

Scallop Plan Team meeting minutes

February 21, 2018

ADF&G Building

Kodiak, AK

Administrative: The Scallop Plan Team held their annual meeting at the ADF&G Regional Office in Kodiak, AK on February 21, 2018. Quinn Smith chaired the meeting.

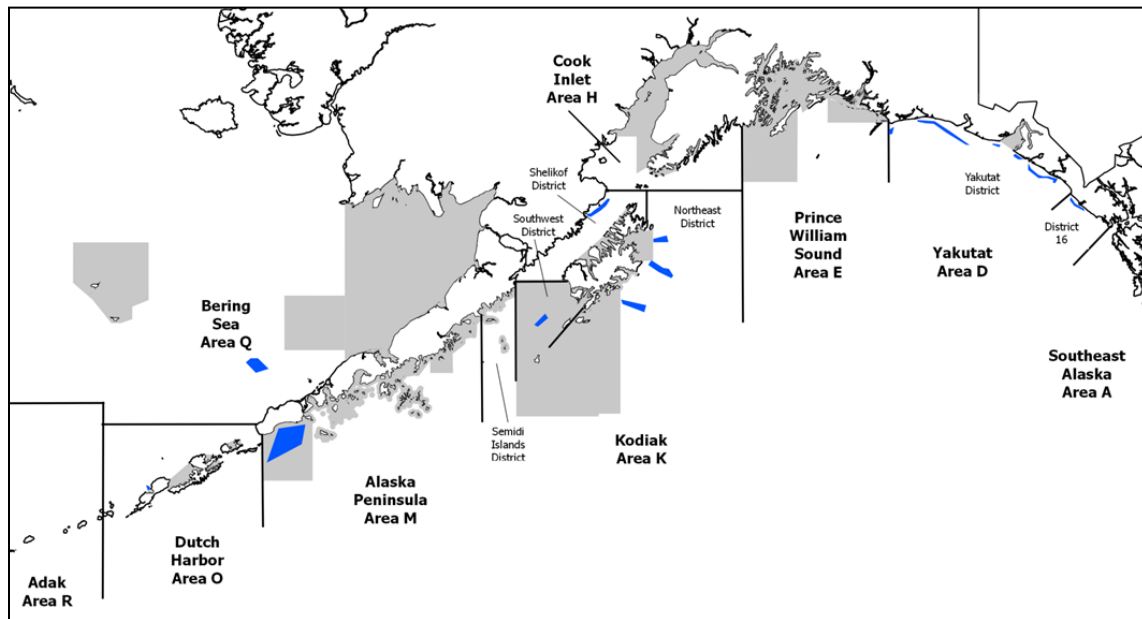
Plan Team members present: Quinn Smith (Chair, ADF&G Douglas), Jim Armstrong (Vice Chair, NPFMC), Ryan Burt (ADF&G Kodiak), Sarah Webster (APU), Mike Byerly (ADF&G Homer), John Olson (NMFS Anchorage), Scott Miller (NMFS Juneau), and Jie Zheng (ADF&G Juneau).

Public and agency personnel present (for some or all of meeting): Mark Stichert (ADF&G Kodiak), Nathaniel Nichols (ADF&G Kodiak), Natura Richardson (ADF&G Kodiak), William Gaeuman (ADF&G Kodiak), Jim Stone (Alaska Scallop Association), John Lemar (F/V Polar Sea), Tom Minio (F/V Provider), and Bobbie Minio (F/V Provider).

Present via phone connection: Ben Williams (ADF&G Juneau), Elisa Russ (ADF&G Homer).

Scallop Plan Team Harvest Recommendations: The Scallop Plan Team recommends that OFL in the 2018/19 season be set equal to maximum OY (1.29 million lb; 585 t) as defined in the Scallop FMP, and which includes discards for which a 20% discard mortality rate is applied. The Team also recommends that ABC for scallops in 2018/19 be set consistent with the maximum ABC control rule (90% of OFL) and which is equal to 1.161 million lb (527 t).

Agenda: The agenda for the meeting is attached at the end of this document.



Alaska scallop fishery registration areas. Commercial scallop fishing areas in blue, and waters normally closed to scallop fishing in gray. Kodiak Southwest District and Alaska Peninsula Areas have been opened by ADF&G Commissioner's Permit in the past seasons.

Status of Statewide Scallop Stocks and SAFE Report Catch Specifications by Area

Southeast Region

Quinn Smith presented an update on the Southeast Region weathervane scallop fishery. Southeast Region scallop stocks occur in management Area D (Yakutat and District 16). There is no scallop fishery in Area A (Southeast). Separate guideline harvest levels (GHL) are set for the Yakutat and District 16 portions of Area D.

