GROUNDFISH ADVISORY SUBPANEL REPORT ON
ADOPTION OF STOCK ASSESSMENTS

Mr. John DeVore, Pacific Fishery Management Council staff, briefed the Groundfish Advisory Subpanel (GAP) on the adoption of stock assessments to be used to inform management in 2023 and beyond. The GAP offers the following comments and recommendations on stock assessment adoption.

**Full Assessments**

Dover sole

Dover sole was last assessed in 2011 and was at the end of its 10-year projections. The new benchmark assessment estimates the stock is in good shape with a depletion of 79 percent, consistent with the 2011 review. The GAP supports the Scientific and Statistical Committee (SSC) recommendation to endorse the 2021 Dover sole assessment to inform management for 2023 and beyond.

Spiny Dogfish

The GAP recommends that further work on the spiny dogfish assessment is warranted and that the stock be added to the "mop-up" Stock Assessment Review (STAR) panel this fall because there is a critical need to further investigate the West Coast Groundfish Bottom Trawl Survey (WCBTS) catchability coefficient (q) assumed in the assessment. Figure 129 (the likelihood profile over survey q) in the spiny dogfish assessment shows the plausible range of q values is broader than those used as high and low states of nature in the decision table, with a much broader range of low q values within the range of statistical significance (i.e., 2 negative log-likelihoods). The GAP requests the Stock Assessment Team conduct the additional analyses similar to that detailed by the SSC in their G.5 report:

> "An analysis of the seasonality of bycatch rates of spiny dogfish from WCGOP and other available data sources (e.g., ASHOP, Pikitch et al. (1988) bycatch study) should be conducted to evaluate whether the data indicate a strong seasonal availability of spiny dogfish as bycatch to fisheries. This could be done by using month as a factor in a General Linear Model (GLM) of bycatch rates (there would have to be some consideration of the appropriate targeting fishing strategies to include, and how to account for spatial patterns). The idea would be to use this information to develop a weakly informative "upper bound" prior for catchability based on the ratio of bycatch rates during the months which the survey takes place to the months in which spiny dogfish are likely to be more abundant but no survey effort is conducted (e.g., late fall and winter months). Ideally, this would include both a spatial and a temporal component, for example it might be instructive to conduct a VAST analysis of bycatch rates in the winter, relative to the summer, to better understand seasonal availability or shifts in the centroid of abundance (e.g., mean latitude of catch). Alternatively, this

analysis could be conducted by state or region, as a strong southward shift in distribution could result in only modest changes in relative abundance off of Washington state, but a greater increase in bycatch rates off of Oregon and/or Northern California. The results of this work could be used to develop a weakly informative prior for q (representing an upper bounds of plausible q values) to better inform the model (for a comparable example of a weakly informed boundary prior, see He et al. 2006)."

The SSC provides a succinct rationale for conducting these additional analyses noting the "spatial patterns suggested in the WCBTS indicate that the greatest abundance [of spiny dogfish] is found off Washington during the summer but [fishery] catch and bycatch rates may be significantly greater during the winter, particularly in other areas of the coast, as a result of seasonal distribution behavior. This pattern is suggested by landings data but would be more appropriately evaluated from catch rates from bycatch data."

These additional analyses are critical to inform management of spiny dogfish. The major axis of uncertainty in the current assessment is the WCBTS q, which was fixed at 0.586 in the base model, meaning, the model assumes the survey covers 58.6 percent of the dogfish population. This parameter is highly influential on the scale and depletion in the assessment. Again, as stated by the SSC, "[t]he uncertainty in q is problematic since it affects the estimates of key parameters including natural mortality (M) and growth, creating tension in the model between these variables. There is a tradeoff between M and q, and the model fit improved when M was lower and q was higher." Finally, the SSC noted several "considerations [that] provide an indication that a q value lower than 0.586 may be more realistic:"

1. "seasonal migrations (of up to 600 km) during the summer relative to the timing of the WCBTS that operated from April through October that likely affects availability,
2. "potential net avoidance given strong swimming abilities,
3. "the distribution of a portion of the stock shoreward of the WCBTS area, and
4. "availability to the net itself given their semi-pelagic habits."

To reduce uncertainty associated with many of the above components, it is likely that directed research studies to collect necessary data would be needed and collaboration with the Canadian government on transboundary fishery-independent and -dependent data collection. However, the SSC's recommended analysis, aimed at evaluating the first point, seasonal availability of dogfish, relies on existing data that could be brought into the model in time for the Mop-up STAR panel.

In addition to our concerns about the WCBTS q value and need for further analysis of this parameter, the GAP is also alarmed by the radical change in life history parameters estimated by the current model, specifically "steepness." As stated by the SSC, "[t]he estimate of steepness for spiny dogfish is among the lowest value for any marine organism," which suggests a spawning potential ratio (SPR) of 90 percent should be used rather than the current SPR 50 percent harvest policy, and the SSC concludes "the SPR proxy is significantly higher than the SPR estimated to correspond to MSY and the stock is predicted to collapse if it is fished at an SPR of 50 percent." In contrast, the GAP stresses that under the current harvest policy the spiny dogfish stock has remained relatively stable over the past 20 years (Stock Assessment, Figure

ES-4), and is further projected to remain stable, as shown in the decision table (ES-7). The current harvest control rule adequately reduces the fishing mortality rate, which is further reduced by a large buffer applied under a p* value of 0.4, sustaining the population.

