North Pacific Fishery Management Council
Steller Sea Lion Mitigation Committee Meeting
January 26-28, 2010
Alaska Fisheries Science Center, Seattle, WA

Minutes

The Steller Sea Lion Mitigation Committee (SSLMC) convened in Seattle at the Alaska Fisheries Science Center on January 26-28, 2010. Committee members present were: Larry Cotter (Chairman), Jerry Bongen, Julie Bonney, Kenny Down, John Gauvin, Pat Hardina, Max Malavansky, Frank Kelty, Stephanie Madsen, Steve MacLean, Glenn Reed, and Beth Stewart. Also present were Jeannie Heltzel and Bill Wilson (Council staff); Dr. Dan Hennen (NMFS, and SSLMC advisor); Dr. John Bengston, Dr. Tom Gelatt, and Lowell Fritz (NMFS AFSC); Sue Salveson and Melanie Brown (NMFS AK Region staff); John Lepore (NOAA General Counsel AKR); and other agency staff and members of the public. Several agency staff and members of the public also participated in the meeting through a web conference.

Chairman Cotter introduced staff and asked for a round of self introductions. Mr. Cotter informed the SSLMC that Jeannie Heltzel is the new Protected Resources Coordinator for the Council and will be the staff person for the SSLMC in the future; Bill Wilson will continue to also support the SSLMC under contract to the Council, at least through the BiOp review.

Mr. Wilson and Ms. Heltzel reviewed the agenda and the handouts provided to the committee, and provided an update on the status of the upcoming BiOp. The BiOp is scheduled to be released on March 1st. The SSLMC will meet the following week in Juneau on March 9-11 (and possibly the 12th) at the NMFS Alaska Region offices to receive a presentation of the BiOp from NMFS staff and develop comments for the Council.

Mr. Cotter noted that the primary purpose of this meeting was to receive presentations by staff from AFSC, ADFG, ASLC, UAF, and others on recent research findings relevant to Steller sea lions, and by NOAA General Counsel staff on legal issues. Other items included discussing NMFS's response to the Council's December 2009 letter on the BiOp and the CIE review process, and providing comments to the Council on the CIE terms of reference.

Presentations

Mr. John Lepore (NOAA General Counsel-AKR) gave a presentation reviewing key components of the ESA, including: the criteria for listing a species, the definition of critical habitat, and the definition of conservation; regulatory requirements for Section 7 consultations; and the role of Biological Assessments in the consultation process. Federal agencies are required to insure that any action authorized, funded, or carried out by the agency is not likely to jeopardize a listed species or adversely modify critical habitat. In the case of Steller sea lions, the Federal groundfish fisheries are the action triggering the Section 7 consultation. Federal actions are first screened with a Biological Assessment to determine whether the action is 'likely' to adversely affect a listed species or its designated critical habitat. If the BA determines that the action is 'likely' to have adverse effects, formal consultation is required and a Biological Opinion is prepared. A Biological Opinion is a written statement describing how the action affects the species or its critical habitat. Several questions were asked regarding the definition of 'likely'. Mr. Lepore noted that the common definition of likely is applied. Mr. Wilson noted that in past assessments, 'likely' has been a relatively easy trigger. For example, in 2006 NMFS prepared a BA which determined that the pollock fishery near St. George/Dalnoi Point was likely to adversely affect SSLs.

Mr. Lepore also provided the committee with a review of recent litigation concerning the adverse modification standard. The U.S. Ninth Circuit Court's 2004 decision in Gifford Pinchot vs. USFWS invalidated the regulatory definition of adverse modification of critical habitat, noting that the definition 'gives too little protection to designated critical habitat' and is inconsistent with other statutory requirements of the ESA which require protection of critical habitat essential to the conservation of a species. Mr. Gauvin asked if this is the most recent court decision on the adverse modification standard, and if there have been any conflicting court opinions. Mr. Lepore responded that the Gifford Pinchot case has not been challenged, and the resulting memo from NMFS (the Hogarth memo) on November 2005 formulated the agency's national policy on the adverse modification standard. Biological Opinions of NMFS now rely on statutory requirements of the ESA and not the regulatory definition for "destruction or adverse modification."

There were several questions for Mr. Lepore following his presentation. Mr. Cotter asked about designation of critical habitat (CH). When CH is defined now, the agency identifies Primary Constituent Elements (PCEs). If PCEs were not identified in the initial CH designation, the agency uses the physical and biological features that are essential to the survival and recovery of a species when determining impacts to CH.

Mr. Down asked whether the State waters fisheries are being considered in the upcoming BiOp. Mr. Lepore said that NMFS isn't consulting on the State-managed groundfish fisheries, because they aren't a Federal action. However, NMFS is considering the effects of the State parallel waters fisheries as part of the BiOp.

