

## STOCK ASSESSMENTS FOR 2007-2008 GROUND FISH FISHERIES

The Scientific and Statistical Committee (SSC) evaluated ten stock assessments at the June meeting which had been reviewed during three Stock Assessment Review Panel (STAR) meetings in April and May 2005. Draft SSC statements on these species are organized below by STAR Panel and were drafted following the June SSC meeting. Therefore, these statements have not yet received a final review by the full SSC. The SSC is scheduled to review and possibly revise these statements at the September meeting. Additional notes and technical recommendations of the SSC can be found in the draft June SSC meeting minutes (Ancillary D).

### **April 18-22 STAR Panel, Seattle, Washington - English Sole, Petrale Sole, Starry Flounder**

#### English Sole

The SSC reviewed the assessment and Stock Assessment and Review (STAR) Panel reports for English sole (*Parophrys vetulus*). The stock of English sole off the U.S. West Coast had not previously been assessed on a coastwide basis; the most recent previous assessment, completed in 1993, was restricted to the stock off Oregon and Washington. The new assessment reconstructed the catch history back to the late 1800s, the assumed start of fishing. For the analysis the stock was divided into southern and northern fisheries and surveys, with detailed length and age composition data available primarily for the northern fishery. The only observations of trends in relative biomass were from the National Marine Fisheries Service (NMFS) triennial shelf bottom trawl survey, which has indicated very large increases during the past decade in the biomass of English sole in both the southern and northern areas. The assessment concludes that the current spawning stock biomass of English sole is very large relative to the unexploited level (91.5% at the start of 2005) and that current exploitation is very low. The SSC found this to be a very thorough assessment and endorses the English sole stock assessment as providing the best available science and can form the basis for Council decision-making.

#### Starry Flounder

The SSC reviewed the assessment and STAR Panel reports for starry flounder (*Platichthys stellatus*). This is the first assessment of starry flounder off the U.S. West Coast. It is based on the assumption of separate biological populations north and south of Pt Conception, CA and uses data on catches, indices of relative abundance based on trawl logbook data, and an index of age-1 abundance from trawl surveys in the San Francisco Bay and Sacramento-San Joaquin River estuary. Unlike most other groundfish stock assessments, no age- or length-composition data are directly used in the assessment. Both the northern and southern populations are estimated to be likely above the target level of  $B_{40\%}$ , although the status of this data-poor species remains fairly uncertain compared to that of many other groundfish species. The SSC endorses the STAR Panel conclusion that this assessment represents the best available science and that it can form the basis for Council decision-making.

## Petrale Sole

The SSC reviewed the preliminary STAR Panel reports for Petrale sole (*Eopsetta jordani*). The petrale sole STAT team decided to treat the population off the U.S. West Coast as separate northern and southern stocks. The assessment for the southern stock (occupying the Eureka, Monterey, and Conception INPFC regions) was reviewed during the April STAR Panel meeting and subsequently completed and accepted by the STAR Panel. The assessment for the northern stock, however, was withdrawn from the April STAR Panel review because age-composition data for recent years, which might strongly influence the assessment's estimate of current stock status, arrived during the STAR Panel review. The assessment for the northern stock will be reviewed during the mop-up STAR Panel in late September.

At the time of the April STAR Panel the northern and southern petrale assessments used essentially the same model structure and the decision was taken to review the two assessments as a combined assessment and the two STAR Panel reports as a combined report, with the SSC review occurring at the November Council meeting. The STAT team, however, has decided that the structure of the northern assessment is likely to be revised and to differ substantively from the southern assessment.

The SSC recommends that the assessment document for the southern stock petrale sole be reviewed by the SSC at the September Council meeting and that the final STAR report, which will not be completed until after the September mop-up STAR, should have two sections, the results of the April panel for the south and the results of the mop-up panel for the north.

## **May 9-13, 2005 STAR Panel, Long Beach, California - Cowcod, Gopher Rockfish, Vermilion Rockfish, and California Scorpionfish**

### Gopher rockfish

The SSC reviewed the assessment and STAR Panel report for gopher rockfish (*Sebastes carnatus*). This is the initial assessment of gopher rockfish. Though the distribution of gopher rockfish extends south into Southern California Bight, the assessment is restricted to the stock north of Pt. Conception. The assessment is based on landings and length composition data from commercial and recreational fisheries (primarily hook and line gear), and an index of relative abundance (catch per unit effort) from the commercial passenger fishing vessel (CPFV) Sportfish Survey database. These data sources were used to estimate population trends from 1965 to 2004. There are no fishery-independent indices of stock biomass for gopher rockfish. Assessment results indicate an upward trend in gopher rockfish biomass since the 1980s and estimates of 2005 stock abundance ranged between 60% and 110% of unfished. Recent exploitation rates are estimated to have been well below the  $F_{MSY}$  proxy for rockfish. The SSC endorses the STAR Panel conclusions that this assessment represents the best available science and that it can form the basis for Council decision making.

