

Ecosystem & Socioeconomic Profile: Sablefish Report Card

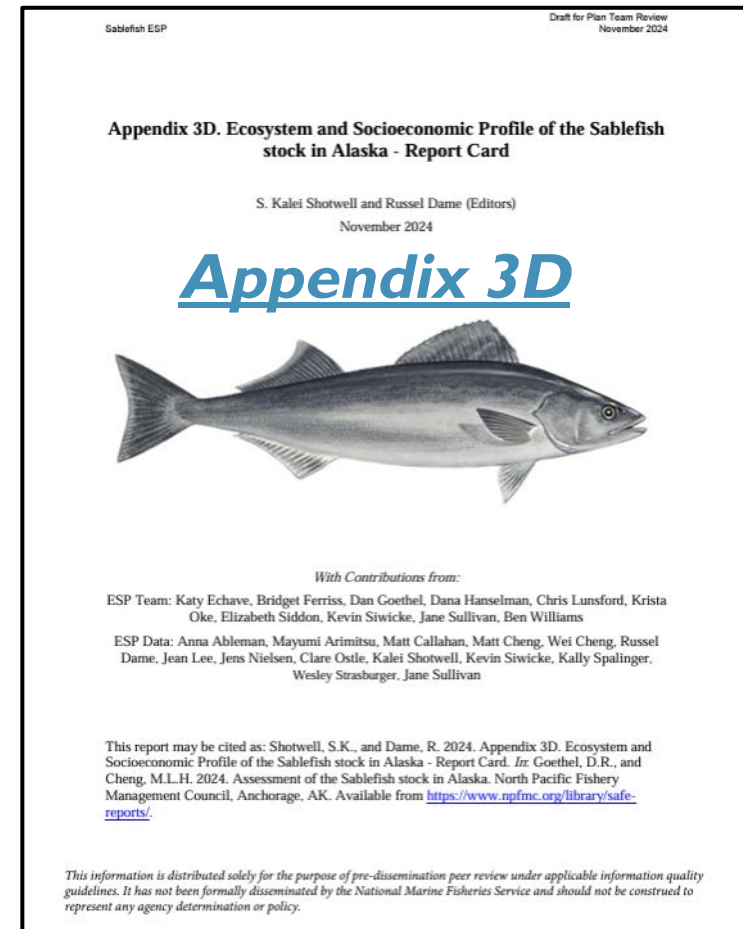
Kalei Shotwell and Russel Dame, November Groundfish Plan Team 2024



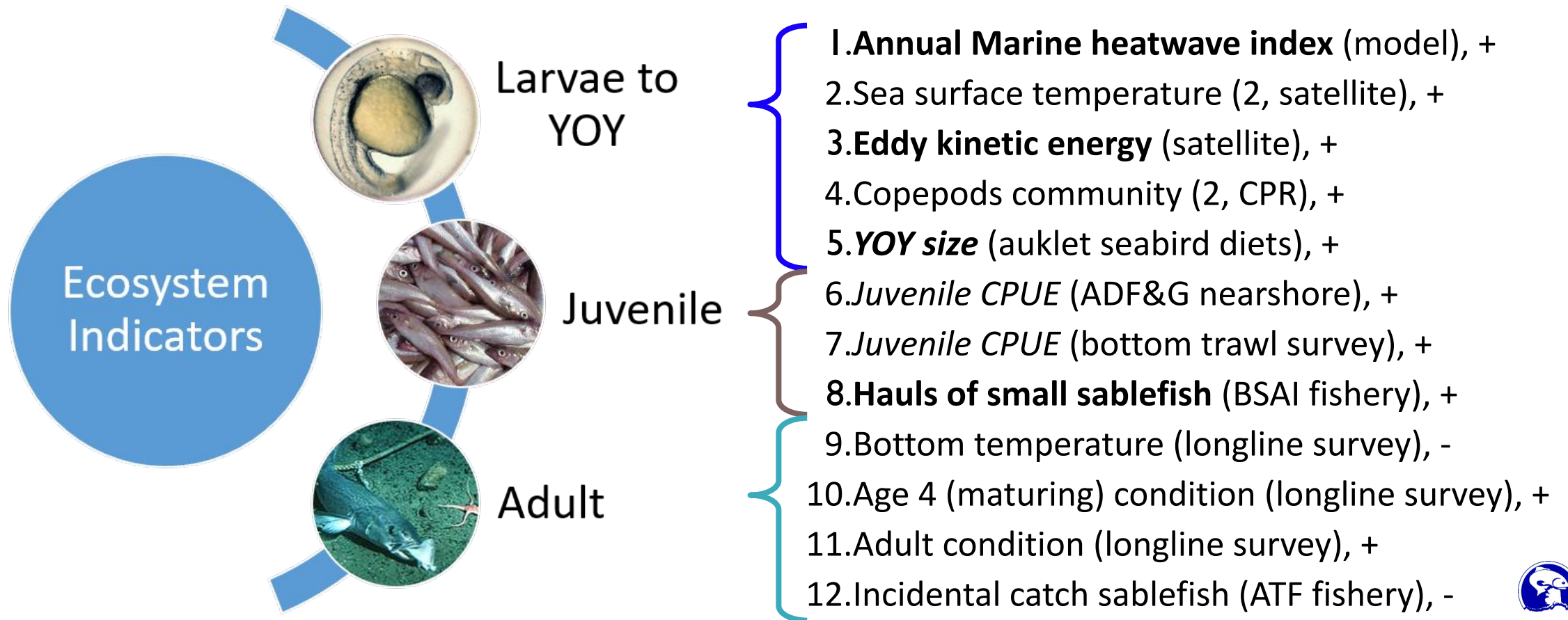
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Overview and Updates

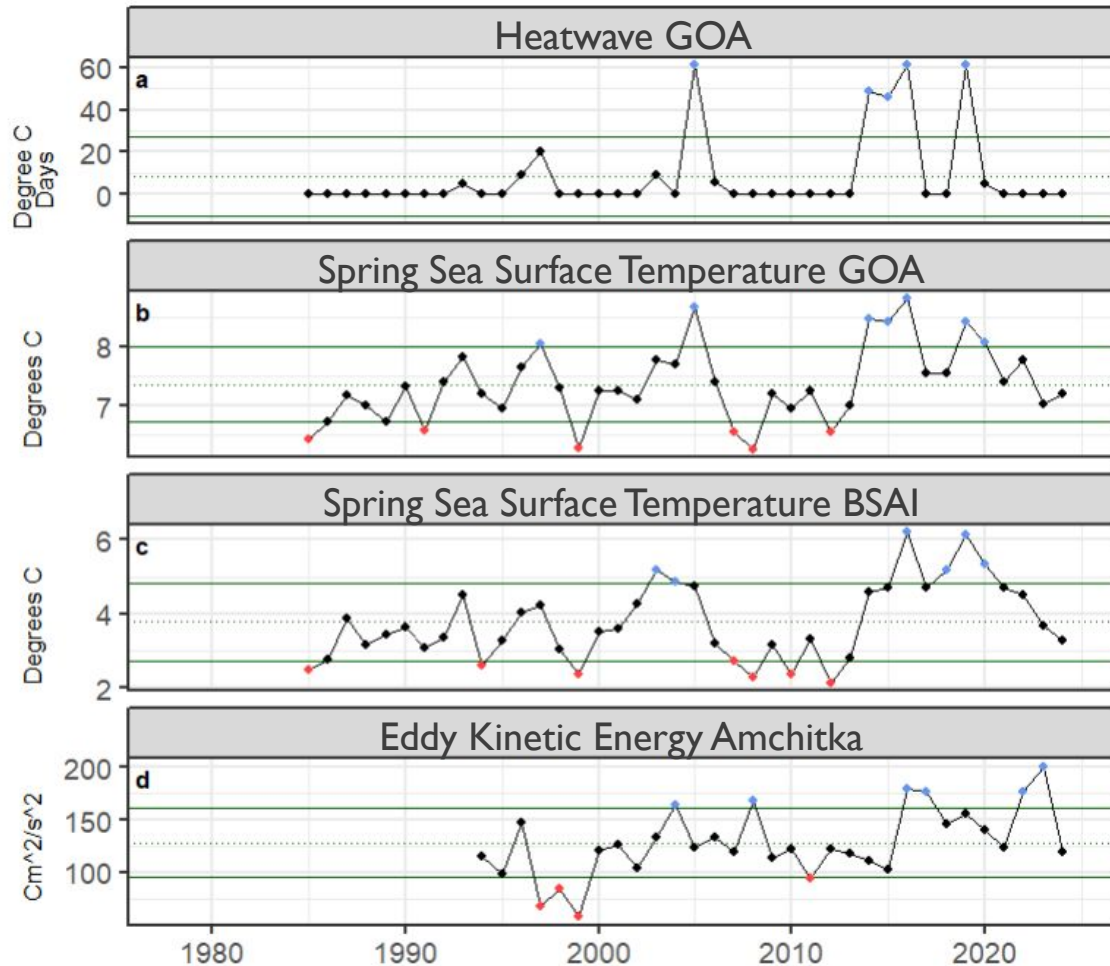
- Appendix 3D in SAFE Report
 - Full/partial ESPs in 2017-2020
 - Report Cards in 2021-2024
- Report Card in 2024
 - Updated organization, new categories for ecosystem, new, modified, and removed indicators
 - Value-added indicators
 - New socioeconomic section with updated indicators from Sept



