PACIFIC SCIENTIFIC REVIEW GROUP

A Regional Advisory Group to the National Marine Fisheries Service

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February 10, 2011

Dear Dr. Schwaab,

We would like to provide you with the minutes and recommendations from the most recent meeting of the Pacific Scientific Review Group held 16-18 November 2010. The SRG commends the NMFS for its rapid response and high-quality research regarding false killer whales. The SWFSC and PIFSC worked together to secure shiptime and funding to conduct a much-needed survey of the Hawaiian archipelago. A Biological Review Team has conducted a Status Review of this species, including a Population Viability Analysis. The PIFSC has increased the size of its small marine mammal program conducting research on cetaceans. The SRG encourages the PIFSC to continue strengthening this program. It was also gratifying to hear that the Hawaii longline fishery Take Reduction Team has come to a concensus on a draft Take Reduction Plan.

Once again, the SRG compliments your NMFS staff for their excellent presentations, outstanding research, and support of the SRG. In particular, the SRG would like to single out the long-time contributions of Dr. Tom Eagle who attended his last meeting with us prior to his retirement. Tom has proved to be a wealth of information about the PBR process and NMFS management policies. He has been forthright and informative in his responses to our recommendations and inquiries and has been responsible for maintaining consistency and communication among the three SRGs. We will miss Tom greatly.

Sincerely,

Michael Scott

Michael Scott
Chairman, Pacific Scientific Review Group

cc: Distribution list (attached)

Minutes for the Pacific Scientific Review Group Meeting
Royal Kona Hotel, Kona, Hawaii,
November 16-18, 2010

The 21st meeting of the Pacific Scientific Review Group (SRG) was held at the Royal Kona Hotel in Kailua-Kona, Hawaii from 16-18 November 2010. All SRG members were present except for Robin Brown and Doyle Hanan. Karin Forney served as rapporteur. Michael Scott served as chairman of the SRG. The SRG members and other participants are listed in Appendix 1, review documents are listed in Appendix 2, and the agenda of the meeting is in Appendix 3.

General Management Updates
MMPA policy updates: Tom Eagle provided updates on MMPA-related activities within NMFS. Melissa Andersen has been coordinating three national working groups to develop policy on serious injury determination for marine mammals, and a draft policy is expected to be available for public review and comment during spring 2011. Lisa Ballance provided details on a workshop to address and update guidelines for assessing marine mammal stocks (GAMMS III), which will be hosted by SWFSC during February 2011 and is expected to address many national-level issues. Two Pacific SRG members are invited to attend.

2011 List of Fisheries: Nancy Young presented updates to the 2011 List of Fisheries. A number of classification changes were made for Pacific fisheries to take into account changes in species taken during the last 5 years, stock identity of animals taken in high-seas fisheries, and updating superscript designations that indicate whether certain species are driving the classification for a given fishery. It was noted that the wording of 'treaty fisheries are exempt' would be more accurate if it stated 'only non-treaty fisheries are included' because some fisheries have both treaty and non-treaty components. NRDC has petitioned NMFS to re-categorize the Hawaii troll fishery as Category II because vessels are known to catch tuna by trolling through herds of spotted dolphins and there is some evidence of injuries to dolphins. This fishery includes both recreational and commercial components.

Pacific Islands Management
Hawaiian monk seal management update: Nancy Young described recent activities related to Hawaiian monk seals. These include developing the monk seal recovery program and response network, conducting scoping meetings to solicit public comments on the development of a programmatic EIS for monk seal research and enhancement, documenting mortalities (such as toxoplasmosis or fishing gear), hiring an assistant recovery coordinator, contracting with a Hawaiian issues cultural liaison, and revising critical habitat for monk seals. Toxoplasmosis has been known to occur in the Hawaiian Islands for a long time and may be transmitted from urban run-off, but the method of transmission is not known definitively. The PIFSC staff has reinitiated a shark-removal effort at French Frigate Shoals, but only one shark has been removed so far.

Hawaiian spinner dolphin management: Nancy Young reviewed an ongoing project to gather systematic baseline data in advance of the implementation of new regulations, to allow evaluation of their effectiveness. The SRG indicated interest in receiving more details about the overall plan next year, and inquired about stepping up enforcement for tour operators advertising illegal activities. Prosecutions are difficult, however, and there are difficulties associated with

restricting traditional access to bays and with widespread disregard of the MMPA.

Insular false killer whale ESA listing petition: Nancy Young provided updates on NMFS activities related to a petition to list insular false killer whales under the ESA. On 5 January 2010, NMFS issued a finding that the petition presented substantial information indicating that ESA listing may be warranted, and a Biological Review Team (BRT) was convened to conduct a status review. This Status Review, including a population viability analysis (PVA), for insular false killer whales was published in August 2010. On 17 November 2010, NMFS announced its determination that the Hawaiian insular false killer whale is a distinct population segment (DPS) and proposed to list the DPS as endangered (75 FR 70169). The Draft Take Reduction Plan for false killer whales includes measures to reduce the likelihood of takes of insular animals in longline fisheries.

The SRG requested some clarification on the insular false killer whale PVA conducted as part of the status review, specifically whether the estimated average 9% decline was driven by the 1989 Reeves *et al.* (1989) aerial survey count, and whether the results would have been different if Robin Baird's more recent abundance estimates of about 150-170 animals had been used. Erin Oleson explained that the recent Baird estimates had in fact been used in the PVA, although it is now known that they are overestimates because of missed matches in the photo-ID catalog. Further, some of the simulations excluded the 1989 counts but nonetheless indicated a marked decline. All 45 simulations indicated a decline, with an average rate of decline of about 9% and a Bayesian 95% probability interval of (4.7% - 12.3%). This indicates that no single PVA element was a determining factor, but rather that the full set of data strongly supported the estimated rate of decline of about 9%.

Svein Fougner inquired about the precedent of using an endangered definition of "5% probability of extinction over 75 years." Oleson indicated this was based on other listing decisions, and that there are not specific criteria for listing marine mammals. Tom Eagle said that a 1% chance of extinction in 100 years was considered a threshold for endangered.