### Vermilion rockfish

The SSC reviewed the assessment and STAR Panel report for vermilion rockfish (*Sebastes miniatus*). This is the initial assessment of vermilion rockfish. The assessment is restricted to the stock in California waters. Separate assessment models were developed for the stock north and south of Pt. Conception. Recent genetic research suggests that vermilion rockfish is actually two species, however nothing is known about biological differences between the two species, or their

relative abundance. The assessment uses data on recreational and commercial catches, length-frequency data, and indices of relative abundance derived from CPFV and RecFin CPUE data. There are no fishery-independent indices of stock biomass for vermilion rockfish. Biomass estimates for most model configurations show an upward trend since about 1990, and recent exploitation rates are estimated to be near the  $F_{MSY}$  proxy for rockfish. However, fishing mortalities may have exceeded the  $F_{MSY}$  proxy for rockfish historically, and vermilion rockfish may have dropped temporarily below the overfished threshold prior to the recent increase. For the northern component, estimates of 2005 biomass ranged between 41% and 89% of unfished biomass, while for the southern component, the range was between 30% and 88% of unfished biomass.

The STAR Panel concluded the vermilion assessment is on the threshold of acceptability, and noted that model results show a very broad range of current stock sizes. The STAR Panel also concluded the stock does not currently appear to be overfished and overfishing is not occurring. The SSC does not fully concur with the STAR Panel conclusions. The SSC notes the available data indicate the stock was overfished in the past, and a few recent outliers appear to drive the recent upward trend in abundance. The assessment model produced divergent results and exhibited extreme sensitivity to what should be innocuous changes in data or assumptions. Vermilion rockfish is currently in a group of rockfish that are subject to precautionary management. Given concerns about assessment reliability, the SSC questions whether moving vermilion rockfish out of this precautionary group and basing management on this stock assessment can be justified. SSC considers the assessment to be best available science, but at this stage does not endorse the results as being suitable for setting OYs.

### Cowcod

The SSC reviewed the assessment and STAR Panel report for cowcod (*Sebastes levis*). The first assessment of cowcod, in 1999, led to the stock being declared overfished and the establishment of a rebuilding plan. Like the previous assessment, this assessment is restricted to the stock south of Pt. Conception, although the distribution of cowcod extends further north. The assessment is based on catch data from commercial and recreational fisheries, an index of relative abundance (catch per unit effort) derived from commercial passenger fishing vessel (CPFV) data from 1963-2000, and a single visual transect survey conducted by submersible in the Cowcod Conservation Area (CCA) in 2002. Although assessment results suggest that cowcod are not as depleted as was estimated in the initial assessment, they are still overfished by Council criteria. Estimates of stock depletion in 2005 ranged from 14 to 21% depending on a plausible range of assumptions for the stock-recruit relationship. Rebuilding measures appear to have been successful in reducing cowcod exploitation rates to negligible levels. The SSC endorses the STAR Panel conclusions that this assessment represents the best available science and that it can form the basis for Council decision making.

### California scorpionfish

California scorpionfish (*Scorpaena guttata*) is related taxonomically to rockfish, but exhibits different behavior and biology. Unlike rockfish, scorpionfish form dense spawning aggregations and releases eggs rather than larvae. Although the species ranges south into Mexican waters, the assessment evaluates stock status in US waters south of Pt. Conception. This is the first stock assessment of California scorpionfish. The assessment is based on landings and length composition data from commercial and recreational fisheries and an index of relative abundance

(catch per unit effort) derived from commercial passenger fishing vessel (CPFV) logbook data from 1980-1999. A fishery-independent index of abundance was obtained by combining trawl surveys by sanitation districts in southern California. Assessment results indicate an upward trend in California scorpionfish biomass since the 1970s. Estimates of 2005 stock abundance ranged between 60% and 80% of unfished stock size. Estimates of historical exploitation rates are uncertain, but apparently were significantly higher than the Council's FMSY proxy of  $F_{50\%}$  for most of the last three decades. The current high abundance of scorpionfish is most likely the result of favorable environmental conditions. The SSC endorses the STAR Panel conclusions that this assessment represents the best available science and that it can form the basis for Council decision making.