Mr. Henderschedt asked whether the SSL Recovery Plan can be modified in response to new information. Mr. Lepore replied that the current Recovery Plan downlisting and delisting criteria have not changed from the original plan, and if new information becomes available indicating that the current plan is insufficient, the RP would be revised again.

Mr. Lowell Fritz (AFSC) presented recent SSL pup and non-pup count data for the W DPS in Alaska and the E DPS, as well as a summary of changes in vital rates since the 1970s. Some of this information, particularly the results of the 2009 aerial survey, was also presented to the Council at its December 2009 meeting. Overall, counts of adult and juvenile (non-pup) SSLs in the W DPS increased by either 1.4% or 1.7% per year from 2000 to 2008 (depending on how the issue of seasonal movement between SE Alaska and the E GOA is treated). Pup production on W DPS rookeries increased by 1.7% per year from 2001 through 2009. All of these rates are not statistically different from zero. Dr. Dan Hennen noted that in order for these trends to be significant, more years of survey data or a steeper rate of increase is needed.

Mr. Fritz noted that there is considerable regional variation in W DPS SSL population trends in Alaska. Pup production and non-pup counts have declined at all rookeries W of 178°W in the Aleutian Islands (the W Aleutians and the western half of the C Aleutians). Both pup production and non-pup counts have increased in the E Aleutians, and E and W GOA. He noted that both sets of trend counts are largely stable in the eastern portion of the C Aleutians and in the C GOA. Non-pup and pup counts in the E DPS (in SE Alaska, British Columbia, Oregon, and California) continue to increase, indicating that this stock is recovering or has recovered.

Regarding the issue of seasonal (late spring) movement between the E and W DPSs, brand-resight data (n=38) collected at Kayak Island (the easternmost haulout in the W DPS) in early June 2009 indicated that an estimated 25% of the 800 to 900 SSLs observed there were from the E DPS. Mr. Gauvin asked why the trend data presented did not include the 2006 and 2007 surveys. Mr. Fritz

said that surveys were conducted during both years, but were truncated early in 2006 due to litigation. New survey equipment, poor weather conditions, and other logistical issues prevented the completion of the 2007 survey. Consequently, the 2006 and 2007 data were not included in the trend summaries presented but are available in other reports.

Mr. Fritz reported that increases in non-pup counts on rookeries within most W DPS regions in Alaska since 2000 indicate good recruitment to the adult breeding population, which reflects relatively high adult and juvenile survival in recent years. He noted that non-pup counts at haulouts in these same regions have decreased or remained stable, indicating low recruitment to the largely juvenile population at these sites. In regions with increasing populations (E Aleutians, W and E GOA), non-pup counts on rookeries are increasing faster than pup counts (while the opposite is true in SE AK). Pup-to-nonpup ratios are, on average, lower at rookeries within the W DPS than they are in SE Alaska. Mr. Fritz noted that these patterns are consistent with the hypothesis that birth rates have declined in the W DPS, and that they are, on average, lower in the W DPS than in SE Alaska (E DPS).

Mr. Fritz also noted that comparison of empirical measurements of survival (from resights of animals branded as pups) during different periods and in different areas, and demographic modeling of the C GOA population (Holmes et al. 2007) revealed that the W DPS population decline in the 1980s was associated primarily with a steep decline in juvenile survival, but was also accompanied by the start of a three decade long drop in natality, at least in the C GOA. Juvenile survivorship in the 2000s (as measured by sightings of marked animals) has rebounded to rates similar to those estimated for the 1970s prior to the decline, at least in the C GOA and E Aleutian Islands, with a smaller (though statistically significant) increase observed in the E GOA. The current estimates from marked animal resights in the E GOA are similar to those estimated from the life history transmitter satellite tags deployed by Dr. Markus Horning (OSU) and Dr. Jo-Ann Mellish (UAF/Alaska SeaLife Center). Current (2000s) estimates of female SSL survival in the W DPS are slightly higher than in SE Alaska (based on animals branded as pups in the mid-1990s).

Finally, Mr. Fritz summarized results from two recent food habits studies. In the Central AI, pollock is an important component of the SSL diet when and where it is aggregated in winter, but on an annual basis, pollock may only comprise <10%of the SSL diet in this area. In other areas, such as the GOA and E BS pollock is important year-round. At Dalnoi Point on St. George (EBS), scat samples collected in June 2009 found 80% frequency of occurrence of pollock, all >40 cm in length (commercial size).

Dr. Vladimir Burkanov (Natural Resources Consultants and NMML) reported on recent research on the Russian population of SSLs. Over a 20-year period from 1989 to 2009, nearly 7,000 pups have been branded, of which 2,600 (37%) have been resighted at least once. Most resightings occurred during the breeding season in June and July (72%). Based on the brand-resight data, the average and maximum distance traveled from each rookery was calculated. One animal from the Medny rookery in the Commander Islands was resighted at Chiswell Island in Alaska, over 3,000 km from the branding site.