False killer whale Take Reduction Plan: Nancy Young provided an overview of the Take Reduction Team (TRT) process during the past year. A pre-TRT meeting was held in November 2009 and the TRT was established in January 2010. The scope included the takes of three false killer whale stocks in HI longline fisheries. Four meetings were convened between February and July, and working groups and conference calls were active between the meetings. The team came up with a consensus Draft TRP, which NMFS is using as a basis for developing rulemaking. The proposed rule is not available yet, but Young summarized the measures in the Draft TRP. The TRT's recommended regulatory measures focus on the deep-set longline fishery and would require the use of weaker circle hooks which straighten out rather than hook marine mammals, and which may prevent the branchline from snapping during an interaction. The TRT also recommended requiring owner/captain training in marine mammal handling and release, and posting of placards showing what the captain and crew should do when handling marine mammals. The TRT recommended a year-round "Northern Exclusion Zone," which would eliminate the seasonal contraction of the existing Main Hawaiian Islands longline exclusion zone, and the creation of a "Southern Exclusion Zone" that would be closed to deep-set longline fishing if certain take triggers are met. Recommended non-regulatory measures include a weak-hook experiment, increasing observer coverage in the deep-set longline fishery to 25%, notification of the TRT of any false killer whale or 'blackfish' (*i.e.*, false killer whale or pilot whale) takes, expediting the determination of injury severity, implementing changes to observer

training and protocols, expediting the processing of Hawaiian Islands Cetacean and Ecosystem Survey (HICEAS 2010) data, and reconvening the TRT every six months for two years following plan implementation to allow adaptive management and monitoring. The TRT also made a variety of research recommendations. The SRG discussed aspects of the plan and requested some further details on specific measures, including the logistics of skipper/crew training. SRG members indicated that continued research is required not just on the pelagic population, but on the insular stock as well.

PIRO Observer Program update: Michael Marsik presented information on interactions in the shallow-set (6), deep-set (11), and American Samoa (0) longline fisheries since the last SRG meeting. Shallow-set included 7 Risso's, 1 striped, 2 bottlenose, and 1 unidentified dolphin, all outside the US EEZ. Reporting is based on landing year, and not the take date. The deep-set fishery (with 20% coverage) took 4 false killer whales (1 outside, 3 inside EEZ), 1 bottlenose dolphin (outside EEZ), 1 Risso's dolphin (inside EEZ), and 1 blackfish (inside EEZ).

Lloyd Lowry gave an AK SRG perspective on observer programs and monitoring impacts using methods other than Nmin and mortality estimates. The AK SRG would like to see more latitude to use various sources of information to verify whether takes are occurring and their magnitude. For example, humpback whales seem to get tangled in virtually all areas and multiple observer programs may not be necessary if whale-watch boats can monitor takes. Observer programs are very expensive, and many AK fisheries are unobserved and thus have no documented takes even though the gear types are known to take marine mammals. Instead of spending money on multiple observer programs, one could put resources instead on take reduction. The use of trend surveys could perhaps be used instead of absolute abundance estimates to monitor impacts. This will be brought up at the GAMMS III meeting.

Insular false killer whale Status Review: Erin Oleson provided an overview of the insular false killer whale Status Review, which summarized all available information, including relevant published and unpublished reports and data. Goals were to determine whether the population qualified as a distinct population segment (DPS) and, if so, evaluate its extinction risk. Team members were chosen from within NMFS to cover broad expertise relevant to Hawaiian false killer whales. The status review presents information on general false killer whale biology, genetics, and historical, current, and potential population densities. The BRT determined that insular false killer whales were a distinct population segment, using established criteria, applying a system of plausibility points to questions underlying the designation. The Status Review document outlines the full suite of questions considered and the arguments for/against each, and conducted a 4-step risk assessment: 1) identification of potential threats, 2) assessment of threats by severity, geographic scope and level of uncertainty, 3) a PVA analysis, and 4) assessment of extinction risk. It was suggested that additional haplotypes could be determined from animals previously captured by Sea Life Park.

Pacific Islands Research

2010 Hawaiian Islands Cetacean and Ecosystem Survey: Erin Oleson provided an update on the HICEAS 2010 survey, conducted as a collaboration between PIFSC and SWFSC on the *McArthur II* and *Oscar Elton Sette*. The survey uses traditional line-transect and ecosystem sampling, as well as acoustics. Preliminary results show higher sighting rates than during the 2002 HICEAS survey, with 6 visual false killer whale sightings on effort and a total of 14 false killer whale sightings. Objectives included using acoustic and other data to improve precision and accuracy of abundance estimates. The survey will end in early December, and then visual

and acoustic data will be processed. In February the PIFSC/SWFSC will develop plan for analysis and work on producing abundance estimates, hopefully having preliminary results by the next SRG meeting. There are also plans to make an acoustic beaked whale abundance estimate.

False killer whale genetics update: Karen Martien reviewed recent genetic analyses of additional false killer whale samples, with greater numbers of mtDNA and nDNA markers and additional strata. In general, results are consistent with previous analyses. HI Insular whales are statistically different from all other strata, with high estimates of divergence (<<1 migrant per generation) allowing local differentiation to occur. Based on genetic diversity, the effective population size is about 52 animals (up from previous 45, but more precise). No evidence of a population decline was found in the expanded dataset, but the statistical power to detect a decline in the insular population is very low, because the decline happened over less than one generation and genetic methods require 3-5 generations. New methods that were examined include an assignment test, which is not yet reliable with the available number of markers (although 3 out of 4 Palmyra were strongly excluded as coming from insular population). Future research needs include additional samples, additional microsatellite markers, and sequencing the entire mitochondrial genome (~16,000 base pairs) rather than just the D-loop (~1000). For killer whales, a tree based on 1000 base pairs showed little global structure and little bootstrap support for groupings (LeDuc *et al.* 2008), but when the full mitochondrial genome was sequenced (Morin *et al.* 2010), patterns fell out clearly with residents, transients, Antarctic killer whales separating cleanly. This technique also allows divergence times to be estimated, showing divergences times for killer whale types between 150,000 and 700,000 years ago. The split between Antarctic B and C is related to a non-neutral gene related to cold tolerance and habitat associations. This mitogenomic approach could be applied to false killer whales in the future.

Spotted dolphin genetics update: Sarah Courbis provided updates on additional analyses conducted to examine spotted dolphin genetics in Hawaii. Results continue to indicate population structure within the Hawaiian Islands. Courbis has submitted a manuscript for publication and received reviews back for this study, and this research would be available for next year's SARs.

