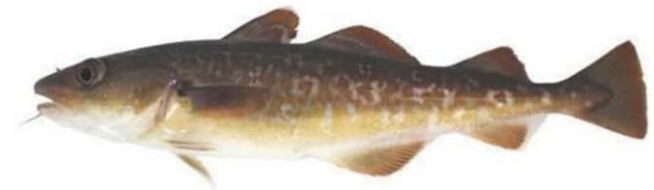
- Draft ESP in Nov 2020
- Full ESP in Sept 2021
- Report card in Nov 2021
 - Simplified template allows for including current year data
 - Some indicators missing due to cancellations, data timing
- 7 editors, 17 contributors

November 2021 Plan Team Draft

GOA Pacific cod

Attachment 2.1.1 Ecosystem and Socioeconomic Profile of the Pacific cod stock in the Gulf of Alaska - Report Card

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Pp. 161-206, 207-226

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ESP Report Card Template

Stock/Complex:

Outline for Ecosystem and Socioeconomic Profile (ESP)

Current Year Update (Report Card)

- Short description of an ESP process and reference to full ESP

Management Considerations

- Summary ecosystem and socioeconomic considerations from the assessment for use in the main stock assessment

Modeling Considerations

- Summary of intermediate stage importance results and research ecosystem linked model status

Assessment

Ecosystem and Socioeconomic Processes

- Short description of ecosystem and socioeconomic processes from full or partial ESP with conceptual models
- Table of data sources, key processes affecting survival, conceptual model graphics

Indicator Suite

- List of ecosystem and socioeconomic indicator titles with standard time series graph

Indicator Monitoring Analysis

- Beginning stage traffic light test with comparison table and historical scoring by ecosystem and socioeconomic indicators

- Intermediate stage importance test with covariate graph, direction, magnitude, and importance results (optional)
- Advanced stage research model update with reference to developed model and supportive graphs (optional)

Data Gaps and Future Research Priorities

- Description of metric or indicator data gaps and needs
- Priorities for ecosystem and socioeconomic research that would support future versions of the ESP |

Acknowledgements & Literature Cited

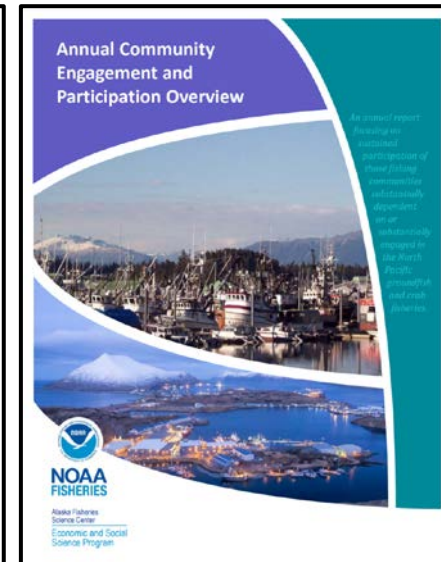
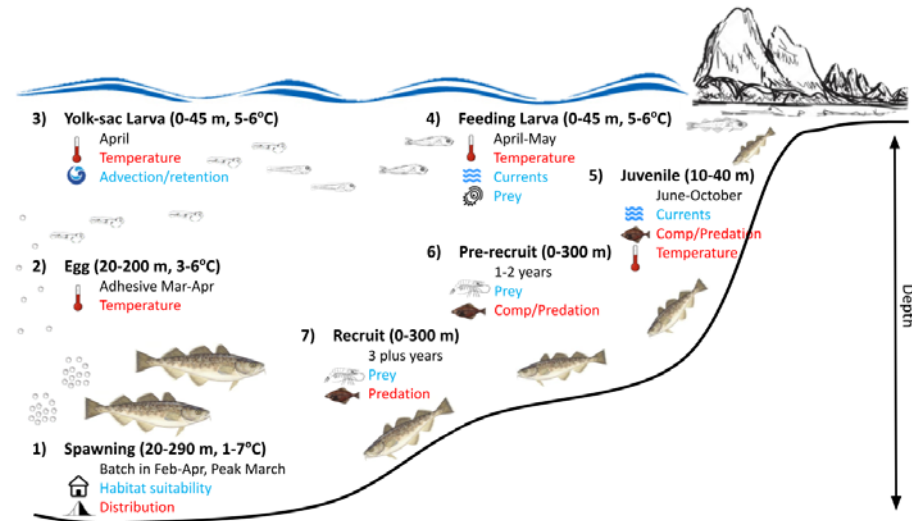
Processes