Across rookeries, an average of 28% of animals are immigrants (were not born at that rookery). The rate of juvenile immigration was higher (41% males, 35% females) than the rate of adult immigration (20% males, 24% females). However, no animals moved to the Commander Islands from the Asian population. In the Asian population, total SSL abundance increased from 2000-2008, mostly due to an increase in the Kuril Islands. The Western stock, found in the Commander Islands, did not increase during this time period. The population trend in the Commander Islands is not likely correlated with large-scale commercial fishing activity, because there is a 30-mile no-

fishing zone around the Commander Islands. Dr. Burkanov noted that small-scale illegal fishing is likely occurring in the closed area.

Dr. Brian Fadely (NMML) presented an analysis of telemetry data on SSLs. The analysis only included data collected from 2000-2005. Since 2005, only a small amount of telemetry data has been collected by ADFG in Glacier Bay, but these data have not yet been analyzed. Satellite tags were placed on 116 juveniles SSLs aged 3 to 26 months by NMML and ADFG (the majority were 9-12 months old). Tags recorded location, dive depth and duration, and proportion of time at depth. The original analysis determined whether dive locations were 0-10 nm, 10-20 nm, or >20 nm from the nearest listed haul-out or rookery, or outside of critical habitat. In 2006 the SSL Mitigation Committee suggested exploring distance distributions by individual, rather than by 'cookie-cutter' bins. The purpose of the analysis was to determine to what extent critical habitat encompassed potential juvenile sea lion foraging locations.

Data were filtered to include only locations associated with dives to greater than 4m in depth and to remove duplicates. The results of the new analysis were generally consistent with the 2006 analysis in that most animals had at least 75% of their dive locations within 10 and 20 nm of a listed site and that proportions varied with age, season and region. Older animals (>10 months old) tended to forage farther from listed sites, particularly in winter. Juveniles in the central and western Aleutian Island areas had larger proportions of locations outside of critical habitat compared to other areas. Some animals were observed foraging beyond areas that are commercially fished.

There is a very limited amount of telemetry data in the NMML database available on a small number of wDPS adult females (n=28) marked from 1990-1993. Finally, Dr. Fadely noted that when compared with existing telemetry data the Platforms of Opportunity (POP) data shows broader spatial distributions. The POP data cover a much broader geographic area, and illustrate the limitations of current telemetry data.

Dr. Paul Wade (NMML) provided an update on recent killer whale research. Transient killer whales feed on a wide range of marine mammals, including various whale species, Dall's porpoise, harbor seals, sea otters, and SSLs. Surveys from 2001 to 2003 found an estimated 345 (95% CI: 255 to 487) transient killer whales from the C GOA to the C Aleutians (Durban et al. in press). Based on these abundance estimates and observations of predation events, it is estimated that killer whale predation could account for 40% to 80% of the natural mortality of SSLs in the W DPS. Similar estimates have been made for SE Alaska, where SSL numbers have been increasing. Killer whales would not be expected to cause declines in SSL populations under these assumptions, but more work needs to be done to understand the impacts of killer whale predation. Based on field observations of feeding events, and stable isotope measurements of skin samples, an estimated 7% of the diet of transient killer whales in the AI is comprised of SSLs.

Dr. Andrew Trites (University of British Columbia) reviewed a wide range of recent SSL research projects conducted by researchers at the North Pacific Universities Marine Mammal Research Consortium. One project modeled the combined effects of killer whale predation, commercial fishing, competitive interactions with arrowtooth flounder, and ocean climate on SSL populations in the Aleutians. The results showed that killer whale predation could be an important factor limiting population growth when the SSL population is low, but not when the population is relatively high. In another project, SSL skulls were measured to test the hypothesis that if food resources have declined over time, average skull sizes should also have declined. No evidence was found of a decline in average skull size over time at Alaska rookeries. Instead, the data indicate that young sea lions became larger after the population decline. Dr. Trites has documented variability in sea lion counts at several rookeries and haulouts. At one rookery, counts varied from 25 to over

200 individuals depending on the tide, time of day, and recent disturbance. Finally, Dr. Trites summarized the results of several recent lab studies on diet composition, energetics of diving, effects of season on nutritional stress, and SSL growth rates.

Dr. Lorrie Rea (ADFG) presented results from a wide range of recent field studies. Top research priorities were to assess age-specific survival rates, reproductive rates, movement patterns, and weaning rates in the W DPS. ADFG branded approximately 2,000 pups on rookeries from 2001-2005, and an additional 500 young of the year and juveniles that were dive-captured during 2001-2009. Observations of resighted females were used to calculate the proportion of breeding age females on rookeries with pups. This proportion was compared across females of different ages and at different rookeries. Overall, more than 50% of females on rookeries were observed to have pups accompanying them, with the peak at age 9, when approximately 65% of females had pups. Notable differences were observed across rookeries.

