Minutes of the Second Meeting of the Alaska Steller Sea Lion Restoration Team, December 15, 2000

Participants

The second meeting of the Alaska Steller Sea Lion Restoration Team (ASSLRT or Restoration Team) was held in Anchorage on December 15, 2000. The following members of team were present: C. Morgen Crow – a representative (executive director) of the CDQ group, Coastal Villages Region Fund, Jay Stinson – a trawl fisherman from Kodiak, Michelle Ridgway – a marine ecological consultant and board member of the Alaska Marine Conservation Council, Kate Wynne – a marine mammal biologist with the University of Alaska Sea Grant Program, Gordon Kruse (chair) – a marine fishery scientist with the Alaska Department of Fish and Game (ADF&G), Ken Pitcher – a marine mammal biologist with ADF&G, Lorrie Rea – a marine mammal biologist with ADF&G, and Denby Lloyd – the westward regional supervisor with ADF&G. Bob Small – the marine mammals coordinator with ADF&G and Earl Krygier – the extended jurisdiction coordinator with ADF&G were absent. Jeff Hartman – an economist with ADF&G participated for Earl by taking detailed meeting notes.

Preliminaries

Minutes from the first ASSLRT meeting were approved, and a draft agenda for the second meeting was adopted with one minor amendment. The meeting opened with a discussion of the status of the congressional rider that was passed on December 15th and whether the rider affected the team's mission. As the rider creates additional opportunities for review of the Biological Opinion (BiOp) through a deferred schedule for RPA implementation, the team resolved that their goals and tasks should remain as defined during the first ASSLRT meeting.

Public Involvement in ASSLRT Meetings

It was noted that the press has raised the level of public awareness of the restoration team. The Attorney General's office advised ADF&G to provide public notice for the ASSLRT meetings. ASSLRT meeting notices are posted with the Lieutenant Governor's web site at (http://www.gov.state.ak.us/ltgov/) under "Online Public Notice" for the Department of Fish and Game.

The Restoration Team established a set of guidelines to enhance public awareness of their actions and to clarify public involvement:

1. ASSLRT meetings are open to the public, although there is limited seating and services available.

2. As meetings of the Restoration Team are working sessions, no public comment will be taken during team meetings.

3. In conjunction with routine NPFMC meetings, the state convenes a Stakeholders Meeting as the primary venue to seek public dialogue on sea lion issues. Minutes of the ASSLRT meetings are provided at the Stakeholders Panel meetings. Michelle Ridgway, Jay Stinson, and Earl Krygier participate on both the Stakeholder Panel and ASSLRT, and they can answer questions and receive public feedback on ASSLRT activities. Meeting minutes of the Stakeholders Panel are distributed to Restoration Team members for their consideration.

4. Aside from Stakeholders Panel meetings, ASSLRT meeting minutes are available from restoration team members upon request, and team members are available at other times outside of team meetings to discuss ASSLRT activities and to receive public input.

Review of BiOp

General Impressions of the BiOp by Restoration Team Members

The Restoration Team began its review of the BiOp by hearing general impressions of the document from each team member individually. There was broad consensus of opinion about the BiOp. In overview, members agreed that the BiOp is a fairly comprehensive document on Steller sea lion biology and Alaska fisheries information. Yet, it is seriously deficient in a number of ways.

The BiOp lacks a fair treatment of alternative hypotheses for the decline of sea lions. The overall approach is biased in that individual alternative mechanisms are subjectively discounted on a one-by-one basis for their inability to *solely* account for *all* of the observed population declines; the synergistic effects of different mechanisms to collectively account for population trends are not considered.

Potential causes for population declines in the 1970s and 1980s are not distinguished from the potential causes for lack of recovery in the 1990s. In particular, the BiOp fails to account for recent research including investigations that indicate that the western population of sea lions is not nutritionally stressed with respect to the eastern population, at least for adult females and pups on which studies have focused to date.