- Ecosystem

- References main text of the appendix (2.1)
- Includes conceptual model for reference

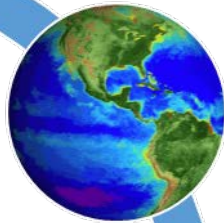
- Socioeconomic

- References main text of the appendix (2.1), in future will reference but not be redundant with Econ SAFE or ACEPO



Ecosystem Indicators

Ecosystem Indicators



Physical



Lower Trophic



Upper Trophic

- 1. Marine heatwave index spawning
- + 2. **Spawning habitat suitability**
- 3. Bottom temperature shelf (CFSR)
- + 4. **Eddy kinetic energy (satellite)**
- + 5. **Spring bloom peak timing (satellite)**
- + 6. Summer copepods (EcoFOCI)
- + 7. Euphausiids (acoustic backscatter)
- + 8. **Spring Pacific cod larvae (EcoFOCI)**
- + 9. **Common murre reproductive success**
- + 10. Juvenile condition (BTS)
- + 11. Adult condition (BTS)
- 12. **Center of gravity, northeast (VAST)**
- + 13. **Area occupied (VAST)**
- 14. Adult Steller sea lion counts (survey)
- 15. Arrowtooth total biomass (SAFE)

Socioeconomic Indicators

RQ = Regional Quotient

Socio-economic Indicators



Fishery Performance



Economic



Community

1. Ex-vessel value
2. Ex-vessel price per pound
3. Revenue per unit effort
4. Processing RQ for Kodiak
5. Harvesting RQ for Kodiak
6. Processing RQ for small comm.
7. Harvesting RQ for small comm.

Indicator Monitoring Analysis

Beginning Stage



Traffic Light

- Historical simple score (SSC)
- Current year trends relative to mean of series
- Evaluate whole suite utility

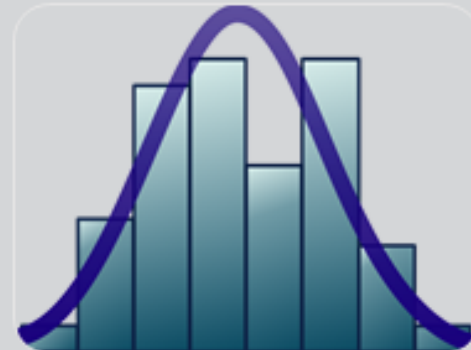
Intermediate Stage



Importance

- Regression R^2
- Direction, magnitude, uncertainty, inclusion weight
- Prediction performance