Hawaiian monk seal research update: Jenny Schultz presented information from a collaborative study with Jason Baker that looked at genetics of NWHI and MHI populations, which are demographically distinct (declining -4% vs. increasing 7%). The key question was whether there were genetic differences (reflecting local adaptations) that could cause translocations to be detrimental if the moved individuals are less fit in their new habitat. Overall conclusions are that there is little evidence for genetic subdivision, translocation to enhance pup survival would not likely result in genetic incompatibilities, and the species can be managed as a single stock. Given that males were translocated during the early 1990s, an analysis using only females is underway.

Hawaiian monk seal SAR: The SRG reviewed the monk seal SAR, with no comments for revision.

Other Hawaiian cetacean research updates: Robin Baird presented information from photo-ID, tagging, and genetic studies of melon-headed whales. Encounter rates of this species are low, but the photo-ID catalog includes ~50,000 photographs from Hawaii and Palmyra. Jessica Aschettino did a Master's research project looking at social networks, and found at least two

populations within Hawaiian waters; one cluster of animals uses shallower water off the NW coast of Hawaii and another cluster uses waters ~1500m deep off Kauai, Oahu, and Hawaii. A third cluster was seen only once, and it is unclear whether it might link up to the other two populations or is a different population. Satellite-tagged individuals either moved offshore nearly to the edge of the EEZ, or stayed off NW Hawaii. Karen Martien estimated a dispersal rate of around ~1/1,100 years. Genetic analysis shows all pair-wise comparisons between MHI, Palmyra, Johnston, and Hawaii resident populations are significant. Photographs show evidence of line injuries and gunshot wounds and this species is susceptible to impacts from high-intensity anthropogenic sound.

Baird also presented updates on beaked whale studies. There is evidence for small populations of Cuvier's and Blainville's beaked whales with limited ranges offshore of the island of Hawaii as well as a resident population of melon-headed whales in the same area. All three species are known to be susceptible to impacts from high-intensity sounds such as mid-frequency sonar. (Cox *et al*. 2006; Southall *et al.* 2006; Zimmer and Tyack 2007; Brownell *et al.* 2009). Protecting these small distinct populations would require area closures on the west side of the Big Island, where there are also pygmy killer whales and short-finned pilot whales, and high resighting rates for dwarf sperm whales

Erin Oleson presented an update on other research activities, including piggy-back surveys on the *Sette* as it headed to the Marianas. The cruises included transit surveys around Wake, Guam and the Marianas, and small-boat work around Guam, Tinian, and Saipan. Species seen included sperm whale, spotted dolphin and spinner dolphin; and some biopsy samples were obtained. The first circumnavigation of Wake documented a few more species than were previously recorded: minke whale, sei whale, and humpback whale. Two cetacean observers participated in a survey in the Marianas, documenting Risso's dolphins, pilot whales, and spotted dolphins.

There are six long-term acoustic monitoring stations off Kona, Kauai, the Ladd seamount (recently moved to P&H reef), Palmyra, Wake, and Saipan. Goals include monitoring baleen whale occurrence, migration patterns, and stock structure, beaked whale occurrence, species ID, response to noise; false killer whale ID and stock structure. Combining results with stations off AK, WA, CA, and Baja resulted in interesting patterns of fin whale sounds suggesting resident and migratory populations.

Photo-identification work on spinner dolphins has continued. Marie Hill has been matching photographs to estimate abundances for recently split stocks. Over 1000 distinct animals have been identified, with only one match between Oahu and Hawaii. Mark-recapture estimates are planned for next SAR revisions.

Completing cetacean stock assessment needs for all Pacific Islands, would require over 500 days at sea and this is not realistic, so PIFSC has been looking into ways to do research with other methods. Jeff Polovina is evaluating the use of sea-gliders to detect and locate cetaceans, and collect oceanographic data. One test deployment to an eddy SW of Oahu has been completed and will be evaluated in the coming year.

Central Pacific cetacean density models: Karin Forney presented preliminary cetacean density models for the central Pacific for 10 species based on the 2002 HICEAS, 2005 PICEAS and 1997 SWAPS surveys. The modeled densities are broadly consistent with published density estimates, but provide additional spatial resolution. Models revealed a previously unknown high

density area for false killer whales north of the NWHI, which was found during HICEAS 2010 to be a productive warm-water region with a shallow thermocline and high densities of many seabird and cetaceans. Thus, the model appears to have picked up on a real ecological pattern. Models also indicated expected higher densities of false killer whales around Johnston and Palmyra Atoll. Models for cryptic species (small beaked whales, *Kogia*) did not perform well, likely because of limited effort in calm seas state that allow detection of these species. Future work will include quantitative validation (not presently possible with the available data) when the 2010 survey data are available, and a report is being prepared.

Cetacean serious injury determinations, HI longline fisheries: Karin Forney presented information on serious injury determinations for cetacean takes in the Hawaii-based deep-set and shallow-set fisheries. Interactions for which determinations could be made were similar in nature to past serious/non-serious injuries, but four interactions had insufficient information to make a determination. The SRG reviewed the available information for these four interactions and agreed that they should remain 'cannot be determined.' When estimating total mortality and serious injury, these interactions are pro-rated based on the proportions of documented serious/non-serious interactions.

Cetacean interactions in Hawaii-based longline fisheries: Marti McCracken presented updated estimates of cetacean interactions that lead to the death or serious injury of the animal during 2005-2009. During 2009 there were 7 observed false killer whale interactions outside of the EEZ in the deep-set fishery – this is a greater number than in past years. Since 2000, there have been 10 blackfish interactions in the deep-set fishery and one in the shallow-set fishery, all within the EEZ. Based on 50 total false killer whale or pilot whale interactions, Marti developed three models for prorating blackfish to each species: 1) proportional, 2) distance to shore, and 3) latitude/longitude models. All three models yielded similar 5-yr estimates of takes. Prorating was also investigated for assigning estimated takes within the insular/pelagic overlap zone to each stock (7.0 in 2003 and 6.1 in 2006). Methods assume the insular and pelagic stocks interact with fisheries at same rate. Three different assumptions were tested: 100% area utilization (each population has full use of overlap zone), 50% area utilization (each population has an effective area used of 50% the total area), and a distance to shore model with 50% effective area used, whereby the density of insular stock decreases with increasing distance, and the density of pelagic stock decreases with decreasing distance (using a logistic function). Based on the locations of takes, the 2006 take is more likely to be pelagic when method 3 is used than with the other methods. Average 5-year estimates are similar (Insular 0.6, 1.0, and 1.1; Pelagic 10.2, 10.0 and 10.6 (including prorated blackfish). There are insufficient data to choose any single method as the 'best,' although there was some discussion whether the logistic is most consistent with the satellite data and other biological considerations (species densities tend to be lower at edges of range). Tom Eagle pointed out that in AK and Atlantic regions, animals are double counted, once for each stock as a precaution. The SRG chose not to do this but agreed that the logistic model method was better than the previous constant density model.

