# GOA Demersal Shelf Rockfish

Presentation for November GOA GPT

Aaron Lambert, Caitlin Stern, Laura Coleman, Rhea Ehresmann,
Kristin Omori, Christine Hinds, and Bridget Ferriss



# GOA DSR Assessment



- Yelloweye, Canary, China, Quillback, Copper, Rosethorn, Tiger
- DSR in Central GOA/Western GOA/West Yakutat: **Tier 6**
  - Second assessment with this complex in DSR
  - OFL based on catch from 2013 - 2022
- DSR except yelloweye rockfish in Southeast Outside (SEO): **Tier 6**
  - OFL based on catch from 2010 - 2014
- Yelloweye in SEO: **Tier 5**
  - Two-index multi-area random effects model (REMA)
  - Extra biomass observation error
  - ADF&G ROV biomass survey
  - IPHC FISS survey
    - Spatiotemporally standardized (sdmTMB)

# Changes to the input data

- IPHC survey data updated through 2025
  - Stations used in SEO changed
  - 13 stations removed from SEO
  - Below average stations surveyed in 2024 & 2025
  - No EYKT in 2024, only 3 in 2025 (all 0 catch)
  - No NSEO in 2025
- SEO commercial fishery weights were updated through 2025
- **No new** ADFG ROV survey data
  - Last survey was EYKT in 2023
- Catch updated through October 2026
  - Sport through 2025

Number of IPHC stations

| Year | CSEO | EYKT | NSEO | SSEO |
|---|---|---|---|---|
| 1998 | 15 | 48 | 8 | 37 |
| 1999 | 18 | 47 | 8 | 36 |
| 2000 | 18 | 46 | 6 | 34 |
| 2001 | 16 | 47 | 8 | 34 |
| 2002 | 19 | 49 | 8 | 33 |
| 2003 | 19 | 46 | 8 | 34 |
| 2004 | 18 | 47 | 8 | 34 |
| 2005 | 17 | 48 | 7 | 36 |
| 2006 | 19 | 49 | 8 | 33 |
| 2007 | 19 | 50 | 8 | 34 |
| 2008 | 18 | 48 | 7 | 35 |
| 2009 | 18 | 47 | 7 | 35 |
| 2010 | 18 | 44 | 8 | 35 |
| 2011 | 18 | 48 | 6 | 31 |
| 2012 | 16 | 48 | 8 | 34 |
| 2013 | 16 | 45 | 8 | 35 |
| 2014 | 17 | 47 | 6 | 35 |
| 2015 | 17 | 48 | 5 | 32 |
| 2016 | 18 | 47 | 8 | 34 |
| 2017 | 18 | 48 | 7 | 34 |
| 2018 | 20 | 44 | 6 | 41 |
| 2019 | 20 | 41 | 9 | 37 |
| 2020 | 22 | 49 | 8 | 40 |
| 2021 | 20 | 41 | 7 | 39 |
| 2022 | 21 | 27 | 5 | 16 |
| 2023 | 21 | 47 | 9 | 39 |
| 2024 | 14 | NA | 4 | 28 |
| 2025 | 6 | 3 | NA | 24 |
| **Mean** | **17.7** | **44.4** | **7.2** | **33.9** |

# GPT/SSC Comments



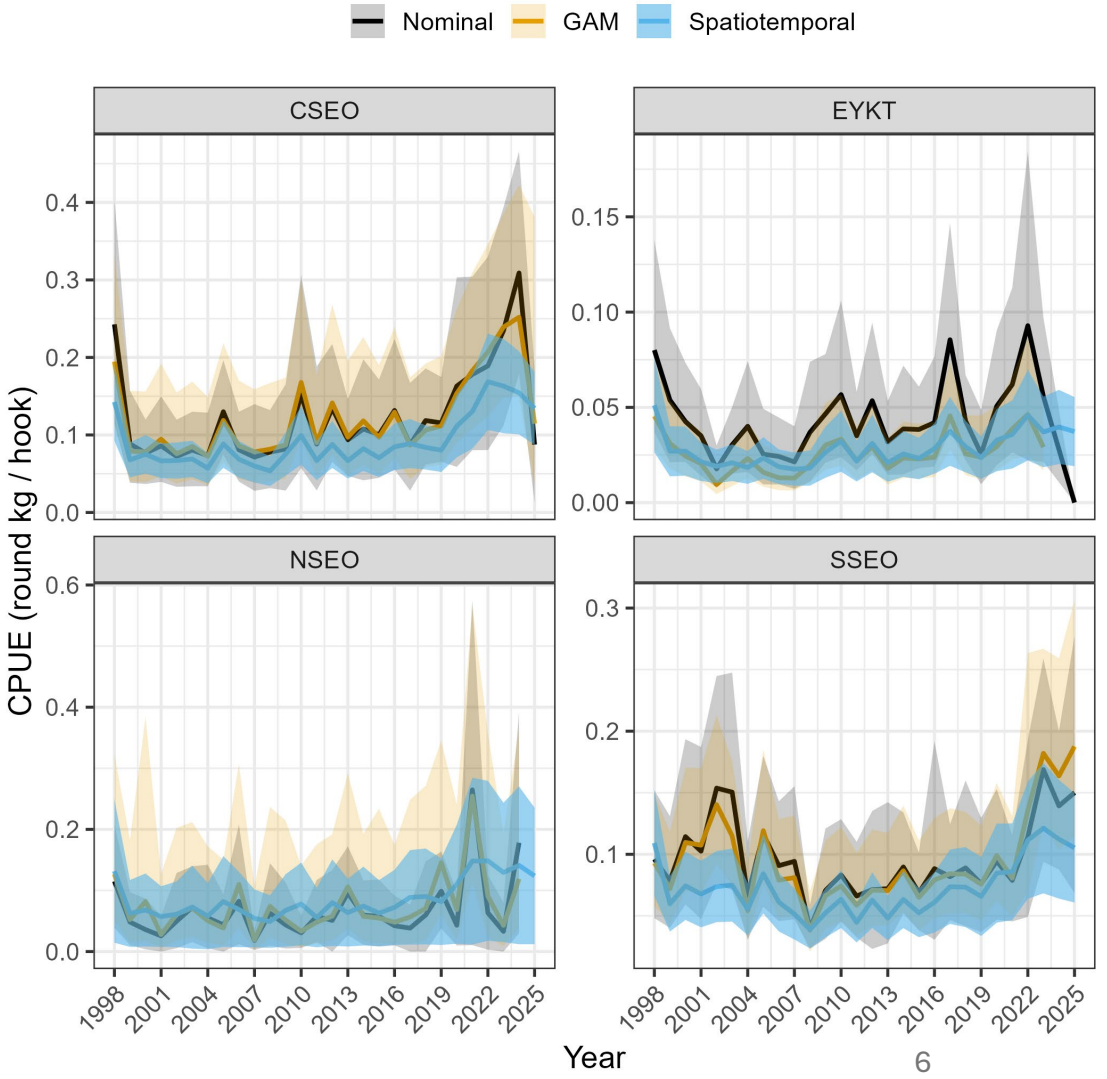
- *The Team recommended* (GOA GPT, Sept. 2026)*:*
  - *presenting the previously accepted model for continuity in bridging.* (**Model 22.2**)
  - *presenting the author-recommended sdmTMB model.* (**Model 26.0**)
  - *a model using bootstrapped IPHC CVs as inputs to REMA.* (**Model 26.1**)
  - *presenting the additional Tier 6 calculations evaluating appropriate periods for averaging catch or ABC.* (GOA GPT, Sept. 2026)
- The SSC agreed with the GPT recommendations, but "*does not recommend bringing forward a Tier 6 assessment for this assessment cycle*."