Brand-resight data were used to track short-term and long-term movements of animals across the E-W stock boundary. Most movements across the stock boundary were by younger SSLs, but in part this was a reflection of the age of branded animals (the oldest branded animals were 8 to 9 years old). Cross-boundary movements varied by sex and natal stock: 100 eastern-born SSLs moved west, and only 2 were females; 76 western-born SSLs moved east, and nearly half were females. Some W stock females were seen within the E stock annually since a young age, with 7 of these females eventually pupping in the E stock. However, one of these females returned to the west to pup in a subsequent year, making it hard to determine if this represents permanent emigration.

Finally, Dr. Rea presented data collected from 382 SSLs that were dive captured as pups (2-11 months old) between 1998 and 2005 in 4 regions (SE, PWS, GOA, AI). Extensive data were collected to assess body condition, diet, disease, and contaminant exposure. Mean body mass and percent lipid content in W stock pups was higher than in SE Alaska pups. Compared to other otariid species, there was no evidence of poor body condition or starvation in SSL pups in the first year of development. Concentrations of haptoglobin (an indicator of inflammation or disease) were higher in SE Alaska and PWS young of the year than in the AI or GOA. There was evidence of higher mercury concentrations in the hair of pups in the W stock as compared with pups in SE Alaska.

Dr. Ian Boyd (University of St. Andrews, Scotland) reanalyzed NMFS SSL count data through 2008. The objectives of his study were to define SSL abundances at all sites throughout their range, build data on the rate of change of the population distributions, and examine future population scenarios to test the hypothesis that the SSL is endangered. The analysis accounted for the effect of counting error, the incomplete nature of surveys, and the problems associated with using 'trend sites' to assess population status so that all data about the population is included in assessments. Dr. Boyd noted that both pup and non-pup numbers declined throughout the 1980s, but have been stable in recent years. This period of stability coincides with the period in which survey efforts have been the highest and conservation measures were established. In recent years, the pup to non-pup ratio has been approximately 0.25, which suggests that current productivity is close to or above the long-term mean, considering the period from 1990 to the present. The ratio is similar in the W and E stocks, and is consistent with fecundity rates in other pinniped species. Current population levels may be close to the long-term mean, depending on which years are used to calculate the average population level. Long-term stability in the population of the W DPS suggests that the stock may be close to carrying capacity. Dr. Boyd projected future population levels of both the Western and Eastern stocks. He noted that when recent trend data are included in the model, the results for the Western stock suggest increasing viability and that the probability of extinction has been extremely small for at least the past 10 years. For both the Eastern and Western DPS, the

predicted population trajectory indicated that conservation objectives have been met in every year since 1997.

Dr. Markus Horning (Oregon State University) presented recent research on satellite-tagging of juvenile Steller sea lions conducted in collaboration with the Alaska SeaLife Center. Since 2005, life-history (LHX) tags have been implanted into 27 juveniles 12-24 months old. All of the tagged animals were from the PWS-KF area. The tags have a life span of at least 10 years, and record body temperature and other data for each animal. Data stored through the life of the animal are uplinked via satellite only after the host animal has died and the LHX tags have been released from the decomposing or dismembered carcass. There have been 8 detected mortalities to date. Detection probability is estimated at >97%. In seven of the mortalities, the temperature profile data show a sudden drop in temperature from normal body core to ambient. This suggests that deaths occurred at sea due to sudden massive trauma, such as predation by killer whales or sharks. Mortalities that result from disease or starvation would be expected to show a more gradual decrease in body temperature. Data from the eighth mortality is incomplete, and no inferences concerning the cause of death were drawn. None of the LHX mortalities occurred near rookeries or during the summer months (June-September). In contrast, most direct observations by field researchers of SSL mortalities occur in summer months near rookeries, when researchers are monitoring breeding season activity.

Dr. Horning used a single vector, birth-pulse Leslie Population Matrix parameterized with annual survival rates adjusted from published data and LHX tag data and seeded with pup counts for PWS based on recent NMFS surveys. Mortality from predation was adjusted from the LHX tag data and added to the matrix. Using published estimates of adjustments to Steller sea lion vital rates the minimum natality was estimated from the matrix under stable or increasing conditions for the eastern portion of the W DPS. The estimated natality was >0.6 for the PWS region only. Dr. Horning also noted that using current predation data and the modeling exercise described, around 50% of females born in this region are consumed by predators before primiparity (at age of 4 years). Dr. Horning concluded that these data and modeling suggest predation on juvenile SSLs rather than low natality may be the primary impediment to SSL recovery in the PWS area.