## **May 16-20, 2005 STAR Panel, Seattle, Washington – Pacific Ocean Perch, Darkblotched Rockfish, Cabezon**

### Darkblotched Rockfish

The SSC reviewed the assessment and STAR Panel report for darkblotched rockfish (*Sebastes crameri*), which was assessed as a single stock ranging from California to the Canadian border. The last full stock assessment occurred in 2000 and estimated spawning biomass to be 22% of the unfished level. It was subsequently declared overfished in January 2001 and a rebuilding plan was implemented, based on results from an updated assessment conducted in 2001. The assessment model was again updated in 2003 using recent data. Notably, both updated stock assessments resulted in depletion estimates considerably lower than the original assessment. The 2005 analysis was a full assessment and incorporated a number of significant changes to the model, including: (1) use of Stock Synthesis II, (2) starting the model in 1928 vs. 1963, (3) estimating growth parameters within the model, (4) estimation of discard rates and retention curves within the model, (5) eliminating all age composition data except for shelf trawl survey ages read in 2004, and (6) use of delta-GLM estimates of abundance from the AFSC slope survey. Model estimates of abundance are influenced primarily by three fishery-independent surveys, i.e., the AFSC triennial shelf and slope trawl surveys and the NWFSC combined trawl survey. Results of the assessment indicate that spawning output has more than doubled since 1999 (i.e., 8% to 17% of the unfished level) and that rebuilding is occurring due to strong 1999 and 2000 year-classes. Moreover, recent exploitation rates have been quite low (2-3%). The SSC endorses the STAR Panel conclusion that this assessment represents the best available science and that it can form the basis for Council decision-making.

### Pacific Ocean Perch (POP)

The SSC reviewed the updated assessment and STAR Panel report pertaining to the stock of Pacific ocean perch (POP, *Sebastes alutus*) residing in the combined US Vancouver-Columbia INPFC areas. Historically POP catches were characterized by removals in excess of 5,000 mt-yr<sup>-1</sup> from 1962-68, largely due to extensive foreign fishing. In 1981 the Council adopted a 20-yr plan to rebuild what was considered a depleted resource, representing the first attempt at stock rebuilding by the PFMC. POP was declared overfished in 2001 and a rebuilding plan was officially adopted as Amendment 16-2 to the Groundfish FMP. The 2005 assessment is an update of the stock assessment model prepared in 2003. Consequently the model code is unchanged but data time series were extended to include: (1) catches through 2004, (2) fishery size compositions for 2003 and 2004, (3) NWFSC slope survey biomass estimates through 2004, (4) NWFSC slope survey age compositions for 2001, 2003, and 2004, (5) the triennial shelf

survey biomass estimate for 2004, and (6) triennial shelf survey age compositions for 1995 and 2004. Results of the assessment show that exploitation rates have been very low since 2000 (~1% per yr) and that the stock is slowly rebuilding (depletion in 2005 was 23.4%, up from 20.9% in 2000). Relatively strong recruitments occurred in 2002 and 2003, representing the 1999 and 2000 year-classes. The SSC endorses the STAR Panel conclusion that this assessment represents the best available science and that it can form the basis for Council decision-making.

### Cabazon

The SSC reviewed the assessment and STAR Panel report for cabazon (*Scorpaenichthys marmoratus*). The assessment only considered cabazon residing in the State of California and divided the population into two stocks, one north of Point Conception (NCS) and one south of Point Conception (SCS), based on different historical patterns of exploitation. The northern stock has been the primary area from which removals have occurred, principally due to a greater commercial harvest in that region. Splitting the assessment model into separate northern and southern stocks departs from the approach taken in the previous assessment that was conducted in 2003, which treated the entire State as a unit stock. In addition, 6 fisheries were modeled for each substock (4 recreational and 2 commercial) and 3 trend indices were evaluated for each area. Results of from assessment show that exploitation rates for the NCS and SCS stocks are close to their target values ( $F_{45\%}$ ). Depletion levels, however, differ among the two areas, with the NCS stock close to its target population size ( $B_{40\%}$ ), while the SCS stock is close to the minimum stock size overfished threshold ( $B_{25\%}$ ). Furthermore, assessment results show that spawning output from the SCS stock was very low as recently as 2002 (i.e., 5% of the unfished level), but that strong recruitment has apparently occurred due to the 2000 and 2003 year-classes. Uncertainty about the strength of the 2000 year-class, in particular, was highlighted in a decision table analysis. The stock assessment included projections for both stocks under the Council's default 40:10 harvest policy, as well as the State of California's nearshore management plan 60:20 harvest policy. The SSC endorses the STAR Panel conclusion that this assessment represents the best available science and that it can form the basis for Council decision-making.

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