| | | IPHC Index | |
|---|---|---|---|
| Model | Biomass Index | Standardization | CV Method |
| 22.2 | ADF&G ROV Survey | GAM | GAM-derived |
| 26.0 | ADF&G ROV Survey | Spatiotemporal | Spatiotemporal model-derived |
| 26.1 | ADF&G ROV Survey | Spatiotemporal | Bootstrapped |

# SEO Yelloweye Models
## IPHC Indices

- GAM used in base model 22.2
- Spatiotemporal used in models 26.0 and 26.1
  - Fit in sdmTMB
  - Chosen model (m2)
    - AR1 spatiotemporal structure
    - Included depth and soak smooths
- Spatiotemporal index shows less volatility
  - Especially present in NSEO (r = 0.53)
  - Similar trend to GAM in other regions (r >0.78)

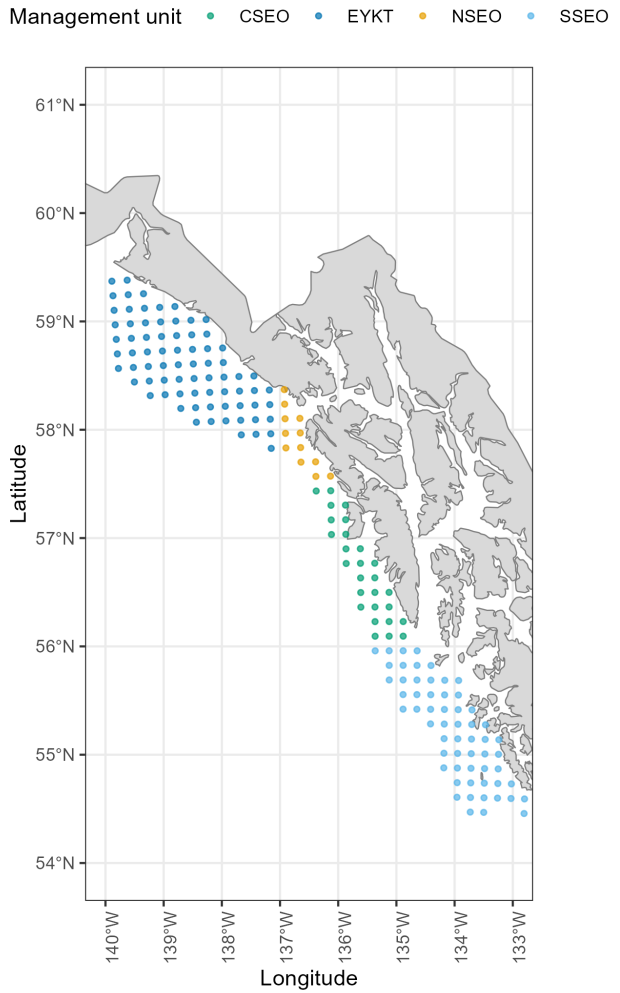
| | | IPHC Index | |
|---|---|---|---|
| Model | Biomass Index | Standardization | CV Method |
| 22.2 | ADF&G ROV Survey | GAM | GAM-derived |
| 26.0 | ADF&G ROV Survey | Spatiotemporal | Spatiotemporal model-derived |
| 26.1 | ADF&G ROV Survey | Spatiotemporal | Bootstrapped |



# SEO Yelloweye Models
## CVs for REMA model

| Model | Biomass Index | IPHC Index | |
|---|---|---|---|
| | | Standardization | CV Method |
| 22.2 | ADF&G ROV Survey | GAM | GAM-derived |
| 26.0 | ADF&G ROV Survey | Spatiotemporal | Spatiotemporal model-derived |
| 26.1 | ADF&G ROV Survey | Spatiotemporal | Bootstrapped |

- Model 26.0
  - From sdmTMB predictions
  - Averaged across each management unit
  - $SE_{d,y} = \frac{SD_{d,y}}{\sqrt{n_{d,y}}}$
  - $CV_{d,y} = \frac{SE_{d,y}}{\mu_{d,y}}$



# SEO Yelloweye Models
## CVs for REMA model

| | | IPHC Index | |
|---|---|---|---|
| Model | Biomass Index | Standardization | CV Method |
| 22.2 | ADF&G ROV Survey | GAM | GAM-derived |
| 26.0 | ADF&G ROV Survey | Spatiotemporal | Spatiotemporal model-derived |
| 26.1 | ADF&G ROV Survey | Spatiotemporal | Bootstrapped |

- Model 26.0
  - From sdmTMB predictions
  - Averaged across each management unit
  - $SE_{d,y} = \frac{SD_{d,y}}{\sqrt{n_{d,y}}}$
  - $CV_{d,y} = \frac{SE_{d,y}}{\mu_{d,y}}$
- Model 26.1
  - Resamples observed station-level IPHC CPUE (hook-adjusted kg/hook), not model predictions
  - Fewer stations means a larger CV, so the CVs respond to reduced IPHC effort
  - No usable bootstrap
    - (EYKT 2024–2025, NSEO 2025): CV = 2 × the largest bootstrap CV for that management unit

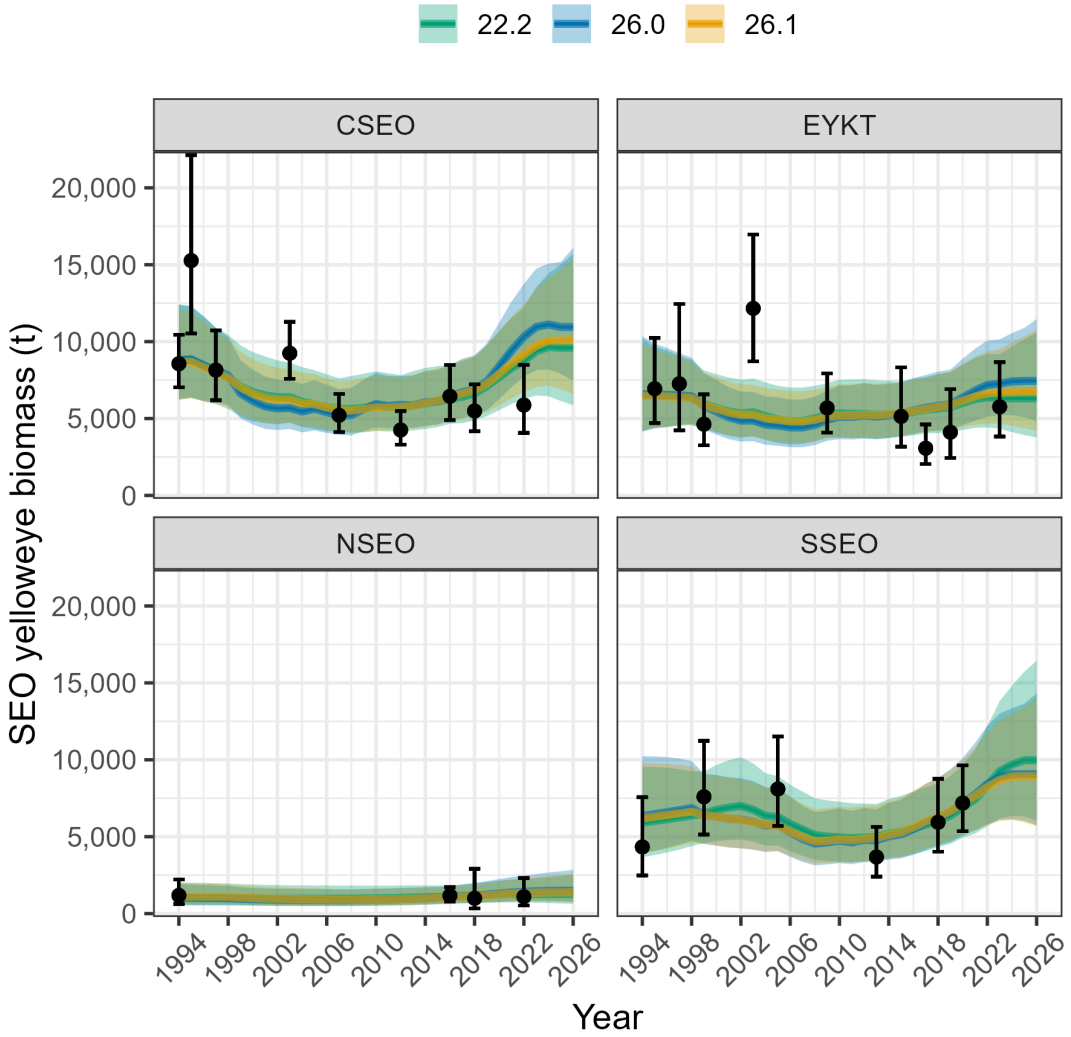
**CV = SD(bootstrap means) / mean(bootstrap means)**