Management of scallops in Area D mainly relies on fishery dependent data and information collected by scallop observers, but in May of 2017 a fishery independent dredge survey was done. This dredge survey will occur again in 2018 and the data will become more useful in the future. The GHL is adjusted based on changes in fishery catch per unit effort (CPUE) by bed, the size and age of the scallop catch, changes in spatial distribution of effort over time and dredge survey results. In 2013/14, managers began evaluating fishery performance in-season using a minimum performance standard (MPS) to determine possible time and area of a fishery closure. The MPS in Area D is defined as the lowest, cumulative CPUE observed since 1997. The MPS is evaluated at the point in the fishing season when 50% of the GHL has been harvested. At that point, if cumulative CPUE falls below the MPS, then managers may take action to close the fishery. To date, the cumulative CPUEs of scallops in the Area D fisheries have not fallen below the MPS.

The District 16 GHL remained at 5,000 pounds of meats for the 2017/18 season. Scallop harvests from District 16 are unpredictable from year to year. CPUE, meat yield, and meat quality are highly variable. For example, during the 2016/17 season, CPUE was low (like the 2014/15 and 2015/16 seasons) but increased during the 2017/18 season. Graphs of raw and standardized CPUE do not show a definite trend due to low and highly variable fishing effort. In 2017/18 meat quality was higher, the sizes of scallop meats were larger, and 5,005 pounds were harvested.

The Yakutat GHL increased to 140,000 pounds of meats for the 2017/18 and 140,075 pounds were harvested. The long term CPUE trend is decreasing slightly but has been increasing over the past five fishing seasons. Graphs of raw and standardized CPUE show the same increasing trend. Estimated shell height distributions from Yakutat show an increased range of sizes since 2013/14.

Tanner crab bycatch remained relatively low in Area D with an estimated 2,600 crab caught during the 2017/18 season. The majority of Tanner crab measured by observers ranged from 20 mm to 50 mm carapace width. No crab bycatch cap has been established in Area D.

Central Region

Elisa Russ presented an update on the Cook Inlet and Prince William Sound (PWS) management areas scallop surveys and commercial fisheries. She began by giving a brief overview of the PWS and Cook Inlet registration areas, fishing districts and general scallop fishery regulations.

In Cook Inlet, two scallop beds are located in Kamishak Bay, the north and south beds. The most recent scallop assessment in the Kamishak Bay district was completed in 2015. Survey results showed a small increase in scallop abundance in the northern portion of the district and an age structure that included both older and younger scallops. Results also showed a concentration of smaller scallops in the southern portion of the north bed. Therefore, the southern portion of the north bed was closed to conserve younger scallops while a GHL of 10,000 pounds has been established for the northern portion of the north bed since the 2015 season. The entire southern bed has been closed since 2009. There was no fishing effort during the 2017 season. Another scallop assessment is planned for Kamishak Bay in the spring of 2018.

In PWS, scallop beds occur near Kayak Island and are identified as the West Kayak Subsection (WKS) and East Kayak Subsection (EKS). The most recent scallop survey near Kayak Island was completed in

April 2016 and results showed increased abundance and biomass in the WKS, a continued trend since 2014. The survey also showed a continued decline of abundance and biomass in the EKS to historic low levels. The WKS opened to commercial fishing for scallops in the 2016/17 and 2017/18 seasons, both with a GHL of 6,300; the EKS has been closed since 2012.

Westward Region

Natura Richardson presented an update on the Westward Region scallop fisheries. Westward Region includes four registration areas: Kodiak, Alaska Peninsula, Bering Sea, and Dutch Harbor. Managers use fishery dependent data, MPSs, and information from the scallop observer program to establish GHLS and manage harvests in-season. Crab bycatch in Westward Region scallop fisheries is limited by crab bycatch caps. Scallops in the Westward Region have historically not been assessed but, in 2016 and 2017, the main Shelikof scallop bed was surveyed and this bed will be surveyed again in 2018.

In 2013/14, managers established a district wide GHL for the Kodiak Northeast District and discontinued use of bed and statistical area GHLS. However, if in-season observer data indicate poor scallop CPUE or localized depletion, then managers may use MPSs to close individual areas before the total district GHL is harvested. The Westward Region began setting MPSs in the Northeast District in 2003/2004. The Kodiak Northeast District GHL of 55,000 pounds of meats was not reached in 2017/18. CPUE has declined in recent seasons and is partly due to fishing effort being more spread out around the district in 2015/16 and low catch rates in 2016/17 and 2017/18.