Ecosystem Indicators

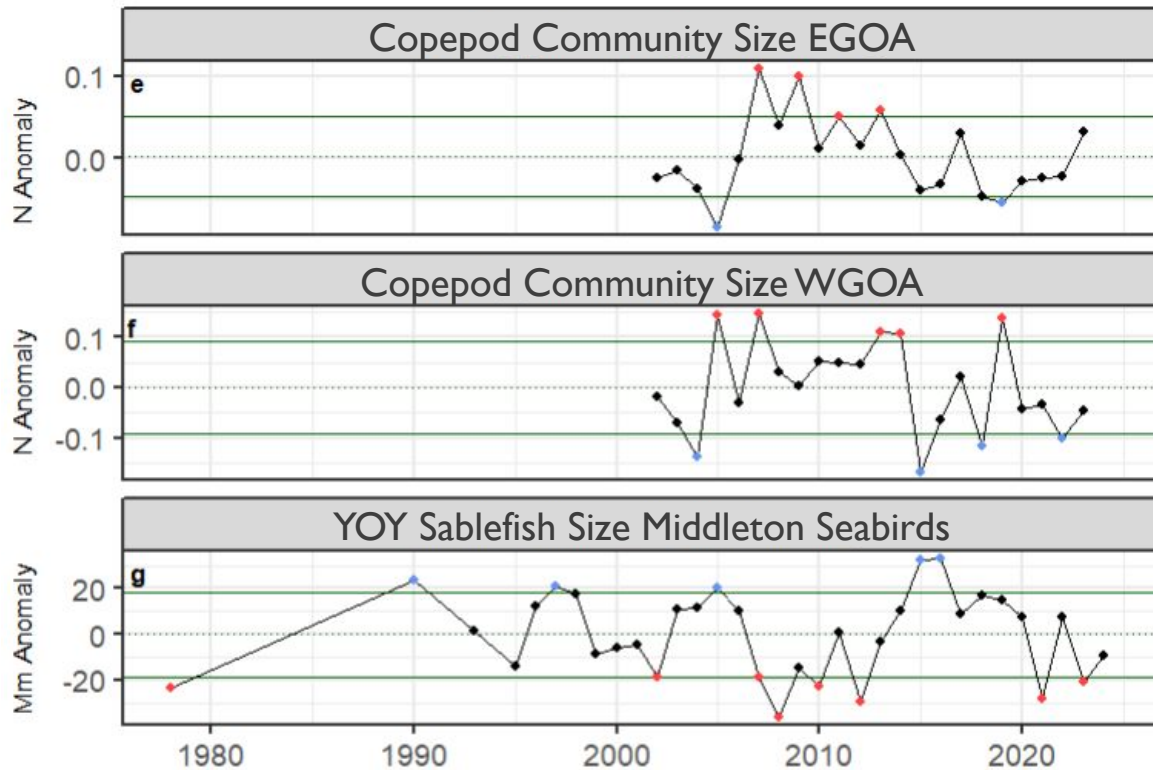


Larval Indicators



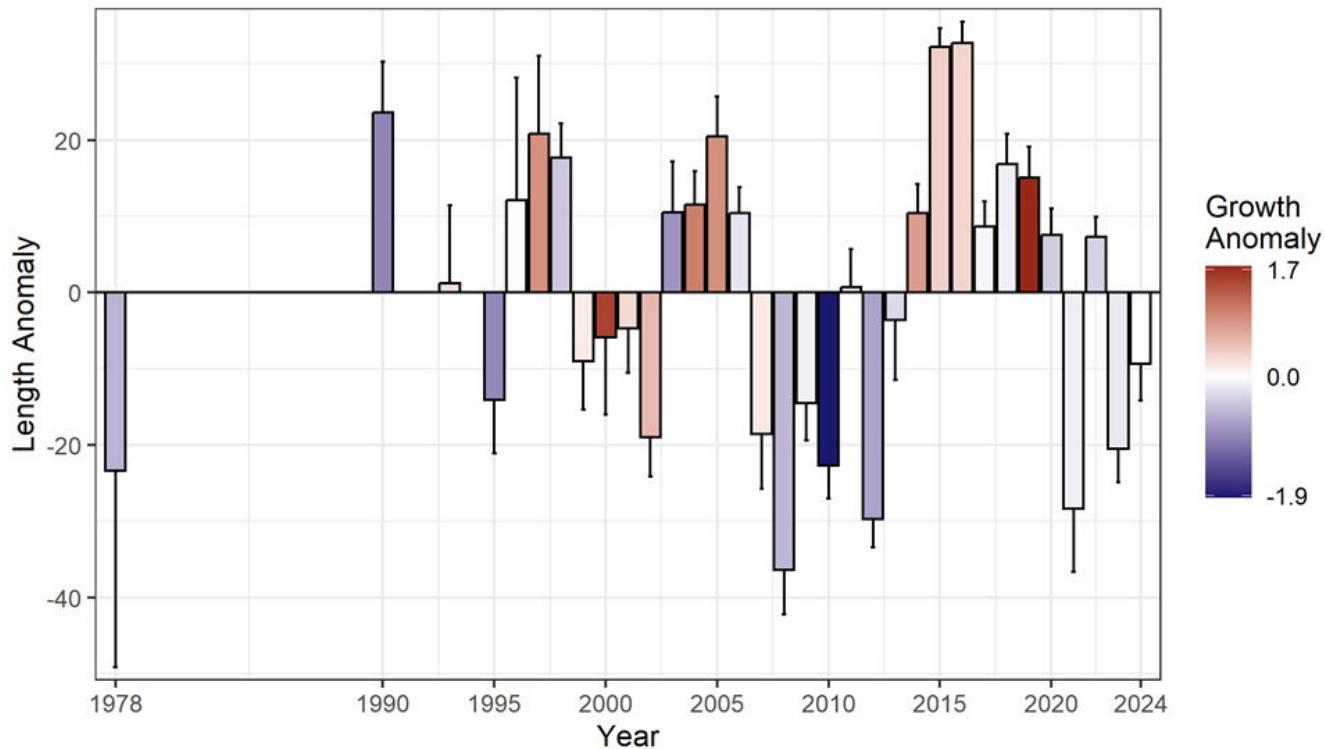
- Surface temperatures in the GOA and EBS remain below average, with no heatwave events in the GOA, implying potentially slower larval sablefish growth.
- Lower energy near Aleutian passes implies reduced retention in suitable habitats and reduced transport through these passes to nursery environments along the Aleutian North Slope Current.