The BiOp's conclusions of fishing effects are not the result of an objective scientific analysis, but rather a seemingly foregone conclusion largely rationalized by a series of speculative arguments. Scientific evidence was not presented to support the hypothesis that fisheries cause deleterious localized depletion of sea lion prey. Some of the scientific literature is incorrectly or selectively cited for information that is consistent, rather than contradictory, with the BiOp's conclusions.

Little new data are brought to bear on the causes of sea lion declines. A serious omission is the lack of analysis of existing data on the spatial, temporal, and size overlap of sea

lion foraging and fisheries that would have shed light on the prospects for competition from particular fisheries in particular times and places.

The BiOp identifies two types of sea lion foraging behaviors: (1) foraging around rookeries and haulouts by adult females with pups, pups, and juveniles, and (2) foraging over much larger areas while these and other animals are no longer tied to rookeries and haulouts. The BiOp does not adequately address the potential adverse effects of localized depletion under each of these two foraging patterns. Specifically, the spatial and temporal aspects of the two foraging strategies, fish (prey) distribution and abundance, and localized depletion need further discussion.

The Restoration Team acknowledges that fishing could have some adverse effects on sea lions and that it is simply impossible to prove otherwise. Therefore, precaution is warranted on behalf of the Steller sea lion. However, the team is not convinced that localized depletion by Pacific cod, Atka mackerel, and walleye pollock fisheries is the most likely mechanism for fishing effects. The team will discuss this issue further in subsequent meetings.

Rather than taking an ecosystem approach, the RPA modifies fishery management strategies without consideration for effects on other species of fish, invertebrates, birds and marine mammals through bycatch and/or modifications of their habitats. Although ASSLRT is encouraged by the inclusion of an experimental management strategy in the RPA, the team is concerned about low statistical power associated with lack of adequate contrast among treatments. A fatal flaw in the design is the failure to account for all removals of sea lion prey by fisheries including those in state waters.

In summary, the Restoration Team feels that the scientific integrity of the BiOp suffered from the lack of an objective analysis of alternative hypotheses and available relevant data. The team has many specific recommendations on how to improve the next Biological Opinion.

Consideration of Other BiOp Reviews and Related Activities

The Restoration Team reviewed the December meeting minutes of both the North Pacific Fishery Management Council's Advisory Panel and Scientific and Statistical Committee (SSC). Michele Ridgway and Jeff Hartman discussed the Final Council Motion that dealt with sea lion issues.

The team discussed the SSC's reluctance to modify the global control rule used to estimate acceptable biological catch (ABC) and the SSC's preference that catch reductions to accommodate sea lions are made to the total allowable catch (TAC) rather than to the ABC. The team noted that relegation of these adjustments to the TAC-setting process would neither mean that the adjustments would be formalized nor subject to analysis. Although there is considerable science in the ABC calculations, the team noted that the choice of control rules is somewhat subjective based on the management objective. For instance, control rules can be analyzed for the tradeoff between maximization of catch and minimization of variance in catch. Whereas objective scientific analyses can be conducted for different tradeoffs, the choice of weights of the

tradeoffs is subjective depending on particular management objectives. Some members of the team envisioned that heavier weighting could be given to minimize catch variance – a management objective that would promote higher standing stocks and lower catch rates of target fish species that are important prey items of endangered species, such as sea lions. Nevertheless, the team agreed to set this issue aside for future consideration.

Gordon reviewed some recent discussions with the Governor's office concerning potential actions by the State. The possibility of an interim fishery for state waters was being considered prior to the announcement of the rider. The Governor expressed the importance of the Stakeholders Panel and Restoration Team, and a strong desire to work through available mechanisms to set into place fishery management strategies that foremost foster the restoration of Steller sea lion populations while providing for fisheries that consider the needs of Alaska coastal communities and others participants. The State of Alaska has not eliminated the possibility of court action to achieve a sound BiOp with reasoned and fitting RPAs should other mechanisms prove unsuccessful.