1,000 replicates per management unit and year; each replicate draws n stations with replacement, where n is the number sampled

# SEO Yelloweye Models
## REMA fit ROV biomass survey

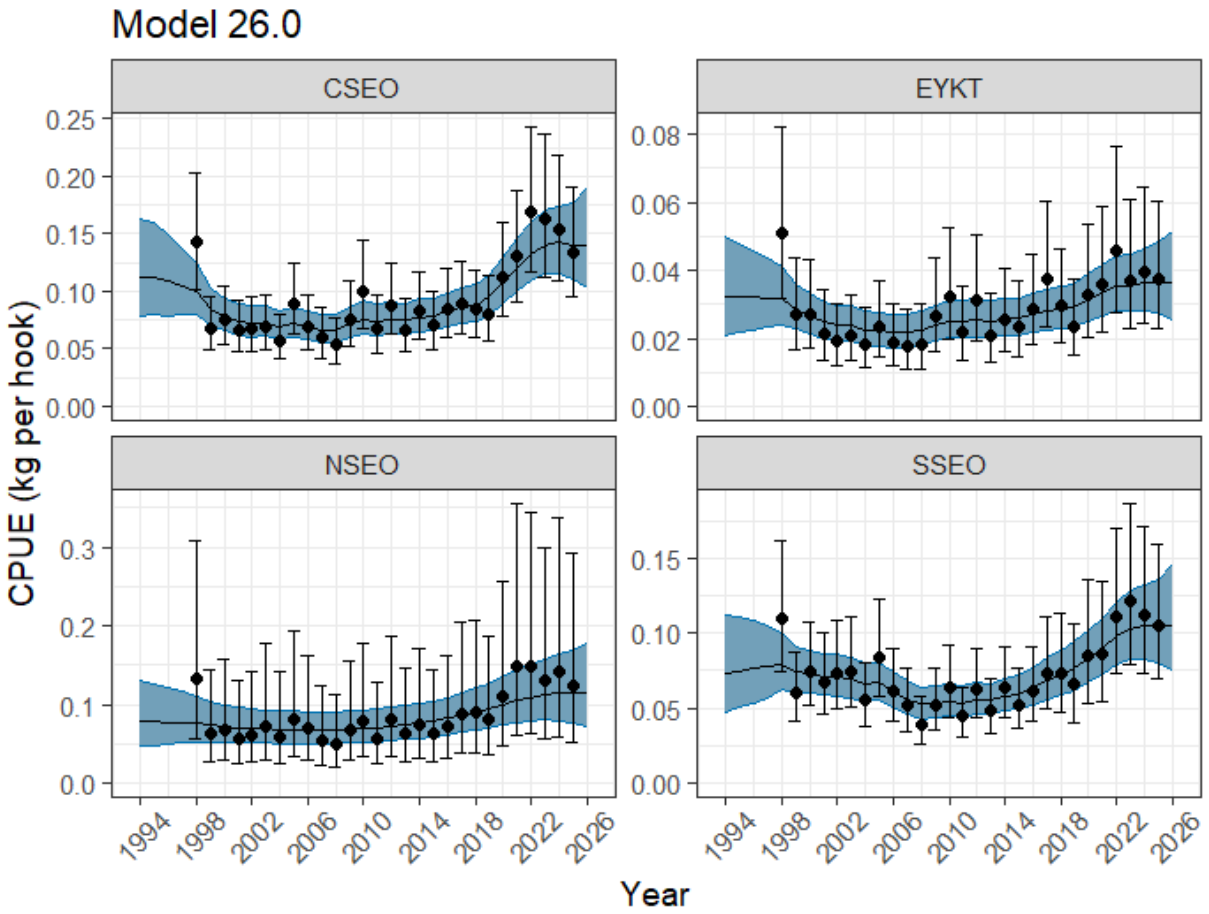
- 26.1 fits closer to ROV biomass survey
  - Less weight on IPHC index
  - Similar fit to base model

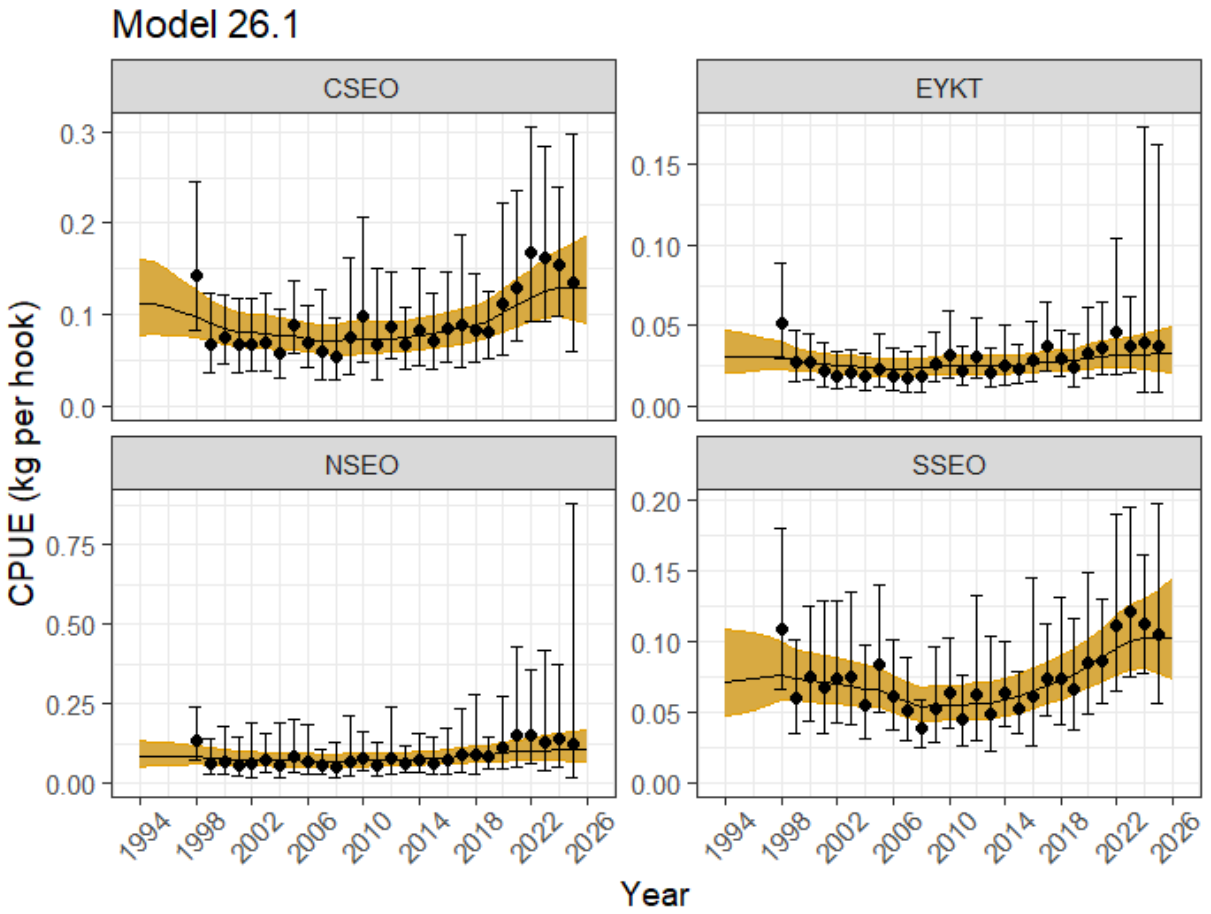
| | | IPHC Index | |
|---|---|---|---|
| Model | Biomass Index | Standardization | CV Method |
| 22.2 | ADF&G ROV Survey | GAM | GAM-derived |
| 26.0 | ADF&G ROV Survey | Spatiotemporal | Spatiotemporal model-derived |
| 26.1 | ADF&G ROV Survey | Spatiotemporal | Bootstrapped |