Larval Indicators



- In 2023, the zooplankton community size was above average in the eastern GOA but below average in the western GOA, implying variable feeding conditions for larval and young-of-the-year (YOY) sablefish.
- Although the size of YOY sablefish observed in seabird bill loads increased, it remained below average, while growth was average in 2024

Value-Added: Size/Growth Sablefish in Seabirds

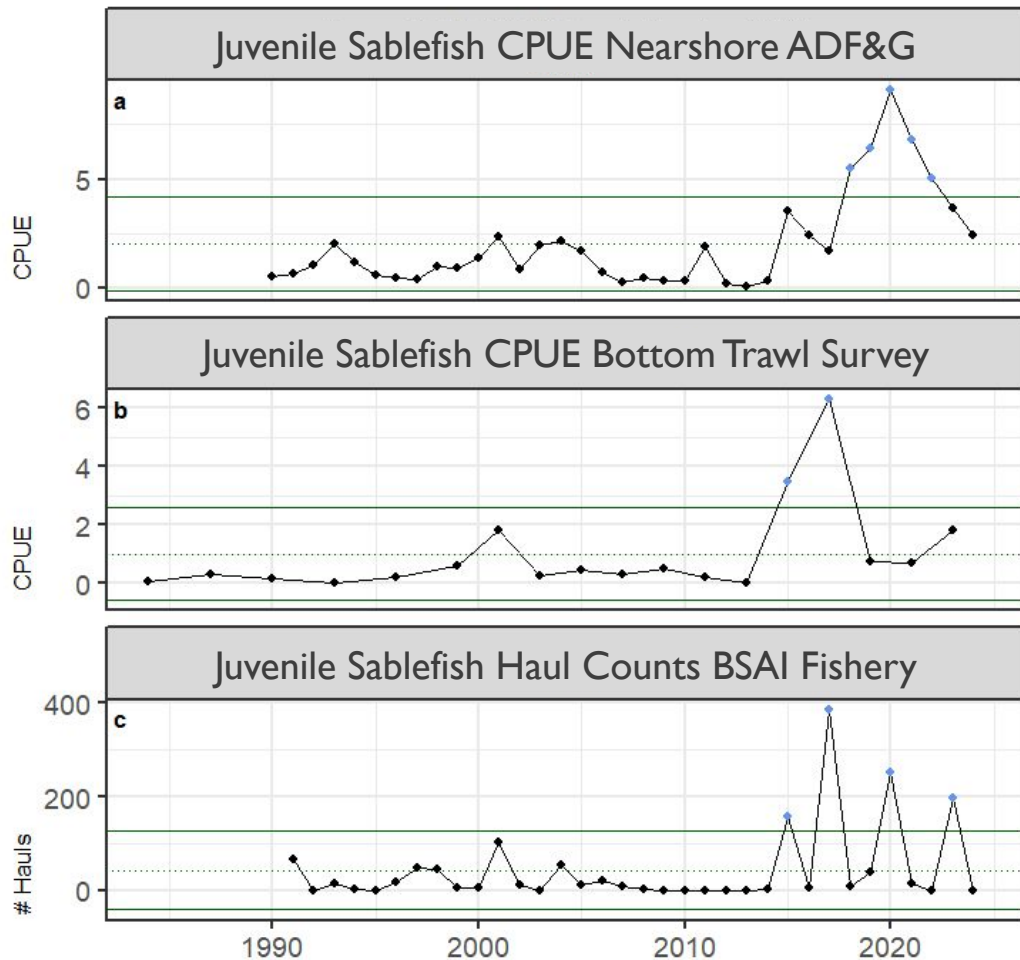


Description: Growth rate and length on median sampling date of age-0 sablefish in rhinoceros auklet diets at Middleton Island over the chick rearing period

Status/Trends: Age-0 sablefish predicted length (90 mm) was below average on the median sampling date (Jul 24) in three of the last four years, but growth has been near the long-term average.

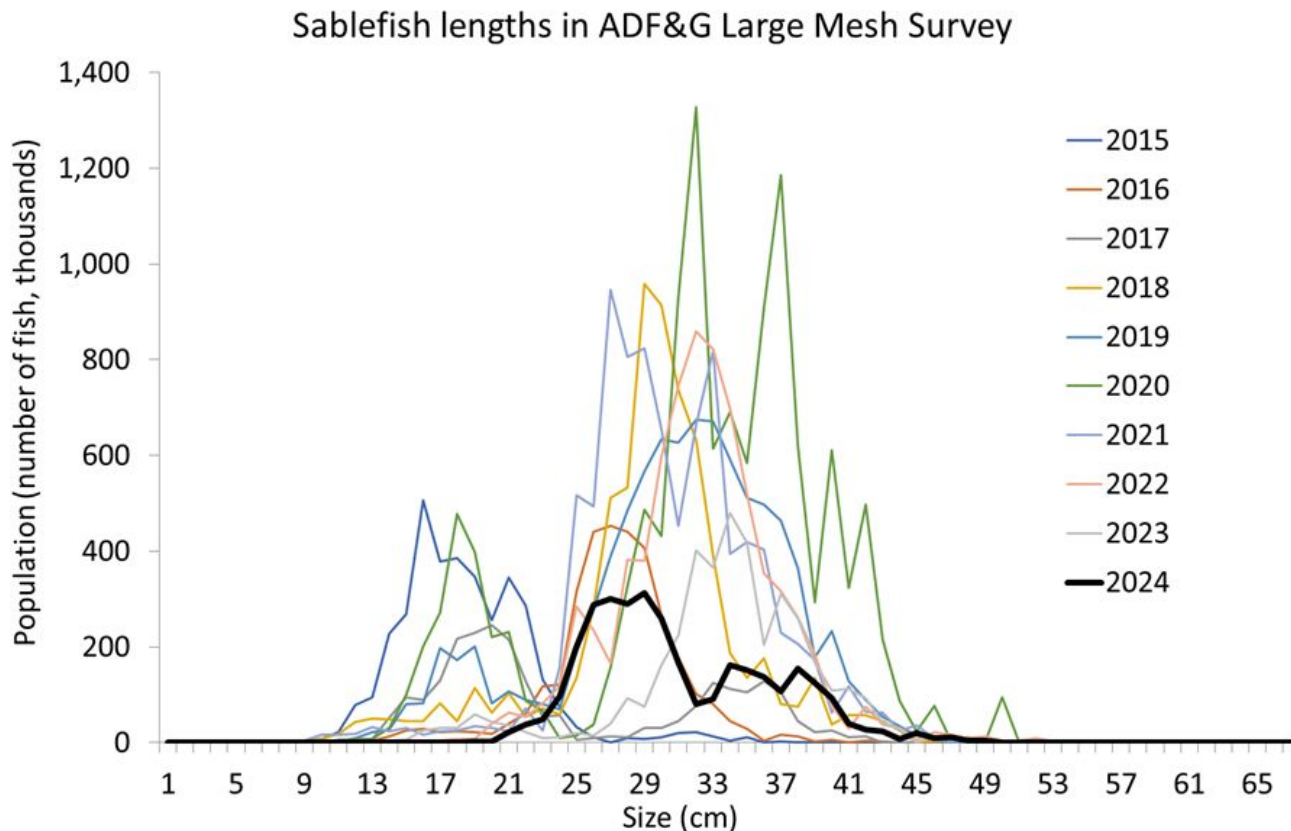
Implications: an early indication of recruitment related to spawn timing, local prey conditions, or survival of the cohort

Juvenile Indicators



- Catch-per-unit-effort (CPUE) for sablefish in nearshore surveys has declined since the peak in 2020, but remains above average. Length frequencies continue to reflect the 2019 year class, with no new cohorts.
- High counts of small (~age-1) sablefish from the BSAI fishery and above average from the GOA bottom trawl survey in 2023 suggest a strong 2022 year class. However, fishery counts were low in 2024.