Despite lowering the Kodiak Shelikof District GHL four times since the 2010/11 season, the 2016/17 cumulative CPUE was the 2nd lowest since the district was managed for a GHL. For the 2017/18 season, the district opened with a GHL of 25,000 pounds and the preliminary harvest is 25,050 pounds. The 2017/18 CPUE of 46 lb/hr was comparable to the 2013/14 CPUE of 43 lb/hr and rebounded from the 2016/17 CPUE of 30 lb/hr. The reason for the decline in CPUE of the main Shelikof bed is unknown but the surveys conducted in April of 2016, May 2017 and the survey planned for 2018 will hopefully provide insight. Estimated Tanner crab bycatch for 2017/18 was approximately 3,550 crab compared to the bycatch limit of 63,926.

The Kodiak Southwest District opened in 2009/10 with a GHL of 25,000 pounds. The fishery is allowed by ADF&G Commissioner's permit and managers are debating whether to continue exploratory fishing or implement management regulations. The GHL was reached in five out of the last seven years. The district was closed early during the 2015/16 season due to high Tanner crab bycatch rates when the bycatch cap was reached after approximately 44% of the scallop GHL was harvested. Recently, Tanner crab bycatch has been much lower than the 2015/16 season. The area is very exposed to weather and dominated by large, old scallops but there are signs of younger year classes.

There was no exploratory effort to harvest scallops in the Kodiak Semidi Islands District in 2017/18.

The Alaska Peninsula Registration Area supported a scallop fishery in the mid- to late-1990s near the Shumagin Islands between 160° and 161° west longitude. In 2014/15, the area between 160° and 161° west longitude was open with a GHL of 7,500 pounds but effort in the area was deterred because of the presence of Pacific cod pot gear. This area was opened again for the 2017/18 season, but no effort was put forth.

In 2012/13, the Alaska Board of Fisheries authorized exploratory fishing in Unimak Bight under the authority of an ADF&G Commissioner's permit to harvest a GHL of 15,000 pounds. The GHL has been achieved each season since 2012/13. Shell height and age distribution data for these years indicate the population has a broad range of age classes most represented by ages 7 to 12.

The Bering Sea Registration Area opened with a GHL of 50,000 pounds for the 2014/15 season. Two vessels participated in the fishery and harvested 12,445 pounds with an overall fishery CPUE of 24 lb/hr. The two participating vessels quit fishing voluntarily due to low CPUE and signs of high natural mortality throughout the scallop bed. Fishermen and observers both reported high numbers of scallops in which the meat slid off the shell or ripped in half when shucked. In January 2015, samples of scallops were collected and sent to the ADF&G Anchorage Pathology Lab for analysis of any evidence of diseases and/or parasites. The results showed that the scallops were infected with an apicomplexan-like parasitic organism. In 2015/16, the area opened with a GHL of just 7,500 pounds to allow the fleet to look around the bed to better gauge the extent of the problem. In 2017/18, the area opened again with a GHL of 7,500 pounds to allow the fleet to further look around the bed to gauge the extent of the problem. One vessel has harvested the 7,500 pound GHL's for the last three seasons and there is some evidence that the parasite event may be subsiding (fewer meats sliding off the shell or ripping in half when shucked). Estimated crab bycatch during the 2017/18 season was 9,148 Tanner crab (bycatch capped at 65,000 Tanner crab), 5,038 snow crab (bycatch capped at 300,000 snow crab), and 0 king crab (bycatch capped at 500 king crab).

The Dutch Harbor Registration Area reopened to fishing in 2008/09 with a GHL of 10,000 pounds of meats, which was split between the Bering Sea and Pacific Ocean. Due to poor fishery performance on the Pacific side, the GHL was reduced to 5,000 pounds on the Bering Sea side from 2012/13 through 2014/15. The 2015/16 and 2016/17 GHL was raised to 10,000 pounds, split between the Bering Sea and Pacific Ocean, to allow for exploration on the Pacific Ocean side. The 5,000 pound GHL on the Bering Sea has historically all come from one bed outside Inanudak Bay and had been reached each year until the 2017/18 season when only 285 pounds were harvested. Fishermen indicated that there were simply less scallops in the area, but we don't have an indication as to why yet. Limited effort was put in on the Pacific Ocean side from the 2015/16 through 2017/18 but no scallops have been harvested during these three seasons.

Progress on Age Based Model Assessment

Jie Zheng gave the presentation "Evaluation of a Stock Synthesis Approach to Assess Weathervane Scallops in Kamishak Bay, Alaska". This work built on two earlier efforts by Bill Bechtol in 2000 and Xinian Zhang in 2014, to develop an age-structured model for Kamishak Bay. This new effort incorporates updated data through 2015 and unlike the earlier efforts includes both age and size structure and is analyzed using Stock Synthesis 3.