Lorrie prepared and reviewed a list of recent and ongoing studies on Steller sea lions. The team noted that this new work is very relevant and, in general, was not analyzed in the BiOp. One recent paper (Swain and Calkins 1997) was mentioned on the bottom of page 90, but other new data, including some highly relevant unpublished information, should be brought forward in the BiOp. For instance, new diving studies suggest that the juveniles dive much deeper than previously thought. The team was very impressed with this new information and Lorrie was encouraged to complete her review of this ongoing work. Such information will be useful to develop an improved BiOp, new RPAs, and priority research recommendations. Similarly, Gordon will be providing information on current fishery interaction studies at another meeting.

ASSLRT Strategy for BiOp Review

Realizing that it would not be possible for the team to provide a detailed review of the entire BiOp during the course of this meeting, the team agreed to the following strategy. First, the team identified some non-scientific issues that warrant future consideration. Next, the team identified major issues of concern primarily in Chapters 4 and 5. Noting that the RPAs were not necessarily directly linked to cause and effect, the team then conducted a brief review of key demographic problems of sea lions, evidence for alternative mechanisms, and critical life history stages of sea lions. Finally, the team identified issues that should be considered in the development of an improved set of RPAs. As the Restoration Team's review of the BiOp is a work in progress, additional major issues will be identified at upcoming meetings and the team will also develop a detailed written list of all of their comments on the document.

Non-scientific Issues

The Restoration Team identified the following non-scientific issues that warrant future consideration:

- The eastern population of Steller sea lions is listed as threatened, while data suggest that the population is at or near all-time high levels of abundance. Should this population be de-listed?

- The BiOp was developed through a non-public process. The appropriateness of this approach should be investigated. Were appropriate procedural and legal requirements followed?

- The factual basis for many statements in the current BiOp are difficult to substantiate because the only evidence given were findings from previous BiOps and these findings may not have undergone scientific review. Is it not appropriate for the BiOp to provide substantiating evidence rather than citing opinions or information in previous BiOps?

- The purpose of the BiOp is to determine whether fisheries jeopardize Steller sea lions. What is jeopardy? How is uncertainty included in this determination? How do you assess matters of degree?

- How should BiOps balance biology, sociology, and economics?

Comments on Chapter 4

The Team offered the following major comments on Chapter 4:

- P. 3-4 in Appendix 3 cited in Chapter 4, and again on pages 183 to 188 in Chapter 5. These pages present the essence of the argument for competition between fisheries and sea lions for prey by the mechanism of localized depletion. On page 89, the BiOp states two feeding patterns: (1) foraging around rookeries and haulouts, and (2) foraging over larger areas. The BiOp fails to adequately specify the spatial and temporal scales of localized depletion such that a comparison with the foraging patterns would provide a better assessment of potential competition. For example, if localized depletion occurs in an area when sea lions are primarily foraging elsewhere, the effect of that localized depletion would likely be substantially reduced. These considerations have implications on the design of the RPA.

- P. 80-83 and elsewhere. The BiOp fails to fairly present pieces of evidence that don't support the nutritional limitation hypothesis. Data from the 1970s and 1980s are interwoven with data from the 1990s without recognizing that there are important contrasts between these decades. Some data from the 1970s and 1980s support the nutritional limitation hypothesis through effects on reproductive success, mortality of juveniles and/or older ages. However, data in the 1990s on adult females and pups do not support the nutritional limitation hypothesis, at least for these life stages. Failure to distinguish these decadal differences is the root of the problem evident in subsequent chapters where the BiOp fails to contrast evidence for *historical* fishing

practices and climate changes on the *historical* decline in sea lions from the evidence for *current* fishing practices and climate conditions on their *current* lack of recovery.

- Chapter 4 fails to indicate the month during which diet samples were collected. Rather than lumping all data, it would be preferable if data were disaggregated by season and region to the extent possible. By considering location and season, seasonal and spatial patterns in prey consumption may have emerged. Also, although biases in diet data collection methods were indicated on page 91, it would have been helpful if the diet data were interpreted in the context of these biases when summarized on pages 92-93. The team noted that there is at least 8 years of new data available on foraging behavior, and it is critical to use this information in the next BiOp. The team discussed foraging data collected by the University of British Columbia, NMFS and ADF&G, as well as recent juvenile dive and movement data.