Value-Added: Length Compositions ADF&G



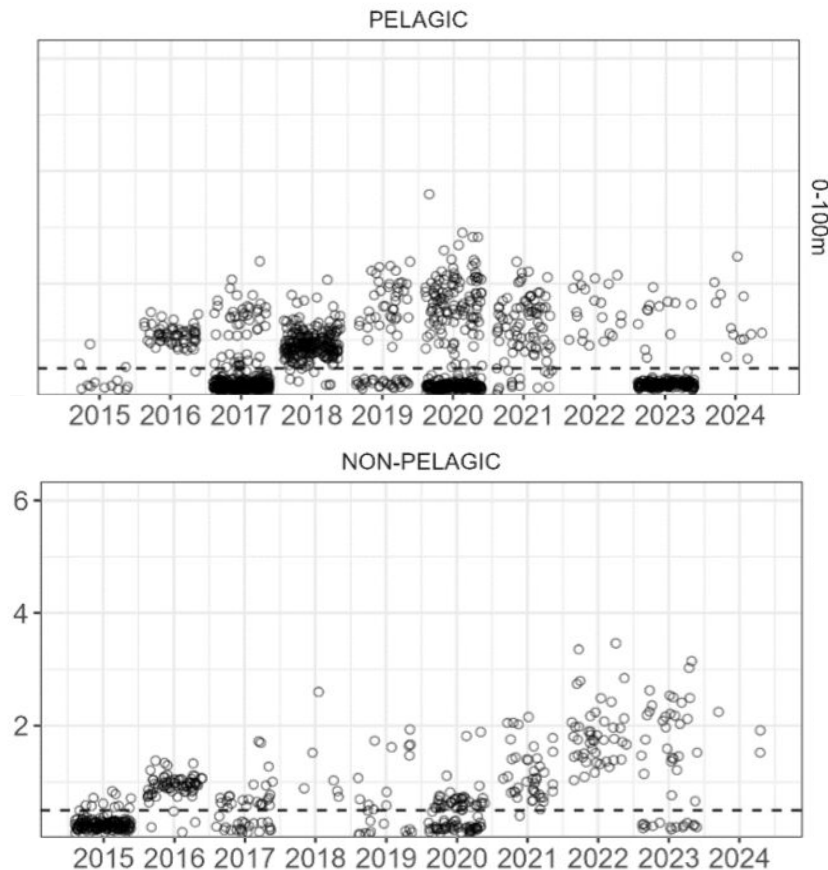
Spalinger et al., 2024

Description: Length distribution of sablefish by year from the Alaska Department of Fish and Game (ADF&G) annual large-mesh bottom trawl surveys

Status/Trends: Length frequencies (LF) from 2020 support strong 2019 year-class similar to 2014 and 2016. LF from 2021 through 2024 track the 2019 cohort, but no new cohorts

Implications: A signal of overwinter and nearshore residency success for the early to late juvenile stages of sablefish

Value-Added: Hauls of Small Sablefish BSAI Fishery

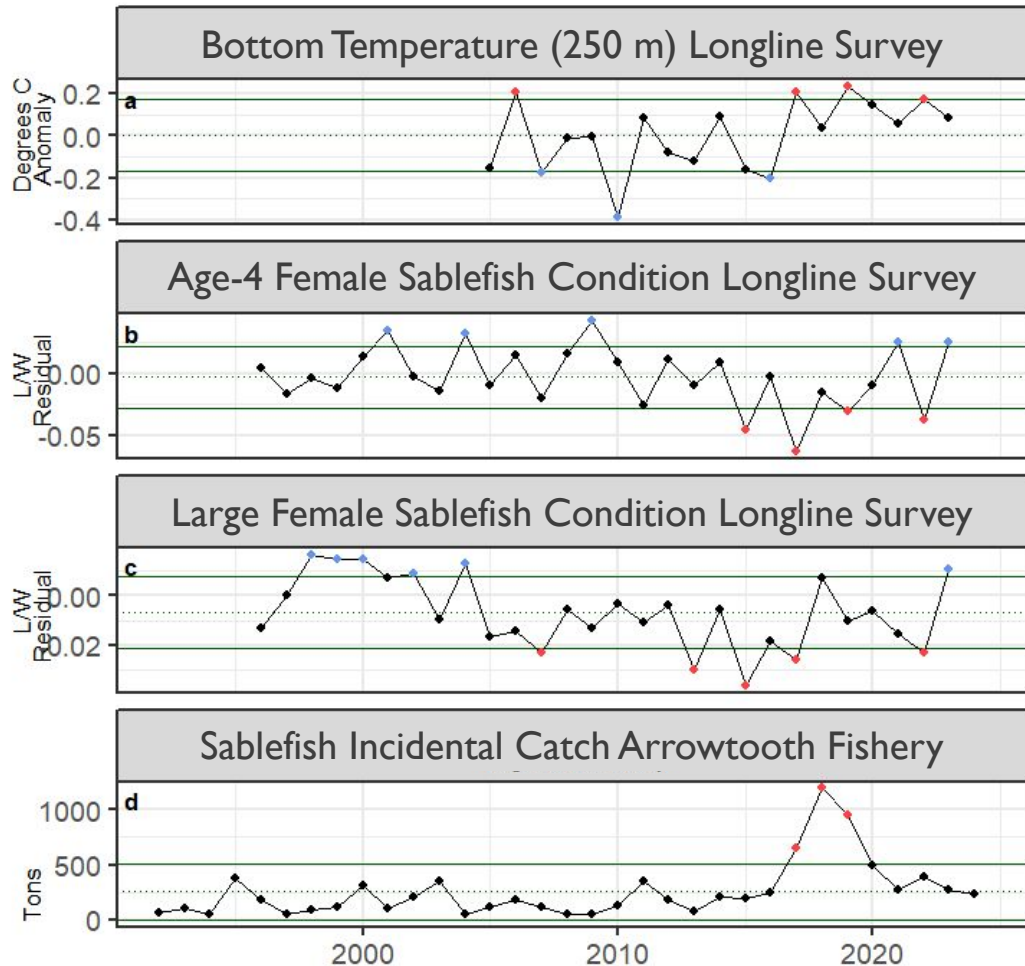


Description: Number of pelagic and non-pelagic trawl hauls fishing 0-100 m in the Eastern Bering Sea that caught small sablefish (≤ 0.5 kg)

Status/Trends: Haul count of small (likely age-1) sablefish historically low, but large haul counts for 2001 and post marine heatwave onset during 2015, 2017, 2020 and 2023.

Implications: Evidence of small sablefish may indicate a strong year class in the year prior before surveys observe them

Adult Indicators



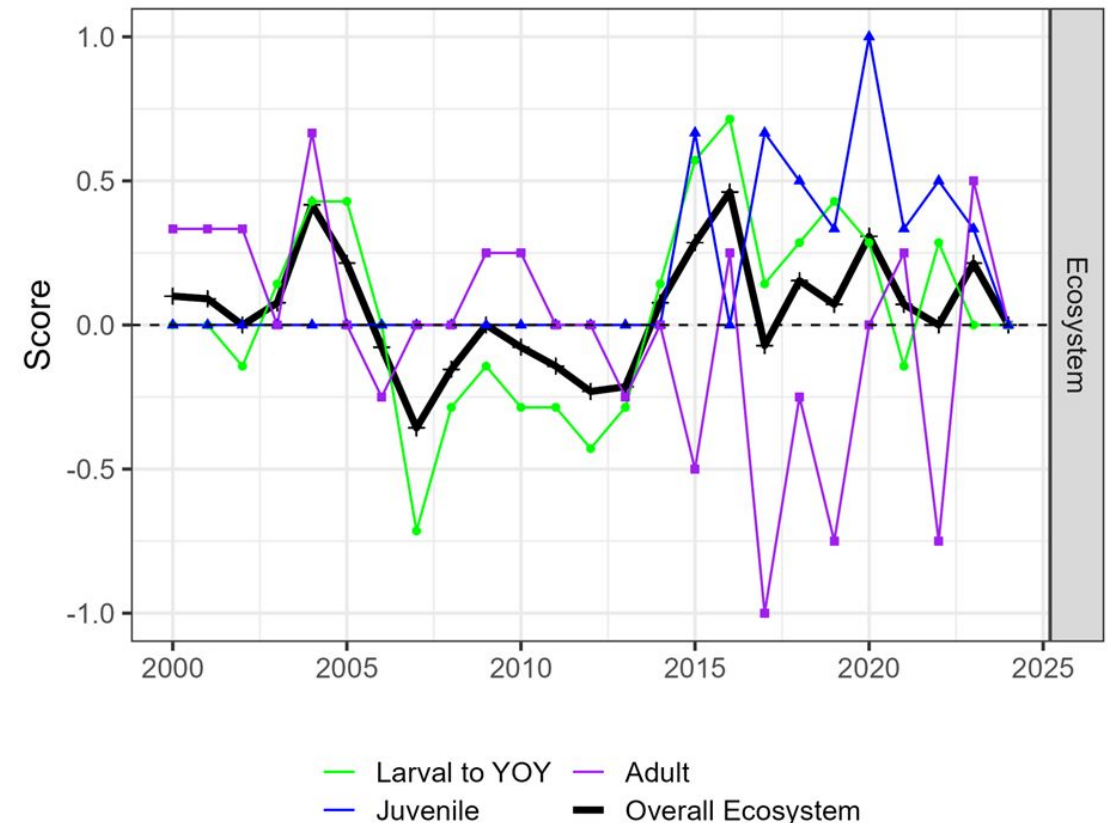
- No new data on bottom temperature
- Condition of the 2019 year-class (2023 data) and condition of large females in the longline survey were high in 2023, suggesting adequate prey for maturing and spawning fish last year (no data 2024).
- The spatial overlap between sablefish migrating to adult slope habitats and the arrowtooth flounder population decreased to slightly below average.