Survey time series ranged from 1983 – 2015, but since a different dredge was used in 1983 and the data are incomplete, that year may not be usable. Survey biomass and CV were re-estimated using station as a sampling unit to compute CVs. This is a departure in how estimates are currently made which expands mean standardized catch to a standardized survey area. In addition to survey abundance, fishery CPUE is included as an abundance index. Size (shell height), age composition, and mean size at age from the survey and fishery are included as is commercial catch.

Jie summarized some of the trends in the age and size data. There was some recruitment early on but recruitment was weak mid-way through the time series to the end. The age composition in survey differs slightly from fishery in that there are older larger animals in survey. Overall the age data looks good though cohorts track better in the fishery data than in the survey.

Parameters estimated outside of the model or taken from the literature were, age at maturity, size at maturity, and natural mortality. Natural mortality was estimated using Hoenig's method or based on maximum age using the 1% rule. Estimates of M were similar using both methods and Jie recommended using the max age 1% rule. Though maximum age ranges up to > 28 yrs, few scallops older than age 18 are found in the fishery and survey. Jie used $M = 0.19$ (1% rule assuming max age of 24 yrs) as a base case in his analysis.

Assumptions for the model included constant M, no handling mortality, no stock-recruitment relationship, variation in size at age as a linear function of age, size at age following a normal distribution, and logistic maturity and selectivities (estimated within the model)

The model fit the survey and fishery abundance indices fairly well. The model fit the fishery and survey shell height data adequately but fits to the age composition were not very good. The model appears to expect older animals than are in the data. Fit of the selectivity function for the fishery looked good but the fit for the survey data was flatter and never reached 1. Recruitment estimated about 4 strong year classes with weak recruitment from the late 1990s on. Estimated F was below M for time series. Estimated biomass was low at the beginning of time series, peaked in approximately 2000 and dropped steadily through 2015. Biomass trends from retrospective analysis looked very similar.

Jie ran 4 alternative model scenarios:

- 1) using all data back to 1984,
- 2) using a harmonic mean to adjust effective sample sizes for shell height and age compositions,
- 3) not including survey data, and
- 4) alternative values of M (0.14, 0.17, 0.21, and 0.24).

The trend in estimated spawning biomass was very similar for all scenarios. Scenario 3 SSB estimates were approximately 1/3 lower than the other scenarios. Changes in M had a very large effect on spawning biomass estimates. For the future, Jie posed the question: Do we want to apply age/size structure SS model to other Alaskan scallop stocks? He mentioned that, generally, data are less available for other areas and may need further examination. He also recommended biometric and biological staff work together to put more data into electronic form.

Update on Fishery Economics

Scott Miller provided an overview of the Fishery Economics appendix to the 2018 Scallop SAFE. This section was last edited in 2006 and has been comprehensively updated.

He reviewed statewide commercial Weathervane scallop real wholesale values from 1993-2017. Scott stated he was attempting to obtain information from the State of Alaska Department of Revenue that more accurately depicts the processed/frozen-at-sea nature of the scallop harvest.

Scott also presented historic commercial Weathervane scallop harvest statistics from 1967-2017. It was noted that while price per pound is at a high point, catch in pounds of meats is near a low in the time trend and has declined steadily since the early-1990s.

Scott provided a breakdown of the number of vessels that could break even from a cost perspective under various price and landing scenarios. These values range from 3.6 vessels at \$5/lb with a 600,000lb harvest to 12.6 vessels at \$13/lb and an 800,000lb harvest. With a current average price of \$12.53/lb and approximately 238,000lb harvest, it is estimated that the fishery could support slightly more than 3 boats at the breakeven point. There are currently two vessels participating in the fishery, and it is uncertain whether a third could fish in 2018.

The Federal Scallop FFP holder history and current activity was presented. This information is publicly available from State and Federal sources. It was noted there are two current vessels active in the fishery. Scott went over current Cooperative member LLP ownership attribution, including cumulative ownership of 7 individual partners in 5 LLPs.

Scallop deliveries by port from 1990-2016 were discussed. Discussion centered around a large number of deliveries that lacked a physical port, i.e Kodiak, Homer, but were listed as “undescribed”. Ryan Burt

(ADFG) explained the source of the “undescribed port” designation as data entry error and will provide updates in time for the April NPFMC meeting.

Finally, Scott presented a comparison of sea scallop values and imports. He explained issues related to scallop markets and peaks of demand driven by currency and seasonal adjustments. He also stated that it is possible that farmed scallop and wild catch scallop data could be comingled.