- P. 95. A stronger case for the role of diet diversity in sea lion population trends may exist than presented. Merrick's work seems to suggest that at least two prey taxa need to be commonly available in sea lion diet for population success. Other evidence, including work conducted or cited by Andrew Trites in his publications, points to the importance of diet diversity. Pitcher (1981) found capelin in 61% of diets of sea lion stomachs in the Kodiak area in 1975-1978. Subsequent studies failed to find capelin in significant numbers in sea lion stomachs. Octopus ranked #2 in 1985-1986 in Kodiak. Sand lance occurred in 26% of sea lion stomachs in Gulf of Alaska in 1960s. While acknowledging that biases of different collection methods can explain some of these differences, how did such changes in sea lion consumption of these unfished or very lightly fished species affect sea lion population trends? A more thorough treatment of the potential role of diet diversity may have led to a different set of RPAs than the set based almost exclusively on the gadid portion of sea lion diets.

- P. 100. The potential for competition between sea lions and other species is presented in a very superficial and biased manner. The statement "To some extent, these potential competitors may partition the prey resources so that little direct competition exists" is implausible. Sea lions occupy a similar trophic level as Pacific cod. Herring, sand lance, smelt, squid, and other "forage" are heavily predated by many species. Changes in prey competition between sea lions and other members of the marine ecosystem could be facilitated by regime shifts. For example, abundance and availability of herring, capelin and sand lance could be regulated by piscivores, such as Pacific cod, arrowtooth flounder, Pacific halibut, and others whose abundance changed dramatically after the mid-1970s. The BiOp downplays the well-documented ecosystem shifts in species abundance and ignores the potential downstream impacts of these changes on sea lions through competition for limited prey.

- P. 104. The population viability analysis may be outdated. The team recommends a new viability analysis with recent sea lion population trend data. As the rate of decline in sea lion populations has moderated, how would recent population trend data affect the long-term population projections? Moreover, the team is aware of a

population viability analysis conducted by the University of Washington (Gerber's thesis) that concluded that Steller sea lions should not be classified as endangered. This work was not cited in the BiOp; this is one of many instances where literature is selectively cited. Whether the authors agree or disagree with those findings, the BiOp should objectively present all relevant data and scientific research.

- P. 128-130. The ecological bases for sea lion critical habitats have not been completely described. Future BiOps should consider the following features: (1) seasonality – winter and summer haulouts should be distinguished – some haulouts are used for a few months; (2) some haulouts support few animals – *current* sea lion data should be used to formulate new RPAs; (3) recent foraging data should be considered, for instance PTT data since 1992 should be incorporated into the analysis; (4) rather than consider arbitrary 10 nm or 20 nm distances around rookeries and haulouts, critical habitat should be designated based on the distribution of dive depths and distances from rookeries and haulouts.

Chapter 5

The Team offered the following major comments on Chapter 5:

- P. 131-137. Ecological changes, some of which were related to the regime shift, and their likely effects on SSL, are incompletely described and not evenly interpreted. Large recruitments increased the abundance of many groundfish in the early 1980s. Those with sharp increases in abundance included pollock, cod, Atka mackerel, arrowtooth flounders, other flatfish. Shrimps and some crab stocks declined. Anecdotal evidence indicates that capelin and other forage fish declined or shifted in geographical distribution. Changes in some species, such as herring and capelin, could have directly affected sea lion nutrition, whereas others, such as cod and arrowtooth flounder, could have had indirect effects through competition. Some important papers were not cited nor considered.

- The BiOp does not distinguish sea lion prey that are fished and unfished. For example, pollock, mackerel, cod, rockfish are fished, octopus and squid are very lightly fished in some areas only, herring are fished in certain areas only, and capelin, sand lance, other forage fish are unfished. All these prey are important to sea lions at particular times and places, and yet the BiOp does not consider their role in sea lion reproductive success and survival.

