Center for Independent Experts (CIE) External Independent Peer Review on the

2010 Biological Opinion on the Effects of the Federal Groundfish Fisheries and State Parallel Fisheries on listed species in Alaska, including Steller sea lions

prepared for

Center for Independent Experts

by

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Executive Summary

The substantial decline of the Steller sea lion (*Eumetopias jubatus*) in the latter part of the 20th Century prompted listing of the species as *threatened* under the US Endangered Species Act (16 U.S.C. § 1531 *et. seq)* in 1990. Following a reclassification of the species into a Western Distinct Population Segment (WDPS, west of 144°W longitude) and an Eastern Distinct Population Segment (EDPS, east of 144°W longitude), the WDPS was reclassified as *endangered* whereas the EDPS has remained classified as *threatened*. Proposed actions by NOAA/NMFS to 1) authorize commercial groundfish fisheries under the Fishery Management Plan for groundfish of the Bering Sea and the Aleutian Islands (BSAI) management area; 2) authorize commercial groundfish fisheries under the Fishery Management Plan for groundfish of the Gulf of Alaska (GOA); and 3) authorize State of Alaska parallel groundfish fisheries required NOAA/NMFS to prepare a Biological Opinion determine whether those agency actions are likely to jeopardize the continued existence of the EDPS or the WDPS of Steller sea lions) or likely to result in the *destruction or adverse modification* of critical habitat of the EDPS or the WDPS.

The Biological Opinion concluded that a) "…the action, as proposed, is likely to jeopardize the continued existence of the western DPS of Steller sea lion [sic]" (page xxxi, Page 345) and b) "…the action, as proposed, is likely to adversely modify the designated critical habitat for the western DPS of Steller sea lion [sic]" (page xxxiv, Page 348). The conclusion was principally based on consideration of the status and trends in abundance (through 2008) of 4 sub-regions in the western reach of the WDSP.

The Center for Independent Experts (CIE) chartered a three-person panel to review the Biological Opinion of 2010, additional relevant published and unpublished literature and additional new information presented at a public meeting in Seattle on 1 & 2 August 2012, and evaluate whether its findings were supported by the available science and the interpretations of that scientific evidence.

My evaluation of the information and data presented and the arguments constructed in the Biological Opinion, the additional information presented at the public meeting, and the legal framework governing the assessment is that the conclusions of the Biological Opinion are not supported. The ESA constrains the analysis to population units no smaller than a DPS. The data indicate that the WDPS and the EDPS have been

increasing for most of the past decade, including a 30% increase in births in the WDPS from 2002 through 2011. Though a number of hypotheses (bottom-up including effects of commercial fisheries causing nutritional stress to sea lions and consequent reductions in survival and fecundity; and top-down including substantial predation on sea lions by killer whales) have been proposed to account for the earlier population decline and the potential for further declines or lack of recovery, there has been no causal evidentiary support for any of them. The Biological Opinion often equates language of possibility (e.g., may, may have, appears to be, might, possible, plausible, could, could have, has possibly, could be argued) with language of substantial chance (i.e., likely), transliterating the former to conclude that that the actions were likely to jeopardize the continued existence of the DPS and likely to adversely modify critical habitat of the DPS. Speculative and hypothetical suggestions for jeopardy and adverse modification do not, I think, meet the standard established by the Endangered Species Act to conclude that the actions have a substantial chance (likely) of jeopardy and adverse modification.

Because the conclusions of the Biological Opinion are not supported by the evidentiary record or by persuasive arguments, the RPA is not a relevant consideration. In any event I think that the construction of the hypothesis to test the potential affirmative consequences of implementing the Reasonable Prudent Alternative (RPA) is not strong because of the proposal to use a potential correlation of two weak proxies to judge causation.

Background

The abundance of Steller (Northern) sea lions (*Eumetopias jubatus*) declined substantially throughout its range in Alaska in the 1970s and 1980s prompting a petition to list the species under the U.S. Endangered Species Act (ESA; 16 U.S.C. § 1531 *et. seq.*). The species was subsequently listed as "threatened" on 5 April 1990 (55 FR 12645) primarily because of apparently continuing declines in the Aleutian Islands. The species was then later split into two "Distinct Population Segments (DPS)" in 1997, which led to listing of the Western DPS (all sea lions west of 144°W longitude) as "endangered" (62 FR 24345, 62 FR 30772) and retained "threatened" status for the Eastern DPS (all sea lions west of 144°W longitude). The EDPS increased steadily through the 1990s and through the first decade of the 21st Century (estimated at around 46,000 to 58,000 in 2002) whereas NOAA concluded that abundance in the WDPS increased from 2000 through 2004 (estimated at around 45,000 in 2005) but then either remained the same or perhaps declined through 2007.

On 19 April 2006 the National Marine Fisheries Service/NOAA began formal consultation with the US Fish and Wildlife Service to determine whether its proposed actions to: 1) authorize commercial groundfish fisheries under the Fishery Management Plan for groundfish of the Bering Sea and the Aleutian Islands (BSAI) management area; 2) authorize commercial groundfish fisheries under the Fishery Management Plan for groundfish of the Gulf of Alaska (GOA); and 3) authorize State of Alaska parallel groundfish fisheries were consistent with the procedural and substantive constraints and requirements of the Endangered Species Act. Under the provisions of the Endangered Species Act (16 U.S.C. § 1536(a)(2))[1], the agency subsequently prepared a Biological

[1] 16 USC 1536(a)(2) (a.k.a. "Section 7") requires that "Each Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency (hereinafter in this section referred to as an 'agency action' is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction of adverse modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section. In fulfilling the requirements of this paragraph each agency shall use the best scientific and

Opinion to evaluate the two prongs of the provisions of the Endangered Species Act (16 USC 1536(a)(2)) to insure that the agency action is not likely a) to jeopardize the continued existence of any endangered species or threatened species (i.e., the EDPS or the WDPS of Steller sea lions) or b) result in the *destruction or adverse modification*[2] of critical habitat of the EDPS or the WDPS.

At the conclusion of its Biological Opinion (BiOp), the National Marine Fisheries concluded that:

1. "…the action, as proposed, is likely to jeopardize the continued existence of the western DPS of Steller sea lion [sic]" (page xxxi, Page 345) and
2. "…the action, as proposed, is likely to adversely modify the designated critical habitat for the western DPS of Steller sea lion [sic]" (page xxxiv, Page 348).

The Center for Independent Experts (CIE) subsequently chartered a three-person panel review of the Biological Opinion and it's findings.

Description of Review Activities

I conducted a desk review from 5 through 31 July of the Biological Opinion, other required documents, and other documents provided by CIE. I also consulted the primary literature that was cited in the Biological Opinion as questions arose on the use of particular data and some interpretations or representation of findings.