Historical Dredge Survey / CamSled Comparison

Mike Byerly gave a presentation on work that the Central and Westward Region staff did to compare dredge survey results to CamSled results in 2007 (Kamishak Bay) and 2008 (Kayak Island). He provided background on the Central Region’s historical biennial dredge surveys in Kamishak Bay and near Kayak Island, dating back to 1996 that are used to set GHLS; and on the Westward Region’s development of underwater video methods to use as an alternative to dredge sampling. At the time there was momentum towards moving to a fully camera-based assessment and replacing the dredge surveys. Because the Central Region had a time series of dredge estimates, studies needed to be done to determine how well the CamSled data correlated to the survey dredge data, and to provide insight on how the time series could be combined.

The main goal of this study was to get at least one year of overlap of the two survey methods, dredge and CamSled, in each of the two Central Region scallop beds, Kamishak and Kayak. A secondary goal was for the Central Region staff to be able to evaluate the strengths and weaknesses of the CamSled technology. In each bed a dredge assessment survey was conducted, followed by a CamSled survey over the same grid. All scallops detected using both survey methods were binned into small (< 50 mm), medium ($50 < 100$ mm), and large (≥ 100 mm) size classes. For the CamSled data, independent reviews were done between Central and Westward Region staff to examine between observer agreement of detection and size classes. The data between the two survey estimates were compared using bootstrap variance. Finally, the catch-efficiency of the dredge relative to CamSled was evaluated using both design-based estimators to compare the two survey methods (bootstrap variance) and regression for station by station variance (Model II; Major Access and Standard Major Access).

All stations were surveyed in the North bed of Kamishak with both the dredge and with CamSled. Several stations were dropped in comparisons due to low visibility, resulting in 42 useable stations. Between observer agreement of CamSled data was good for large scallops in Kamishak. Agreement for medium size scallops was not as good; the cause of this discrepancy was unknown. Agreement for small scallops was marginal, especially for high counts, but when all species of scallops were grouped the estimations improved suggesting that one set of readers was mis-identifying scallop species. Recent filtering methods on the cameras have likely improved the ability of observers to classify scallop species. Catch per unit effort for the North bed of Kamishak was presented for all size bins and both survey methods. Only the Central Region staff’s CamSled estimates were used in these analyses. Catch per unit effort of medium sized scallops had high variability between stations for both gear types, while small sized showed high variability in the CamSled survey and less in the dredge survey, likely due to the low catchability of the gear for the small sizes. When standardized survey estimates were compared for Kamishak, the dredge was catching about 5% of what CamSled was seeing for small scallops. Estimates were similar for medium size scallops. The dredge estimated 77% of large scallops compared to CamSled numbers. There was discussion about whether the dredge could be used for recruitment estimates, though if recruitment was high, that should be reflected in the preceding year’s age structure data.

The dredge survey was completed in all stations in the East bed of Kayak, and most stations were completed for the CamSled survey, resulting in 28 overlapping stations; the dredge sampled approximately half of the West bed, while CamSled had low visibility in several stations and several stations did not contain scallops, leading to the decision to drop the West bed data. There was high variability in the standardized CPUE for all three size bins, with much higher counts for large scallops

and low numbers for medium and small scallops in both survey methods. CPUE was much higher in Kayak than in Kamishak for large scallops. For the large scallops, the dredge estimated about 30% of the scallops relative to the CamSled. Estimates were not made for medium and low scallops due to the low sample size.

Preliminary regressions were run on raw data and square root transformed raw data to compare the Dredge CPUE to the CamSled CPUE for large scallops. There was high variability within stations for the dredge survey in Kamishak. Distribution was scattered, especially for higher counts. Kayak had more consistency in lower catches throughout the bed, with high numbers in the southwestern portion. Distribution was scattered with high counts away from the central portion of the data. Catch efficiency as measured by the regression had similar results to the design-based data for both survey areas.

Progress on Scallop Assessment Program

Bill Gaeuman gave the presentation focusing on the scallop survey results in 2017 and overviewing the scallop catch sampling methods. The 2017 statewide scallop survey covered ten scallop beds in the Kodiak Shelikof, Kodiak Northeast and Yakutat districts. In each bed, systematic sampling was used to select one out of every three 1 by 1 nautical mile sampling stations. In general, beds in the Yakutat district had the highest proportion of large scallops while Kodiak Shelikof bed 1 and Kodiak Northeast bed 3 were dominated by small scallops. Only two beds, Kodiak Shelikof beds 1 and 2, were surveyed in both 2016 and 2017. Total estimated scallop abundance increased in bed 1 and decreased in bed 2. Abundance CVs vary greatly among beds: from as high as 45%-46% for Kodiak Shelikof bed 2 and Kodiak Northeast bed 2 to a low of 15%-16% for Kodiak Shelikof bed 1 and Yakutat bed B. Increased sample sizes are needed in most beds to attain the target 20% CV.