# SEO Yelloweye Models
## REMA fit to IPHC Indices

| | | IPHC Index | |
|---|---|---|---|
| Model | Biomass Index | Standardization | CV Method |
| 22.2 | ADF&G ROV Survey | GAM | GAM-derived |
| 26.0 | ADF&G ROV Survey | Spatiotemporal | Spatiotemporal model-derived |
| 26.1 | ADF&G ROV Survey | Spatiotemporal | Bootstrapped |

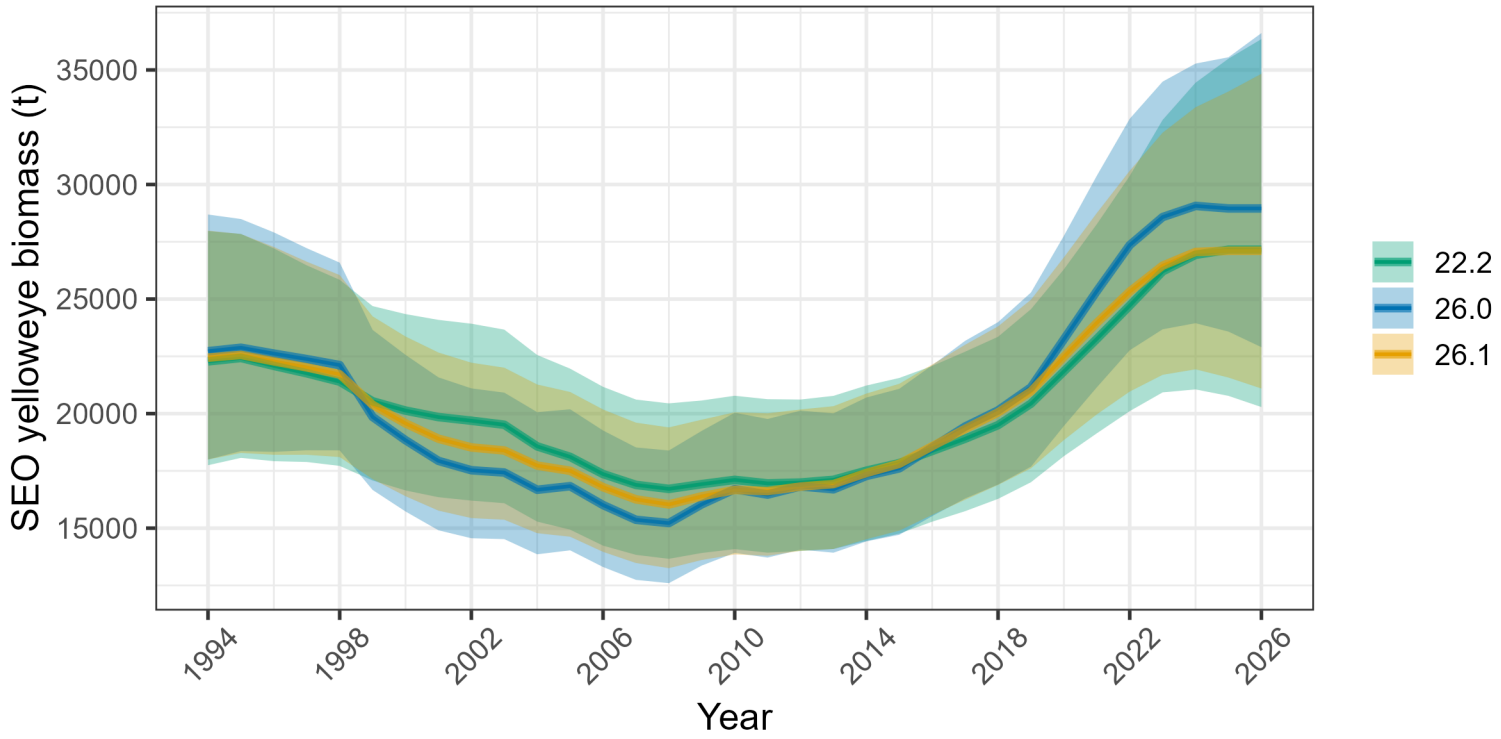


# SEO Yelloweye Models
## REMA total biomass estimates

| | | IPHC Index | |
|---|---|---|---|
| Model | Biomass Index | Standardization | CV Method |
| 22.2 | ADF&G ROV Survey | GAM | GAM-derived |
| 26.0 | ADF&G ROV Survey | Spatiotemporal | Spatiotemporal model-derived |
| 26.1 | ADF&G ROV Survey | Spatiotemporal | Bootstrapped |