John Maniscalco (Alaska SeaLife Center) reported on recent findings at Chiswell Island. Remote cameras installed in 1998 around the island provide full coverage of the rookery, and allow for year-round, real-time observations. In addition, more than 200 SSLs were marked, which represents about 30% of the pups born from 2000-2009. Counts of SSLs ≥1 year old conducted in July-August have increased by approximately 4% per year since 1999 on Chiswell. Pup production has remained stable.

Natality rates were estimated based on extensive behavioral observations of breeding-aged females (≥5 years old) on the rookery. The natality rate is defined as the proportion of females who give birth, assessed based on late-term pregnancy status, and includes stillbirths. The natality rate on Chiswell was estimated to be 69% (± 2.5%) from 2003-2009. This was consistent with pre-decline SSL natality rates and contrasted with the estimated C GOA natality rate of 43% in Holmes et al. (2007). The Holmes et al. estimate is based on population modeling using aerial photos rather than direct field observations.

There was no indication that adult females on Chiswell were nutritionally stressed. Females that gave birth in a given year had a higher probability of giving birth in the following year than females not giving birth. In a nutritionally stressed population, females that give birth in a given year would be expected to have a lower probability of giving birth the following year compared to females who that did not give birth in the previous year.

Finally, data on the cause of pup mortalities was collected. The source of mortality depended on the age of the pups, and differed greatly across years. During the first two weeks, abandonment and surf caused the majority of pup mortalities. During August and September, when juveniles began to enter the water to forage, killer whale predation was a common cause of mortality. Mr. Maniscalco noted that on most rookeries, field researchers are typically present during the breeding season (June-July) and may miss the peak occurrence of killer whale predation events in August and September.

Dr. Russ Andrews (Alaska SeaLife Center) reported on recent technological innovations in SSL research developed specifically to study the foraging ecology of adult females. New instruments include a stomach temperature sensor, an accelerometer to detect 'strikes' at prey, and head-mounted satellite tags. The head-mounted satellite tags were deployed on 3 adult females in Russia in 2005, and collected up to 11 months of data. Tags were attached using a newly-developed surgical technique so that they remained on the animals beyond the annual molt. Finally, a head-mounted digital camera was developed and deployed to record high-resolution images of foraging trips near rookeries.

Dr. Andrews reported on field work conducted at 10 rookeries in Russia. Currently, the Recovery Plan considers the entire population of SSLs in Russia/Asia to be part of the Western stock. A publication distinguishing the Asian stock (Kuril Islands, Sea of Okhotsk and Sakhalin Islands) from the Western stock (Eastern Kamchatka, Commander Islands and Western Bering Sea) will be available soon. SSL abundance in the Asian stock is increasing, but the W stock is not recovering.

Research priorities were to promote cooperative pup brand/resight programs in Russia, deploy instruments to obtain fine-scale data on SSL foraging habitat, study energetic costs of foraging, and assess SSL response to changes in prey availability. Studies were conducted on several rookeries with increasing trends and several with decreasing trends. Dr. Burkanov reported earlier on the brand/resight work. Dr. Andrews presented results from research on the length of maternal foraging trips, dive duration, diet composition, and foraging behavior. Head-mounted digital video cameras were mounted on 9 SSLs, and high-resolution images of foraging trips were recorded. SSLs primarily fed on Atka mackerel on the bottom; some salmon and pollock were taken in the water column. All video work was conducted at Lovushki Island, where SSL numbers are increasing (and commercial fishing occurs).

Dr. Andrews would like to extend this study and look at foraging success in the Commander Islands, where commercial fishing isn't occurring. This work is especially relevant since the Commanders are part of W stock, and SSLs have been declining. This would allow a comparison of the Commander Islands to the Kuril Islands, and provide data on foraging range of animals and success rate in an environment similar to the Aleutians. Predation by killer whales may be affecting SSL populations in the Commanders.

Dr. Libby Logerwell (AFSC) presented recent work by the Fisheries Interaction Team (FIT). Two studies examined the effects of fisheries on localized depletion of SSL prey species. A study in the Kodiak area examined localized depletion of walleye pollock due to fishing. Acoustic surveys were conducted before and after the August commercial fishing season in sites open (Barnabus) and closed (Chiniak) to fishing. Pollock abundance estimates for Barnabas in 2001 exhibited high variability, but not in response to fishing. In 2004, pollock abundance decreased between the pre-fishing and post-fishing periods. During the last set of surveys in 2006, pollock abundance did not decrease after fishing, but fishery removals were substantially lower than in 2001 and 2004.