Bill explained the use of meat weight, round weight and abundance number and wondered whether we need to report all these in the SAFE report. Jie Zheng commented that we should report all these.

Bill described scallop observer catch sampling methods and discussed the extent to which they facilitate estimation of catch and discard numbers of scallops. Bill explained that current protocols involve pseudo-random, representative selection of sampled hauls, with a daily sampling quota of 5 out of about 15-20 hauls/day. If there are two dredges fished, observers randomly choose one of them. For each haul, three representative baskets of retained catch are selected and weighed. Scallops in one of the three baskets are enumerated, and shell heights are recorded for a subsample of size 20. One basket of subsampled discarded scallops is collected and then sorted into intact and broken scallops. Broken scallops are weighed. Intact scallops are weighed and counted, and shell heights are recorded for a subsample of 20. All remaining discarded scallops are weighed. Observers are also required to count all clappers and break them apart before discarding them. Estimation of scallop catch and discard numbers using these data is relatively straightforward, with the exception of determining the number of broken scallops included in discard. Current observer sampling protocols should be adjusted to address this.

2018 Survey Plan

Quinn Smith provided an update on the 2018 scallop survey plan. Past surveys that couldn't be completed due to mechanical or weather issues allow use of remaining grant funds for a survey April and May. The goal is to conduct the surveys before spawning and before the GHL is set in mid-June. The current funding plan is a first trip, headed by Mike Byerly, to survey the Shelikof area and then to do experimental work on refinements of catchability coefficients before moving on to survey in the Kamishak area. The experimental work plan is presently under development. The second trip will survey Yakutat bed 3 (4-5 days) then beds 2, 1, and B in that order before moving on to bed EK1. This will be refined when budgets firm up; however, this is the priority plan for now.

The plan team also discussed whether there is a possibility of surveying the North Kamishak bed since it hasn't been surveyed since 2015. This is something of an open question at present and ADF&G staff will

evaluate conservation concerns on a large scale and will discuss the issue, internally, post plan team regarding how best to use EJ grant funds.

Potential State Regulatory Changes

Quinn Smith provided an update on the recent and proposed Board of Fish actions. He informed the plan team that Proposal 92, to remove a specific Weathervane scallop GHR for Area D16 and set GHR for all of Area D as a single DHR was recently adopted in a 7-0 vote and is being codified and will be in the new regulations in this upcoming season.

There are also four new proposals potentially affecting the scallop fishery coming up at the March Board of Fish meeting:

207: Allow retrieval of a personal use scallop dredge with a five horsepower, or less, hauler. This proposal was from the Mat-Su Borough.

210: Establish a fishing season for scallops in the Southeast registration district of Area K.

211: Reduced closed waters for scallops in the Southwest District of Area K.

215: Allows commercially caught scallops in Kamishak Bay District of the Cook Inlet Area to be delivered alive. Essentially this would allow a new market type.

Quinn noted that no new proposals regarding the State management plan have been made.

Review/response to SSC comments

2017 SSC comments:

Comment 1: The SSC strongly supports the 2016 survey sampling and continued efforts to implement a statewide scallop survey. This will provide for fishery-independent GHs that do not rely on standardization of fishery CPUE, and may support a refinement of the OFL/ABC approach based only on historical landings and discard mortality. This will also require further consideration of dredge efficiency, and aggregate survey catchability.

Response: The statewide survey continued in 2017 surveying the Shelikof, Yakutat, and Kodiak Northeast districts. Areas planned to be surveyed in 2018 include Shelikof, Yakutat, Kamishak, and portions of Kayak Island.

Comment 2: Progress on assessment modelling remains a priority for this species. With fishery-independent survey abundance estimates and associated age information available for some beds, this path appears promising. Efforts should first rely on bed-specific modelling, but could be extended to incorporate meta-population considerations (and possibly genetic information) in the future. The SSC is encouraged that ADF&G is in the process of hiring a Biometrician II to tackle this modelling in the near future.

Response: The SPT agrees on the importance of assessment modeling.

Comment 3: The SSC reiterates the need to compare and evaluate survey-based scallop abundance estimates and fishery CPUE. This can be approached both through time-series, as well as calibrations for which fishery-independent information is only recently available. Fishery CPUE standardization efforts should be continued, including an effort to provide standardized values on a similar scale as those observed in the raw data (back-transformed).