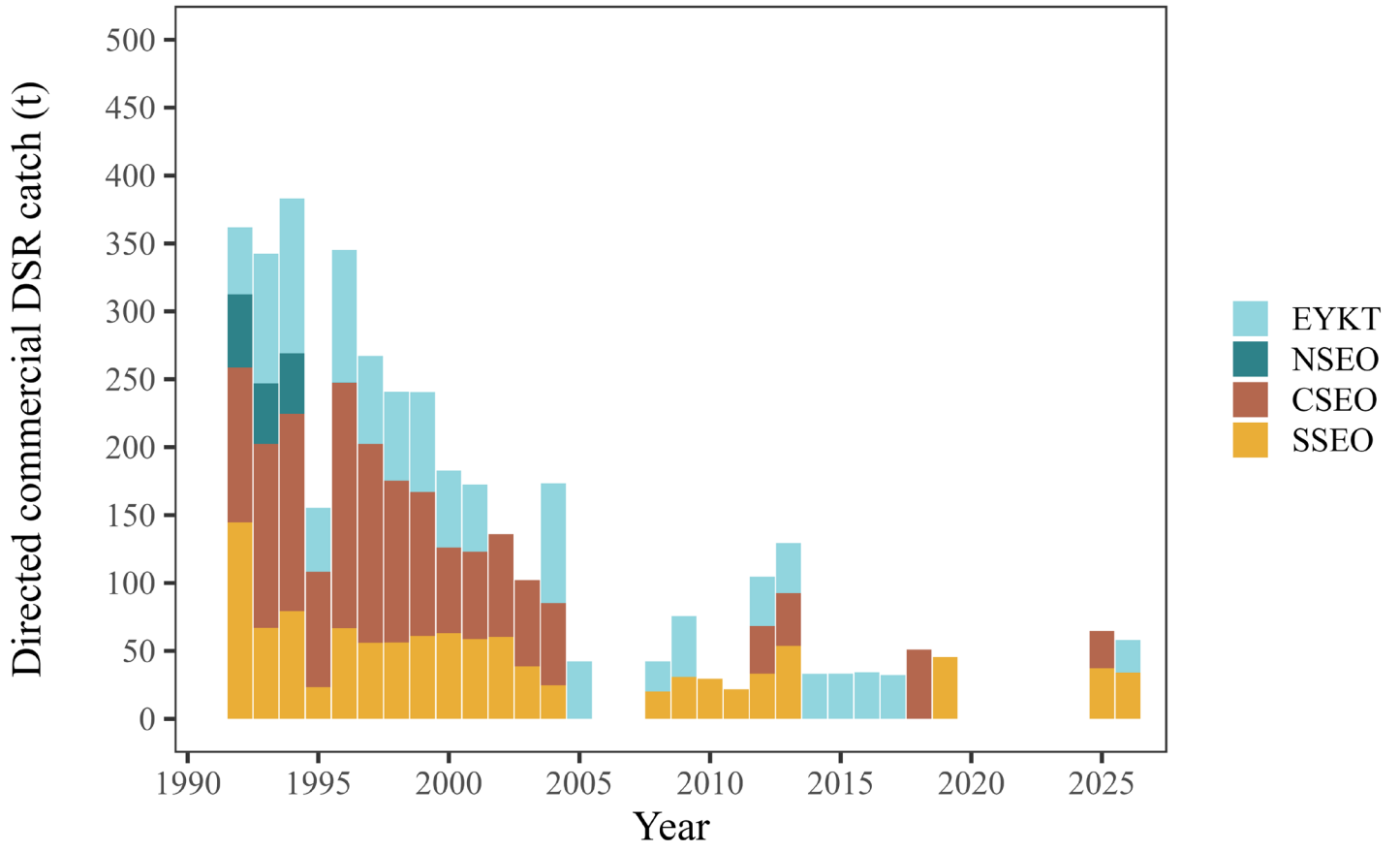
| Model | Biomass | Lwr 95% | Upr 95% | OFL | Max ABC |
|---|---|---|---|---|---|
| 22.2 (Base Model) | 27,154 | 20,287 | 36,346 | 543 | 407 |
| 26.0 | 28,955 | 22,902 | 36,608 | 579 | 434 |
| 26.1 (Author Recommended) | 27,108 | 21,096 | 34,832 | 542 | 407 |



# GOA DSR Catch

- Directed fishery
  - Occurs in January
  - Open 2025 and 2026
  - SSEO & CSEO in 2025
  - SSEI & EYKT in 2026
  - 65 t in 2025
  - 58 t in 2026
  - 98% Yelloweye in 2025-2026

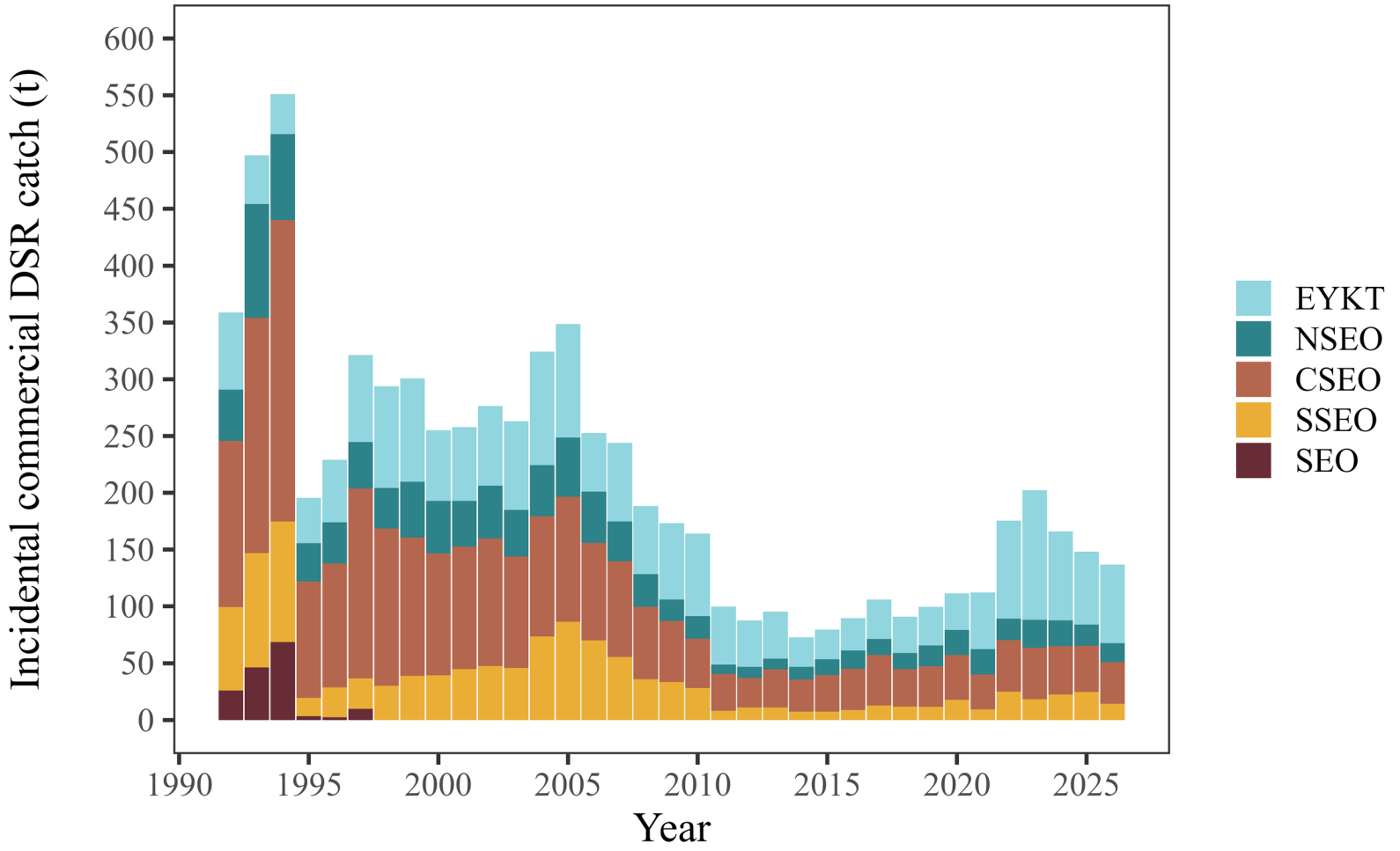
| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|
| Copper rockfish | 0.13 | 0.09 | 0.06 | 0.09 | 0.18 | 0.07 | 0.01 | 0.07 | 0.05 | 0.03 |
| Yelloweye rockfish | 133.59 | 135.01 | 137.84 | 106.27 | 107.40 | 167.62 | 196.58 | 159.72 | 207.89 | 190.33 |
| Canary rockfish | 0.82 | 2.94 | 1.12 | 0.69 | 0.68 | 0.54 | 0.32 | 0.73 | 0.64 | 0.44 |
| Quillback rockfish | 3.05 | 3.40 | 5.76 | 3.86 | 3.21 | 5.38 | 4.57 | 5.06 | 3.97 | 3.60 |
| Tiger rockfish | 0.22 | 0.22 | 0.14 | 0.12 | 0.50 | 0.29 | 0.17 | 0.14 | 0.23 | 0.50 |
| China rockfish | 0.05 | 0.06 | 0.08 | 0.15 | 0.04 | 0.09 | 0.40 | 0.05 | 0.03 | 0.03 |
| Rosethorn rockfish | 0.28 | 0.17 | 0.07 | 0.20 | 0.09 | 1.50 | 0.16 | 0.14 | 0.07 | 0.04 |
| Total | 138.14 | 141.88 | 145.07 | 111.38 | 112.11 | 175.49 | 202.22 | 165.90 | 212.89 | 194.97 |
| Proportion yelloweye | 0.97 | 0.95 | 0.95 | 0.95 | 0.96 | 0.96 | 0.97 | 0.96 | 0.98 | 0.98 |