I attended the public meeting organized by CIE and hosted by NMFS at the NOAA facilities in Seattle on 1 and 2 August for the presentation of additional data and views by NMFS scientists, fishing industry representatives, environmental organizations and other stakeholders.

I then reviewed the Biological Opinion again from 3 through 17 August in the context of the proceedings of the public meeting and also reviewed other relevant

commercial data available"

[2] "*destruction or adverse modification* means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of the physical or biological features that were the basis for determining the habitat to be critical" 50 CFR §402.02"

documents provided by CIE and other relevant studies published since the issuance of the Biological Opinion.

Synthetic Summary of Review Findings

Chapter 1

Preface

The USFWS and the NOAA/NMFS has often lumped the two-pronged consideration of "not likely" to a) "jeopardize the continued existence of any endangered species or threatened species" or b) "result in the destruction or adverse modification of critical habitat" a single test (the Jeopardy Test which combines 'jeopardizing continued existence" with "adverse modification", which has become referred to as JAM).

The ESA did not define the meaning of "likely" nor has it yet been defined by either Congressional amendment of the statute or by formal administrative rule or regulation. The general use of the term and the consideration of it by several District and Circuit courts in non-ESA claims clearly indicate that "likely" means a substantial or a great chance.

The test for adverse modification under extant US Federal Law requires that the agency that proposes the action must determine whether the action "will appreciably diminish the value of the habitat for *both* survival *and* recovery of a listed species" (50 CFR § 402.02). USFWS and NMFS however have been refusing to apply this binding codified definition evidently because of concerns that those agencies might lose legal challenges to its application owing to recent decisions by some courts.

The Biological Opinion confuses those standards and the tests and it appears did not apply them correctly. The Biological Opinion claims that "For the **jeopardy analysis**, NMFS analyzed those combined factors (*i.e., the status of the listed species, the condition of the critical habitat, the environmental baseline for the action of the action as proposed, and cumulative effects*) to determine **whether the proposed action is likely to appreciably reduce the likelihood of survival and recovery of the affected listed species"** (page 2). This construction and application of a new test to evaluate the first prong of "jeopardy" in a biological assessment is not, to my knowledge, justifiable. The Biological Opinion then states "With respect to critical habitat, the

analysis relies only on the statutory provisions of the ESA, and not on the [codified] definition of 'destruction or adverse modification" at 50 CFR Part 402.02" (page 2). It is not clear what statutory provisions were applied during the analysis required to determine whether it is likely that critical habitat will be destroyed or adversely modified.

The NOAA Recovery Plan (2008) evaluated population change throughout the species range by dividing the two DPSs into smaller sub-regions. The textual definition of "species" in the ESA[3], and the various judicial decisions that have considered that definition, have clearly and unequivocally established that no unit smaller than a DPS is relevant when considering actions that arise from claims under the provisions of the ESA. Nonetheless the Biological Opinion disregarded that fundamental constraint and instead concluded that the apparent status of three small sub-regions of the WDPS justified the finding that the agency action would likely jeopardize the existence of the WDPS. Legitimate consideration of the WDPS under the ESA does not, I think, appear to justify that decision.

Review

Term of Reference 2. Evaluation of the scientific information and its interpretation that developed the rationale and the subsequent findings regarding factors potentially affecting Steller sea lion population status, vital rates, critical habitat, risk of extinction, and recovery including in particular the findings regarding the effects of fisheries on Steller sea lion population status, vital rates, and critical habitat considering: a) whether the BiOp thoroughly and accurately (i.e. using the best available scientific information) describes what is known about the status of the listed species; b) whether the BiOp thoroughly and accurately describes what is known about groundfish fishery practices and catch statistics under the current ongoing "status quo" action, as defined in the BiOp; c) whether the BiOp also adequately addresses alternative scientific explanations (e.g., predation, disease, ecosystem/carrying capacity, or emigration) for the apparent population changes of the WDPS of Steller sea lions; d) whether the BiOp thoroughly and accurately assess the direct and indirect effects of the action on the listed species and its critical habitat; and e) whether the evidence in the BiOp provides strong, moderate or weak support for the discussion, findings and conclusions made in the document.

The Biological Opinion summarized information available, published and unpublished, on the population biology, diet, movements, foraging behaviors, and physiology of Steller sea lions. The structure of the textual summary of Biological Opinion

[3] "The term 'species' includes any subspecies of fish or wildlife or plans, and any distinct population segment of any species of vertebrae fish or wildlife which interbreeds when mature" 16 U.S.C § 1532(16), 50 CFR 222.102.

complicates analysis of the available information and consideration of the strength of original data, analyses, and interpretations. Opinions, sometimes presented as beliefs, routinely overwhelm presentation of data in the main text and are often not supported by the generally scant data. There appeared to be little critical evaluation of the data or the conclusions of the primary published and unpublished literature but rather just declaratory statements and conclusions and simple repetition of abstract and summary declaratory statements. The strengths of available data would have been better identified and conserved by separating summaries of those factual data, followed by concise acknowledgement of the constraints of the data, the interpretations of those data and the arguments for the conclusions of the primary literature, and then a discussion of reasonable secondary interpretation and argument conditioned on the logistical and substantive limitations, weaknesses and strengths of the original data and primary arguments.

The decline in abundance of Steller sea lions in the 1970s and 1980s was clearly substantial though the cause(s) remain unknown. A number of speculations and several ad-hoc hypotheses have been proposed to account for those declines, including *inter alia*, changes in prey communities associated with oceanographic climate change (regime shift), lethal and non-lethal infectious disease, predation (by killer whales or sharks), direct and incidental killing by humans, competition with commercial fisheries, pollutants,

Following the listing of Steller Sea lions as threatened and the later designation of the Western Distinct Population Segment as endangered, and designation of *critical habitat*, a number of protection measures were established and executed relative to the various ground fish fisheries including, *inter alia*, absolute prohibition of shooting, exclusion of fishing activities near breeding and haulout sites (BiOp p 60-65).