Response: Further work on CPUE standardization and comparisons between abundance estimates and fishery will be performed as funding and staffing levels allow.

Comment 4: The ageing protocol represents an important framework for future aging efforts. The SSC recommends using this protocol, but emphasizes that validation of some sort (perhaps O₁₈-based methods) is still required to determine the relationship between age estimates and true age. Specifically, the methods in the ageing protocol should not be confused with actual bias or precision. There are existing methods (e.g., Punt, A.E.; Smith, D.C.; KrusicGolub, K.; Robertson, S. 2008. Quantifying age-reading error for use in fisheries stock assessments, with application to species in Australia's southern and eastern scalefish and shark fishery. *Can. J. Fish. Aquat. Sci.* 65:1991-2005) available to deal with precision correctly – naïve estimates of reader agreement disregard the joint probability that matching age estimates are both incorrect, and therefore tend to overstate precision. The SSC reiterates its concern that a 'plus group' may be required for older ages at which reader agreement and/or relative bias may be unacceptable. The current protocol recommends that if ages cannot be resolved, the samples should be excluded (p.11, #3). However, this would bias the age distribution; it is preferable to aggregate these ages, rather than exclude them.

Response: Ageing protocols will be updated, and a validation study will be performed as funding and staffing levels allow.

Comment 5: The SSC recommends continuing to consider collecting data (survey and fishery) and managing in numbers rather than shucked or round weight – both of which appear seasonally variable.

Response: The SPT agrees.

Comment 6: The SSC continues to look forward to improved estimates of discard mortality rates, based on information provided in previous analyses.

Response: Further studies on discard mortality in the fishery will be performed as funding and staffing levels allow.

Comment 7: The SSC notes that both observer and VMS data are collected during scallop fishing but are not currently included in the Catch In Areas (CIA) database. The SSC recommends that ADFG staff work with NMFS staff to include these data in the CIA database so that they will be included in future fishing distribution and EFH fishing impacts analyses.

Response: Alaska Department of Fish and Game staff will examine the issues of data confidentiality. Once that issue is resolved integration of fishery and observer data into the CIA database will be completed as staff availability allows.

Research priorities

The Council’s terminology associated with research priorities was reviewed, followed by a review of existing research projects. The table on the following pages comprises the research priorities reviewed by the Plan Team. Modifications are highlighted in **bold red font**.

Research ID	Title	Description	Council/SSC Priority	Scallop Plan Team	Research Status
166	Estimate scallop stock abundance	Estimate scallop stock abundance in unsurveyed areas using fishery independent methods including analysis of current camera sled data.	Urgent	Strategic	Partially underway
171	Acquire basic life history information (e.g., natural mortality, growth, size at maturity) for data-poor stocks	Basic life history information is needed for stock assessment and management of data-poor stocks, such as scallops, sharks, skates, sculpins, octopus, grenadiers, squid, and blue king crab (Bering Sea), golden king crabs (Aleutian Islands), and red king crab (Norton Sound). Specifically, information is needed on natural mortality, growth rates, size at maturity, and other basic indicators of stock production/productivity.	Urgent	Important	Partially underway
173	Expand studies to identify stock and management boundaries	To identify and refine stock boundaries and understand source/sink dynamics (e.g., scallop metapopulations). Conduct studies to evaluate all crab stock boundaries relative to management boundaries (e.g., Bristol Bay red king crab, Adak red king crab, Pribilof blue king crab). Expanded studies are needed in the areas of genetics, mark-recapture, reproductive biology, larval distribution, and advection. Such boundaries are to be evaluated so that the risks and consequences of management actions are clear.	Urgent	Urgent	Partially underway
175	Develop age-structured models for scallop assessment	Age structured models for scallops are needed to increase understanding of population dynamics and harvestable surpluses.	Strategic	Important	Underway
203	Improve discard mortality rate estimates for scallops	Field and laboratory studies are needed to estimate Alaskan scallop discard mortality by evaluating relationship between capture, release condition and deck time, and subsequent survival.	Urgent	Urgent	Partially underway
207	Analyses of fishery effort and observer data for scallops	Potential for standardization of fishery CPUE data. Evaluate factors contributing to variable fishery CPUE.	Urgent	Urgent	Underway