Another study in the Cape Sarichef area examined localized depletion of Pacific cod in response to fishing. Surveys were conducted before (January) and after (March) the most intense period of commercial fishing. Areas inside and outside the trawl exclusion zone at Cape Sarichef were surveyed. The study was initiated in 2001, and pilot studies were conducted in 2002 and 2003; the experiment was fully successful in 2004 and 2005. Pacific cod abundance increased between January and March in both fished and unfished areas. Possible explanations for these results: fishery removals were not large enough to affect local abundance; fish disperse and repopulate fished areas quickly; the spatial scale of the experiment was too small to detect an effect; or a combination of these effects. This work was published in 2008. Ongoing Pacific cod tagging studies at Unimak pass have found that most tagged fish are recovered within 100 nm of where they were tagged, but some fish made longer movements. A new NPRB-funded project will estimate movements of Pacific cod in the BS from summer feeding areas to winter spawning distributions.

Dr. Logerwell summarized the results of an Atka mackerel tagging project conducted in the Aleutians from 2000-2006. The objective of the study was to measure abundance of Atka mackerel inside and outside of four trawl exclusion zones, and to determine whether fish move from inside to outside of the exclusion zones. Fish were tagged and released in June-July and recaptured in September-October. The efficacy of the trawl exclusion zones at mitigating competition between sea lions and commercial fisheries varies geographically. There is a small movement of fish from inside to outside the exclusion zones at Seguam, Tanaga and Kiska, and a large movement at Amchitka. In addition, the biomass of Atka mackerel at Amchitka is relatively small. The other exclusion zones (Seguam, Tanaga, Kiska) have a relatively large biomass of Atka mackerel. Based on food web modeling, it appears that Atka mackerel abundance at Seguam, Tanaga, and Kiska is sufficient to support SSLs at their current abundance, but not at Amchitka. Model results suggest that Atka mackerel abundance is sufficient only at Seguam to support SSLs at their 1977 abundance estimates. This work is currently being prepared for publication and has been provided to PR for consideration for the BiOp.

In 2008, another study examined potential interactions between SSLs and fisheries in the Central Aleutians, focusing on pollock. The goal of the study was to determine whether cooperative biomass assessments and surveys could be an effective way to manage fisheries at the local scales that are important to predators such as SSLs. SSL distributions at haulouts in the Central AI were not strongly correlated with the spatial distribution of pollock, but the diets of Steller sea lions on haulouts near areas where high densities of pollock were observed showed high frequency of occurrence of pollock. The study concluded that although pollock abundance in the Central AI is relatively low, local pollock aggregations are an important food resource for SSLs during winter, and interactions with fisheries are possible.

Finally, Dr. Logerwell reported on preliminary results of models examining relationships between groundfish harvest rates and SSL non-pup counts. There appears to be a negative relationship between Atka mackerel harvest rates and non-pup trends in some Aleutian Islands areas in model runs using data back to 1991, but no such relationship for the 2000-2008 period covering the SSL protection measures currently in place. The relationship would suggest that as estimated harvest rates increased, non-pup counts decreased. The opposite trend appeared to exist for the Pacific cod and pollock fisheries, with a positive association between Pacific cod and pollock harvest rates and non-pup counts in the BSAI and GOA. However, the regressions used to model these relationships generally had relatively high P-values (<0.25) and these associations are inconclusive. Dr. Logerwell also examined relationships between oceanographic conditions and SSL non-pup counts in the Aleutians, and found that some indicators, such as chlorophyll counts, decrease farther west in the Aleutians.

Kate Wynne (UAF-Kodiak) reported on recent work by the Gulf Apex Predator (GAP) study around Kodiak. The objectives of the study are to examine what the trophic-level effects of past baleen whale removals may have been relative to SSLs, and what effect whale recovery might have on SSL carrying capacity. Ship-based Russian whalers operating from the 1948-1972 period removed a huge number of whales from the GOA. For example, logbook data show that as recently as 1965, 2 whaling ships operating near Kodiak removed 873 fin whales, 566 humpback whales, and 1821 sperm whales, as well as smaller numbers of other whale species. The GAP study hypothesizes that such removals affected the GOA trophic system. Baleen whales primarily feed on zooplankton and forage fish, and removing whales from the system may have had bottom-up effects on the GOA ecosystem by making these resources available to other predators.

In recent years, humpback and fin whale populations in the north Pacific have been increasing by 6% and 4.7% per year, respectively. As a result, the prey base is now being shared by more consumers, and there is the potential for competition among species with overlapping diets, and a reduction in carrying capacity for SSLs. The study is focusing on two areas: diet of humpback and fin whales in the Central GOA and their population abundance, seasonal distribution, reproductive rates, and stock structure.

Committee Discussion

Data Tables from BiOp

Ms. Melanie Brown (NMFS) gave a brief overview of the tables and figures provided to the committee by NMFS PR that show the amount of groundfish catch inside critical habitat. The committee was disappointed that PR wasn't available to answer questions and provide more information on the tables.

There were numerous questions about the tables and concerns about the presentation of the data:

(1) It was not clear why arrowtooth flounder was a focus of the tables, in addition to the 3 SSL prey species.