NMFS concluded that "Through the 1990s, the eastern DPS increased at approximately 3% per year (Pitcher et al. 2007), while western DPS continued to decline at approximately 5% per year throughout its range (Burkanov and Loughlin 2005, NMFS 2008a". (BiOp page 80[4]). The Biological Opinion confuses an understanding of patterns

[4] The conclusion of a decline seems to be a bit unsupported as Burkanov & Loughlin 2005 reported an increase the Asian population from the late 1990s through 2005 and the reference to NMFS 2008a is to the secondary literature (the unpublished Recovery Plan) which concludes that non-pup counts increased and then were stable. More recent data

of change in the status of the EDPS and the WDPS by detailing small scale changes in particular sub-areas of the ranges of Steller sea lions in each of those DPSs rather than evaluating patterns and status in each DPS as constrained and required by the ESA. Moreover, it uses fragmented geographic and temporal data that greatly reduce the strength of the data and the persuasiveness of arguments and declaratory conclusions. The use of 'non-pup' counts versus counts of pups as a proxy for "natality" (or the incorrectly used term "natality rate"; natality [i.e., birth rate] is a rate) is, I think, a primary weakness for an assessment of population change. The strength and reliability of relationship of this index to actual birth rate (i.e., natality = number of births per thousand animals in the population) is unknown. The distribution and haulout behaviors of juvenile and non-breeding pinnipeds, including otariids, are generally substantially different from breeding animals and also highly variable geographically and temporally. These dynamics present substantive concerns about the accuracy, precision, and bias in this derived index and its use to estimate abundance. Moreover, the use of this index to then compute estimates of survival arguably results in additional pyramiding of error. I don't think that it is a valid application, particularly when used to judge sub-region patterns of abundance, natality, fecundity, or fertility. The focus of surveys on trend sites as an index is valid only to the extent that the trends at those sites are reflective of patterns at sites not surveyed as trend sites (though I do understand the logistical attractiveness of this approach). In a met population analytical framework (Steller sea lions have been argued to be a metapopulation), populations or colonies are continually blinking out, some permanently, and blinking in over the range of the metapopulation, and particularly along fringes or ends of ranges. Use of trend sites within this framework would seem to be a poor method to assess overall population status and vitality.

The BiOp uses hypothetical models to do post-hoc tests of suggestive hypotheses. There are virtually no substantive data on vital rates (i.e., survival, mortality, fertility, fecundity) for the WDPS and few for the EDPS (with the limited exception of recent mark recapture data from, and from harvested animals in the 1980s). The BiOp declared that "The observed decline in western DPS population size is not explained by emigration from the western DPS to the eastern DPS" (Page 93). No data are presented to support this statement and indeed it is contradicted by data presented elsewhere in the BiOp on

indicate continued increases and don't agree with the treatment of data in the Recovery Plan.

dispersal, emigration and immigration. The subsequent statement that "Thus, the historic declines observed in the western DPS are primarily attributable to changes in birth and death rates" (Page 93). This is a *non-sequitur* and also unsupported by any available data. It is contrary to the data presented on emigration and immigration and also lacks any actual data for birth rates and death rates[5].

The BiOp concluded that "….the current fisheries, as modified by the actions and RPAs contained in past Biological Opinions, continue to impede the survival and recovery of the western DPS of Steller sea lion [sic]" (pp. 344-345). The BiOp provides little support for that conclusion other than "A significant rationale for this conclusion is based on the continued decline in abundance of Steller sea lions **within** the western and central Aleutians (RCAs 1,2,3,4)" (Page34), and a 'belief' that "…the extirpation of Steller sea lions in the western Aleutians would be significant to the western DPS, and is expected to appreciably reduce the likelihood of both their survival and recovery in the wild" (page 345). To the extent that the ESA requires only DSPs are to be considered as the minimum population units for determination of jeopardy and adverse habitat modification, this conclusion appears to be beyond the acceptable domain of the ESA. The evidence to support the BiOp's contention that commercial fisheries are the cause of potential jeopardy and adverse modification is the conclusion "This decline **may** be associated with reductions in numbers of individuals due to decreases in habitat functionality as a consequence of the continued fishery operations in these areas" (p345). Further, it concluded that "this decline is not significantly influenced by emigration to other areas…" (p 345). The former evidence is hypothetical and the latter is unsupported (and indeed contrary to data presented elsewhere in the BiOp and the primary literature). These hypothetical suggestions and beliefs are not adequate, I think, to meet the standards necessary to make the conclusions reached in the BiOp.

Term of Reference 3. Evaluation of the quality and completeness of the scientific and commercial information used in the BiOp analysis and whether the BiOp analysis is

[5] Hypothetical models did use a proxy of birth rate (ratio of counts of pups to non-pups) to derive a second proxy of survival. Those models suggested based on those hypothetical proxies that birth rates and survival might have changed during periods of decline and increase but those hypothetical exercises and suggestions can not support the declaratory statements in the BiOp that survival or natality did in fact change or that changes in survival "likely" or certainly accounts for the population changes observed.

comprehensive or if there are relevant scientific or commercial data or information that were not used in the BiOp analysis.

This was difficult to judge regarding quality as there did not appear to be much critical evaluation of the primary published or unpublished literature. The only way to evaluate this would be a *de novo* review of the primary literature. That product of that review should be structurally presented much differently than the 2010 BiOp to allow the reader to judge the strengths of conditions, arguments, interpretations, and conclusions against an uncluttered presentation of the original data rather than a restatement of interpretations by the primary, secondary, and tertiary literature. I think that the BiOp needs to be rewritten to address these issues. Throughout the BiOp, there are frequent transliterations of simply suggestive hypotheses, interpretations, and conditioned conclusions into compelling declaratory statements (i.e., the suggestive terms may, might, possible, plausible, perhaps, etc. in the literature and in various parts of the BiOp are converted to "likely" in the Executive Summary and concluding findings).

*Term of Reference 4.*Evaluation of: a) the scientific basis for the findings of nutritional stress findings in the final 2010 BiOp; b) the strength of the linkages among fish biomass estimates, fishery removals, Steller sea lion reproductive rates, and recovery of the WDPS; and c) the inter-relationships between Steller sea lion population status and trends, foraging ecology, and groundfish fisheries effects across broad geographic areas (ecosystems to highly localized regions) and temporal scales (years to seasons).

There does not appear to be any substantive direct evidence to support the suggestion or bottom-up hypothesis that Steller sea lions have been, are or might be nutritionally stressed, either as a result of oceanographic climate variability, non-lethal infectious disease, or owing to the effects of extraction of common prey by commercial fisheries.

Term of Reference 5. Consideration of whether there is any additional literature, assessments, or analyses that should have been considered in this BiOp (as of the end of the public comment period for the Draft BiOp, September 3, 2010).

I think that the BiOp could have been greatly improved by a more robust critical evaluation of the published and unpublished primary literature and a clear separation of the presentation of dispositive facts and evidence from opinion and belief (which I think should have no presence in this assessment and construction of the BiOp).

Term of Reference 6. Consideration of whether the findings of the BiOp are contradicted by any scientific information available as of Sept 3, 2010 presented in, or omitted from, the BiOp.

I think that the findings of the BiOp are not supported by the scientific information that is available. There does not appear to be any persuasive evidentiary support for any of the hypotheses considered to account for the population decline in the 1970s, 1980s, and part of the 1990s and for the increases since then. The limited substantive evidence that is available has been used to suggestively argue for the ranked roles of those various hypotheses but is not adequate to support compelling arguments (i.e., "likely") or even persuasive arguments for more than simple correlation of some variables with others. No explanatory variable appears to be capable of establishing likely causation for population change.