Research ID	Title	Description	Council/SSC Priority	Plan Team	Research Status
223	Develop and evaluate global climate change models (GCM) or downscaled climate variability scenarios to assess impacts to recruitment, growth, and spatial distributions.	Quantify the effects of historical climate variability and climate change on recruitment, growth, and spatial distribution. Develop standard environmental scenarios (e.g., from GCMs) for present and future variability based on observed patterns.	Strategic	Strategic	No Action
224	Climate and oceanographic information covering a wider range of seasons	There is a need for climate and oceanographic information that covers a wider range of seasons than is presently available.	Strategic	Strategic	Partially underway No Action
251	Modeling studies of ecosystem productivity	Modeling studies of ecosystem productivity in different regions (EBS, GOA, and AI). For example, studies could evaluate the appropriateness of the 2 million t OY cap.	Important	Strategic	Underway No Action
361	Effects of Ocean Acidification on Scallops	Laboratory studies are needed to understand the mineralization of scallop shells through their life cycle and under current spatial variability and future scenarios of ocean acidification.	Strategic	Urgent	No action
362	Monitoring potential water quality impacts	Seasonal water quality monitoring in known scallop areas are needed to determine whether conditions are detrimental to scallop growth and survival.	Important	Important	No action
363	Area-specific variability in scallop population processes	Investigate area-specific variability in vital population processes including growth, recruitment, natural mortality, and movement including mark-recapture tagging studies. Bed-specific growth could be analyzed from archived shells.	Important	Important	Partially underway
367	Continue to improve stock assessment methodology with respect to uncertainty	Recent studies have made advances in determining effective sample size, effective number of parameters, Bayesian parameterizations, and how to weight datasets in assessments with multiple datasets. However, results appear to vary from paper to paper, and no general rules have emerged. Thus, our ability to characterize uncertainty remains elusive.	Urgent	Strategic	No action

Research ID	Title	Description	Council/SSC Priority	Plan Team	Research Status
472	Evaluate causes of variable meat size, undersized meats in scallops	Exploratory tows in the Bering Sea (District Q) and some areas open to harvest around Yakutat (District D) have shown scallops with disproportionately small meats relative to shell height. The cause of this condition as well as potential for recovery is unknown to industry.	Important	Important	Partially underway Completed in 2017 SAFE
511	Computerized image analysis of current camera sled data	Assessment of existing database of Cam-Sled images is needed to provide scallop counts and sizes, contributing to abundance estimates. Additionally, sediment and habitat type and presence of other organisms can be assessed.	Urgent	Urgent	Underway
513	Evaluate extent and importance of parasites in scallop populations	Samples from Bering Sea scallops with weak meats were collected and sent to the ADF&G Anchorage Pathology Lab for analysis of any evidence of diseases and/or parasites. The results showed that the scallops were infected with an apicomplexan-like parasite. To further evaluate the geographic extent and infection rates of this parasite, a sampling effort was initiated in July 2015 to collect samples from select locations across the state, from Yakutat to the Bering Sea.	Important	Important	Partially underway Underway
551	Estimate scallop survey catchability	Catchability of scallops in the fishery independent survey is needed to generate abundance estimates of scallops. Currently the survey provides only CPUE data.	Urgent	Critical Ongoing Monitoring	No action Partially underway
571	Age validation for scallop shells	The combination of O18 (an oxygen isotope) analysis and a benthic temperature model can be used to validate that the bands in cross sections of scallop shells are indeed annuli and can be used to determine scallop age. This method is less time consuming than other methods that require mark and recapture of scallops.	Pending	Important	No action (Grant not written yet)

SPT meeting for 2019

The Scallop Plan team will meet at the ADF&G office in Kodiak on February 20, 2019.

AGENDA

Scallop Plan Team Meeting February 21, 2018 ADF&G Building
Kodiak, AK
Wednesday February 21: 9:00am – 5:00pm

9:00 – 9:15 am

- Introductions and approval of agenda, schedule for SAFE compilation / minutes assignments (Smith)

9:15 – 10:00 am

- Status of Statewide Scallop Stocks and SAFE report-Catch specifications by area
 - Southeast (Smith)
 - Central Region (Byerly)
 - Westward Region (Nichols)

10:00 – 10:15 am

- Progress on Age based model Assessment (Zheng)

10:15 – 10:45 am

- Update on Fishery Economics (Miller)

10:45 – 11:00 - Break

11:00 – 11:20 pm

- Historical Dredge Survey / CamSled comparison (Byerly)

11:20 – 12:30 pm

- Progress on new scallop assessment program (Williams & Gaeuman)
 - Fishery Independent
 - Fleet based sampling

12:30 – 1:30pm Lunch

1:30 – 1:45 pm

- 2018 Survey Plan (Smith)

1:45 – 2:00 pm

- Potential state regulatory changes in the fishery (Smith)

2:00 – 5:00 pm

- Review/respond to SSC comments
- Research Needs
 - Research priorities: review and revise (Armstrong)
 - ~~Potential for additional analyses on MSY~~
- New business
 - SPT meeting for 2019

Adjourn