(2) The figure showing the RCAs would be much more useful if it showed latitude and longitude delineations for the boundaries of the 10 areas; it is difficult to see where the boundaries are from the maps provided.

(3) NMFS indicated that the tables are based on extrapolated observer data. There is more than one way to extrapolate observer data, and additional information is needed understand the significance of these data, particularly a comparison of the catch estimates to the TACs and biomass estimates for each fishery.

(4) Why was 1999 chosen as the base year for comparing later years (2005, 2006, 2007, and 2008)? Are the results different if another year (e.g., 1998, 2000) is used as the base year?

(5) The seasonal catch data are reported in a misleading way in the figures showing quarterly catch in each fishery. The figures report catch (mt) on a seasonal (quarterly) basis, which gives the impression that in some fisheries seasonal apportionments (e.g., GOA Pcod 60/40 A/B split) are not being adhered to by inseason management. It is important to show how these aspects of the SSL protection measures have worked.

(6) Catch in the 0-3 nm zones appears to be underrepresented, particularly in the GOA, and is higher than expected for some fisheries in some areas (e.g., Atka mackerel in the Aleutians).

(7) Are the State waters groundfish fisheries included in the tables?

(8) How were the amounts of catch around rookeries and haulouts calculated in cases where these zones may overlap?

(9) The tables comparing the percentage of catch in CH among years should account for differences in the relative abundance of the species (i.e., TACs and biomass estimates) among years.

(10) The SSLMC is especially concerned that the tables do not appear to include an evaluation of all of the SSL management measures and their effect on the prosecution of the groundfish fisheries. For example, current measures were intended to reduce catch rates by day, week, or season (e.g., Atka mackerel and Pacific cod) and not data were presented to evaluate whether these objectives were achieved).

All of these combined data issues raise red flags to the Committee. Given these omissions, errors, and lack of breadth in the data tables, the SSLMC is concerned over the use of such information in the upcoming BiOp.

BiOp Schedule

NMFS staff informed the committee that the internal NMFS BiOp review process begins on February 1, and the draft BiOp is still scheduled to be released on March 1. The SSLMC asked whether NMFS Sustainable Fisheries can reject the draft BiOp during the internal review process, and whether NMFS is still compelled to release the BiOp. Mr. Lepore informed the committee that the document currently being prepared is only the draft BiOp prepared by NMFS Protected Resources; when the BiOp is final it will be NMFS' document.

CIE Terms of Reference

The SSLMC is concerned that the reviewers have been given an unrealistic amount of background reading material for a 10-day assignment. In addition to the extensive list of background documents (BSAI and GOA FMPs, etc.) that the reviewers have been assigned to read, will the CIE also review the SSLMC and NPFMC comments on the BiOp, and NMFS' response to these comments?

NMFS letter to the Council

The SSLMC strongly believes that the BiOp should compare SSL survey data from 2000 to 2008/9 to evaluate the effectiveness of the SSL protection measures. The committee is concerned that item (4) in the NMFS letter indicates that the agency will use a 30-year trend to assess the population, yet none of the presentations by NMML staff on the trend counts have used a 30-year period.

The SSLMC suggests that reexamination of the boundary between the E DPS and the W DPS is warranted *vis a vis* the genetic composition, and recent use of, rookeries at White Sisters and Graves Rock. The SSLMC understands that both SSL sites have been occupied only very recently (an estimated 20 years), and the genetic composition of these animals includes haplotypes (mitochondrial DNA sequences) that were commonly found in the western stock, but had not been seen in the eastern stock. Gelatt et al. (2007) found that both Graves Rock and White Sisters rookeries contained haplotypes that were commonly found in the western stock, but had not been

seen in the eastern stock. At Graves Rock and White Sisters, approximately 55% and 30% of the sampled pups, respectively, showed western stock haplotypes. It seemed to the committee that inclusion of these animals in the E DPS may be inappropriate if they are indeed W DPS animals, regardless of how these counts have been classified in the past. If new genetics and movement information is available that clarifies this issue, the agency should consider this in this BiOp.

Legal issues

The Adverse Modification standard is not clearly defined or interpreted in case law, and the SSLMC believes this poses a potential problem given the apparent inclusion of a firm recovery standard (the SSL population must increase annually for a 30-year period) based on the recovery plan, which is only a "guidance document" and not law. The SSLMC is also concerned over the lack of a clear definition of "conservation" as it applies to the Adverse Mod standard.

Recent scientific findings

The SSLMC thanks the presenters who provided new scientific information on SSL populations, diet, vital rates, predation, and movements in Alaska and Russia over the past three days. The quality and scope of these presentations was excellent, and new information is greatly helping the public understand the status of the SSL population in the north Pacific and interactions with fisheries. The killer whale ecology information was particularly informative, especially Dr. Wade's new data on killer whale abundance, movements, and diet, and Dr. Horning's work on SSL predation based on new life history (LHX) tagging work. The SSLMC requests that NMML provide as soon as possible the brand-resight information for all SSL sites where this work has been done in graphic and numerical form similar to the format of the data provided by Dr. Burkanov for the Russian SSL sites.