False killer whale SAR: New information for the Draft 2011 SAR includes the additional genetic information (Chivers *et al*. 2010) and population size and trend information from the Status Review (Oleson *et al*. 2010). There was some discussion about the recovery factor for the insular stock, given that insular false killer whales have been proposed for ESA listing but are not currently listed. The SRG recommended using a recovery factor of 0.1, based on the population's small size, declining trend, and proposed listing as endangered under ESA. The pelagic stock's abundance estimate is now > 8 years old, so no PBR can be calculated, but a very

low Nmin could be calculated as the maximum observed group size during 2010 (51 animals). Erin Oleson solicited input whether additional information on the lack of demographic data and trends should be included. The SRG agreed that the SAR should not use the maximum group size observed during HICEAS 2010 as the Nmin for pelagic stock but rather should state that no PBR can be calculated. Further, mortality and serious injury estimates should include the distance-from-shore proration of blackfish and the logistic-model overlap zone prorating of insular and pelagic animals presented by Marti McCracken.

CA/OR/WA Management

Southwest Region fishery and management updates: Monica DeAngelis provided a recap of California TRT status and recommendations, and she presented information on past and planned observer coverage for California fisheries. The TRT will not meet again unless there is new information, takes exceed 10% of the PBR for a stock, or observer coverage drops below 10%. During 2009-2010, observer coverage included the large-mesh drift gillnet (13% coverage). Fisheries with observer coverage during 2010 included large-mesh drift net (20%), deep-set pelagic longline (100%), southern California setnet (20%), and small-mesh driftnet (20% beginning in June 2010). The 2011 observer plans include continued monitoring of the above fisheries, plus the coastal pelagic purse-seine fishery. The SWR has also increased capabilities for dealing with entangled whales, and is working on a characterization of risk based on geographic overlap of trap fisheries and humpback whales. Pinniped deterrence work has also continued (a contract with Hanan and Associates) to examine the effectiveness of pulse-power devices, seal bombs, and gear modifications to reduce depredation.

The region is also writing a new negligible impact determination (expected in early 2011) for humpback, fin and sperm whales in Category I and II fisheries, as the previous one expired in October 2010. There was one self-report of a humpback whale in the driftnet fishery off San Diego in January 2009, and this might require the category for this fishery to change back from III to II. The fin whale recovery plan was finalized in July 2010, a sperm whale plan will be finalized by Feb 2010, a sei whale plan is expected in late 2011/early 2012, and the blue whale plan will be updated after that. Wave and tidal energy development is increasing, and there is increased interest in potential interactions and impacts. The SWR also hosted a vessel collision workshop in May 2010 to improve understanding of vessel collisions and review available information and research needs. Recommendations included a request to SWFSC to collate available distribution data, the identification of methods to determine potential impacts to each stock, the development of a process to identify and fill data gaps, including shipping data, and to comment on the Port Access Route Study currently underway by U.S. Coast Guard. NMFS will conduct a risk assessment for ship-whale collisions by combining whale and ship density surfaces. The timeline for this is tight (March 2011), and the project will include an examination of potential shifts in shipping traffic.

Large whale ship strikes: Monica DeAngelis summarized sources of data on vessel collisions, which are all opportunistic (vessel reports, stranding network) and provide only limited information. Species involved include gray, blue, fin, humpback and sperm whales. Areas of greatest confirmed reports are areas where whale concentrate near ports. A seasonal peak is in April (gray whales) and the number of reports has increased from <4 in 1990s to 10 so far during 2010. An unusual mortality event (UME) might be declared for 2010.

John Calambokidis presented information on strandings involving ship strikes in Washington. The proportion of whales with evidence of ship strikes shows an increasing trend from ~5% in

1970s to >30% in 2000s. Adding information on the amount of ship traffic would be useful. Off San Francisco, they have tagged humpback and blue whales to learn about distribution relative to shipping lanes. Whales were concentrated in the lanes that are now preferentially used to accommodate air pollution requirements, and ships appeared to follow along the shelf edge, increasing the amount of time in whale habitats, rather than entering the lanes perpendicular to shelf which would reduce risk to whales. Whales do not actively appear to be avoiding ships, but rather are crossing paths and closing distance to ships as the ship passes by. There is a hint of some delayed reaction causing whales to spend more time at surface following dives.

CA/OR/WA Research

Humpback and blue whale trends in abundance: John Calambokidis presented trends in estimates of abundance for humpbacks and blue whales. One only gets unbiased blue whale estimates when coast-wide cruises are done (most recently done in 2008), but using only the coastal samples, annual estimates show a small but significant increase. Annual humpback whale abundances for CA/OR are still increasing (~7%), but precision is decreasing as population grows and a smaller proportion is sampled, so efforts are being made to obtain more photos.

Cetacean behavioral response study: Jay Barlow described a research project being conducted with John Calambokidis on behavioral responses to loud sounds off Southern California. They have completed the first of what is expected to be a multi-year study. This effort targeted a variety of cetacean species over the course of multiple weeks using two vessels, and involved playing different types of sounds (at a lower source level than actual sonar). The playbacks (controlled exposure experiments) were done at relatively close range to mimic much louder sounds produced by a more-distant vessel. Using a variety of tags (D-tags, limpet tags, GPS tags), 62 deployments were completed on nine species including blue, fin, sperm, sei, Cuvier's, Baird's, and killer whales, as well as bottlenose and Risso's dolphins. It appears that there is a relatively high density of Cuvier's beaked whales on the range. Reactions ranged from no reaction to avoidance, depending on the species and individual. Barlow is also working on developing a portable method of acoustically detecting and tracking beaked whales so they can be tagged in areas where the weather is better, rather in the windier offshore areas used by Navy.

