# How do carryover and payback provisions impact stock status and rebuilding timelines?

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# Council Request to SEFSC

Provide recommendations on the **percentage of unharvested quota that can be carried over and percentage of overharvested quota that must be repaid** to avoid negatively impacting stock status and rebuilding plans for red snapper, greater amberjack, and king mackerel.

- **Goal**: Demonstrate that 1:1 carryover and payback provisions can be applied without negative consequences.
- **Assume**: Underages and overages between ±50% across all directed fleets.

# Methods

- Used base projection models (SS3) from SEDAR 33 update, SEDAR 38, and SEDAR 52.
  - Maintained all projection assumptions with no update to input data.
    - Utilized 49 : 51 commercial : recreational allocation for red snapper.
    - Bycatch rates fixed at values for red snapper.
    - Utilized 27 : 73 commercial : recreational allocation greater amberjack.

# Methods

- Conducted twelve projection scenarios for each example species:
  - 2 - Base scenarios.
  - 3 - fixed single year overage scenarios.
  - 2 - 10 year randomized over/underage sequences beginning with an overage.
  - 3 - fixed single year underage scenarios.
  - 2 - 10 year randomized over/underage sequences beginning with an underage.

# Methods

- Base projections (1-2):

  Base 1: Landings fixed at OFL projected levels.

  Base 2: Landings fixed at ABC projected levels.

# Methods

- Single year perturbation projections (3-8):
  a) 2019 landings were increased/decreased by 10%, 25%, or 50% for all directed fleets.
  b) 2020 landings were decreased/increased by fleet-specific 2019 overage/underage.
  c) 2021-2030 landings were held at the ABC projected weight/numbers for each fleet.

# Methods

- 10 year repeated perturbation projections (9-12):
  a) 2019 landings were changed by ±50%.
  b) 2020-2028 landings were modified by a random change between ±50% and the carryover/payback from the previous year.
  c) 2029 landing were modified by the fleet-specific 2028 underage/overage
  d) 2030 landings were fixed at ABC.

# Results – Landings/ABC

## Red snapper

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.10 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 1.07 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 1.05 | 1.50 | 1.50 | 1.50 | 1.25 | 1.10 | 1.00 | 0.90 | 0.75 | 0.50 | 0.50 | 0.50 |
| 2020 | 1.04 | 0.62 | 0.70 | 0.45 | 0.72 | 0.89 | 1.00 | 1.11 | 1.28 | 1.56 | 1.74 | 1.82 |
| 2021 | 1.03 | 0.46 | 0.48 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.46 | 0.48 |
| 2022 | 1.02 | 1.54 | 0.82 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.55 | 0.82 |
| 2023 | 1.02 | 1.31 | 1.84 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 1.84 |
| 2024 | 1.02 | 0.12 | 0.22 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.12 | 0.22 |
| 2025 | 1.03 | 1.35 | 1.87 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.34 | 1.86 |
| 2026 | 1.03 | 1.23 | 0.64 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.23 | 0.64 |
| 2027 | 1.03 | 0.37 | 0.74 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.37 | 0.74 |
| 2028 | 1.02 | 1.32 | 0.78 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 0.78 |
| 2029 | 1.02 | 1.14 | 1.37 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.14 | 1.37 |
| 2030 | 1.02 | 1.01 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

- Landings perturbations much greater than OFL-ABC buffer.
- Over a multi-year period landings track ABC.
- Slight deviations <1% due to allocations by number in recreational fleets.

## Greater amberjack

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 1.28 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 1.25 | 1.49 | 1.49 | 1.49 | 1.24 | 1.09 | 1.00 | 0.89 | 0.75 | 0.50 | 0.50 | 0.50 |
| 2020 | 1.21 | 0.75 | 0.83 | 0.57 | 0.78 | 0.91 | 1.00 | 1.08 | 1.21 | 1.42 | 1.60 | 1.68 |
| 2021 | 1.18 | 0.49 | 0.53 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.49 | 0.53 |
| 2022 | 1.15 | 1.51 | 0.80 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.51 | 0.80 |
| 2023 | 1.13 | 1.33 | 1.81 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 1.33 | 1.81 |
| 2024 | 1.12 | 0.15 | 0.25 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 0.15 | 0.25 |
| 2025 | 1.11 | 1.34 | 1.86 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 1.34 | 1.86 |
| 2026 | 1.10 | 1.23 | 0.66 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 1.23 | 0.66 |
| 2027 | 1.10 | 0.38 | 0.75 | 1.00 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 0.38 | 0.75 |
| 2028 | 1.09 | 1.31 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 0.79 |
| 2029 | 1.09 | 1.14 | 1.37 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.14 | 1.37 |
| 2030 | 1.09 | 1.00 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 |