Ecosystem Summary Table

Indicator category	Indicator	2020 Status	2021 Status	2022 Status	2023 Status	2024 Status
Larval_YOY	Annual Heatwave GOA Model	neutral	neutral	neutral	neutral	neutral
	Spring Temperature Surface GOA Satellite	high	neutral	neutral	neutral	neutral
	* Spring Temperature Surface SEBS Satellite	high	neutral	neutral	neutral	neutral
	Annual Eddy Kinetic Energy Amchitka Satellite	neutral	neutral	high	high	neutral
	Annual Copepod Community Size EGOA Survey	neutral	neutral	neutral	neutral	NA
	Annual Copepod Community Size WGOA Survey	neutral	neutral	low	neutral	NA
	Annual Sablefish Size YOY Middleton Survey	neutral	low	neutral	low	neutral
Juvenile	* Summer Sablefish CPUE Juvenile Nearshore GOAAI Survey	high	high	high	neutral	neutral
	Summer Sablefish CPUE Juvenile GOA Survey	NA	neutral	NA	neutral	NA
	Annual Small Sablefish Incidental Hauls EBS Fishery	high	neutral	neutral	high	neutral
Adult	Summer Temperature 250m GOA Survey	neutral	neutral	high	neutral	NA
	Summer Sablefish Condition Female Age4 GOA Survey	neutral	high	low	high	NA
	Summer Sablefish Condition Female Adult GOA Survey	neutral	neutral	low	high	NA
	Annual Sablefish Incidental Catch Arrowtooth Target GOA Fishery	neutral	neutral	neutral	neutral	neutral

Indicator Monitoring Analysis: Traffic Light

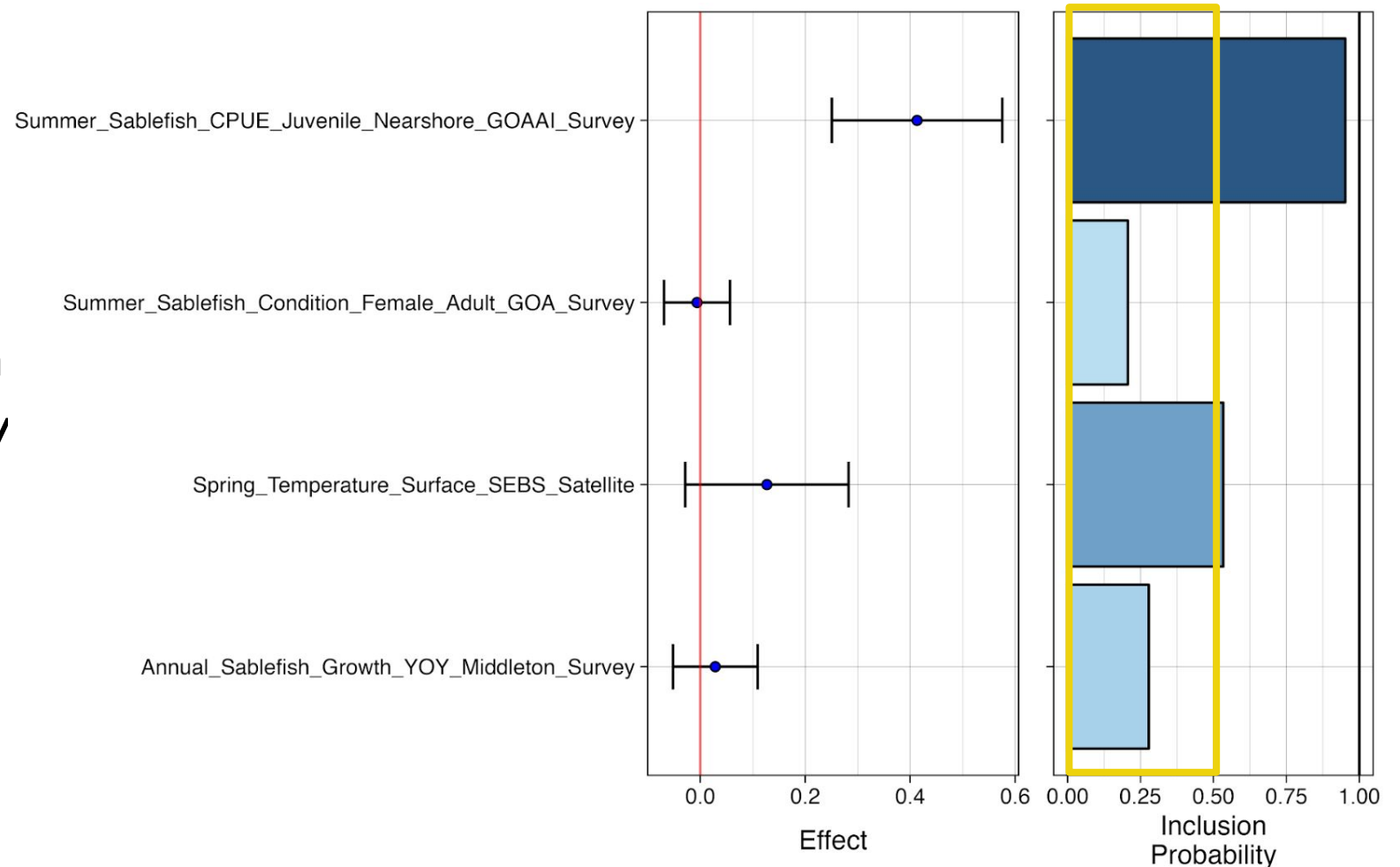
- Overall
 - 11 of 14 indicators updated
 - Decrease from above average to average
- Category
 - Larval to YOY remained average
 - Juvenile and adult < from above average to average
 - Adult category had two less indicators than anticipated



Indicator Monitoring Analysis: Importance

Two indicators with importance > 0.5 :

- Juvenile sablefish CPUE in ADF&G nearshore survey
- Spring sea surface temperature from SEBS
- 1996-2019 year class