2009 CA/OR driftnet fishery bycatch: Jay Barlow summarized 2009 bycatch estimates for the CA/OR driftnet fishery. Observer coverage was lower than in the past (13%), and overall bycatch was low and did not involve any strategic stocks. One leatherback sea turtle was taken in the fishery. Fishing effort continues to decrease, and beaked whales have not been taken since pingers were required during the 1990s. For common dolphins, post-pinger takes are about 50% of pre-pinger takes, although they are variable. There is concern about increase in CA sea lion depredation rates, and Jim Carretta is investigating causes. So far, it appears that the increase can be explained by shift of the fishery into areas with more CA sea lions, and an increase in overall CA sea lion abundance. There is no evidence of pingers having a 'dinner bell' effect.

California sea lion SAR: Three subspecies of California sea lions have now been recognized as full species, so subspecies designations were removed from the SAR. Five genetically distinct stocks have recently been identified, with the Pacific temperate stock being the only one in U.S. waters. The population continues to increase and now numbers almost 300,000. A logistic growth curve suggests that population growth rate is slowing and population is approaching K. It is likely above OSP, but a full OSP determination would require taking historical fishery

mortality into account. Total bycatch is greatest in southern CA setnet fishery, but limited data are available. The SAR also includes new information on recreational and commercial hook-and-line fisheries, lethal removals authorized in the Columbia River, and accidental takes in research trawls.

CA Harbor seal SAR: Updates to the CA harbor seal SAR include new abundance estimates that are based on a recent survey and use a newly developed correction factor for animals that were in the water. The most recent estimate is slightly lower, probably due to variation in the proportion hauled out or a slight variation of the population size, which appears to be leveling off and might be at carrying capacity. The setnet fishery is the greatest source of mortality, but observer coverage has been limited.

Potential gray whale SAR changes: Lisa Ballance noted that gray whale research responsibilities have been transferred to the SWFSC, and there has been recent interest and activity (*e.g.*, re-listing petition). Logistics would be simplified if the SWFSC also takes over responsibility for the gray whale SAR and includes it in the Pacific reports to the Pacific SRG. Another option is to have both the AK and Pacific SRGs review the SAR. The SRG is willing to review this species. John Calambokidis indicated that there is a need to resolve the issue of summer resident gray whales that have recently been documented to be genetically distinct from animals in the Baja lagoons. This has implications for Makah whaling EIS and IWC involvement. SWFSC plans to revisit the genetic information and will present this at the IWC meeting.

Distinct Population Segments for humpback whales: Jay Barlow presented an update on the Biological Review Team convened by NMFS to conduct a Status Review of humpback whales. The team has held three meetings in 2010. Photo-identification and genetic analyses of whales on feeding and breeding grounds show marked physical and genetic separation, so the condition of discreteness was met for 16 breeding areas. The significance criteria applied differently to the different breeding populations. Most of the criteria referred to the taxon, and therefore the BRT reviewed the taxonomic status. A Society for Marine Mammalogy committee on taxonomy provided a majority opinion that North Atlantic, North Pacific and Southern Ocean humpback whales would likely be different subspecies, and the Arabian Sea would likely belong to Southern subspecies. One or more significance criteria were met by 15 of the 16 breeding areas, with only mainland Mexico and Revillagigedos being combined. The risk assessment analysis has categorized each breeding area as either high risk, moderate risk, or not at risk of extinction within the span of 3 generations (60 years). This is still an ongoing process, and final recommendations are not yet available. NMFS plans to address the issue of breeding *vs*. feeding stocks at the upcoming GAMMS III workshop, because this complicates the allocation of impacts in feeding areas within U.S. waters and currently allocation is inconsistent for different stocks. The SRG suggested one option might be to make a 'stock complex' SAR that presented combined information.

Fin whale genetics: Karen Martien presented information on work by Eric Archer on fin whale genetics and population structure within the Pacific. There are currently two subspecies defined (Northern and Southern Hemisphere), but the northern hemisphere samples were only from the Atlantic. Eric Archer has recently looked at North Pacific samples, and there appears to be strong population structure within the North Pacific. There are some fixed differences (N. Atlantic, Antarctic, Gulf of California). Pairwise tests among nearly all strata are significant except for the Bering Sea *vs*. the Gulf of Alaska and Bering Sea *vs*. CA/OR/WA tests. SWFSC is doing mitogenomics to try to resolve this. Completed results are expected to be available at

the next SRG meeting.

Southern resident killer whales: Brad Hanson (by phone) provided updates on the population size and deaths in the population. The minimum population size as of July 2010 is 86. Progress has been made on biopsy sampling (a paper has been submitted on pedigree analysis) and satellite tag deployments (a permit is currently undergoing public review). The loss of 4 young adult males is troubling, although pedigree analysis indicates a single male is responsible for most of the calves. Hanson was asked why southern resident killer whales are so dependent on Chinook and do not eat sockeye salmon when Chinook are not available and he answered that there is substantial variability in strength among Chinook runs. Hanson argued that salmon management must take into account the whales' requirements. The SRG suggested that Figure 1 in the SAR is difficult to read and could be improved.

Southern sea otter SAR: Lilian Carswell (by phone) presented an overview of status and management for the southern sea otter. The range has retracted slightly at both ends, probably because of relocation of males from the edges. Three-year average counts are slightly down, keeping the average below the delisting threshold. San Nicolas I. is about 45, up from 39, but the growth rate has slowed. Mortality has been about 8-10% of the spring count. Female end-lactation syndrome and liver failure caused by toxins have increased, but the importance of disease as a driver of population dynamics is not clear. There is an ongoing study led by Tim Tinker comparing otters in a high-density areas with high (Monterey) and low (Big Sur) anthropogenic impacts. Preliminary results indicate similar survival rates and time spent feeding. Diet differs somewhat, with more clams, chitons, crabs and urchins in Monterey *vs*. more abalone and mussels in Big Sur. Monterey has higher exposure to pathogens. Monterey animals were also more exposed to xenobiotic stressors. USFWS will have more complete results next time. A supplemental EIS for the translocation program is still in progress; USFWS plans to have a revised draft in 2011 and a final SEIS in 2012. The SAR does not have any new fishery information or other major changes, but it addressed a public comment from the Marine Mammal Commission recommending the use of a minimum population estimate that was not a raw count or 3-yr average, but rather the log-normal 20^{th} percentile of 3-year counts. The SRG expressed skepticism about this approach, because the 20^{th} percentile was intended to apply to a statistical estimate, and recommended that the lesser of the latest count or the 3-yr average be used. There was also discussion about the use of uncorrected counts, and the SRG requested that a comparison of uncorrected and corrected counts be presented at the next meeting (or a rationale of why this was not possible). Carswell requested a more streamlined system for obtaining information from NMFS on levels of observer coverage, and the NMFS SWR indicated this would be possible.