# GOA DSR Catch



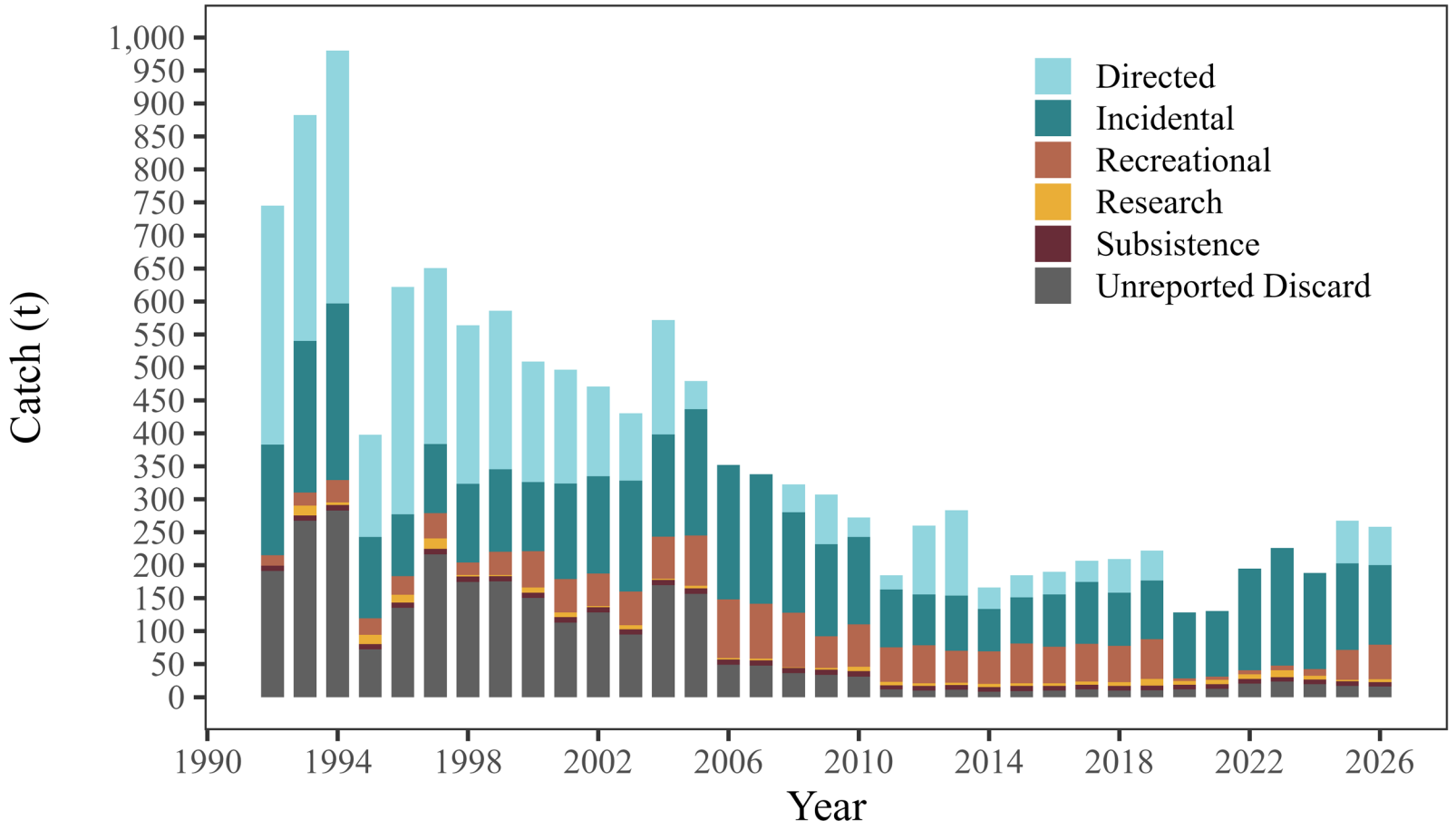
- Directed fishery
  - Occurs in January
  - Open 2025 and 2026
  - SSEO & CSEO in 2025
  - SSEI & EYKT in 2026
  - 65 t in 2025
  - 58 t in 2026
  - 98% Yelloweye in 2025-2026
- Incidental catch
  - Mostly from halibut fishery
  - 148 t in 2025
  - 137 t in 2026