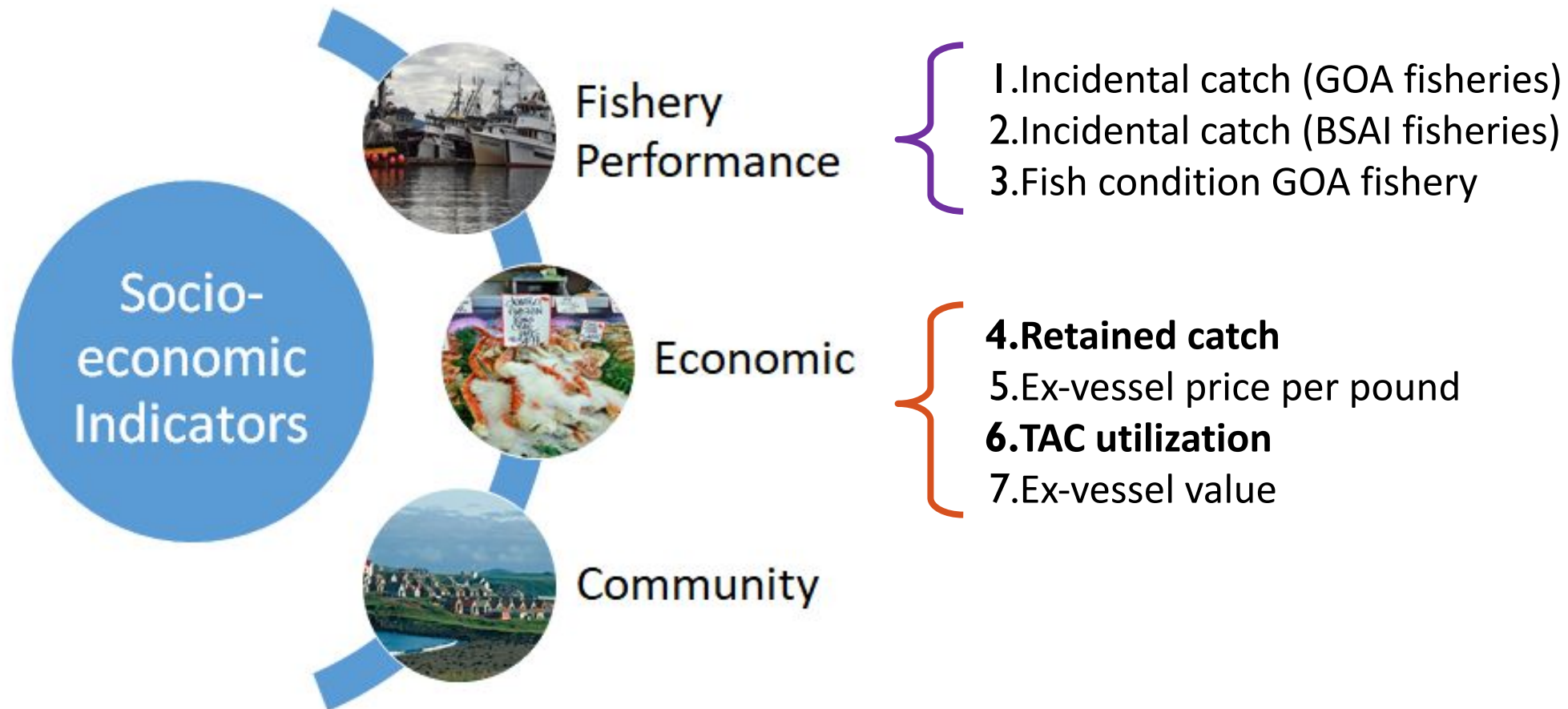


Indicator Monitoring Analysis - Advanced

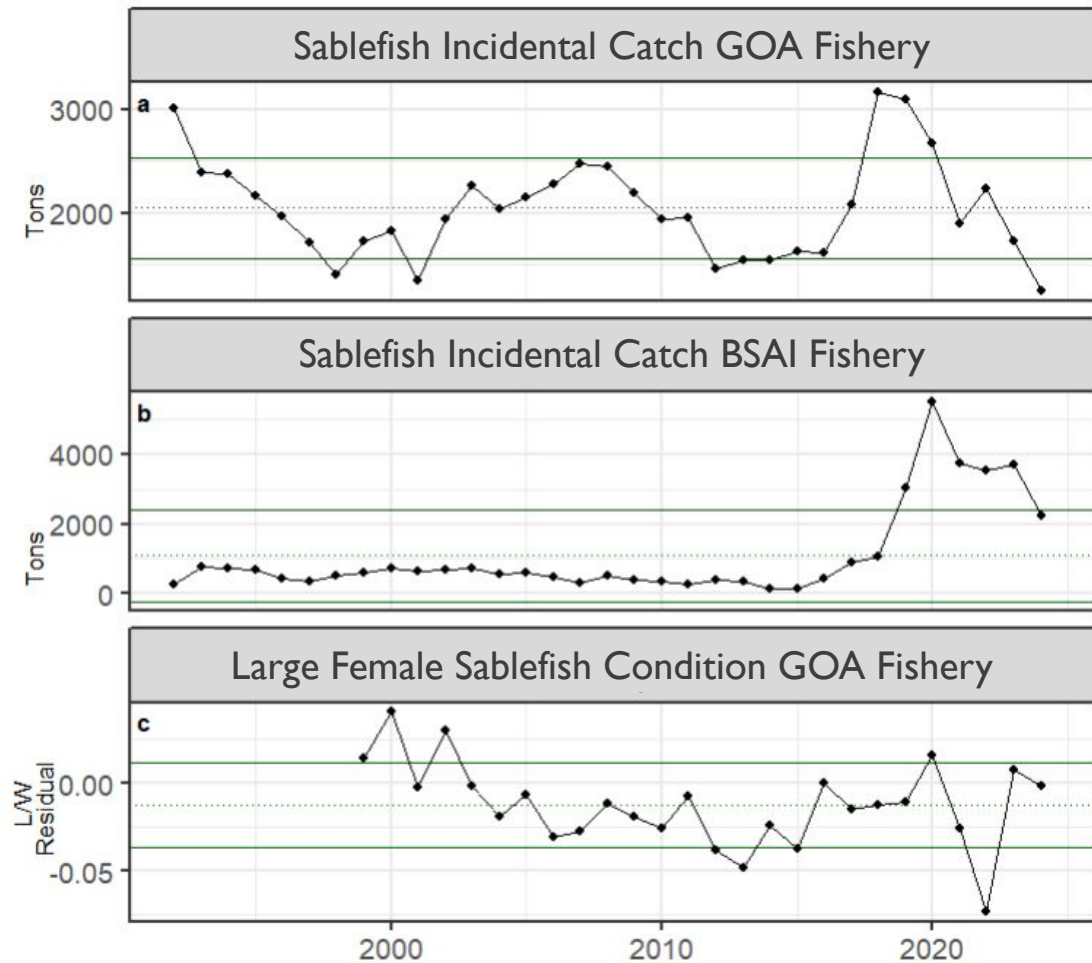
- State-space growth model (Cheng et al., 2023, Cheng et al., 2024)
 - Incorporates age, year, and cohort correlations to examine the potential for time and cohort-specific trends in weight-at-age
 - Recent reductions in growth, likely due to density-dependent responses following large recruitment events
- Spatial Explicit Life Cycle (SILC) model (Goethel et al., *in prep*)
 - Pairs an individual based model (IBM) with a spatial statistical catch-at-age assessment model
 - Intent to develop regional estimates of recruitment and link with relevant indicators to explain spatial shifts in the population