Term of Reference 7. Assessment of the scientific record to determine whether adequate consideration has been given to the likelihood that factors other than fishing are negatively affecting the population status, critical habitat or recovery of the WDPS including predation, changes in the ecosystem or carrying capacity, emigration, exposure to contaminants, or other factors.

The BiOp identified a number of bottom-up and top-down hypotheses that might explain the changes in population abundance of Steller sea lions. They have largely focused on the possible causes for the substantial decline in abundance in the latter half of the 20th Century during a period of apparent oceanographic climate change and variability. The attempted post-hoc testing of those have been inconclusive about causation. The apparently leading bottom-up hypothesis that the declines of WDPS has been caused nutritional stress, whether from climate related changes in prey communities or fisheries related changes in prey abundance or relative community composition, lacks persuasive evidentiary support and remains simply hypothetical. The apparently leading top-down hypothesis that predation by killer whales can account for the population declines, particularly in the WDPS, likewise lacks persuasive evidentiary support and remains simply hypothetical. A general conclusion that all possible explanatory variables could likely account for the declines and the patterns of recovery is not useful. The two contrasting leading hypotheses are testable, to the extent that robust data on the reproductive, physical, and physiological responses of Steller sea lion and their habitats

(i.e., biological and physical) could be collected in their logistically challenging habitats. Allowing fisheries to operate under the constraints of the contemplated Fishery management plans would support testing of the bottom-up hypothesis, but the possibility of this is constrained by the final legal determination of whether the proposed agency action is allowed or not. Regulating killer whale abundance and potential predation, to the extent that it would actually be considered and allowed by the public and the courts, would facilitate the testing of this top-down hypothesis. Regardless of the outcome of the decision on the proposed agency action, additional well-planned and well-executed robust studies of the biology and ecology of Steller sea lions and their habitats are needed to establish, explain, and understand the role of various biotic and abiotic factors on their biogeography and population vitality and to maintain vigilance to facilitate rapid adaptive modification of management plans and actions for Steller sea lions, their habitats, and commercial fisheries.

Chapter 2

The CIE convened a public meeting at NOAA facilities in Seattle, Washington on 1 & 2 August that included scientific presentations on new data and analyses since the issuance of the Biological Opinion in 2010 by NOAA, environmental organizations, the fishing industry, and other stakeholders. Additional presentation materials and documents were made available to the CIE panel during and after the meeting. I participated in that meeting to listen to and consider all of the discussion and any new information and data that were presented relative to an assessment of the BiOp and issues tasked in Chapter 1.

Term of Reference 2. Reevaluation of the scientific basis for the conclusions of the final 2010 BiOp, that fisheries are causing nutritional stress in Steller sea lions, which in turn is adversely impacting the survival and recovery of the WDPS of the Steller sea lion, and of the strength of the relationship between fishery removals and recovery of the WDPS.

Though there were contrasting data presented on feeding behavior in captive Steller sea lions, there was no new data presented to support the hypothesis that the commercial groundfish fisheries in the Western Bering Sea, the Aleutian Islands or the Gulf of Alaska have caused, are causing or may cause (under the proposed FMPs) nutritional stress to Steller sea lions. This hypothesis remains unsupported.

Data presented on the possible population effects of predation of killer whales on Steller sea lions in the Gulf of Alaska were equivocal and too speculative to support a conceptual model that killer whales could have had and might continue to be having a substantial effect on status and vitality of Steller sea lion populations.

New survey data were presented for the abundance of Steller sea lions in the WDPS and the EDPS, which indicated steady increases in births of sea lions in both DPSs since 2000, including at least a 16% increase in births in the WDPS from 2005 through 2011 and a 34% increase in births in the WDPS from 2002 through 2011. This contrasts substantially with the conclusion in the BiOp that births in the WDPS have been stable or declining since 2005.

Additional data were presented on dispersal, immigration, and emigration of Steller sea lions throughout its range indicating that these animals are highly mobile throughout the year and among years and that movement of reproductive animals from natal sites to distant breeding sites is apparently considerable.

Term of Reference 3. Consideration of the Reasonable Prudent Alternative (RPA) presented in the BiOp (Section 8.3.4) and as implemented through an Interim Final Rule (75FR77535; December 13, 2010) to test to test the response of fisheries and Steller sea lions to the fisheries closures implemented by the RPA/IFR.

I don't think that the evidence or arguments presented in the BiOp support the conclusions that either "…the action, as proposed, is likely to jeopardize the continued existence of the western DPS of Steller sea lion [sic]" (page xxxi) or that "…the action, as proposed, is likely to adversely modify the designated critical habitat for the western DPS of Steller sea lion [sic]" (page xxxiv). Consequently, it is not appropriate to consider the RPA necessary. In any event, I do not think the use of "non-pup" counts (there is some confusion in various parts of the BiOp about whether these might be counts of adult females to compare to pups or counts of adult females, adult males, and juveniles to compare to pups) is a valid proxy for natality. The key and simplest index of population status and trends is a count of pups. Moreover, correlating a questionable proxy of natality with a simple estimate of biomass (or a proxy for biomass) is not, I think, an adequate test of an hypothesis that seeks to determine whether changes in abundance of Steller sea lions might be caused by changes in biomass that are posited to occur as a result of implementation of the RPA.

Appendix I. Documents reviewed

Adak Community Development Corporation (2011) Comments to CIE BiOp Review Panel, 3 August 2012. 16 pp.

Bernard DR, Jefferies SJ, Knapp G, and Trites AW (2011) An Independent Scientific Review of the Biological Opinion (2010) of the Fisheries Management Plan for the Bering Sea/Aleutian Islands Management Areas.

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Boyd IL (2010) Assessing the effectiveness of conservation measures: Resolving the "wicked" problem of the Steller sea lion. Biol Cons doi:10.1016/j.biocon.2010.04.006.

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Hui TCY (2011). Steller sea lions and fisheries: Competition at Sea? Masters Thesis University of British Columbia. 114 pp.

Maniscalco JM, Springer AM, Parker P (2010) High natality rates of endangered Steller sea lions in Kenai Fjords, Alaska and perceptions of population status in the Gulf of Alaska.

Merrigan G (2012) Fishing industry perspective on the 2010 Biological Opinion and new available information. CIE Panel Review, August 1-2, 2012, Seattle, Washington. 23pp.

National Research Council (2003) Decline of the Steller sea lion in Alaskan waters: Untangling food webs and fishing nets. The National Academies Press. 216 pp.