The SSLMC notes that the Holmes et al. (2007) natality information is only potentially relevant to the specific subarea (Central GOA) examined in the paper, and cannot be extrapolated to other areas in the range of the W DPS. New work on natality in the eastern part of the W DPS clearly shows much higher natality estimates than those estimated in Holmes et al (2007). The SSLMC also notes that Dr. Boyd's analysis indicates that current levels of pup productivity are similar for both the E DPS and W DPS, and may be close to the long term mean for the population overall.

When using pup to nonpup ratios to estimate SSL abundance trends, the SSLMC notes that where known emigration or immigration occurs in such areas as the western Aleutians (evidenced by Russian brand/resight data for nearby areas), these ratios may not be comparable to ratios calculated in other subareas given the potentially large amount of movement of individuals into or out of these subareas, confounding the efficacy of calculating, much less comparing, these ratios.

The committee expressed concern about assumptions that may be made when rookery counts decline in one area, absent movement information derived from marked animals. For example, movements among rookeries could explain declines at rookeries in one area and increases in another area. Pooling rookeries within a given subarea may provide a snapshot of the trend in that subarea, but subarea groupings are arbitrary and do not account for movements among subareas. Again, the brand-resight data requested from NMML above would provide insight into these movement patterns.

Mercury contamination may be a potentially large issue in the health of SSLs in portions of their range, particularly in the west. The SSLMC believe greater emphasis should be placed on

evaluation of contaminants and disease in all subareas of the SSL – these factors could be important in regulating SSL abundance, and recovery, in some areas.

Severe weather and some oceanographic parameters (chlorophyll, sea surface temperature) may be impacting SSL abundance in some subareas in ways that are not understood; but some new work indicates potentially strong negative correlations between stormy subareas and SSL trends in abundance. More work is needed to evaluate correlations between these oceanographic indicators and SSL abundance trends in areas of the W DPS.

The SSLMC is greatly concerned over the recent AFSC research correlating SSL non-pup abundance trends to harvest rates in certain groundfish fisheries and areas; new information from the FIT group presented to the SSLMC showed some very weak to non existent relationships with P-values of 0.25, and are thus insignificant and very preliminary at this time. The SSLMC believes that this kind of analysis should not be used in the upcoming BiOp. However, if it is contemplated that this analysis should be incorporated into the draft BiOp, it should be fully vetted and peer reviewed prior to such use.

New information showing the potential for competition between humpbacks and other large whales with SSLs was of particular interest to the SSLMC. The trophic-level analysis from blubber and data on whale abundances and distributions may shed light on the potential reduction in carrying capacity for SSLs as a result of increases in whale populations.

Future research

The SSLMC strongly encourages NMFS and NMML to place high priority on SSL monitoring and research, including brand resight work, and killer whale predation, in the C and W Aleutians. The SSLMC recognizes the permitting issues. However, Russian studies of SSLs in fished and unfished areas (reported on by Dr. Burkanov and Dr. Andrews) show some interesting and potentially informative correlations, and lack of correlations, between fishing and SSL trends. The SSLMC recommends that the Council ask that a commitment be made for long-term research and monitoring in this area and to prioritize funding this work in future years.

The meeting adjourned at 4pm on January 28.

North Pacific Fishery Management Council
Steller Sea Lion Mitigation Committee Meeting
January 26-28, 2010

Alaska Fisheries Science Center, Seattle

Purpose: Receive databases, reports, and other updated information requested by the Committee to prepare for review of the upcoming draft *status quo* Biological Opinion; identify other information relevant to the BiOp review; discuss BiOp review process

AGENDA

January 26 - 8:30 AM – 5:00 PM

1. Introductions and Opening Remarks, Announcements, Agenda Approval (Cotter)

2. Minutes of Last Meeting (Heltzel)

3. Update on draft *status quo* BiOp (Heltzel, Wilson)

4. Receive Updated Information on SSL-related research (see attached schedule of presentations)

January 27 – 8:30 AM – 5:00 PM

5. Continue Review of Updated Information

January 28 – 8:30 AM – 5:00 PM - **AFSC**

6. Continue Review of Updated Information

7. Define Additional Data Needs

8. Discuss BiOp Review Process and Committee Meeting Schedule

9. Action Items, Closing Remarks, Adjourn (Cotter)

Public comment periods will be provided during the meeting.

Contact Jeannie Heltzel or Bill Wilson at the Council offices if you have questions: 907-271-2809 or jeannie.heltzel@noaa.gov or bill.wilson@noaa.gov