Socioeconomic Indicators

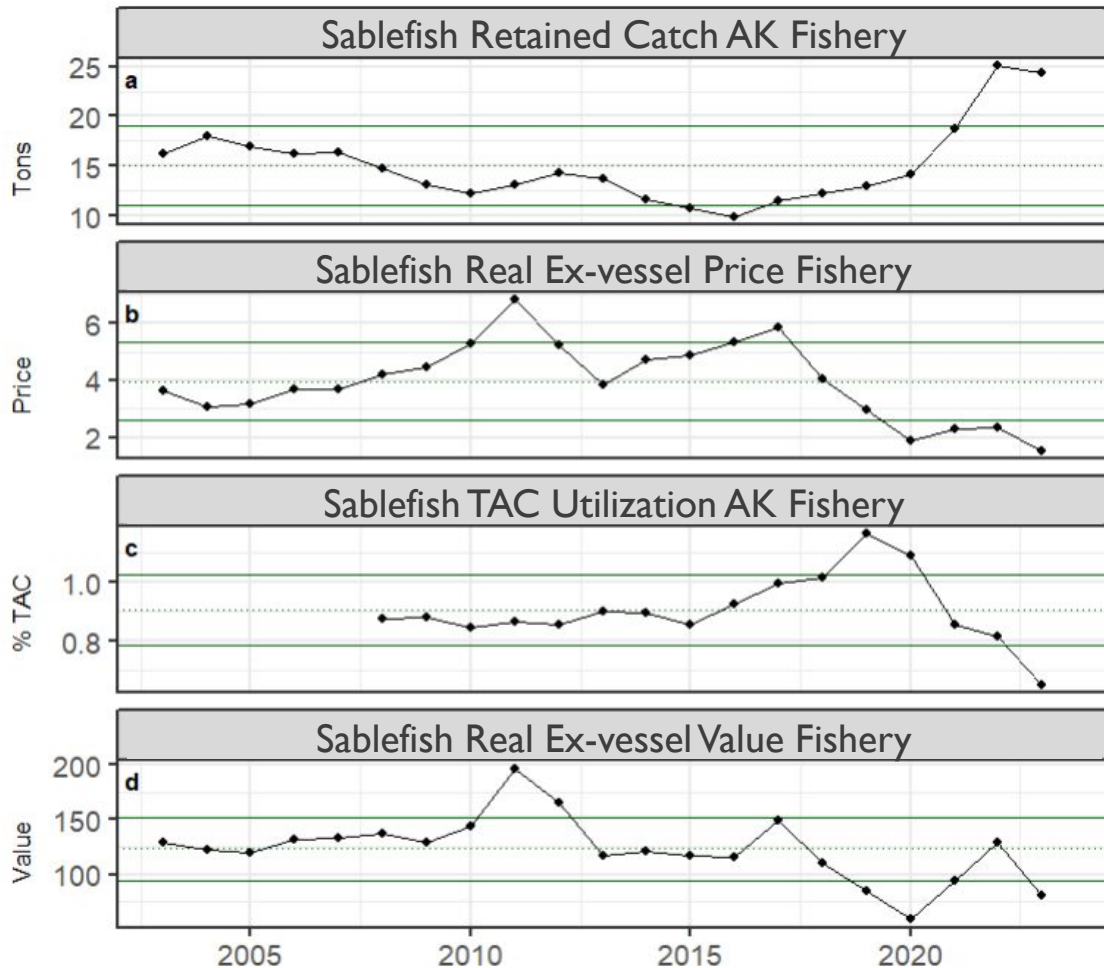


Fishery-Informed Indicators



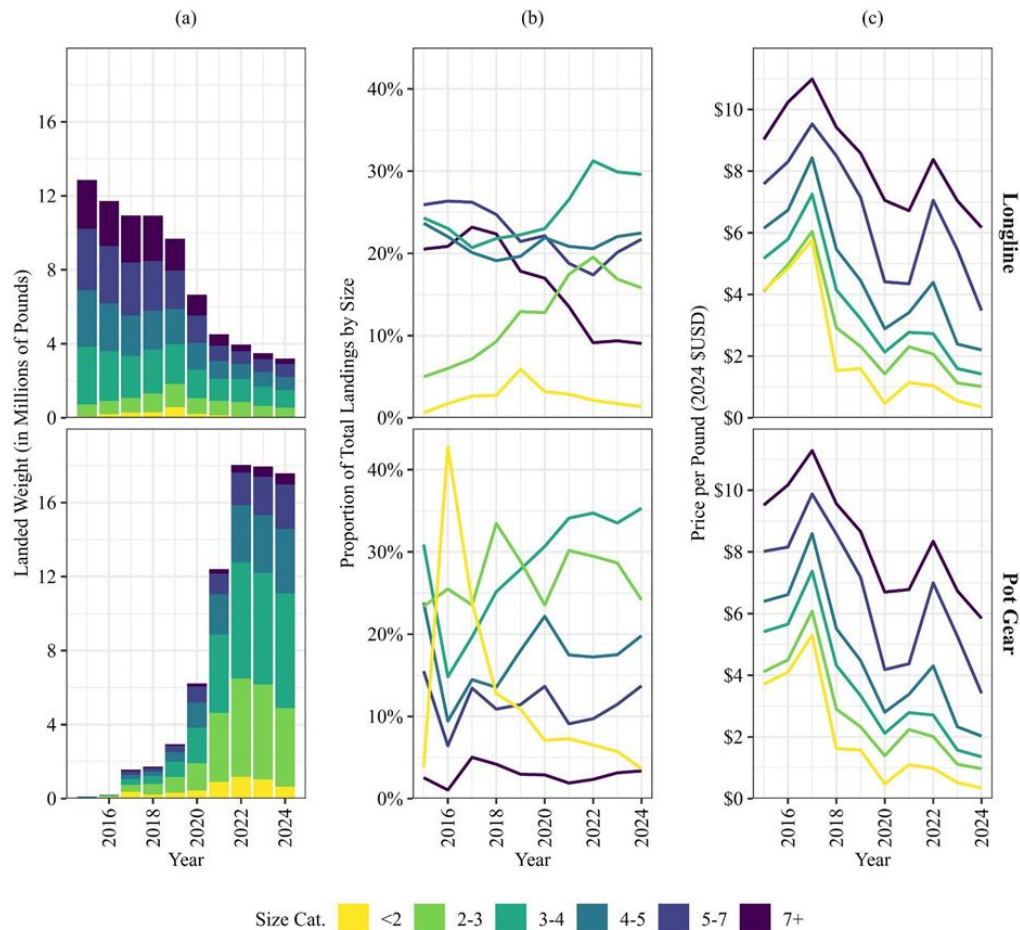
- Incidental catch of sablefish in non-sablefish targeted fisheries decreased to a time series low in the GOA in 2024 and also decreased in the BSAI, although it remained above average.
- The condition of adult female sablefish in GOA fisheries declined slightly in 2024 but remained above average, though sample sizes were smaller compared to previous years

Economic Indicators



- Retained catch decreased slightly (-3%), but remained above one-standard deviation of the historical range.
- Ex-vessel prices of sablefish reached a new historical low of \$1.53 per pound (down 63% from the 2014 to 2018 average).
- Year-over-year increases in TAC have outpaced increases in total catch.
- Ex-vessel revenue decreased below one-standard deviation of the historical range for the fourth of the past five years.

Value-Added: Price by Size

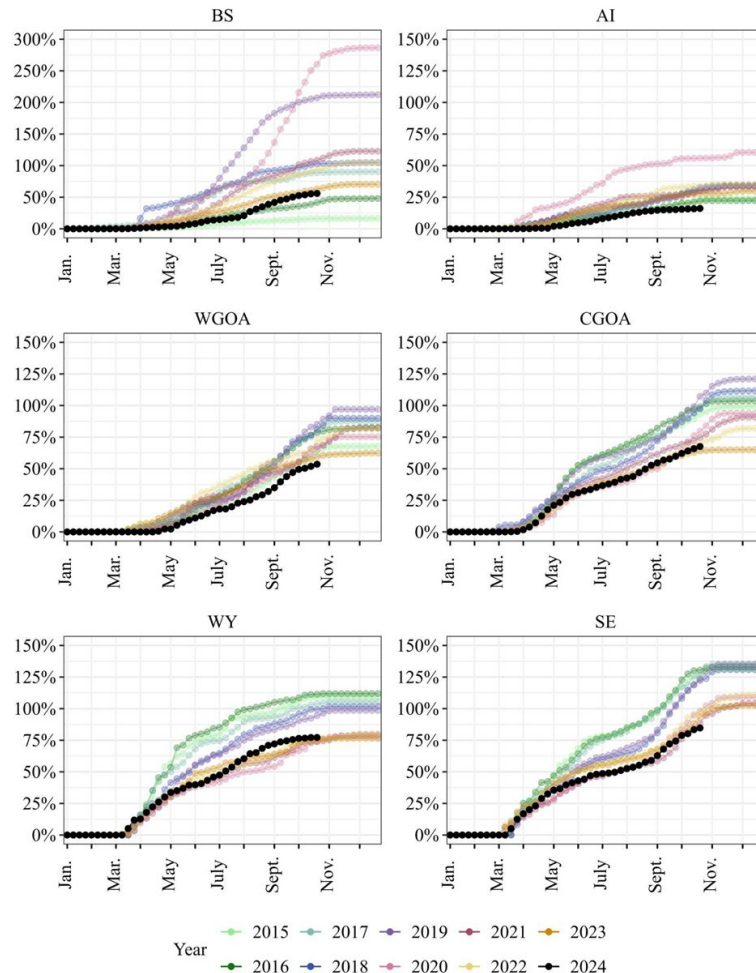


Description: Comparison of total landings, proportion of total landings by size, and price per pound by size for the fixed gear fishery differentiated by gear-type

Status/Trends: small (<2lb) and large (>7lb) sizes decreasing, middle sizes increasing, larger fish price decreasing faster

Implications: Information on fishery performance and market conditions for the fixed gear fishery