WA Sea otter update: Deana Lynch (by phone) reviewed information on WA sea otters and explained that there were no substantive changes so the SAR was not revised. Lynch stated that an initial study placed the population within OSP, but more recent data suggest the population is below the threshold and there are concerns about carrying capacity calculations, because the number of otters has continued to increase in areas of high Dungeness crab abundance, where otters were previously assumed to be at carrying capacity. Jon Scordino inquired why the current recovery factor is 0.1 when the species is not listed as federally endangered (although it is WA State listed). The SRG suggested this topic could be reviewed at the GAMMS III meeting, but Jay Barlow cautioned that GAMMS meeting will not be able to focus on regional issues, only national-level issues. The SRG would like to review this question at the next meeting.

OR/WA harbor porpoise SARs: Marcia Muto (by phone) presented information on two updated harbor porpoise SARs, which include new mortality information, but no new abundance estimates. There were slight changes in average annual mortality and serious injury estimates, and the range map in the WA Inland was updated to reflect the previous change in the Northern OR/WA outer coast stock. The abundance estimates for both stocks are >8 years old, so the SARs should no longer calculate a PBR. John Calambokidis noted that two things have occurred since the last surveys that would further support not reporting a PBR – an unusual mortality event (UME) and distributional shift or expansion back into Puget Sound. John Calambokidis also pointed out some corrections to the stranding information and noted that there seemed to be some inconsistency with listing tribal fisheries in the table.

Sperm whale population structure: Karen Martien reviewed information on male sperm whales that depredate fisheries in Alaska and reported on a study to identify where they came from. Currently there is only one 'North Pacific stock' that is found in Alaska, in addition to the CA/OR/WA and Hawaiian stocks. Nuclear and mtDNA genetic markers indicate that animals in the California Current are demographically independent and should continue to be managed as is. Hawaii shows mtDNA difference, but not nuclear, although the sample size is small. Alaskan male sperm whales appear to be a mix from all other areas, indicating that Alaska is a feeding ground for males from different stocks, including Hawaii, California Current, eastern tropical Pacific and probably the western Pacific waters off Russia. This raises the question of how to allocate mortalities in Alaska and deal with this in SARs. Currently it is not possible to assign the animals genetically, so some sort of prorating would be required, but the proportions of each stock are unknown. Robyn Angliss (by phone) inquired whether PBR would be exceeded anywhere if entanglements from Alaska are apportioned to the other stocks. The PBR for CA/OR/WA is small and Hawaii has expired abundance information. SWFSC is currently doing mitogenomics, but it is uncertain when results would be available. Robyn requested that Karen present this information to the AK SRG in February. John Calambokidis also suggested tagging data could be informative. The PSRG would like to hear what AK SRG thinks about this.

Topics, Timing, and Location for Next Meeting

The next meeting of the SRG will be in the NW Pacific, likely in Seattle. The PIFSC requested that the next SRG meeting be held January or later due to budget constraints during the first fiscal quarter, however, this may conflict with SRG member availability.

Potential agenda items are:
1) Spinner dolphin research and management
2) GAMMS III Workshop report
3) Grey whale status and SAR
4) Global genetics of fin whales
5) CA sea otter corrected counts
6) WA sea otter status and recovery factor
7) Harbor porpoise status
8) Harbor seal status
9) Alaska sperm whales
10) HICEAS survey results
11) Spotted dolphin genetics
12) False killer whale status

Review of Previous Research and Management Recommendations

The SRG recommends the Pacific Islands Fisheries Science Center (PIFSC) Protected Species program continue to build its small cetacean research program. The SRG notes that a cetacean survey should be conducted in Hawaiian waters by 2010, and that planning for such a survey should be initiated soon, given the complex planning and extensive resources required for such a survey.
The Hawaii survey is currently being conducted and personnel have been added to the PIFSC staff.

The SRG recommends continued studies of movements, abundance, genetics, and depredation behavior on fishing gear of false killer whales and other cetaceans around Hawaii and in the Central and Western Pacific to better understand stock structure, population trends, and potential fisheries takes. Additional tagging should be focused to determine differences in ranging patterns on windward and leeward sides of the islands and more information is needed about near-shore fisheries that may potentially take false killer whales to determine whether fishery mortality has played a role in the apparent decline in the insular population.
Studies continue around Hawaii.

The SRG recommends that continued investigations be conducted on the causes of large whale ship strikes and effective ways to mitigate them.
The SW Region has held a workshop to identify data needs and assess threats. It is convening a working group to assess risk.

The SRG recommends that harbor porpoise assessment surveys be conducted off Oregon and Washington and in Washington inland waters in light of the long duration since the last surveys, the Unusual Mortality Event that occurred in this region since the last surveys, and the evidence for recent ecosystem changes and shifts in distribution of harbor porpoise into Puget Sound.
The NWFSC has conducted two summer small-vessel surveys of the main basin of Puget Sound to estimate distribution and abundance and is currently working on the estimates.

The SRG recommends that a brief statement should be added to the SARs that indicates the level of certainty about the key elements (abundance estimate, stock structure, human-caused mortality) used for determining the status of the stock) together with a prioritized list of information or research needed to improve the assessment for that particular stock.
This topic will be discussed at the GAMMS III Workshop.

The SRG recommends that the stock structure of humpback whales be revised to reflect the mixed stock structure revealed by the SPLASH study. There are clear genetic differences among different feeding areas and among breeding areas but without a one-to-one connection among individual feeding and breeding areas. The SRG recommends that PBRs be calculated and all takes be apportioned among feeding areas and separately among breeding areas in such a way that it insures protection of each of these areas individually.
This topic will be discussed at the GAMMS III Workshop.

The SRG recommends that NMFS safely mark entangled cetaceans (*e.g.*, PIT tags, genetic sampling, visual tags, VHF/UHF tags, photo-identification) before they are disentangled to assist with identifying individuals, to help assess the effectiveness of disentanglement efforts, and to provide probabilities of mortality after entanglement injuries.