- P. 138 to 140. One alternative to the localized depletion hypothesis is predation by Killer whales (predator pit hypothesis). The BiOp includes a critical review of a report that estimated sea lion predation by killer whales. Also, the BiOp offers a second analysis of killer whale predation information. The critique misses the fact that both analyses are based on a minimum estimate of transient killer whale population size (125) and that predation rate would be higher if more killer whales do, in fact, exist. Survey efforts to estimate killer whale abundance from Kodiak

Island and west have been minimal compared to other areas. The derivation N=125 is not presented, and it is very likely that abundance of transient killer whales is higher than this estimate. ASSLRT feels strongly that more killer whale predation research is needed, including better information from the western Gulf of Alaska and Aleutian Islands. Moreover, research is needed into the prospects of sleeper and salmon shark predation on sea lions, especially on young sea lions. An increase in shark abundance in Alaska in the past decade, coupled to the documentation of shark predation on harbor seals, suggests that potential shark predation studies on sea lions may be worthy of study in the context of sea lion population declines. While it is uncertain that predation fully accounts for recent sea lion population trends, the Restoration Team feels that this source of mortality must be considered in concert with other mortality sources (e.g., entanglements, bycatch, shooting, disease) for their combined ability to explain the lack of recovery in the 1990s.

- P. 147. The section beginning on this page is titled "aggregate mortality," but all sources of mortality are <u>not</u> considered in aggregate. Later in the BiOp other mortality sources (e.g., entanglement and intentional takes) are considered individually. Others, such as a recent paper by Alverson, have made a much better attempt to account for all sources of mortality in a cumulative manner. A major flaw of the BiOp is failure to aggregate all sources of mortality together and to compare those deaths with the current rate of sea lion population decline. The team suspects that a combination of mortality sources could, in fact, account for recent 4% annual declines in sea lion abundance. The lack of evidence for nutritional limitation among adult female sea lions and their pups in the 1990s is consistent with mortality-based hypotheses rather than a food-driven hypothesis involving competition with fisheries. The Restoration Team notes that adequate recent data on juveniles are lacking, so the possibility of competition cannot be completely ruled out. Comparable studies on juvenile sea lions are a high priority research needs.

- P. 150 to 152. The BiOp documents some historical cases of overfishing: e.g., foreign fisheries for pollock in Aleutian Basin, Pacific Ocean perch, yellowfin sole, and Pacific halibut. Although the BiOp is fairly thorough in describing these cases, this section does not analyze what role, if any, these may have these played in the historical sea lion declines. In particular, could overfishing of pollock in Aleutian Basin in the 1970s and 1980s have depleted pollock as forage for sea lions in Western Aleutians? Could overfishing and prolonged reduced abundance of herring in the mid-20th Century have caused nutritional limitation in sea lions in the 1970s and 1980s? These are instances of historical failure to apply a global control rule on large-scale industrial fishing. As noted in Chapter 4, evidence for demographic problems in sea lion populations during decades of decline versus the recent decade of lack of recovery was not distinguished. Likewise, here in Chapter 5, historical cases of overfishing versus the conduct of current fisheries, and their potential differential implications on sea lions, are not distinguished. The Restoration Team feels that these distinctions are critical to objectively evaluate the likelihood of alternative hypotheses, associated risks, and the appropriateness of particular RPAs.

- P. 182. Pages of equivocal information on competition are presented. However, competition is not defined until much later on page 227. Organization of the document could be improved. A better treatment of the case for competition is warranted. Also, the localized depletion elements of the argument need to be reconciled. The absence of any spatio-temporal fishery data and catch size composition data is perplexing. It seems ironic that the hypothesis accepted by the authors of the BiOp is one for which no data are presented.

Review of Sea Lion Trends and Life History Relevant to the BiOp

Review of Sea Lion Demographic Problems

The Restoration Team put aside further review of the BiOp to consider the next agenda item: a review of the demographics of the original sea lion decline (1970s and 1980s) versus evidence for recent (1990s) problems. The team used an outline that Gordon prepared based largely on an unpublished white paper by Ken Pitcher.