## King mackerel

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 1.04 | 1.50 | 1.50 | 1.50 | 1.25 | 1.10 | 1.00 | 0.90 | 0.75 | 0.50 | 0.50 | 0.50 |
| 2020 | 1.04 | 0.67 | 0.75 | 0.49 | 0.75 | 0.90 | 1.00 | 1.10 | 1.25 | 1.51 | 1.69 | 1.77 |
| 2021 | 1.04 | 0.47 | 0.49 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.47 | 0.50 |
| 2022 | 1.04 | 1.54 | 0.81 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.54 | 0.82 |
| 2023 | 1.04 | 1.31 | 1.83 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 1.83 |
| 2024 | 1.04 | 0.12 | 0.22 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.12 | 0.22 |
| 2025 | 1.04 | 1.35 | 1.87 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.35 | 1.86 |
| 2026 | 1.04 | 1.23 | 0.64 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.23 | 0.64 |
| 2027 | 1.04 | 0.37 | 0.74 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.37 | 0.74 |
| 2028 | 1.04 | 1.31 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 0.78 |
| 2029 | 1.04 | 1.14 | 1.37 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.14 | 1.37 |
| 2030 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Results – SSB/ABC

## Red snapper

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2020 | 0.97 | 0.95 | 0.95 | 0.95 | 0.98 | 0.99 | 1.00 | 1.01 | 1.02 | 1.05 | 1.05 | 1.05 |
| 2021 | 0.97 | 0.98 | 0.97 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.99 | 0.98 |
| 2022 | 0.96 | 1.02 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.03 | 1.02 |
| 2023 | 0.96 | 0.99 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.04 |
| 2024 | 0.96 | 0.96 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.98 |
| 2025 | 0.96 | 1.02 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02 | 1.03 |
| 2026 | 0.95 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 |
| 2027 | 0.95 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 |
| 2028 | 0.95 | 1.03 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.03 | 1.00 |
| 2029 | 0.95 | 1.02 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.02 |
| 2030 | 0.95 | 1.01 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

- SSB deviated minimally from ABC even under large ±50% overages/underages.
- Carryover/payback at 1:1 returned stock to within 1% of ABC in the following years.
- Slight deviations <1% due to allocations by number in recreational fleets.

## Greater amberjack

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2020 | 0.95 | 0.90 | 0.90 | 0.90 | 0.95 | 0.98 | 1.00 | 1.02 | 1.05 | 1.10 | 1.10 | 1.10 |
| 2021 | 0.94 | 0.96 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.97 | 0.95 |
| 2022 | 0.93 | 1.08 | 1.05 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.08 | 1.05 |
| 2023 | 0.91 | 0.97 | 1.10 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.96 | 1.10 |
| 2024 | 0.90 | 0.89 | 0.92 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 0.92 |
| 2025 | 0.88 | 1.07 | 1.07 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.08 | 1.08 |
| 2026 | 0.86 | 1.01 | 0.89 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.90 |
| 2027 | 0.85 | 0.96 | 0.96 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.96 | 0.97 |
| 2028 | 0.84 | 1.09 | 1.02 | 0.99 | 0.99 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.09 | 1.03 |
| 2029 | 0.83 | 1.02 | 1.07 | 0.99 | 0.99 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 | 1.03 | 1.08 |
| 2030 | 0.82 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 |

## King mackerel

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2020 | 0.97 | 0.92 | 0.92 | 0.92 | 0.96 | 0.98 | 1.00 | 1.02 | 1.04 | 1.08 | 1.08 | 1.08 |
| 2021 | 0.96 | 0.97 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.96 |
| 2022 | 0.96 | 1.06 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.05 | 1.03 |
| 2023 | 0.95 | 0.98 | 1.08 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.97 | 1.07 |
| 2024 | 0.95 | 0.93 | 0.95 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.91 | 0.93 |
| 2025 | 0.94 | 1.07 | 1.07 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.05 | 1.05 |
| 2026 | 0.94 | 1.02 | 0.93 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 0.92 |
| 2027 | 0.94 | 0.98 | 0.98 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.97 | 0.97 |
| 2028 | 0.94 | 1.08 | 1.03 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.07 | 1.02 |
| 2029 | 0.93 | 1.03 | 1.06 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02 | 1.05 |
| 2030 | 0.93 | 1.00 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Conclusions

- Both carryover and payback provisions at 1:1 ratios are expected to maintain stock long term stock status at ABC projected levels.
- No negative impact on SSB or rebuilding timelines is expected from carryover or payback up to ±50% ABC.
- The small buffers between ABC and OFL means no substantial carryover is possible.
- Calculation of OFL levels as a multi-year total would allow large carryovers to be implemented and maintain sustainability. However, this is currently forbidden under NS1 guidelines.
- Results suggest that these large carryovers do meet SSB and rebuilding targets.