This is being done.

There are no current abundance estimates, and thus no PBRs, for harbor seal stocks in Oregon and Washington and the SRG recommends that new surveys be conducted. If regularly monitored, these stocks could serve as good indicators of environmental change (such as from global warming or anthropogenic causes).
No progress has been made.

The SRG recognizes the need for NMFS to address conflicts between spinner dolphins and human swim-with-wild-dolphin activities off Hawaii. The SRG recommends more resources for enforcement of regulations. The SRG supports ongoing development of new more-enforceable regulations to better protect spinner dolphins and, where possible, recommend these also address the threat of harassment on other Hawaii cetaceans especially because restrictions related to spinner dolphins may result in increased targeting of other species.
New research is being conducted and management closures are being considered. PIRO expects to publish proposed regulatory management measures in Spring 2011.

The SRG recommends NMFS conduct regular surveys of Necker, Nihoa and the Main Hawaiian Islands to obtain abundance and trend information of monk seals on those islands. These populations appear to be increasing and now substantially influence the total abundance trend.
Surveys have been done and camera monitoring will begin on Nihoa.

RESEARCH AND MANAGEMENT RECOMMENDATIONS
Pacific Scientific Review Group – 16-18 November, 2010

The SRG recommends continued studies of movements, abundance, genetics, and depredation behavior on fishing gear of false killer whales and other cetaceans around Hawaii and in the Central and Western Pacific. This information is needed to better understand stock structure, population trends, and potential fisheries takes. For the insular stock of false killer whales, additional tagging could help determine differences in ranging patterns on windward and leeward sides of the islands and additional nearshore surveys could help monitor the population trends. The use of emerging technologies (such as gliders) may allow the more-economic collection of oceanographic data to elucidate distribution patterns and habitat use.

The SRG recommends that the NMFS, in cooperation with the State of Hawaii, collect more information about Hawaiian near-shore fisheries to determine whether fishery takes of marine mammals are significant and how they can be reduced. Additional partners (such as sport and commercial fishing organizations and environmental groups) could also help explore ways that hook-and-line fishing gear and practices can be modified to reduce marine mammal takes.

The SRG supports NMFS' initial efforts to address conflicts between spinner dolphins and human swim-with-wild-dolphin activities off Hawaii and develop new regulations to address these conflicts. While the SRG recognizes the limited resources available for MMPA enforcement, it also notes that such activities are well-advertised and openly conducted. The SRG recommends the expeditious enforcement of existing regulations to encourage compliance and better protect spinner dolphins and other Hawaiian cetaceans.

The SRG recommends that the U.S. Fish and Wildlife Service calculate corrected-count abundance estimates for southern sea otters and present these at the 2011 meeting of the SRG. If this is not possible, the SRG requests the rationale why counts cannot or should not be corrected.

The SRG recommends that NOAA include the need for acoustic detections of marine mammals in the design and deployment of buoys and ocean gliders. Recent increases in placement of ocean buoys and utilization of ocean gliders by NOAA and NOAA partners is creating potential opportunities to gather much needed acoustic signals from marine mammals. NOAA's recent request for proposals stated that "A central tenet of the NMFS Advanced Sampling Technology Working group is to promote collaboration within NOAA, particularly among NMFS Science Centers."

The SRG recommends continued efforts to document and study ship strikes of large whales. Ship strike mortality has increased to the point where it may impact whale populations. Whales suspected of being ship struck should be 1) examined by marine mammal experts as soon as possible to identify species, 2) determine the cause and time of death, 3) collect life history information, and 4) provide photographic documentation of the event. The SRG also recommends that NMFS partner with the U.S. Coast Guard to consider potential impacts to whales when modifying patterns of shipping traffic.

The SRG recommends that NMFS work with the U.S. Navy to establish the area off the NW side of the Island of Hawaii and the Alanuihaha Channel as an exclusion area for mid-frequency sonar use. This area appears to include the range of a resident group of melon-headed whales as well as those of resident populations of Cuvier's and Blainville's beaked whales. All three of

these species are known to be sensitive to naval mid-frequency sonar.

The SRG recommends that harbor porpoise assessment surveys be conducted off Oregon and Washington and in Washington inland waters in light of 1) the long interval since the last surveys, 2) the Unusual Mortality Event that occurred in this region since the last surveys, and 3) the evidence for recent ecosystem changes and changes in distribution of harbor porpoise into Puget Sound. This is particularly important given that PBRs can no longer be calculated because abundance estimates are greater than 8 years old.

The SRG recommends that new surveys be conducted for harbor seal stocks in Oregon and Washington. There are no current abundance estimates, and thus no PBRs, for these stocks.

Appendix 1

Attendees at the 21st Meeting of the Pacific Scientific Review Group

Scientific Review Group - Pacific Region:

Hannah Bernard	Hawai'i Wildlife Fund
Robin Brown	Oregon Department of Fish and Wildlife (*Not attending)*
John Calambokidis	Cascadia Research
Mark Fraker	Terramar Environmental Research
Doyle Hanan	Hanan & Associates, Inc. (*Not attending)*
Jim Harvey	Moss Landing Marine Laboratories
Chuck Janisse	Fisheries expert
Steve Jeffries	Washington Department of Fish and Wildlife
Katherine Ralls	Smithsonian Institution
Michael Scott	Inter-American Tropical Tuna Commission
Terry Wright	Northwest Indian Fisheries Commission

Invited Participants and Observers:

NMFS Southwest Fisheries Science Center
Lisa Ballance
Jay Barlow
Bob Brownell
Karin Forney
Karen Martien

NMFS Southwest Region
Monica DeAngelis

NMFS Pacific Islands Fisheries Science Center
Amanda Bradford
Marti McCracken
Erin Oleson
Frank Parrish
Sam Pooley

NMFS Pacific Islands Region
Michael Marsik
Nancy Young

NMFS Northwest Fisheries Science Center
Brad Hanson (*via telephone*)

NMFS Alaska Fisheries Science Center
Marcia Muto (*via telephone*)