The main demographics of the original decline (1970s and 1980s) of Steller sea lions include: (1) reduced growth rate, (2) high rates of reproductive failure, (3) disproportionate increase in juvenile mortality, and (4) higher mortality across all age groups. The BiOp noted evidence for high rates of reproductive failure. First, late-season pregnancy rate declined from 67% (1970s) to 55% (1980s); however, there was insufficient statistical power, due to small sample sizes, to determine if this difference was significant. Second, among lactating females, late season pregnancy rate was 63% (1970s) versus 30% (1980s), a statistically significant difference. Evidence for a disproportionate increase in juvenile mortality resulted from York's modeling study and low rates of pup re-sighting at Marmot Island in 1987-88. On the other hand, evidence for higher mortality across all ages resulted from ADF&G analyses of survival rates based on mark and re-sighted animals.

Mechanisms causing these demographic problems in the 1970s and 1980s fall into two groups of hypotheses. For nutritional stress, three hypotheses have been suggested: (1) climate-driven regime shift that resulted in declines in abundance of some sea lion prey (e.g., capelin, sand lance) and other species (e.g., shrimp, crabs) and increases in other sea lion prey (e.g., gadids, salmon) and other species (e.g., flatfishes); (2) competition with ongoing large-scale commercial fisheries; and (3) cascading (downstream) ecosystem effects of historical whaling and overfishing (e.g., Pacific herring, Pacific Ocean perch) in previous decades. For mortality, the following mechanisms have been identified: (1) Government eradication programs; (2) commercial harvest; (3) intentional killing by fishers and others; (4) incidental mortality in fisheries; (5) entanglements in lost fishing gear and other man-made debris; and (6) pup abandonment caused by mortality of adult females, disturbance, or other causes.

During the 1990s, different demographics have emerged. Comparative sea lion studies

have been conducted between the declining western population and the stable and/or increasing eastern population. These studies have yielded surprising results. Evidence that reproduction in the western population was *not* compromised in the 1990s include: (1) pup birth weights are highest in the western population; (2) pup growth rates are greatest in the western population; (3) pup size at age 1 month old is higher in the west than east; and (4) blood chemistry studies do not indicate that pups in western population are nutritionally stressed. The BiOp suggested that pups in the western population may be born earlier and that older age could account for the greater pup sizes in the western population. However, the Restoration Team noted the pups in the western population are actually born later, so western pups are truly heavier than eastern pups. The team is unaware of data that suggest that sea lion reproduction was compromised in the 1990s.

In the 1990s, the following findings from comparative studies of eastern and western populations of sea lions suggest that adult females did *not* exhibit nutritional stress: (1) foraging effort was higher in the east compared to the west; (2) females from eastern and western populations had similar milk energy content; (3) adult females from the western population weigh more than those from the eastern population; (4) western females appeared to have more fat than eastern females, although the evidence for this is somewhat uncertain, and (5) maternal attendance and energy budgets are normal for females in the western population. Evidence that females from the western population exhibited nutritional stress in the 1990s comes from a study that indicated that the blubber layer was thinner in western females than eastern females, but this evidence is somewhat uncertain. In conclusion, there is little evidence for nutritional stress for adult females and pups in the 1990s. However, data are lacking for juveniles older than 5 weeks old, the possibility of nutritional limitation can not be completely ruled out.

There are a number of potential mechanisms behind the lack of recovery of the western population of Steller sea lions in the 1990s: (1) nutritional limitation associated with fishery-induced localized depletion (assumes feeding problem with juveniles yet to be demonstrated in 1990s); (2) nutritional limitation associated with junk food hypothesis or changes in prey distribution and availability (assumes feeding problem with juveniles yet to be demonstrated in 1990s); (3) mortality from predator pit hypothesis (predators could include killer whales and sharks); (4) cumulative mortality from a number of sources (e.g., predators, illegal shooting, incidental mortality in fisheries, entanglement, disease); and (5) human disturbance of haulouts and rookeries.

Temporal/Spatial Considerations of Sea Lion Life History

Next, the team considered spatial and temporal aspects of sea lion life history. The team reviewed an outline prepared by Gordon based partly on biological information presented in the BiOp and a publication by Ken Pitcher.