Natural Resources Defense Council v. Salazar (2012) LP 1004 8167 OJI ORO LLC 108

NOAA, National Marine Fisheries Service. (November 2010). Final Biological Opinion: Authorization of Groundfish Fisheries under the Fishery Management Plans for Groundfish the Bering Sea and Aleutian Islands Management Area and the Gulf of Alaska.

NOAA, National Marine Fisheries Service. (March 2008). Recovery Plan for the Steller Sea Lion: Eastern and Western Distinct Population Segments (*Eumetopias jubatus*).

NOAA (2000) Endangered Species Act Section 7 Consultation Biological and Incidental take Statement. Authorization of Bering Sea/Aleutian Islands groundfish fisheries based on the Fishery Management Plan for the Bering Sea/Aleutian Islands Groundfish; and Authorization of Gulf of Alaska groundfish fisheries based on the

Fishery Management Plan for Groundfish of the Gulf of Alaska. November 2000. 588p.

NOAA, NMFS (2003) 2003 Supplement to the Endangered Species Action Section 7 Biological Opinion and Incidental take statement of October 2001, plus appendices. 183p.

NOAA, NMFS (2001) 2001 Biological Opinion and Incidental Take Statement. October 2001. Authorization of Bering Sea/Aleutian Islands groundfish fisheries based on the Fishery Management Plan for the Bering Sea/Aleutian Islands Groundfish as modified by amendments 61 and 70; and Authorization of Gulf of Alaska groundfish fisheries based on the Fishery Management Plan for Groundfish of the Gulf of Alaska as modified by amendments 61 and 70. Parallel fisheries for pollock, Pacific cod, and Atka mackerel, as authorized by the State of Alaska within 3 nm of shore, plus selected supporting documents. 201p.

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Appendix 2. Statement of Work

External Independent Peer Review by the Center for Independent Experts

Biological Opinion on the Effects of the Federal Groundfish Fisheries and State Parallel Fisheries on listed species in Alaska, including Steller sea lions

Scope of Work and CIE Process: The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. The Statement of Work (SoW) described herein was established by the NMFS Project Contact and Contracting Officer's Technical Representative (COTR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are selected by the CIE Steering Committee and CIE Coordination Team to conduct the independent peer review of NMFS science in compliance with the predetermined Terms of Reference (ToRs) for the peer review. Each CIE reviewer is contracted to deliver an independent peer review report to be approved by the CIE Steering Committee and the report is to be formatted with content requirements as specified in **Annex 1**. This SoW describes the work tasks and deliverables of the CIE reviewer for conducting an independent peer review of the following NMFS project. Further information on the CIE process can be obtained from www.ciereviews.org.

Project Description: NMFS Alaska Region has issued a Final Biological Opinion (November 24, 2010) under the ESA on the effects of the current fishery management regime for federal groundfish fisheries on listed species. The main listed species of concern is the endangered western distinct population segment (WDPS) of the Steller sea lion; the threatened eastern distinct population segment (EDPS) of Steller sea lions was also considered. In addition, the effects on listed humpback whales (Central Pacific and Western Pacific populations), fin whales and sperm whales were considered. The basis for the consultation is the new information available to the agency as a result of almost 10 years of intensive research on Steller sea lions in Alaska. The new information pertains to the status of the species, population and sub-regional trends in abundance, and the impacts of the existing conservation measures as well as the prosecution of the federal fisheries and the State of Alaska parallel groundfish fisheries. The focus species for this CIE review is the WDPS of the Steller sea lion.

The review will consist of two parts: (1) conducting a desk review of the Final BiOp including information available to NMFS through up until September 3, 2010 and (2) convening as a panel to peer review new scientific information (e.g. available subsequent to issuance of the Final BiOp). During the public session of the panel review meeting, presentations addressing the scope and context of the BiOp analysis and related scientific information may also be provided from experts in environmental organizations, scientific groups, the fishing industry, and affected communities. In accordance with the predetermined terms of reference (ToRs) as specified in Annex 2, each reviewer will produce an independent peer review report consisting of two chapters: Chapter 1 will describe findings based on the desk audit of the Final Biological Opinion and will be produced prior to the public panel session; Chapter 2 will be based on the evaluation of new scientific

information presented during the subsequent panel review meeting. Each reviewer report will be delivered with the two described Chapters as a single document at the end of the review process according to the scheduling of the deliverables.

Based on the ToRs for Chapter 1, each reviewer will conduct a desk review to specifically review and comment on the scientific information and interpretation that led to the rationale and subsequent findings contained in the Biological Opinion regarding factors affecting Steller sea lion population status, their critical habitat, and recovery. In particular, the desk review will include findings regarding the effects of fisheries on Steller sea lion population status, vital rates, and critical habitat. The reviewers are asked to comment on the adequacy of the best available science and of the appropriate interpretation of that science to reach the conclusions presented in the BiOp.

Based on the ToRs for Chapter 2, each reviewer shall review, evaluate, and consider the Final Biological Opinion, its findings, and scientific and commercial information made available since issuance of the Final BiOp up to the date of the panel review meeting. In addition to the peer review tasks in accordance with the ToRs for Chapter 2, reviewers may also provide additional commentary on the science included in presentations made in the public session during the panel review meeting. The Terms of Reference (ToRs) for the scientific peer review are attached in **Annex 2**.

Requirements for CIE Reviewers: Three CIE reviewers shall be provided with adequate time to conduct a thorough, impartial and independent peer review in accordance with the SoW and ToRs herein. Each CIE reviewer's duties shall not exceed a maximum of 40 days to complete all tasks of the desk peer review, participate during the panel review meeting and complete their independent peer report, as described herein. CIE reviewers shall have the expertise, background, and experience to complete an independent peer review in accordance with the SoW and ToRs. The expertise of the combined CIE reviewers should include marine fisheries management, marine fish biology, ecology and stock assessments, marine mammal population biology and foraging ecology. It is desirable that one or more of the reviewers have familiarity with the standards of the Endangered Species Act Section 7 in relation to conservation biology.

Location of Peer Review: Each reviewer shall conduct the peer review as desk review during which travel is not required and then each reviewer will participate in a panel review meeting in Seattle, Washington.

Statement of Tasks: Each CIE reviewer shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein.

Prior to the Peer Review: Upon completion of the selection of the CIE reviewers by the CIE Steering Committee, the CIE shall provide the CIE reviewer information (full name, title, affiliation, country, address, email) to the COTR, who forwards this information to the NMFS Project Contact no later the date specified in the Schedule of Milestones and Deliverables. From the date when the selected CIE reviewer information is sent to the NMFS, the NMFS will be provided five working days to solicit comments from the North Pacific Fisheries Management Council (Council) in regard to whether there are any conflicts of interest issues that may have been overlooked by the CIE selection process, as related to conflicts defined under the CIE conflict of interest conditions (see http://www.ciereviews.org/interest.php). After this five-day period, if

there is agreement that there are no conflicts of interest issues, the NMFS Project Contact may communicate directly with the CIE reviewers in regard to all necessary peer review arrangements. The CIE Steering Committee will make the ultimate decision, based on supporting information, on the eligibility of the CIE reviewers The CIE Coordinator and COTR must be copied on all email correspondence with the CIE reviewers during the duration of the contract to ensure all contract obligations are satisfied. The CIE is responsible for providing the SoW and ToRs to the CIE reviewers. The NMFS Project Contact is responsible for providing the CIE reviewers with the background documents, reports, and other pertinent information. Any changes to the SoW or ToRs must be made through the COTR prior to the commencement of the peer review.