Advanced Stage

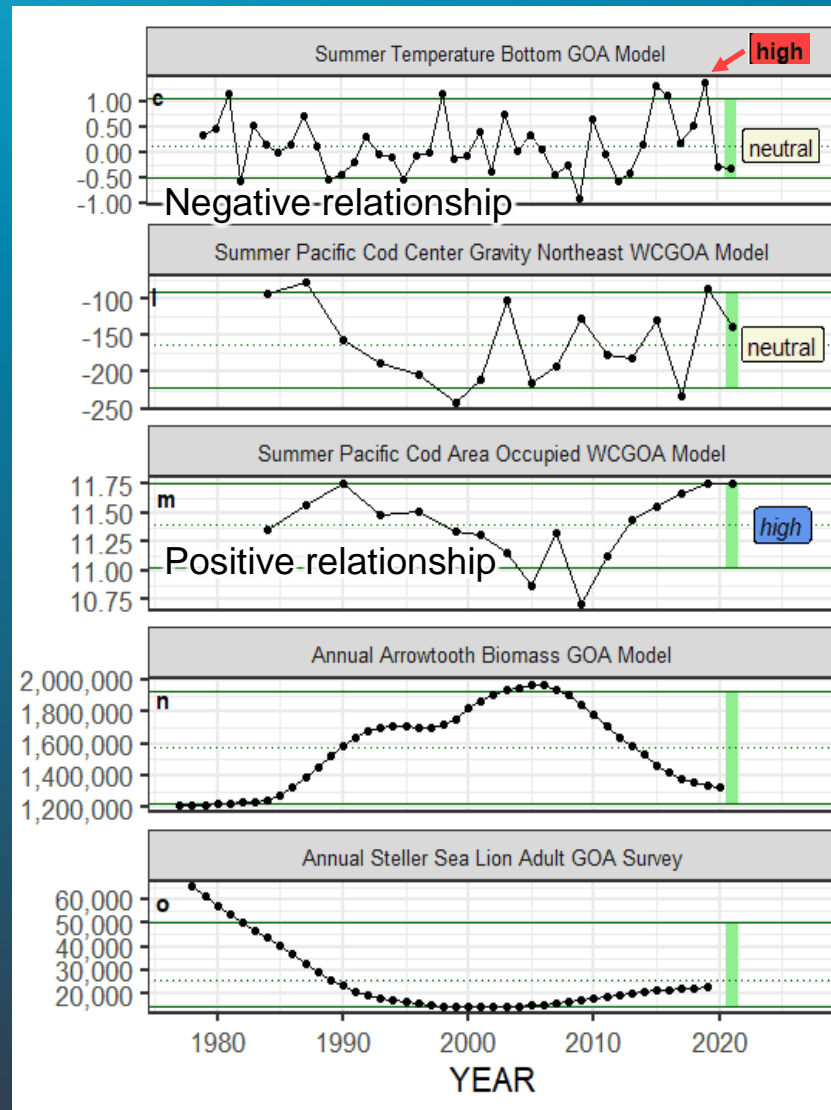


Ecosystem Model Run

- Comparison w/ operational
- Retrospective
- Prediction performance
- Terminal SSB

Traffic Light

- Time series and Table
 - Historical time series (1977:now)
 - Evaluate a given year one stdev from the long term mean
 - High (H), low (L), neutral (N), color is relationship with stock for ecosystem indicators
- Summary Score
 - Score by category last 20 yrs
 - Sum of H, L, N, color is -1,1



Note: new
this year for
report card

Traffic Light Table

Indicator category	Indicator	2017 Status	2018 Status	2019 Status	2020 Status	2021 Status
Physical	Spawning Heatwave GOA Model	neutral	neutral	high	neutral	neutral
	Winter Spring Pacific Cod Spawning Habitat Suitability	neutral	neutral	low	neutral	neutral
	Summer Temperature Bottom GOA Model	neutral	neutral	high	neutral	neutral
	Annual Eddy Kinetic Energy Kodiak Satellite	neutral	neutral	neutral	high	neutral
Lower Trophic	Spring Chlorophyll a Peak WCGOA Satellite	low	low	high	low	neutral
	Summer Large Copepod Abundance Shelikof Survey	low	NA	neutral	NA	NA
	Summer Euphausiid Abundance Kodiak Survey	low	NA	neutral	NA	NA
	Spring Pacific Cod CPUE Larvae Shelikof Survey	neutral	NA	neutral	NA	neutral
	Annual Common Murre Reproductive Success Chowiet	neutral	neutral	high	NA	neutral
Upper Trophic	Summer Pacific Cod Condition Juvenile GOA Survey	neutral	NA	neutral	NA	neutral
	Summer Pacific Cod Condition Adult GOA Survey	neutral	NA	neutral	NA	neutral
	Summer Pacific Cod Center Gravity Northeast WCGOA	low	NA	high	NA	neutral
	Summer Pacific Cod Area Occupied WCGOA Model	neutral	NA	high	NA	high
	Annual Arrowtooth Biomass GOA Model	neutral	neutral	neutral	neutral	NA
	Annual Steller Sea Lion Adult GOA Survey	neutral	neutral	neutral	NA	NA