The following critical life history events were identified for adults:

May – Adult males compete for rookery territory

Late May to early June – adult females arrive at rookeries
Mid-May to mid-July – birth
Late May to mid/late July – mating occurs
Late winter/spring (February to May) – particularly critical period for females

The following critical life history events were identified for pups:

Late May to early July – birth
Age 11 months (if mom gives birth to new pup) or 23 months (if mom does not give birth) – most juveniles are weaned
November to May – juveniles develop foraging skills

The temporal use of rookeries and haulouts is an important feature of sea lion life history strategies. Seasonality is also important to assessing the potential for interactions with fisheries. Rookeries are used mid-May to fall. However, some rookeries are used as winter haulouts. Others are abandoned in winter. Some haulouts are used year-round, and some in winter only. Some haulouts are occupied for very short-term use, such as in association with spring hooligan run. The Restoration Team noted that the 1998 RPAs distinguished seasonal (winter or summer) use of haulouts, but the BiOp, dated November 30, 2000, did not distinguish seasonality of use.

Sea Lion Foraging Depths

The BiOp presents the maximum recorded diving depths for sea lions as follows: adult females in summer, 100-250 m; adult females in winter, > 250 m; young-of-the-year in winter, <72 m; 2-year old male, 252 m; and 1-year old female, 150-250 m. The team noted that the BiOp really should consider the distribution of feeding depths, not just maximum feeding depth. It was noted that winter data are particularly lacking. It was also noted that previous understanding of juvenile diving depths is changing with recent data that show that they dive deeper than previously thought. The depths of diving and distance of foraging trips from rookeries and haulouts is an important consideration in the design of RPAs. Additionally, the two feeding patterns need to be considered seasonally: (1) foraging around rookeries (and haulouts) and (2) foraging over larger areas. For instance, summer fishery closures in critical habitat around winter-only haulouts are likely to be a very ineffective management measure.

Towards an Improved Set of RPAs

Finally, the team began a discussion of features that should be considered in the design of RPAs to reduce the likelihood that fisheries adversely affect sea lions. So far, the team identified the following RPA-relevant features:

- *Current* importance of haulouts. Protecting haulouts that have been vacated for years is not as critical as protecting haulouts currently used by hundreds of animals

- Seasonality of use of rookeries and haulouts

- Critical period for sea lions (late winter/spring – adults; spring – pups)

- Is it necessary to close critical foraging areas (e.g., Shelikof Strait) in winter? Are they necessary for the current domestic fishery as opposed to the foreign and joint venture fishery from which the data were used to make their original designation? ASSLRT recommends a reassessment of these foraging areas with current data

- Is the non-transit zone around abandoned rookeries justified in winter?

- Distance from rookery/haulout and geographic distribution of foraging trips

- The level of conservation could be linked to the level of risk. Maps of foraging trip distributions could be used to assess the fraction of the population at risk from certain activities in time and space.

- Given the information presented, ASSLRT is of the opinion that designation of 20-nm critical habitats around *all* haulouts and rookeries *all year* is too restrictive

- The global control rule is a management measure that bears additional investigation, if there is concern about the overall level of fishing with respect to the broad scale foraging behavior of sea lions (foraging pattern #2).

- The team did not spend much time discussing the experimental design yet, but ASSLRT wishes to make one comment at this time. That is, the experimental design should consider all removals including state fisheries. The state should have been consulted in developing the experimental design as the state manages hundreds of fisheries in Alaska especially in sea lion critical habitat.

Next Meeting of ASSLRT

The next Restoration Team meeting will be convened at 8:30 am to 5:00 pm on January 5, 2001, at the Rabbit Creek Rifle Range in Anchorage. Tentative topics for focus include: (1) further review of the BiOp (Chapters 6-11); (2) specific review of the experimental management plan; (3) additional focus on critical habitat definitions; (4) additional development of advice on issues for consideration by a new RPA; and (5) additional review of current research and development of research recommendations.