Pre-review Background Documents: The NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports with sufficient lead time before the peer review. In other words, a desk review can begin when the necessary information is received while the necessary reports and background documents for a panel review meeting should be sent to the reviewers about two weeks before the meeting. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the CIE Lead Coordinator on where to send documents. CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance with the SoW scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review. A list of specific background documents is provided in Annex 3.

Peer Review: Each CIE reviewer shall conduct the independent peer review in accordance with the SoW and ToRs, and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs cannot be made during the peer review and any SoW or ToRs modifications prior to the peer review shall be approved by the COTR and CIE Lead Coordinator.** The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements.

Panel Review Meeting: Each CIE reviewer shall conduct the independent peer review of the scientific information presented at the panel review meeting in accordance with the SoW and ToRs and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs cannot be made during the panel review, and any SoW or ToRs modifications prior to the panel review shall be approved by the COTR and CIE Lead Coordinator.** Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the ToRs as specified herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact is responsible for ensuring that the Chair understands the contractual role of the CIE reviewers as specified herein. The role of the Chair during a panel review is to facilitate the scientific presentations and discussions with a focus on the ToRs. The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

Contract Deliverables - Independent CIE Peer Review Reports:

Desk review: Each CIE reviewer shall complete an independent peer review of the Final BiOp Report addressing each ToR as described in Annex 2 pertinent to Chapter 1. The desk review will be produced prior to the onset of the public panel review and each reviewer will deliver their

report on Chapter 1 as a single deliverable after the panel review meeting as a single report that includes both Chapters 1 and 2.

Scientific panel review: Each CIE reviewer shall participate during the panel review meeting to conduct a scientific peer review subsequent to the desk review in accordance with the SoW. Each CIE reviewer shall complete and deliver the independent peer review report that includes Chapters 1 and 2 as separate sections of the report described herein, according to required format and content as described in Annex 1. Each CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2 as specified for Chapter 2.

Other Tasks – Contribution to Executive Summary: In addition to each reviewer's individual peer review report, CIE reviewers will provide a brief synopsis of their desk review for compilation by the Chair into an Executive Summary (see Annex I). CIE reviewers are not required to reach a consensus. In addition the Executive Summary will list briefly the findings and conclusions reached by each panelist in accordance with the ToRs.

Specific Tasks for CIE Reviewers: The following chronological list of tasks shall be completed by each CIE reviewer in a timely manner as specified in the **Schedule of Milestones and Deliverables**.

1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review;
2) Conduct an independent peer review as a desk review described herein in accordance with the ToRs (Annex 2, Chapter 1);
3) Participate during the panel review meeting in Seattle, WA during **August 1-3, 2012** to conduct an independent peer review based on the scientific information presented during the panel review meeting in accordance with the ToRs (Annex 2, Chapter 2).
4) No later than **August 21, 2012**, each CIE reviewer shall submit an independent peer review report, including Chapters 1 and 2 in accordance with the ToRs, addressed to the "Center for Independent Experts," and sent to Mr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and Dr. David Die, CIE Regional Coordinator, via email to ddie@rsmas.miami.edu. Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in Annex 2.

Schedule of Milestones and Deliverables: CIE shall complete the tasks and deliverables described in this SoW in accordance with the following schedule.

June 5, 2012	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact who has 5 days to confirm there are no conflicts of interest before the contract is finalized with the reviewers.
June 13, 2012	Upon finalizing the contract, the NMFS Project Contact sends the CIE Reviewers the BiOp and background documents and begins correspondence with the reviewers.
July 5-19, 2012	Each reviewer conducts an independent scientific peer review as a desk review (Chapter 1).
August 1-3, 2012	CIE reviewers participate at the panel review meeting in Seattle WA to conduct a scientific peer review (Chapter 2)
August 21, 2012	CIE reviewers prepare and submit their independent peer review reports, including Chapters 1 and 2, to the CIE Coordinator.
September 4, 2012	After the CIE Steering Committee review process, the CIE reports with Chapters 1 and 2 are submitted to the COTR
September 7, 2012	The COTR distributes the final CIE reports to the NMFS Project Contact, AFSC Science Director, and Administrator, Alaska Region.

Modifications to the Statement of Work: Requests to modify this SoW must be made through the Contracting Officer's Technical Representative (COTR) who submits the modification for approval to the Contracting Officer at least 15 working days prior to making any permanent changes. The Contracting Officer will notify the CIE within 10 working days after receipt of all required information of the decision on substitutions. The COTR can approve changes to the milestone dates, list of pre-review documents, and Terms of Reference (ToR) of the SoW as long as the role and ability of the CIE reviewers to complete the SoW deliverable in accordance with the ToRs and deliverable schedule are not adversely impacted. The SoW and ToRs cannot be changed once the peer review has begun.

Acceptance of Deliverables: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COTR for final approval as contract deliverables based on compliance with the SoW. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (the CIE independent peer review reports) to the COTR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COTR provides final approval of the contract deliverables. The acceptance of the contract deliverables shall be based on three performance standards: (1) each CIE report shall have the format and content in accordance with Annex 1, (2) each CIE report shall address each ToR as specified in Annex 2, (3) the CIE reports shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Distribution of Approved Deliverables: Upon notification of acceptance by the COTR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COTR. The COTR will distribute the approved CIE reports to the NMFS Project Contact and regional Center Director and will notify the Executive Director, North Pacific Fishery Management Council of availability of the report.

Support Personnel:

William Michaels, Program Manager, COTR
NMFS Office of Science and Technology
1315 East West Hwy, SSMC3, F/ST4, Silver Spring, MD 20910
William.Michaels@noaa.gov Phone: 301-427-8155

Manoj Shivlani, CIE Lead Coordinator
Northern Taiga Ventures, Inc.
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Key Personnel:

Robert Mecum, Deputy Regional Administrator, NMFS Project Contact
NMFS, Alaska Region, 709 W.9th Street, Juneau, AK 99802
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Melanie Brown
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NMFS Alaska Fisheries Science Center
17109 Pt Lena Loop Road, Juneau, AK 99801
Douglas.Demaster@noaa.gov Phone: 206-399-1431

Annex 1: Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report (Report) shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations.