If the current assessment were to be used to manage Pacific coast fisheries in 2023 and 2024, without changing the current harvest policy, annual catch limits (ACLs) would be 1,001 mt and 970 mt in 2023 and 2024, respectively.  These ACLs are significantly lower than the 2021 ACL (1,621) and will constrain Council-managed fisheries, which have recently caught 1,908 mt and 1,610 mt in 2018 and 2019, respectively.  For example, if current off-the-top deductions for spiny dogfish are representative of 2023-2024 values, the approximately 1,000 mt ACLs would be reduced by 340 mt, leaving about 660 mt to manage groundfish trawl, fixed gear, and recreational fisheries.  It is clear the Council, National Marine Fisheries Service, and the fishing industry would face a major management problem.  Moreover, if the vastly lower productivity life history characteristics estimated in the model were used to change the harvest control rule for Council-managed fisheries, ACLs would be about 300 mt (Stock Assessment Table ES-4).  Under this scenario, every groundfish fishery on the Pacific coast (including tribal and non-tribal) would likely be constrained out of existence.

It is because of the above technical deficiencies in the current assessment and the subsequent management problems that would occur if this assessment were used for management in 2023 and 2024 that lead the GAP to conclude that further work is warranted. The necessary fishery bycatch data are available and could be analyzed to potentially address some of the uncertainty in the highly influential catchability coefficient. Therefore, the GAP recommends that the Council not adopt the spiny dogfish stock assessment at this time, and add the stock to the Mop-up STAR Panel because additional analyses recommended by the SSC are critically needed.

**Update Assessments**

Sablefish

This was the first update of the 2019 benchmark assessment. This 2021 update assessment confirms past estimates of good recent recruitment in the 2019 assessment and the current depletion is estimated to be 58 percent. The GAP found it interesting the update model estimates the sablefish stock has never dipped below the management target of 40 percent of unfished biomass and the stock may be more productive than indicated in past assessments.

The GAP supports the SSC recommendation to endorse the 2021 update assessment to inform management for 2023 and beyond.

**Data-moderate Assessments (using catch and length data)**

Copper Rockfish

Copper rockfish is one of the more important nearshore rockfish species economically for the non-trawl fisheries in Oregon and California. They are a major component of the nearshore rockfish catch in southern California and are caught in both the nearshore and shelf rockfish

fisheries. Landings have been increasing in the south in recent years. Reports from industry have indicated strong recent recruitment for copper rockfish. The GAP notes several areas – the rockfish conservation area, cowcod conservation areas, Channel Islands Marine Sanctuary, for example – contain significant areas of copper rockfish habitat. Some of these areas have been closed for more than 20 years.

California copper rockfish, south of Point Conception

The GAP is disappointed with the assessment estimate of current depletion at 18 percent, which is below the minimum stock size threshold. The GAP agrees with the SSC recommendation to do a full stock assessment as soon as possible. The GAP believes there are inconsistencies in the model data trends suggesting recent declines in copper populations. This is inconsistent with population trends we have observed in many other stocks that have been assessed in the California Bight in recent years, such as cowcod, bocaccio, chilipepper rockfish and even blackgill rockfish. Therefore, the GAP believes incorporation of age data and fishery-dependent indices in a full assessment is warranted given the serious fishery impacts that may ensue under a rebuilding plan.

California copper rockfish, north of Point Conception

The GAP believes the northern California copper rockfish stock should be included in a full benchmark assessment for all of California as soon as possible. Fishery-dependent indices of abundance are available for use in a full assessment that could not be used in the data-moderate assessment.

Copper rockfish off the coast of Oregon

The GAP supports the SSC recommendation to endorse the Oregon data-moderate assessment to inform management in 2023 and beyond.

Copper rockfish off the coast of Washington

The GAP supports the SSC recommendation to endorse the Washington data-moderate assessment to inform management in 2023 and beyond.

Quillback rockfish for California coastal waters

There was great uncertainty with the assumed growth and mortality parameters in the California model. There are additional data available that could inform a full assessment and were not usable in a data-moderate assessment due to Terms of Reference. The GAP is disappointed with the assessment result for California quillback rockfish indicating stock depletion at 14 percent, which is below the minimum stock size threshold. The GAP recommends a full assessment as soon as possible. Similar to copper rockfish, closed areas in California contain quillback rockfish habitat, and those populations likely are not captured in current stock assessments.

Furthermore, commercial fishermen noted roughly half the landings in the deeper nearshore

consist of copper and quillback rockfish, most of which go to the live fish fishery. This appears to contrast with the assumptions made in the assessment. The GAP suggests the full assessment include catch-per-unit-effort indices. Quillback also comprise much of the recreational sector's bag limits as well, particularly in Northern California.

Quillback rockfish for Oregon coastal waters

The GAP supports the SSC recommendation to endorse the Oregon data-moderate assessment to inform management in 2023 and beyond. The GAP also supports the SSC recommendation that the next assessment be a full assessment.

Quillback rockfish for Washington coastal waters

The GAP supports the SSC recommendation to endorse the Washington data-moderate assessment to inform management in 2023 and beyond. The GAP also supports the SSC recommendation that the next assessment be a full assessment.

Squarespot rockfish off California

The GAP supports the SSC recommendation to endorse the California data-moderate assessment. This is the first time this species has been assessed. It is a species incidentally caught in California nearshore fisheries and is not often targeted due to its small size.

PFMC
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