NMFS Office of Protected Resources
Tom Eagle
Kristy Long

NMFS Office of Science & Technology
Mridula Srivivasam

USFWS
Deanna Lynch
Lilian Carswell

Cascadia Research
Robin Baird

Hawaii Longline Association
Svein Fougner
John Hall

Portland State University
Sarah Courbis

University of Hawaii
Jenny Schulz

Makah tribe
Jon Scordino

Hawaiian Monk Seal Recovery Team
Lloyd Lowry

Western Pacific Fisheries Management Council
Asuka Ishizaki

Wild Whale Research Foundation
Dan McSweeney

Murdoch University
Lars Bejder

SAPPHIRE Project
Isabel Baker
Sarah Deventer
Kim New
Julian Tyne

Appendix 2

Document List

Pacific SRG Meeting Nov 16-18, 2010 (Kona, HI)

Last revised: 11/12/2010

Documents for Pacific SRG review

Document No.	Title/Topic	Contributor(s)	Distrib. Date
PSRG-2010-01	Proposed 2011 LOF	Andersen	1-Nov-10
PSRG-2010-01b	Final 2011 LOF	Andersen	12-Nov-10
PSRG-2010-02	CA sea lion and harbor seal SARs	Lowry	1-Nov-10
PSRG-2010-03	OR/WA harbor porpoise SARs	Muto	1-Nov-10
PSRG-2010-04	Southern sea otter SAR	Carswell	1-Nov-10
PSRG-2010-05	Southern resident killer whale SAR	Hanson	1-Nov-10
PSRG-2010-06	False Killer whale SAR	Oleson	*at meeting*
PSRG-2010-07	Hawaiian monk seal SAR	Baker	1-Nov-10
PSRG-2010-08	PIRO Management and TRT updates	Young	1-Nov-10
PSRG-2010-09	Insular False Killer Whale Status Review (Executive Summary)	Oleson	1-Nov-10
PSRG-2010-10	False killer whale genetics update (Tech Memo)	Chivers/Martien	1-Nov-10
PSRG-2010-11	Sperm whale population structure in the eastern North Pacific	Mesnick	*at meeting*
PSRG-2010-12	Sperm whale stock structure - white paper	Taylor/Mesnick/Martien	1-Nov-10
PSRG-2010-13	Fin whale genetics	Archer/Martien	1-Nov-10
PSRG-2010-14	CA/OR DGN fishery bycatch estimates	Carretta	1-Nov-10
PSRG-2010-15	HI longline serious injury determinations	Forney	12-Nov-10
PSRG-2010-16	HI longline bycatch estimates	McCracken	1-Nov-10
PSRG-2010-17	NRDC Comments on LOF	n/a	1-Nov-10
PSRG-2010-18	Hawaiian pygmy killer whale movements	Baird	1-Nov-10
PSRG-2010-19	Hawaiian spotted dolphin genetics update	Courbis	12-Nov-10
PSRG-2010-20	Melon-headed whale population structure	Baird	12-Nov-10

Background Papers - FYI only

PSRG-2010-B1	Hanson et al. 2010 Killer whale prey	Hanson	1-Nov-10
PSRG-2010-B2	Morin et al. 2010 Killer whale genetics	Morin	1-Nov-10
PSRG-2010-B3	Noren 2010 Killer whale energetics	Noren	1-Nov-10
PSRG-2010-B4	Baker et al. 2010 Monk seal distribution shifts	Baker	1-Nov-10
PSRG-2010-B5	Schultz et al. 2010 Monk seal genetics	Schultz	1-Nov-10
PSRG-2010-B6	Zerbini et al. 2010 Humpback growth rates	M. Scott	1-Nov-10

Web links for large documents not distributed:

Draft False Killer Whale Take Reduction Plan:
http://www.nmfs.noaa.gov/pr/pdfs/interactions/fkwtrp_draft.pdf
Insular False Killer Whale Status Review:
http://www.nmfs.hawaii.edu/tech/NOAA_Tech_Memo_PIFSC_22.pdf

Appendix 3

Agenda
Pacific SRG Meeting, November 16-18, 2010
Royal Kona Hotel, Kona, Hawaii

TUESDAY, 16 NOVEMBER 2010

Welcome and Introductions - *M. Scott, Pacific SRG Chair*

General Management Updates

- MMPA Policy updates (Serious Injury, GAMMS III) - *Eagle*
- List of Fisheries -*Young*

Pacific Islands Management

- Hawaiian monk seal management update - *Young*
- Hawaiian spinner dolphin management - *Young*
- Insular false killer whale ESA listing petition - *Young*
- False killer whale Take Reduction Plan - *Bernard/Young*
- PIRO Observer Program update - *Marsik/Marchetti*
- Insular false killer whale Status Review - *Oleson*

Pacific Islands Research

- 2010 Hawaiian Islands Cetacean and Ecosystem Survey - *Oleson/Barlow*
- False killer whale genetics update - *Martien*
- Spotted dolphin genetics update - *Courbis*
- Hawaiian monk seal research update - *Schultz*
- Hawaiian monk seal SAR
- Other Hawaiian cetacean research updates - *Oleson/Baird*

WEDNESDAY, 17 NOVEMBER 2010

Pacific Islands Research

- Central Pacific cetacean density models - *Forney*
- Cetacean serious injury determinations, HI longline fisheries - *Forney*
- Cetacean interactions in Hawaii-based longline fisheries - *McCracken*
- False killer whale SAR – *Oleson*

CA/OR/WA Management

- Southwest Region fishery and management updates - *DeAngelis*/*Fahy*
- Large whale ship strikes- *Calambokidis/DeAngelis*

CA/OR/WA Research

- Humpback and blue whale trends in abundance - *Calambokidis*
- Cetacean Behavioral Response Study - *Barlow/Calambokidis*
- 2009 CA/OR driftnet fishery bycatch - *Barlow/Forney*
- California sea lion and harbor seal SARs - *Barlow*
- Potential gray whale SAR changes - *Barlow*
- Distinct Population Segments for humpback whales - *Barlow*
- Fin whale genetics - *Martien*

THURSDAY, 18 NOVEMBER 2010

CA/OR/WA Research

- Southern resident killer whales - *Hanson (by phone)*
- Southern sea otter SAR - *Carswell (by phone)*
- WA Sea otter updates - *Lynch (by phone)*
- OR/WA harbor porpoise SARs - *Muto (by phone)*
- Sperm whale population structure - *Martien*

Discuss recommendations

Topics, timing, and location for next meeting

Adjourn meeting