2. The Report will include two chapters. The first chapter will be based on each reviewer's independently conducted desk review. The second chapter will be based on each reviewer's independent peer review of scientific information presented at the panel review meeting, including the evaluation of the full scientific record including scientific information available after September 3, 2010.

3. The main body of each chapter shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR, and Conclusions and Recommendations in accordance with the Terms of Reference (ToRs).

   a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.

   b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views

   c. The CIE independent report shall be a stand-alone document for others to understand the strengths and weaknesses of the science reviewed. The CIE independent report shall be an independent peer review addressing each ToR.

4. The reviewer report shall include as separate appendices as follows:

   Appendix 1: Bibliography of materials provided for review

   Appendix 2: A copy of the CIE Statement of Work

   Appendix 3: A list of persons and organizations participating in the panel review meeting and other pertinent information from the panel review meeting.

Annex 2: Terms of Reference

Background and Context:

The purpose of this independent CIE Peer Review is to evaluate a Final Biological Opinion issued by NOAA Fisheries on November 24, 2010. The Endangered Species Act (ESA) requires NOAA Fisheries to consult with federal agencies proposing actions that may affect ESA listed species. The consultation results in a Biological Opinion (BiOp) that describes the action, reviews species biology, and makes a conclusion as to whether or not the action is likely to jeopardize the continued existence of the listed species or to adversely modify its designated critical habitat. Adverse modification is determined to occur when the direct or indirect effects of an action "appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species" (FWS/NMFS 1998). The consultation process is not required to employ a "prove-disprove" or statistical evaluation process, but instead may evaluate the best available information in a "weight of evidence approach" to make a determination. The process follows the ESA statute, related regulations, and case law; with guidance to authors provided within the Endangered Species Consultation Handbook (FWS/NMFS 1998) and the Final Recovery Plan for the Eastern and Western Distinct Population Segments of Steller Sea Lion (NMFS 2008).

Tasks specific to developing Chapter 1 (conducting the desk review):

1. Read the Final BiOp (November 24, 2010) on the BSAI and GOA groundfish fisheries; and state waters parallel fisheries for groundfish fisheries and related background documents (list of documents provided is attached) and the recovery plan. Refer to Annex 3 for listing of Final BiOp report and background documents.
2. Provide a scientific peer review and comment on the final BiOp, including scientific information available to NMFS through the end of the public comment period (Sept. 3, 2010) for the Draft BiOp, evaluate the scientific information and its interpretation that developed the rationale and the subsequent findings regarding factors potentially affecting Steller sea lion population status, vital rates, critical habitat, risk of extinction, and recovery including in particular the findings regarding the effects of fisheries on Steller sea lion population status, vital rates, and critical habitat. Address the following:

    a. Does the BiOp thoroughly and accurately (i.e. using the best available scientific information) describe what is known about the status of the listed species?
    b. Does the BiOp thoroughly and accurately describe what is known about groundfish fishery practices and catch statistics under the current ongoing "status quo" action, as defined in the BiOp?
    c. While the agency is directed to evaluate the effects of the action on listed species and critical habitat, does the BiOp also adequately address alternative scientific explanations to the apparent population dynamics of the WDPS of Steller sea lion, such as (but not limited to) predation, disease, ecosystem/carrying capacity, or emigration?
    d. Does the BiOp thoroughly and accurately assess the effects (direct and indirect) of the action on the listed species and its critical habitat?

e. Evaluate the scientific weight of the evidence presented in the BiOp. Does the evidence provide strong, moderate or weak support for the discussion, findings and conclusions made in the document?

3. Reviewers shall evaluate the quality and completeness of the scientific and commercial information used in the BiOp analysis, and identify if the BiOp analysis is comprehensive or if there are relevant scientific or commercial data or information that were not used in the BiOp analysis.

4. Reviewers are specifically asked to evaluate the scientific basis for the nutritional stress findings of the final 2010 BiOp. Reviewers shall evaluate and comment on the strength of the linkages among fish biomass estimates, fishery removals, Steller sea lion reproductive rates, and recovery of the WDPS. Does the BiOp accurately evaluate the inter-relationships between Steller sea lion population status and trends, foraging ecology, and groundfish fisheries effects across broad geographic areas (ecosystems to highly localized regions) and temporal scales (years to seasons)?

5. Reviewers will determine if there is any additional literature, assessments, or analyses that should have been considered in this BiOp (as of the end of the public comment period for the Draft BiOp, September 3, 2010).

6. In making these evaluations, reviewers shall consider and address the following questions:

    a. Are the findings of the BiOp contradicted by any scientific information available as of Sept 3, 2010 presented in, or omitted from, the BiOp?

    b. As part of this consideration, reviewers shall also assess the scientific record to determine whether adequate consideration has been given to the likelihood that factors other than fishing are negatively affecting the population status, critical habitat or recovery of the WDPS including predation, changes in the ecosystem or carrying capacity, emigration, exposure to contaminants, or other factors.

Tasks specific to Chapter 2 (panel review meeting):

1. Reviewers will convene as a Panel and will conduct a scientific peer review during the panel review meeting in TBD. In addition to scientific presentations regarding the BiOp analysis and related scientific information, the meeting will include presentations by experts from environmental organizations, the fishing industry, affected communities, and other agencies and institutions. The Panel will conduct the peer review in accordance with the ToRs for Chapter 2 and consider all relevant scientific information available up to the date of the Panel meeting. Refer to Annex 3 for listing of report and background documents.

2. Following the same ToR identified for Chapter 1 (above), the reviewers will reexamine the Final BiOp, its scientific record and any new information available subsequent to the issuance of the Final BiOp and may provide additional commentary on the findings they made in Chapter 1 based on scientific information that arises through the panel presentations. This re-visitation of Chapter 1 shall be part of Chapter 2 of the report. As part of this commentary the reviewers are tasked to reevaluate the scientific basis for the conclusions of the final 2010 BiOp, that fisheries are causing nutritional stress in Steller sea lions, which in turn is adversely impacting the survival and recovery of the WDPS of the Steller sea lion. The reviewers shall evaluate and comment on the strength of the relationship between fishery removals and recovery of the WDPS.

3. The Reasonable Prudent Alternative (RPA) presented in the BiOp (Section 8.3.4) and as implemented through an Interim Final Rule (75FR77535; December 13, 2010) may present an opportunity for an adaptive management experiment to test the response of fisheries and Steller sea lions to the fisheries closures implemented by the RPA/IFR. Reviewers will be asked to (1) comment on the utility of this opportunity, (2) evaluate the metrics identified in the BiOp (e.g., trends in Steller sea lion abundance, trends in biomass of Atka mackerel and other groundfish, etc.), and (3) suggest other metrics not described in the BiOp that could be used to evaluate the efficacy of the action in ensuring the groundfish fisheries are not likely to adversely affect the survival and recovery of western distinct population segment (WDPS) of the Steller sea lion.