Value-Added: %TAC by Region

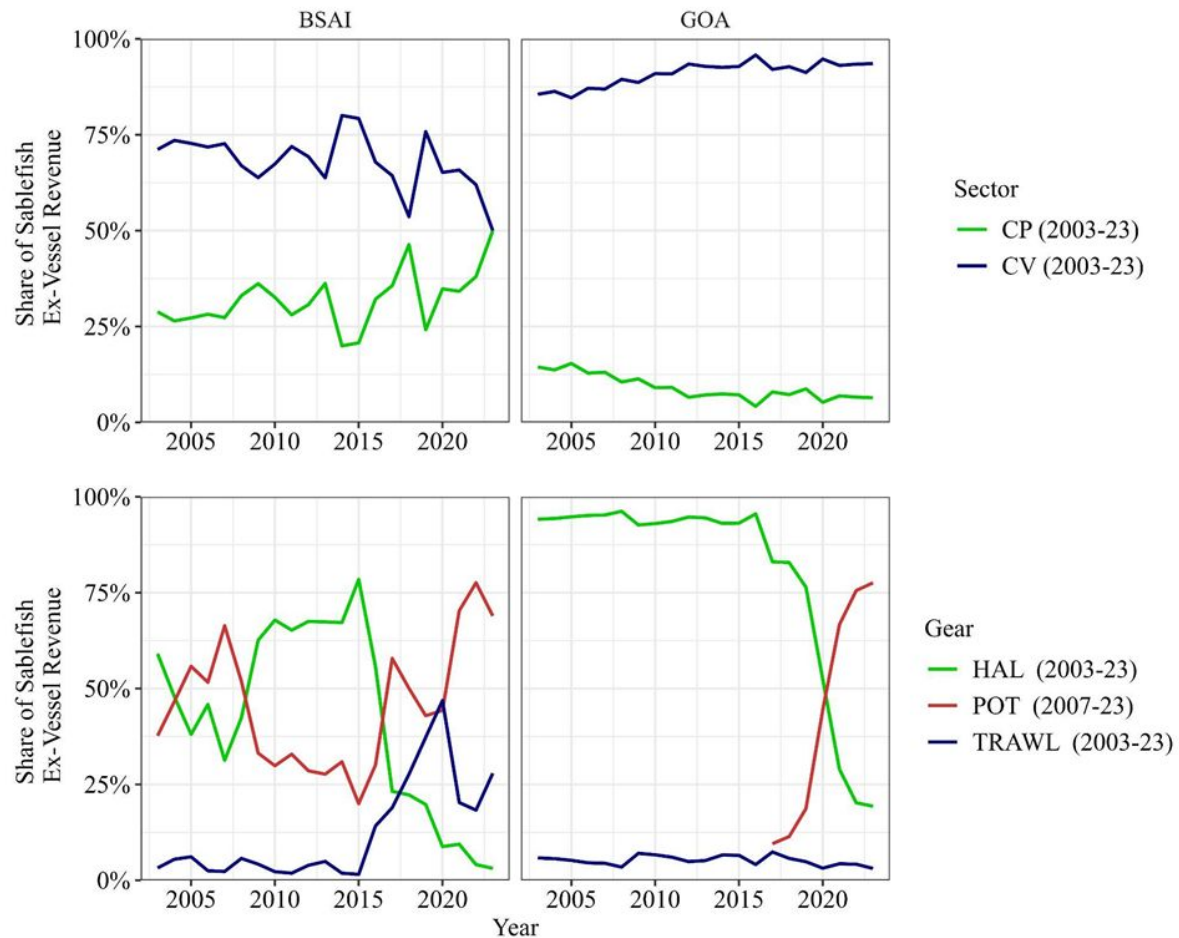


Description: Comparison of the historical and in-season sablefish TAC utilization (by week) differentiated by subregion

Status/Trends: TAC utilization for each subregion is less than the historical average and below 2023 levels (excluding WY and CGOA)

Implications: Subregions that consistently utilize TAC may be more impacted to changes in TAC regulations

Value-Added: Revenue Share by Sector

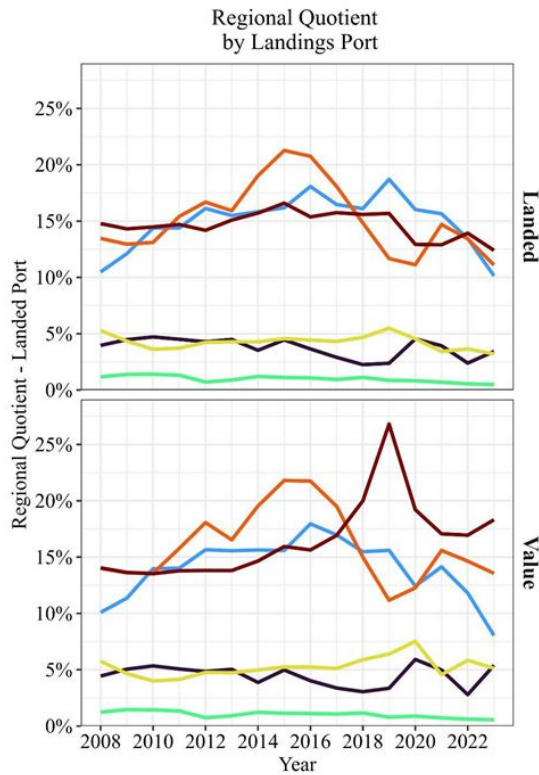
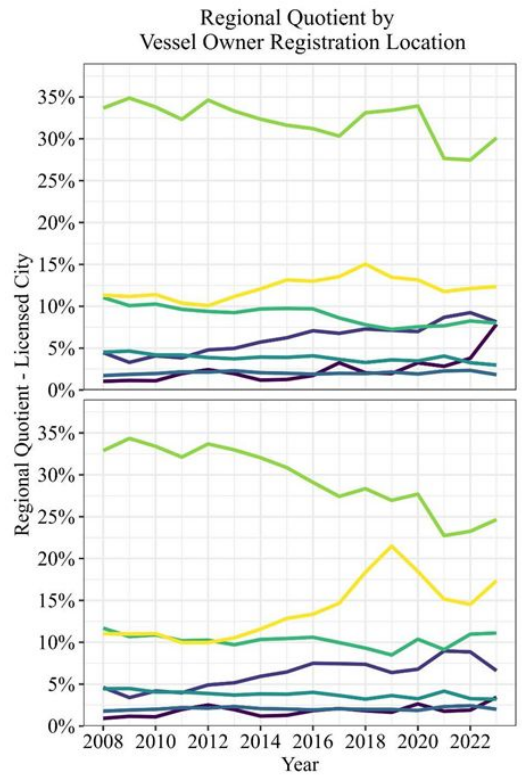


Description: The share (%) of region-specific sablefish revenue broken by sector and gear type.

Status/Trends: CVs generate the largest share revenue, but reaching parity with CPs in the BSAI. Pre-2019 HAL was the dominant gear-type but has been replaced by pot gear.

Implications: Regulations on gear may have to focus on pot and trawl gear.

Value-Added: Regional Quotient



ALL OTHER STATES
 HOMER
 OTHER ALASKA
 OTHER NON-ALASKA
 PETERSBURG
 SEATTLE MSA
 SITKA

JUNEAU
 KODIAK
 OTHER ALASKA
 PETERSBURG
 SEWARD
 SITKA

Description: The share of total revenue and landings (regional quotient) by community (vessel owner registration and landings port)

Status/Trends: Seattle continues to generate the highest share of sablefish value and landings. Three communities, Sitka, Seward, and Kodiak, generate the highest share of sablefish value and landings by landings port.

Summary and Stickers!!!



Ecosystem (ABC Information):

- Surface temps cooler, less transport
- Adequate prey, increased YOY size
- Decreased nearshore CPUE, possibly large 2022 year class
- Good adult condition, less competition/predation

Socioeconomic (TAC Information):

- 2024 data, small/large sizes <, middle sizes >
- Prices reach historic low (\$1.53/#), larger fish price < faster
- % TAC low in 2024 except BSea, Wyak, ex-vessel value 4 yr low
- Shift in top community participants





Planned ESP Developments

- 1) Request for Indicators (RFI) in 2025, use ESP data gaps and research priorities list, indicators submitted in February
- 2) Data modernization project begins in early 2025 to expand the ESP data management system (hosted by AKFIN) and streamline the AK-ESP R package for multiple templates (e.g., one-pager)
- 3) Indicator monitoring analysis for groundfish and crab ecosystem indicators presented to authors in the spring (likely May).
- 4) National ESP workshops to identify support systems that will work toward operationalizing ESPs

Questions?



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