# Important Assumptions/Caveats

- Results are hypothetical and are **not meant as the basis for management advice**
- Results are expected to hold for underages and overages up to ±50%.
- Results only hold if carryover is applied to the fleet for which the underage occurred
  - Differing selectivities by fleet imply that **carryovers/paybacks are non-transferable across fleets**

# Additional Request – Overage without payback Methods

- 4 simulations of a single year overage in 2019 relative to ABC of 1%, 10%, 25%, 50%.
- No payback was applied.
- Catch was applied at ABC levels in subsequent years from 2020-2039.

| | SSB | Time to Rebuild |
|---|---|---|
| ABC > CATCH > ACL | Increasing faster than ABC projections | Decreasing faster than ABC |
| OFL > CATCH > ABC | Increasing slower than ABC projections | Decreasing slower than ABC |
| CATCH > OFL | Increasing much slower than ABC or Decreasing | Increasing, will not achieve rebuild |

# Additional Request – Overage without payback Results

- SSB declined relative to expected ABC levels under all scenarios.
- Decline in spawning stock biomass was sustained for 10-20 years following the single overage.
- Rebuilding was delayed between 1 year (1% overage) and 6 years (50% overage).

| | ABC | 1% Overage | 10% Overage | 25% Overage | 50% Overage |
|---|---|---|---|---|---|
| $SSB/SSB_{ABC}$ 10 year average | 1 | 0.999 | 0.989 | 0.972 | 0.945 |
| Additional years to rebuild | 0 | 1 | 2 | 3 | 6 |

# Additional Request – Overage without payback Conclusions

- Even a single small overage can have long term impacts if not paid back.
- Large delays in rebuilding were seen even for a single substantial overage.
- Repeated overages can be expected to have close to cumulative effects.
- If overages are continually not paid back it can not be expected that red snapper stocks will rebuild in a reasonable timeframe.

# Results – Landings/ABC – Red snapper

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.10 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 1.07 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 1.05 | 1.50 | 1.50 | 1.50 | 1.25 | 1.10 | 1.00 | 0.90 | 0.75 | 0.50 | 0.50 | 0.50 |
| 2020 | 1.04 | 0.62 | 0.70 | 0.45 | 0.72 | 0.89 | 1.00 | 1.11 | 1.28 | 1.56 | 1.74 | 1.82 |
| 2021 | 1.03 | 0.46 | 0.48 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.46 | 0.48 |
| 2022 | 1.02 | 1.54 | 0.82 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.55 | 0.82 |
| 2023 | 1.02 | 1.31 | 1.84 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 1.84 |
| 2024 | 1.02 | 0.12 | 0.22 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.12 | 0.22 |
| 2025 | 1.03 | 1.35 | 1.87 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.34 | 1.86 |
| 2026 | 1.03 | 1.23 | 0.64 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.23 | 0.64 |
| 2027 | 1.03 | 0.37 | 0.74 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.37 | 0.74 |
| 2028 | 1.02 | 1.32 | 0.78 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 0.78 |
| 2029 | 1.02 | 1.14 | 1.37 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.14 | 1.37 |
| 2030 | 1.02 | 1.01 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Results – Landings/ABC – Greater amberjack

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.30 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 1.28 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 1.25 | 1.49 | 1.49 | 1.49 | 1.24 | 1.09 | 1.00 | 0.89 | 0.75 | 0.50 | 0.50 | 0.50 |
| 2020 | 1.21 | 0.75 | 0.83 | 0.57 | 0.78 | 0.91 | 1.00 | 1.08 | 1.21 | 1.42 | 1.60 | 1.68 |
| 2021 | 1.18 | 0.49 | 0.53 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.49 | 0.53 |
| 2022 | 1.15 | 1.51 | 0.80 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.51 | 0.80 |
| 2023 | 1.13 | 1.33 | 1.81 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 1.33 | 1.81 |
| 2024 | 1.12 | 0.15 | 0.25 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 0.15 | 0.25 |
| 2025 | 1.11 | 1.34 | 1.86 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 1.34 | 1.86 |
| 2026 | 1.10 | 1.23 | 0.66 | 1.01 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 1.23 | 0.66 |
| 2027 | 1.10 | 0.38 | 0.75 | 1.00 | 1.01 | 1.01 | 1.00 | 1.01 | 1.01 | 1.01 | 0.38 | 0.75 |
| 2028 | 1.09 | 1.31 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 0.79 |
| 2029 | 1.09 | 1.14 | 1.37 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.14 | 1.37 |
| 2030 | 1.09 | 1.00 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 |