# GOA DSR Catch



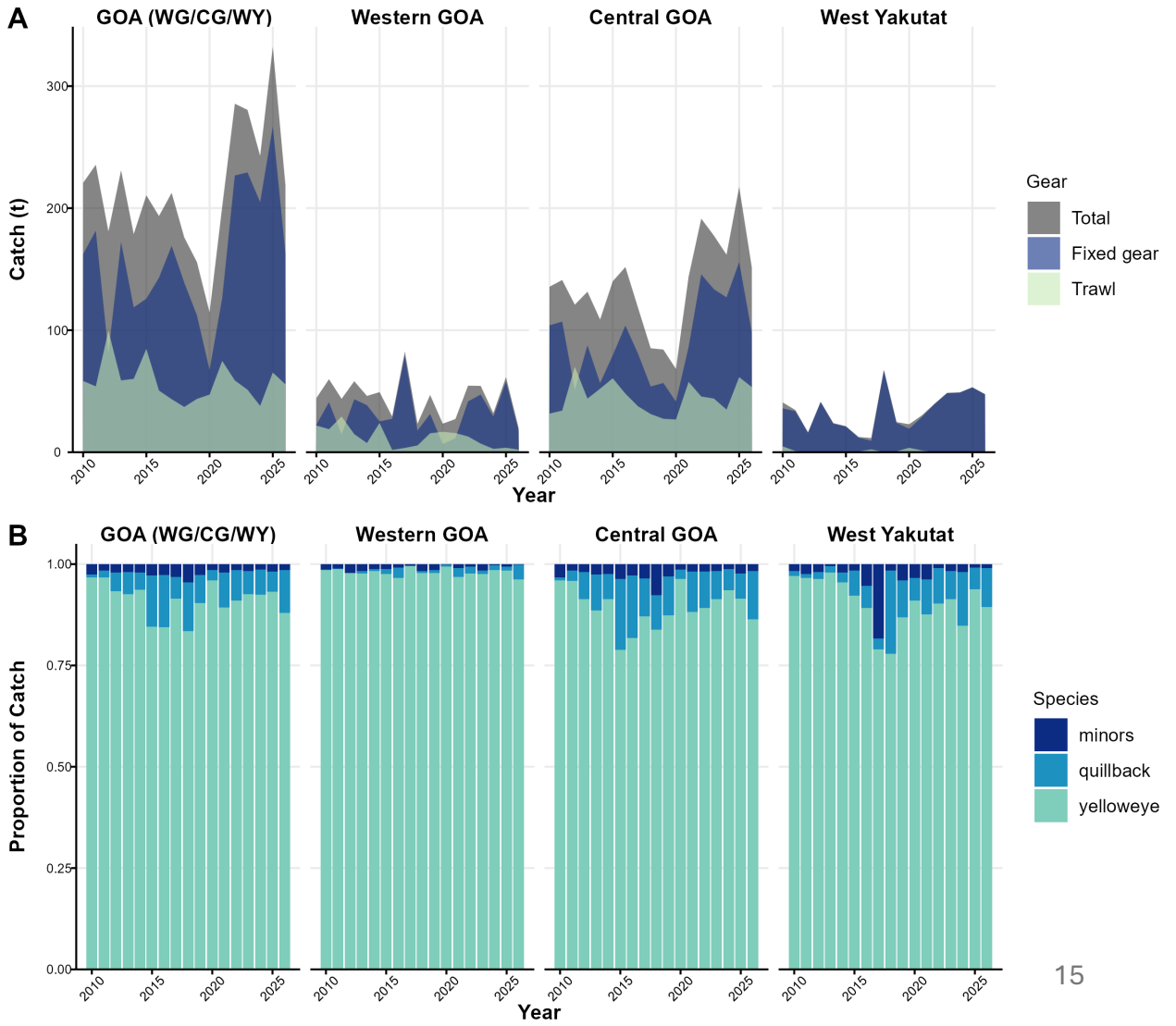
- Directed fishery
  - Occurs in January
  - Open 2025 and 2026
  - SSEO & CSEO in 2025
  - SSEI & EYKT in 2026
  - 65 t in 2025
  - 58 t in 2026
  - 98% Yelloweye in 2025-2026
- Incidental catch
  - Mostly from halibut fishery
  - 148 t in 2025
  - 137 t in 2026
- Recreational catch
  - 45 t in 2025 (89% yelloweye)
  - 52 t (estimated) in 2026
  - Includes discard mortality
  - Avg. ~72% yelloweye



# DSR Catch WG/CG/WY



- No directed fishery
- Bycatch in trawl and fixed gear fisheries
- Total 2025 catch
  - 332 t
  - Largest catch since 1991
- Total 2026 catch through Oct 16
  - 219 t

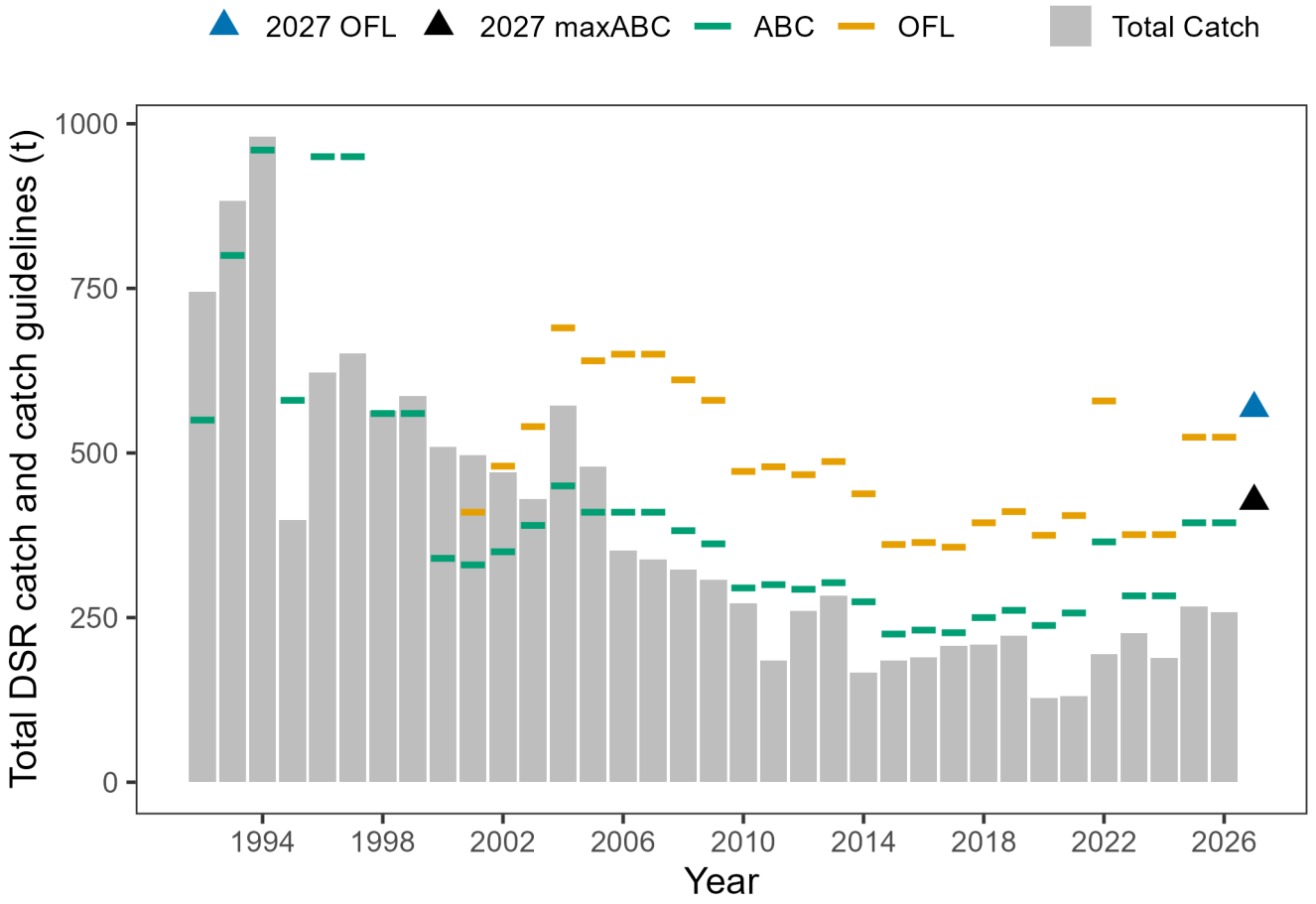


# GOA DSR Status Determination

- SEO DSR
  - 2025/2026 ABC = 394 t
  - No overfishing in 2025
  - Well below ABC in 2026
- SEO Yelloweye
  - 2025/2026 ABC = 374 t
  - No overfishing in 2025

Summary for the DSR complex in Southeast Outside.

| Species | Year | Biomass | OFL | ABC | TAC | Commercial catch | Recreational mortality | Subsistence catch | Total catch |
|---|---|---|---|---|---|---|---|---|---|
| DSR | 2025 | 24,912 | 524 | 394 | 394 | 215 | 45 | 7 | 267 |
| | 2026 | 24,912 | 524 | 394 | 394 | 199 | 52 | 7 | 258 |
| | 2027 | 27,108 | 568 | 427 | - | - | - | - | - |
| | 2028 | 27,108 | 568 | 427 | - | - | - | - | - |



# GOA DSR Status Determination

Summary for the DSR complex in Southeast Outside.

| Species | Year | Biomass | OFL | ABC | TAC | Commercial catch | Recreational mortality | Subsistence catch | Total catch |
|---|---|---|---|---|---|---|---|---|---|
| DSR | 2025 | 24,912 | 524 | 394 | 394 | 215 | 45 | 7 | 267 |
| | 2026 | 24,912 | 524 | 394 | 394 | 199 | 52 | 7 | 258 |
| | 2027 | 27,108 | 568 | 427 | - | - | - | - | - |
| | 2028 | 27,108 | 568 | 427 | - | - | - | - | - |

- SEO DSR
  - 2025/2026 ABC = 394 t
  - No overfishing in 2025
  - Well below ABC in 2026
- SEO Yelloweye
  - 2025/2026 ABC = 374 t
  - No overfishing in 2025
- WG/CG/WY DSR
  - 2025 ABC=TAC (271 t) was exceeded
  - No overfishing in 2025
  - OFL was not exceeded (361 t)
  - 2025 catch = 332.1 t
  - 2026 catch through Oct 16 = 219 t

| Year | WG | CG | WY | GOA | ABC= TAC | OFL |
|---|---|---|---|---|---|---|
| 2024 | 31.99 | 161.82 | 49.05 | 242.86 | | |
| 2025 | 61.54 | 217.34 | 53.21 | 332.09 | 271 | 361 |
| 2026 | 19.81 | 151.33 | 47.60 | 218.75 | 271 | 361 |

# 2027 GOA DSR Harvest Specifications

- SEO yelloweye
  - We recommend model 26.1
  - OFL = 542 t
  - ABC = 407 t
- SEO DSR
  - OFL = 568 t
  - ABC = 427 t

Summary for all SEO DSR species:

| | As estimated or *specified in **2024*** for: | | As estimated or *recommended this* year for: | |
|---|---|---|---|---|
| **Quantity** | 2025 | 2026 | 2027 | 2028 |
| $M$ (natural mortality rate) | 0.02 | 0.02 | 0.02 | 0.02 |
| Tier | 5/6 | 5/6 | 5/6 | 5/6 |
| Yelloweye biomass (t) | 24,912 | 24,912 | 27,108 | 27,108 |
| OFL (t) | 524 | 524 | **568** | **568** |
| maxABC (t) | 394 | 394 | 427 | 427 |
| ABC (t) | 394 | 394 | **427** | **427** |
| | As determined *last* year for: | | As determined *this* year for: | |
| **Status** | 2024 | 2025 | 2025 | 2026 |
| Overfishing | No | n/a | No | n/a |

Summary for SEO yelloweye rockfish only:

| | As estimated or *specified in **2024*** for: | | As estimated or *recommended this* year for: | |
|---|---|---|---|---|
| **Quantity** | 2025 | 2026 | 2027 | 2028 |
| $M$ (natural mortality rate) | 0.02 | 0.02 | 0.02 | 0.02 |
| Tier | 5 | 5 | 5 | 5 |
| Yelloweye biomass (t) | 24,912 | 24,912 | 27,108 | 27,108 |
| $F_{OFL}$ | $F = M = 0.02$ | $F = M = 0.02$ | $F = M = 0.02$ | $F = M = 0.02$ |
| $maxF_{ABC}$ | $0.75M = 0.015$ | $0.75M = 0.015$ | $0.75M = 0.015$ | $0.75M = 0.015$ |
| $F_{ABC}$ | 0.015 | 0.015 | 0.015 | 0.015 |
| OFL (t) | 498 | 498 | **542** | **542** |
| maxABC (t) | 374 | 374 | 407 | 407 |
| ABC (t) | 374 | 374 | **407** | **407** |
| | As determined *last* year for: | | As determined *this* year for: | |
| **Status** | 2024 | 2025 | 2025 | 2026 |
| Overfishing | No | n/a | No | n/a |

# 2027 GOA DSR Harvest Specifications

- SEO yelloweye
  - We recommend model 26.1
  - OFL = 542 t
  - ABC = 407 t
- SEO DSR
  - OFL = 568 t
  - ABC = 427 t
- WG/CG/WY
  - OFL = 361 t
  - ABC = 271 t

| | As estimated or *specified in **2024*** for: | | As estimated or *recommended this* year for: | |
|---|---|---|---|---|
| **Quantity** | 2025 | 2026 | 2027 | 2028 |
| Tier | 6 | 6 | 6 | 6 |
| OFL (t) | 361 | 361 | **361** | **361** |
| maxABC (t) | 271 | 271 | 271 | 271 |
| ABC (t) | 271 | 271 | **271** | **271** |
| | As determined *last* year for: | | As determined *this* year for: | |
| **Status** | 2024 | 2025 | 2025 | 2026 |
| Overfishing | n/a | n/a | No | n/a |

# 2027 SEO Yelloweye Risk Table

| Assessment-related considerations | Population dynamics considerations | Environmental/ ecosystem Considerations | Fishery performance Considerations |
|---|---|---|---|
| **Level 2**: Increased Concern | **Level 1**: Normal | **Level 1**: Normal | **Level 1**: Normal |

- Assessment considerations (Level 2)
  - No new ROV biomass survey since 2023
  - Reduced IPHC surveys in SEO
  - Less-than desirable fits to the CSEO and EYKT (last two surveys)
  - Spatiotemporal index and boot strap CV help alleviate some of these concerns in the short term
- Population dynamics (Level 1)
  - Recent increase has leveled off
  - At a timeseries high in biomass estimates
  - Still no evidence of older fish, not a new concern
- Environmental (Level 1)
- Fishery considerations (Level 1)
  - Managed to a level below TAC in 2025 and well below in 2026
  - Directed fishery is managed conservatively, only opening 2 management units per year.
  - Declining bycatch as halibut catch declines
- **We do not recommend an additional buffer**

# Supplementary Slides

# REMA parameter estimates

| Model | Parameter | Estimate | SE | LCI | UCI |
|---|---|---|---|---|---|
| 22.2 | Process error | 0.104645 | 0.025654 | 0.064721 | 0.169197 |
| | CSEO scaling parameter | 0.000018 | 0.000002 | 0.000014 | 0.000024 |
| | EYKT scaling parameter | 0.000005 | 0.000001 | 0.000004 | 0.000006 |
| | NSEO scaling parameter | 0.000074 | 0.000022 | 0.000041 | 0.000134 |
| | SSEO scaling parameter | 0.000015 | 0.000002 | 0.000011 | 0.000020 |
| | Extra ADFG survey observation error | 0.154364 | 0.059267 | 0.072733 | 0.327613 |
| 26.0 | Process error | 0.103914 | 0.017905 | 0.074132 | 0.145662 |
| | CSEO scaling parameter | 0.000013 | 0.000002 | 0.000010 | 0.000016 |
| | EYKT scaling parameter | 0.000005 | 0.000001 | 0.000004 | 0.000006 |
| | NSEO scaling parameter | 0.000077 | 0.000021 | 0.000045 | 0.000130 |
| | SSEO scaling parameter | 0.000012 | 0.000002 | 0.000008 | 0.000016 |
| | Extra ADFG survey observation error | 0.186947 | 0.058100 | 0.101667 | 0.343760 |
| 26.1 | Process error | 0.094881 | 0.019725 | 0.063128 | 0.142606 |
| | CSEO scaling parameter | 0.000013 | 0.000002 | 0.000010 | 0.000016 |
| | EYKT scaling parameter | 0.000005 | 0.000001 | 0.000004 | 0.000006 |
| | NSEO scaling parameter | 0.000076 | 0.000020 | 0.000046 | 0.000126 |
| | SSEO scaling parameter | 0.000012 | 0.000002 | 0.000008 | 0.000016 |
| | Extra ADFG survey observation error | 0.162007 | 0.056654 | 0.081633 | 0.321515 |