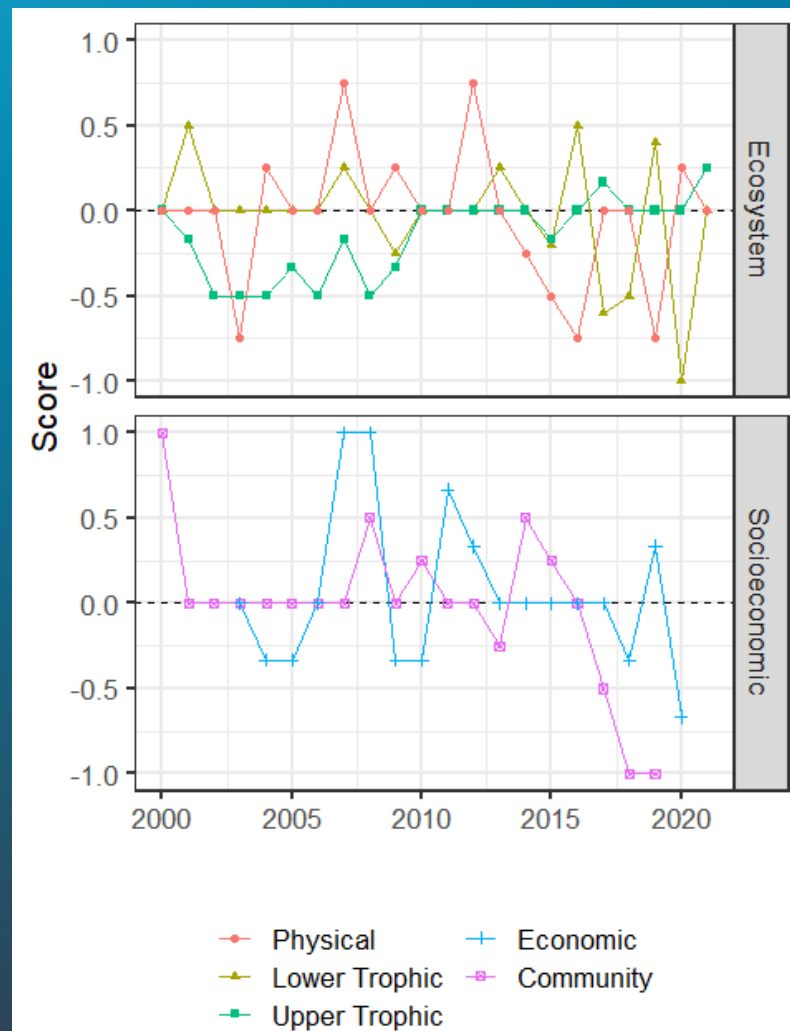
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Traffic Light Table