# Results – Landings/ABC – King mackerel

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 1.04 | 1.50 | 1.50 | 1.50 | 1.25 | 1.10 | 1.00 | 0.90 | 0.75 | 0.50 | 0.50 | 0.50 |
| 2020 | 1.04 | 0.67 | 0.75 | 0.49 | 0.75 | 0.90 | 1.00 | 1.10 | 1.25 | 1.51 | 1.69 | 1.77 |
| 2021 | 1.04 | 0.47 | 0.49 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.47 | 0.50 |
| 2022 | 1.04 | 1.54 | 0.81 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.54 | 0.82 |
| 2023 | 1.04 | 1.31 | 1.83 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 1.83 |
| 2024 | 1.04 | 0.12 | 0.22 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.12 | 0.22 |
| 2025 | 1.04 | 1.35 | 1.87 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.35 | 1.86 |
| 2026 | 1.04 | 1.23 | 0.64 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.23 | 0.64 |
| 2027 | 1.04 | 0.37 | 0.74 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.37 | 0.74 |
| 2028 | 1.04 | 1.31 | 0.79 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.31 | 0.78 |
| 2029 | 1.04 | 1.14 | 1.37 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.14 | 1.37 |
| 2030 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Results – SSB/ABC – Red snapper

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2020 | 0.97 | 0.95 | 0.95 | 0.95 | 0.98 | 0.99 | 1.00 | 1.01 | 1.02 | 1.05 | 1.05 | 1.05 |
| 2021 | 0.97 | 0.98 | 0.97 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.99 | 0.98 |
| 2022 | 0.96 | 1.02 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.03 | 1.02 |
| 2023 | 0.96 | 0.99 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.04 |
| 2024 | 0.96 | 0.96 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.98 |
| 2025 | 0.96 | 1.02 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02 | 1.03 |
| 2026 | 0.95 | 1.00 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 |
| 2027 | 0.95 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.99 |
| 2028 | 0.95 | 1.03 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.03 | 1.00 |
| 2029 | 0.95 | 1.02 | 1.03 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 1.02 |
| 2030 | 0.95 | 1.01 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

# Results – SSB/ABC – Greater amberjack

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2020 | 0.95 | 0.90 | 0.90 | 0.90 | 0.95 | 0.98 | 1.00 | 1.02 | 1.05 | 1.10 | 1.10 | 1.10 |
| 2021 | 0.94 | 0.96 | 0.94 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.97 | 0.95 |
| 2022 | 0.93 | 1.08 | 1.05 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.08 | 1.05 |
| 2023 | 0.91 | 0.97 | 1.10 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.96 | 1.10 |
| 2024 | 0.90 | 0.89 | 0.92 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.89 | 0.92 |
| 2025 | 0.88 | 1.07 | 1.07 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.08 | 1.08 |
| 2026 | 0.86 | 1.01 | 0.89 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.01 | 0.90 |
| 2027 | 0.85 | 0.96 | 0.96 | 0.99 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.96 | 0.97 |
| 2028 | 0.84 | 1.09 | 1.02 | 0.99 | 0.99 | 0.99 | 1.00 | 0.99 | 1.00 | 1.00 | 1.09 | 1.03 |
| 2029 | 0.83 | 1.02 | 1.07 | 0.99 | 0.99 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 | 1.03 | 1.08 |
| 2030 | 0.82 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 | 1.00 | 0.99 | 0.99 | 0.99 | 0.99 | 1.00 |

# Results – SSB/ABC – King mackerel

| Year | OFL | Overage Random 1 | Overage Random 2 | 50% Overage | 25% Overage | 10% Overage | ABC | 10% Underage | 25% Underage | 50% Underage | Underage Random 1 | Underage Random 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2017 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2018 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2019 | 0.97 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2020 | 0.97 | 0.92 | 0.92 | 0.92 | 0.96 | 0.98 | 1.00 | 1.02 | 1.04 | 1.08 | 1.08 | 1.08 |
| 2021 | 0.96 | 0.97 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.97 | 0.96 |
| 2022 | 0.96 | 1.06 | 1.04 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.05 | 1.03 |
| 2023 | 0.95 | 0.98 | 1.08 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.97 | 1.07 |
| 2024 | 0.95 | 0.93 | 0.95 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.91 | 0.93 |
| 2025 | 0.94 | 1.07 | 1.07 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.05 | 1.05 |
| 2026 | 0.94 | 1.02 | 0.93 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 0.92 |
| 2027 | 0.94 | 0.98 | 0.98 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 0.97 | 0.97 |
| 2028 | 0.94 | 1.08 | 1.03 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.99 | 1.07 | 1.02 |
| 2029 | 0.93 | 1.03 | 1.06 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02 | 1.05 |
| 2030 | 0.93 | 1.00 | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |