



Scallop Plan Team

REPORT

February 19, 2020
Meeting at
ADF&G Office Kodiak, AK

Plan Team Members in attendance:

Jim Armstrong (Co-Chair, Council Staff)
Ben Williams (Co-Chair, ADF&G Juneau)
Ryan Burt (ADF&G Kodiak)
Mike Byerly (ADF&G Homer)

Scott Miller (NMFS Juneau)
Andrew Olson (ADF&G, Douglas)
John Olson (NMFS/AKRO-Anchorage)
Jie Zheng (ADF&G Juneau)

Others in attendance:

Alisha Falberg (NOAA GC Juneau) †
Tyler Jackson (ADF&G Kodiak)**
Bobbie Minio (F/V Provider)
Tom Minio (F/V Provider)
Nathaniel Nichols (ADF&G Kodiak)
Natura Richardson (ADF&G Kodiak)**

Bo Whiteside (ADF&G Kodiak)
Wyatt Rhea-Fournier (ADF&G Homer) †
Jan Rumble (ADF&G Homer)
Elisa Russ (ADF&G Homer) †
Jim Stone (Alaska Scallop Association)
Kevin McNeel (ADF&G Juneau) †, *

** Presented to SPT

† Attended via phone connection

Administrative

The Scallop Plan Team (SPT) meeting was hosted by ADF&G Kodiak and began at 9:00 a.m. SPT members and others in attendance introduced themselves including four representatives from the scallop fishery that were in attendance. Information for online broadcast and teleconference attendance was made available through the meeting [eAgenda web page](#) which also provided the documents and presentations for the meeting. The meeting agenda was reviewed and approved, and the Team reviewed assignments and logistics for finalizing the SAFE and the Plan Team Report.

Former Scallop Plan Team Co-Chair Quinn Smith has been reassigned within ADF&G and his duties no longer include serving on the SPT. Dr. Ben Williams of ADF&G Juneau volunteered to serve temporarily as Co-Chair. Team election of a “permanent” Co-Chair will be held next year. Jim Armstrong, Council staff, is the other Co-Chair for the Scallop Plan Team.

Status of Scallop Stocks and SAFE Reports by Area

Southeast Region

Andrew Olson briefly presented an update on the Southeast Region weathervane scallop fishery. Andrew Olson is now the manager taking over for Quinn Smith. The Southeast GHL was increased from 145,000 to 155,000 lbs of meat weight between the 2018/19 season and 2019/20 season. The fishery CPUE (nominal) was at near historical high in 2018/19. However, in 2019/20 there was a 31% decrease in CPUE and the GHL was not fully harvested. It was noted that there is a slight truncation observed in shell sizes from the harvest. Jie Zheng questioned whether the lower CPUE (lbs of meats per dredge hr) was due to reduced meat quality. A discussion ensued acknowledging that in 2018/19 scallop meats were larger – there was better recovery. In this last season scallop catches were 80% 20-30 count. This year was 30-40 counts – not very plump. The fleet thinks that temperatures were a factor in small meat weights

as meats seem to be small statewide. The GHL was not fully harvested due to the unavailability of an observer to finish out the season. The fleet indicated that they would have fished the remaining GHL if an observer was available.

Central Region

Mike Byerly presented an update on the Prince William Sound (PWS) and Cook Inlet management area commercial fisheries. Mr. Byerly gave an overview of each area's management plan including season, Guideline Harvest Ranges (GHRs), gear restrictions, Tanner and king crab bycatch limits, and observer requirements. The PWS area is divided into an inside district and outside district (Western and Eastern section). The Eastern Section is further subdivided into due to scallop beds occurring in proximity to Kayak Island and are identified as West Kayak Subsection and East Kayak Subsection. The inside district remains closed to commercial fishing while the Eastern section has steadily declined in meat weight (lbs of scallop meat per dredge hour) catch per unit effort (CPUE) since 2005 and has remained closed since 2011. Similarly, the Western section CPUE has precipitously declined since 2003 and the fishery was closed from 2010–2015. The Western section reopened from 2016–2018, however, remained historically low, thus the fishery was closed for the 2019/2020 season. The most recent scallop survey in PWS occurred in 2016 (Western section) and 2018 (Eastern section) with CPUE remaining at historical lows with minimal improvement and lack of recruitment despite commercial fishery closures.

Cook Inlet only has Kamishak District that is open to commercial fishing and all other districts are opened by an Alaska Department of Fish and Game Commissioner's Permit. Kamishak is subdivided into North and South scallop beds. The North scallop bed has steadily declined in CPUE since 2000 and has remained low while the South bed was open from 2002–2004 has remained closed since. Surveys in both beds have declined over time and remain at historical lows despite continued commercial fishery closures. The Department has been monitoring parasite incidence and understanding its impact on scallop stocks and lack of recovery in the Kamishak District. Additionally, Mr. Byerly presented a development plan from Pebble Mine which is planning to build a gas pipeline between the North and South beds.

Westward Region

Natura Richardson provided an update on the Westward Region scallop fisheries. An overview was given defining the Kodiak Districts and how the weathervane scallop fishery is managed within the Westward Region. Pre-season decisions include setting guideline harvest limits (GHLs) and crab bycatch limits (CBLs). Data used to inform setting GHLs includes survey and fishery CPUE, size, and age composition when it's available. CBLs are based on historical fishery bycatch and ADF&G trawl survey Tanner crab estimates. Inseason, fisheries are managed by monitoring harvest and crab bycatch until the GHL is achieved or the CBL is not exceeded. Westward has established minimum performance measures for the major harvest areas based on the lowest CPUE observed over a given time scale. Cumulative harvest is followed for each area is if the current fishery CPUE is below the minimum performance measure, management action may be taken.

Next, a time series of harvest and CPUE trends were given for each District with reference to how the fishery for 2019/20 season preformed. For the Northeast District, CPUE has been steady and has had level GHLs through 2014/15. CPUE declined sharply into the 2016/17 season but has steadily improved in subsequent seasons. There are lots of beds in the Northeast District so the fleet can move around a lot to find better fishing.

Historically the Shelikof District has been the biggest producer for the Region. The GHLs have been high (up to 180,000 lbs of meats). CPUE dropped starting in 2011 and bottomed out in 2016/17 but has since improved as new recruits have showed up in the catch. There are some beds in the southern portion of the District along Kodiak Island. The area where these occur was removed from the Shelikof District and moved to the Southwest District by a Board of Fish decision in 2018 (?). This involved moving 2 statistical areas to the Southwest District. The Southwest District fishery has been performing well with

CPUE remaining consistent or increasing into recent seasons and has not seen a drop in CPUE like other Districts. The fleet has been achieving the GHL in each year.

The Board of Fish opened the Southeast District for the 2018/19 season. The fleet prospected here in 2018 but there was not much harvest. There was no effect in 2019/20. The Alaska Peninsula Area is open under a Commissions Permit Fishery. The CPUE has been steady but slowly decreasing in this Area through 2017/18. There was a larger drop in CPUE in 2018/19 which resulted in setting a lower GHL for the following season. CPUE was up in 2019/20. There was prospecting in the earlier years, but effort has become much more concentrated.

The Bering Sea Area had very high GHLS in the earlier years (200 to 400k lbs of meats) but is now only ~2000 lbs. CPUE fell sharply in 2014/15 and has remained low. There was a high incidence of weak meats concurrent with the drop in CPUE. Management is keeping the Area open with a low GHL in order to still have some data to monitor the status of the beds. The Dutch Harbor Area is composed of open waters in both the Bering Sea and Gulf of Alaska. The fishery in the Bering Sea portion has been open every year, while the GOA has alternated opening and closing on a multiple year rotation. This confounds tracking CPUE, but it has none-the-less decreased into the most recent season.

2019 Scallop Survey Results

Tyler Jackson presented a summary of the 2019 statewide scallop dredge surveys. Surveys were conducted in the Southeast region (Yakutat) in five of nine beds (WK1, YAKB, YAK3, YAK4, and YAK5 included, YAK1, YAK2, YAK6Y, YAK6D not surveyed). Previous survey of the included beds varied - WK1 bed in 2016, YAKB, YAK4 and YAK 5 in 2017, and YAK3 in 2018.

Abundance and biomass estimates of large (SH \geq 100mm) and small (SH < 100mm) scallops were presented by bed. Significant increases in abundance occurred in YAK3 and YAK 4 for both size classes, but especially for large scallops. Abundance decreased in WK1 and YAK5 and was very low, but steady in YAKB. Estimated biomass (round weight) increased for both size classes in all southeast beds.

Bed-specific size distributions (shell height) from the previous and 2019 survey years explained the diverging trends in abundance and biomass in WK1 and YAK5. In both areas, incoming year classes dominated small scallops in the previous survey and large scallops were skewed toward smaller sizes.

Although round weight had increased, meat weights had generally decreased in all beds as indicated by meat weight - shell height relationships across survey years. Meat weight-round weight relationships had also shifted downward across beds. Because scallop gonadal development stage is recorded in the survey, comparison of the meat weight-round weight relationship within a given stage was possible. This addressed the possibility of a skewed relationship based on reproductive condition during the time of the survey. Nevertheless, a decrease in meat weight at a given level of round weight persisted. Industry representatives in attendance stated that the meat quality was good, and that the scallops were just smaller. Neither “weak meats” nor parasite issues were suggested to have been an issue in 2019. Stakeholders raised the possibility of, and The Team discussed that higher water temperature in 2019 may have induced a physiological/metabolic response in scallops that affected meat weight.

The SPT notes that because scallop abundance is not estimated for the *entire* stock, biomass relative to MSST is unknown and **the status of the scallop stocks is “unknown”**. Additionally, specified OFL in 2018/19 was 1.290 M lb, while total scallop removals in 2018/19 are estimated to have been 238,973 lb (18.5% of specified OFL), and, therefore, **overfishing did not occur**.

SPT Recommendation

In the absence of a stock assessment that provides an overall abundance estimate, for the 2020/21 season, the Scallop Plan Team recommends continuing to set the OFL equal to maximum OY (1.284 million lb; 582 t) as defined in the Scallop FMP, which applies a 20% mortality rate to

discards. The Scallop Plan Team also recommends setting ABC for scallops in 2020/21 consistent with the maximum ABC control rule (90% of OFL), which is equal to 1.156 million lb (524 t).

2020 Survey Plan

Ryan Burt provided an update on the 2020-2023 statewide scallop survey plan. In April/May 2020 seven beds are scheduled to be surveyed in the Kodiak Registration Area. The larger survey design for the next several years will alternate between Kodiak and Yakutat beds. There is a draft invitation to bid in the works for survey vessels. Crew have been established for the trips. A Regional Operating Plan for the survey structure is in progress to update the 2016-2019 plan. This ROP will cover multiple years and be on-cycle with Extended Jurisdiction funding. This ROP will also have a focus on documenting updates database. Also working on an annual SOP for specific field sampling protocols. Goal is clear written standardizing of the survey on all fronts. When the survey is in the Yakutat District fewer stations will be sampled in order to sample the entire District during a survey.

There was a brief discussion on the randomized grid selection and number of grids to sample. Focus on Kodiak Northeast beds to explore if the previously observed small cohorts have survived and are close to recruiting into the population. The small beds near KSH1 will no longer be surveyed – as they are small and minor contributions to the fishery.

Database management for the survey is close to being finalized. This will provide the ability to download data at sea survey to speed up post survey analysis providing managers more time to incorporate the results into GHM setting.

Exploring obtaining two new dredges, discussing with Pete Chase (NMFS Woods Hole). Have dredge specs of research dredges used on the east coast. Exploring shipping options. Looking to update dredges so that there are two available that are identical. The two current dredges are similar but not identical.

A question was raised of the appropriate method for the PT to provide input on the survey –this is not currently structured, though through the ROP work is being done to establish consistent timeframes that the PT can use to provide input that can then be implemented in the survey.

Scallop Aging Program

Kevin McNeel provided an update on the scallop ageing program. Now statewide scallop ageing is conducted by ADF&G staff with the Age Determination Unit at the Mark, Age and Tag Lab at Juneau. During 2018 and 2019, total 3171 scallops from Yakutat, Kodiak and Central regions have been aged. Due to staff turnover, four age readers were trained in 2019. Other research includes quality control, investigating 2019 outliers, a direct connection between the databases at Kodiak and the Ageing Determination Unit at Juneau, age validation, and age corroboration.

Age validation work includes comparing $\delta^{18}\text{O}$ and $\delta^{18}\text{C}$ values to banding patterns of shells and a growth study. Generally, $\delta^{18}\text{O}$ matched the external banding patterns on most shells. Previous sample size is quite small, 12 specimens. Hopefully, sampling sizes can be increased for more $\delta^{18}\text{O}$ analysis to address questions about age validation. The Age Determination Unit also collaborated with Ted Stevens Marine Research Institute (TSMRI) at Juneau to do an age validation through a growth study. The purposes of this study were to be look at the timing of annulus formation, growth rates, calcein staining methods, spawning timing and mariculture. It is important to be able to measure growth rate directly and to look at bands. Scallops were shipped to TSMRI from Kodiak. So far, calcein and overall survival are good, but none of these scallops have grown after in the lab for about a year. Now the research team are looking for different environmental condition factors, such as pH values, to get the scallops to grow.

For age corroboration, signature lines are examined with a cross-dating technique. So far from the samples in the 2019 survey, very consistent narrow bands have been found for years 2015 and 2016. The measured increments were related to climate data. In 2015 and 2016, PDO and sea surface temperature

values were very high, and these high values potentially corroborated with the 2015-2016 narrow bands on the scallops.

Kevin McNeel also identified a few areas for further research. The current growth and calcein study will continue with different feed and water quality treatments. The work on tracking/identifying signature lines will also continue. New studies include validating the sizes of first annulus and expanding annual validation. There are potentially, opportunistically sampling small scallop shells throughout the year likely off Kodiak to do a cohort analysis across month. Cohort tracking and the isotope analysis should be able to validate the sizes of first annulus. The expanding annual validation is through an isotope analysis, and a grant funding may be needed for this analysis.

Scallop Parasite Studies

Ryan Burt updated the Plan Team on scallop parasite research. Whelks have been identified as the vector for a parasite that may affect scallop meats, although studies are inconclusive at this point. A similar parasite has been documented in Atlantic scallops. ADFG has collected whelk samples from several beds in the Bering Sea and Yakutat, and Jayde Ferguson (ADFG Pathology - Anchorage) has described this parasite for Bering Sea scallops in a paper currently in review. A 7,500lb GHL remains in the Bering Sea as an incentive for monitoring the beds. At this time, the Team recommends biologists monitor scallop parasites, as appropriate, but also that this does not need to be a regular topic for Plan Team meeting agendas.

CPUE Standardization

Tyler Jackson presented an update on the standardization of fishery catch per unit of effort (CPUE). He provided an overview on how guideline harvest levels (GHLs) are currently set using interannual trends in fishery performance CPUE (lbs of scallops per dredge haul) assuming CPUE is proportional to abundance and catchability (q) does not vary across units of effort. Catchability has a multitude of variables that can influence CPUE such as, crew efficiency, environmental variables, weather, gear performance, etc. The objective of standardizing CPUE is to be able to estimate CPUE while controlling for factors that influence catch rates except other than abundance. The Yakutat District was presented as an example where influential factors or explanatory variables were explored from fishery logbooks (year, month, vessel, haul speed, etc.) and weather buoy data (wave height, wind speed, and tidal rate) utilizing general additive modeling (GAM) to provide the most model flexibility. During covariate selection for the GAM it was found that tidal rate, wind speed and haul speed had minimal influence on CPUE and can likely be removed from the GAM, while wave height showed a noisy relationship until large swell occurs so likely it will only be informative during periods of abysmal weather conditions. In the Yakutat District, the nominal and standardized CPUEs with and without wave height tracked closely. Further investigation will look at additional covariates among districts and evaluate standardization of districts and define a single suitable model for all districts. Standardized CPUE will be informative for management in setting pre-season GHLs.

Scallop discards and mortality and scallop fishery bycatch

Tyler Jackson (ADFG Kodiak) presented his ongoing work on improving estimation of scallop discard mortalities and crab and halibut bycatch in the scallop fishery. Under the existing State Scallop Observer Program, scallop CPs have one observer onboard for all trips. All scallops to be discarded (intact and broken) are placed in baskets, and a single basket of discards is taken as a sample. Within the sample, intact scallops are counted and weighed, and broken scallops are weighed only. All remaining discard baskets are weighed to get a total discard round weight for a given dredge haul. Discards and mortality are expressed in terms of meat weight.

Crab and halibut discards reflect census counts under most conditions, but rare “lightning strike” crab bycatch events can make use of basket sampling. Scallop discard and bycatch totals are calculated from rates (e.g., discards / dredge hour). No changes to sampling operations were proposed in Tyler’s review.

Current estimation methods involve a nearest neighbor calculation within a poorly documented macro, and a 20% mortality rate is applied. Under the proposed method, the nearest neighbor catch rate is not used, and a 100% mortality is applied for broken scallops, a 20% mortality for whole discards, and meat weight is calculated as 10% of round weight.

Comparison of results from current vs. proposed methods tracked well for estimates of total scallop, halibut, and tanner crab bycatch. The Team noted that the nearest neighbor method adjusts for lightning strike crab events, however, the new method is reproducible and transparent

Results for total scallop discard mortalities were quite different, often more than 2x the estimates using the current approach. This appears to be due to the change in how mortality is assigned to broken scallops. The Team and industry in attendance suggested that 100% mortality may be too high. Scallops that are “broken” range from crushed scallops to those with a crack or edge chip. A study by Knotek in 2016 showed mortality rates vary relative to shell condition and “brokenness”. The 20% mortality for whole discards is from the previous biologist who wrote the mortality estimation macro and further background on the rate will be looked into. The Team did not make a recommendation on a specific mortality estimation approach and notes that the biologist intends to apply the new methods but also using a more substantiated mortality rate.

Socioeconomic Considerations

Dr Scott Miller provided a review of the development of the Economic Considerations Appendix in the Scallop SAFE. He proposed that the brief economics chapter in the body of the SAFE document be eliminated since it is redundant with material provided in the appendix. The Team agreed with that and the 2020 SAFE will not include an economics chapter. Scott also reflected on the SSC comments provided in 2019 and previously that called for expansion of community-level impacts in the SAFE. Scott noted that the current fleet is quite small and limited entirely to Kodiak, but he will attempt to better characterize historic community dependence and engagement where possible, and explain where data limitations or confidentiality constraints factor in.

Scallop EFH

John Olson gave an overview of the scallop EFH. The Magnuson-Stevens Act defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The NMFS and regional fishery management councils must describe and identify EFH in fishery management plans (FMPs), minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. Basically, there are just two components: the EFH descriptions and maps and the effects of fishing on habitat.

There are four levels of species descriptions, based on data availability. Level one is the most basic distribution data; level two has habitat-related densities, usually interpreted as CPUE; level three means that growth, reproduction, or survival rates are available by habitat; and level four has production rates by habitat. Right now, most of the species in Alaska are level one or level two. In Alaska, the data sources were from the bottom trawl surveys, EcoFOCI data, and catch in area database. GAMs or MaxEnt models were used for all the managed species and life stages other than scallops. There were over 400 species and life stages modeled for species across the Gulf of Alaska, Aleutian Islands, and Bering Sea for eggs and larval stages with the MaxEnt models primarily and for juvenile and adult stages usually with the GAMs models. Besides reviewing the EFH descriptions and maps, John Olson also briefly reviewed the methods to evaluate the fishing effects on EFH and examples in Alaska.

For the Alaska scallop stock, catch data and some survey data were used to create an EFH map in 2005, a non-model version, and stock assessment authors also filled out habitat assessment report tables. In the five-year review in 2016, the SSC gave the SPT team a pass on updating the scallop EFH. However, the SSC pointed out that there were some new, relevant data that could be used to improve the scallop EFH definitions. New information includes sediment information, new surveys, cam sled data processed at Alaska Pacific University, and the results of a multivariate analysis of community composition on weathervane scallop beds by Jessica Glass and Gordon Kruse. In Alaska scallops are the only FMP species still described solely by catch and survey data. In the scallop FMP, there is a habitat objective for scallops as well as considering the impacts of the scallop fisheries on other fish.

Considering the update of the scallop EFH has been long overdue and new information available for enhancing EFH for scallops, the SPT recommends updating the scallop EFH. The new scallop EFH should include scallop distribution models validated with an independent source of data.

Research Priorities

Jim Armstrong presented an overview of recent changes to Council's research priority setting process which is moving away from line-by-line review of all projects in the database at the Council and SSC levels. Plan Teams are still asked to review projects associated with their FMP responsibilities and also to recommend candidate projects for an SSC top ten list. Jim displayed the Scallop Plan Team's 21 research projects in a spreadsheet on screen and the Team stepped through them as he edited "research status" and "SPT priority", based on Team suggestions. Jim indicated that "theme" and "focus" had been added to help summarize the projects. The Team supported the suggested theme approach and recommended two projects for the SSC's top ten: Project #553 "Population structure of scallops" was added because the basis for the current population structure is quite dated, and should be addressed with modern approaches, i.e., spatial genetics. Project #571 "Age validation for scallop shells" was added because although pilot studies have been done, biologists need to collect more samples and apply the proven methods. Both of these projects were categorized as "Important". Other recommended changes to the Team's research priorities would be updated in the database.

Review/Response to SSC comments

Scallop Plan Team discussion of SSC comments is provided in the SAFE.

SPT meeting for 2021

The Scallop Plan team will meet at the Council office in Anchorage on February 17, 2021. Prior to the next meeting, Plan Team leadership will discuss whether progress in organizing data inputs and other considerations for developing an age-structured model is sufficient to justify a full SAFE or whether an Executive Summary would be sufficient.