# CANARY ROCKFISH - 2023

A coastwide canary rockfish assessment (a population model that uses information to create a population estimate) was completed in 2023, updating population status and overfishing limits from the 2015 assessment. The new assessment includes updated data from California, Oregon, and Washington and has been simplified compared to the previous assessment.

The 2023 assessment estimates canary rockfish population recovery is slower than was estimated in 2015, but similar to assessments prior to 2015. The current relative population level is slightly lower (35 percent of unfished levels) than the 2015 assessment (55 percent). **This puts canary rockfish in the precautionary zone that warrants reductions in catch until the population is fully recovered.**

What data were used?

The 2023 canary rockfish assessment uses a wide range of data from both fisheries monitoring and independent surveys. These include:

- historical and modern catch data (shown right, separated by fleet and state).

- length and age data from several fisheries and coastwide NOAA fishery-independent surveys.

- three indices of abundance from fishery-independent surveys over time.
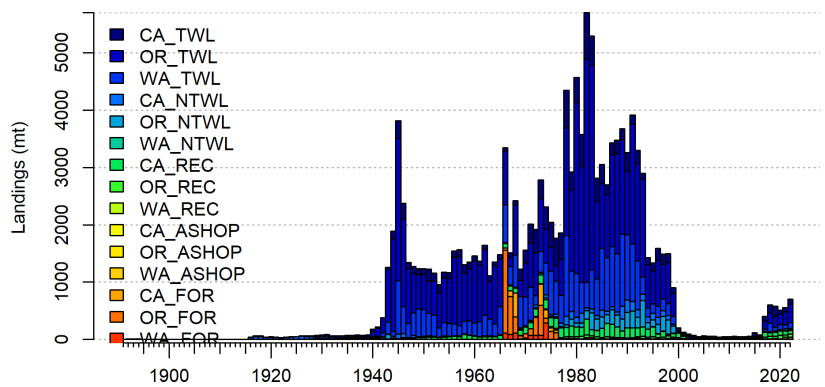
Fisheries included two commercial fleets, trawl and non-trawl and a recreational fleet for each state (WA, OR, CA). Updated biological relationships for maturity and fecundity (fertility) were also used.

What was the review process for the assessment?

The review process for federal assessments is extensive and provides several opportunities for public comment during development. Several public workshops discussing data and preliminary models were also conducted.

The primary review is a STAR (Stock Assessment Review) panel with independent experts and members of the Scientific and Statistical Committee (SSC) for the Pacific Fisheries Management Council (PFMC). STAR panels are a week-long, intensive, and detailed review where the assessment team and panelists come to an agreement on the best model.

During the STAR panel, many changes to the assessment model were explored but ultimately, only minor changes were recommended to the original model. Finally, the assessment was reviewed by the SSC and approved by the PFMC at the September 2023 meeting.

KEY TAKEAWAY

By including updated data sources and a simplified modeling approach, the new 2023 stock assessment is an improvement in many ways and more consistent with earlier assessments.

What are the key differences between the 2023 assessment and the 2015 assessment?

The new assessment differs from the previous in several ways. The most significant change is the new model estimates separate natural mortality values for males and females, whereas the 2015 assessment estimated a separate natural mortality only for older females. In that assessment, female natural mortality was increased for older fish to account for a lack of older females in the data.

However, the 2023 assessment chose a simplified approach that used a single value for natural mortality for females that was slightly higher than males to account for this phenomenon. This is also consistent with the approach used for the 2023 Oregon black rockfish assessment.

The 2023 assessment also simplifies the approach for estimating incoming recruitment by estimating recruitment coastwide instead of by individual state. Selectivity curves are now separated by males and females and by state in the new model, giving a more accurate picture of how fisheries remove fish from the population. Data were updated through 2022, including catch, biological data and survey indices of abundance. Finally, the method for weighting data from different sources was updated to the current standard practices.

Why did the size of the population change?

The primary changes to the new assessment that impact scale of the population are the change in how natural mortality was estimated and the new approach to weighting the multitude of data from different sources.

Natural mortality was a source of major uncertainty in both the current and previous canary rockfish assessments. Both canary and black rockfish data show a persistent lack of older females in fishery and survey data. Prior to the 2023 assessment, state and federal agency experts agreed the most likely explanation was that females were dying at a faster rate than the males. Estimating natural
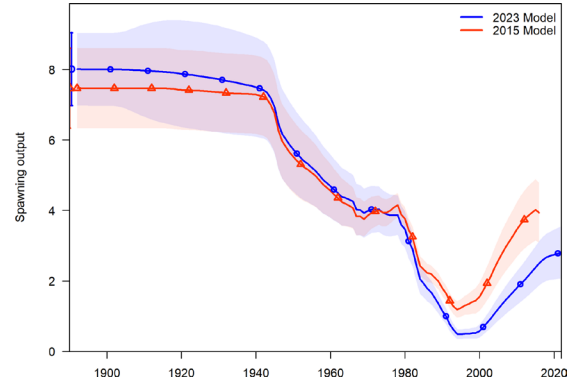
mortality for males and females separately, with the female estimate constrained to a higher value, addresses this biological aspect of the canary rockfish population more accurately than the previous assessment.

Finally, the procedures for weighing different data sources are updated and standardized across assessments since the 2015 canary rockfish assessment. Multiple data weighting methods are always evaluated to assess the differences among the methods. The choice of data weighting method can impact the scale of the population.

Next Steps: Harvest specifications

The PFMC approved the 2023 assessment to set harvest specifications at the September 2023 meeting. During the winter and spring of 2023/2024, the PFMC will evaluate alternative catch limits to achieve the target stock size for canary rockfish. A new rebuilding plan is not necessary as the stock is above the overfished level, but catch reductions will be necessary in the short-term to allow the stock to increase to the target level.

KEY TAKEAWAY

This assessment represents the best available science at this time. The canary rockfish stock is rebuilding but at a slower rate than the last assessment showed. Catches may need to decrease temporarily to allow the stock to fully recover.