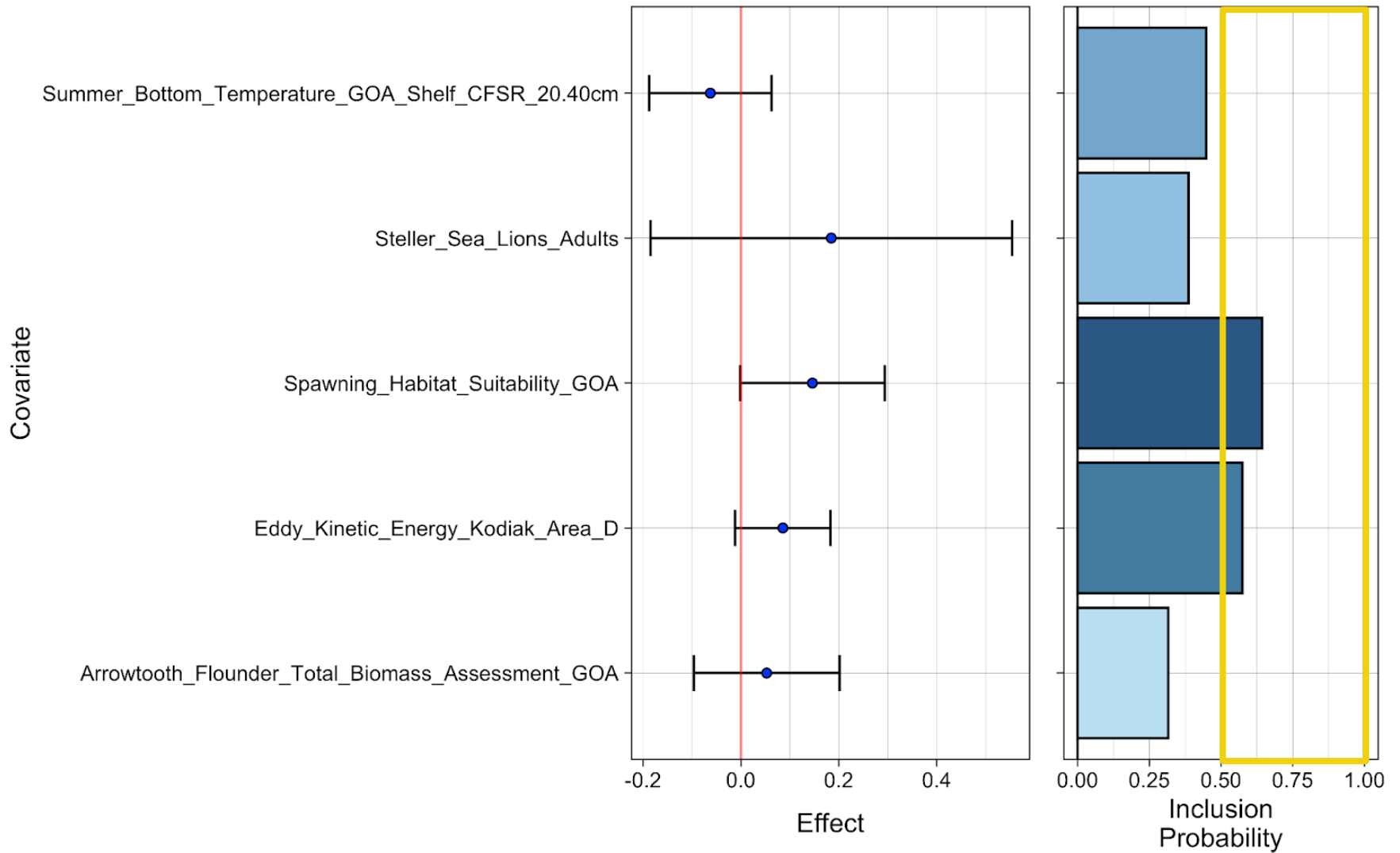
Indicator category	Indicator	2017 Status	2018 Status	2019 Status	2020 Status	2021 Status
Economic	Annual Pacific Cod Real Exvessel Value GOA Fishery	neutral	low	low	low	NA
	Annual Pacific Cod Real Exvessel Price GOA Fishery	neutral	neutral	high	neutral	NA
	Annual Pacific Cod Real Revenue Per Unit Effort GOA Fishery	neutral	neutral	high	low	NA
Community	Annual Pacific Cod RQ Harvesting Revenue Kodiak Fishery	neutral	low	low	NA	NA
	Annual Pacific Cod RQ Processing Revenue Kodiak Fishery	low	low	low	NA	NA
	Annual Pacific Cod RQ Harvesting Revenue Small Communities GOA Fishery	low	low	low	NA	NA
	Annual Pacific Cod RQ Processing Revenue Small Communities GOA Fishery	neutral	low	low	NA	NA

Traffic Light Score

- Ecosystem (11 of 15 total)
 - Physical decreased to average
 - Lower trophic > to average
 - Upper trophic > to above average
- Socioeconomic (3 of 7 total)
 - Economic lagged by one year and decreased to below average
 - Community indicators not updated
- 14 of 22 indicators available



Importance



Considerations

- Management Summary

- Cooling overall, more suitable, above average transport
- Larvae low, sufficient prey, juv & adult condition mixed
- Population center average but remains spread out
- Economic indicators overall very low

- Modeling Summary

- 2 potential covariates for GOA Pacific cod recruitment
- Research ecosystem linked models being evaluated as alternatives using age-0 CPUE Kodiak beach seine survey

Next Steps

- 2022 Request for Indicators (RFI)
 - Use ESP data gaps and research priorities
 - ESP team creates RFI in Jan
 - Indicators submitted and reviewed in Feb
 - If new indicators, then initiate partial ESP
- 2022 ESP
 - If partial, in Sept and consider exploring more recruitment indicators and dependency (SSC)
 - Report card of current data in Nov

Questions?

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