Annex 3. Listing of documents for the CIE peer review

Mandatory documents for the 'desk' review (Chapter 1):

National Marine Fisheries Service. November 2010. Final Biological Opinion: Authorization of Groundfish Fisheries under the Fishery Management Plans for Groundfish the Bering Sea and Aleutian Islands Management Area and the Gulf of Alaska. 472p + 224p. Available at: http://www.alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

National Marine Fisheries Service. March 2008. Recovery Plan for the Steller Sea Lion: Eastern and Western Distinct Population Segments (*Eumetopias jubatus*). Revision. 325p. Available at: http://www.alaskafisheries.noaa.gov/protectedresources/stellers/recovery/sslrpfinalrev030408.pdf

L. Boyd (2010) Views expressed by Professor I.L. Boyd on the Biological Opinion Groundfish Fisheries, Bering Sea and Aleutian Islands Management Area US National Marine Fisheries Service – 8 pp. Available at: http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

J. M. Maniscalco, A. M. Springer, and P. Parker (2010) High Natality Rates of Endangered Steller Sea Lions in Kenai Fjords, Alaska and Perceptions of Population Status in the Gulf of Alaska – 33 pp. Available at: http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

D. Calkins (2008) Fixed Gear Marine Mammal Study, North Pacific Wildlife Consulting, LLC. NOAA Grant Number: NA07NMF4390024, April 6, 2008– 45 pp. Available at: http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

Mandatory documents for the panel review (Chapter 2):

Bernard, D. R, S. J. Jefferies, G. Knapp, and A. W. Trites, 2011, An Independent Scientific Review of the Biological Opinion (2010) of the Fisheries Management Plan for the Bering Sea/Aleutian Islands Management Areas, October 8, 2011. 128 pp. Available at: http://wdfw.wa.gov/conservation/steller_sealions/final_fmp_biop_ind_sci_rev_08oct2011.pdf

M. Horning1 and J. E. Mellish. (2012). Predation on an Upper Trophic Marine Predator, the Steller Sea Lion: Evaluating High Juvenile Mortality in a Density Dependent Conceptual Framework. January 2012 | Volume 7 | Issue 1 | e30173. Plosone.org. 10 pages. Available at: http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

J.N. Waite, V.N. Burkanov, and R.D. Andrews (2012). Prey competition between sympatric Steller sea lions (Eumetopias jubatus) and northern fur seals (Callorhinus ursinus) on Lovushki Island, Russia. NRC Research Press. 18 pages. Available at: http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

Demaster, D. (2011) Memorandum for Jim Balsiger regarding Results of Steller Sea Lion Surveys in Alaska, June-July 2011, December 5, 2011, Alaska Fisheries Science Center. 18 pages, Available at:
http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

Trites, A.W., R. Flinn, R. Joy, and B. Battaile. 2010. Was the decline of Steller sea lions in the

Aleutian Islands from 2000 to 2009 related to the Atka mackerel fishery? University of

British Columbia Fisheries Centre Working Paper 2010-10. 29 pp. Available at:
http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

Conn, P. B. (2011). An internal review of Trites et al. 2010, NOAA/NMFS/NMML, Polar Program. February 11, 2011 3 pages. Available at:
http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

Demaster D. (2011) Presentation to the North Pacific Fishery Management Council of NMFS Comments on the Bernard et al. 2011 review of the 2010 biological opinion. 24 pages, Available at: http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm

T. C. Y Hui. (2011). Steller Sea Lions and Fisheries: Competition at Sea? Masters Thesis University of British Columbia, March 2011. 114 pp. Available at:
http://alaskafisheries.noaa.gov/protectedresources/stellers/esa/biop/final/1210.htm
http://www.afsc.noaa.gov/REFM/stocks/assessments.htm

Additional background documents:

Fisheries of the Exclusive Economic Zone off Alaska; Steller sea lion protection measures for the Bering Sea and Aleutian Islands Groundfish fisheries off Alaska. Interim Final Rule (75FR77535; December 13, 2010). 26p. http://www.fakr.noaa.gov/frules/75fr81921.pdf and
http://www.fakr.noaa.gov/frules/76fr2027.pdf

Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Areas. North Pacific Fishery Management Council. November 2011. 145p. Available at:
http://209.112.168.2/npfmc/PDFdocuments/fmp/BSAI/BSAI.pdf

Fishery Management Plan for Groundfish of the Gulf of Alaska. North Pacific Fishery Management Council. December 2011. 128p. Available at:
http://209.112.168.2/npfmc/PDFdocuments/fmp/GOA/GOA.pdf
North Pacific Fishery Management Council (2011) 2012 Bering Sea and Aleutian Islands Groundfish Stock Assessment and Fishery Evaluation Report. Introduction 50 pages, BSAI Pacific cod chapter: 476 pages, BSAI Atka mackerel chapter: 1156 pages. BS pollock chapter: 168 pages, Aleutian Islands pollock chapter 258 pages. Available at:
http://www.afsc.noaa.gov/REFM/stocks/assessments.htm

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Appendix 3. Attendees at the CIE BiOp Review 1 & 2 August 2012, Seattle, Washington.

Jon Kurland	NMFS Alaska Region Protected Resources Division
Dana Seagars	NMFS Alaska Region Protected Resources Division
Brandee Gerke	NMFS Alaska Region Protected Resources Division
Mary Grady	NMFS Alaska Region Sustainable Fisheries Division
Mary Furuness	NMFS Alaska Region Sustainable Fisheries Division
Glenn Merrill	NMFS Alaska Region Sustainable Fisheries Division
Melanie Brown	NMFS Alaska Region Sustainable Fisheries Division
Stefanie Moreland	Sen. Murkowski Office
Larry Cotter	Chair of Steller Sea Lion Mitigation Committee
Gerry Merrigan	Member Steller Sea Lion Mitigation Committee
Dave Fraser	Member Steller Sea Lion Mitigation Committee
John Gauvin	Member Steller Sea Lion Mitigation Committee
Todd Loomis	Member Steller Sea Lion Mitigation Committee
Kenny Downs	Member Steller Sea Lion Mitigation Committee
Nicole Kimball	Alaska Dept. of Fish and Game
Doug Vincent-Lang	Alaska Dept. of Fish and Game
	Alaska Dept. of Fish and Game
Doug Demaster	Alaska Fisheries Science Center Director
Jim Balsiger	NMFS Alaska Region Administrator
Jim Iannelli	Alaska Fisheries Science Center
Lowell Fritz	National Marine Mammal Laboratory
Brian Fadely	National Marine Mammal Laboratory
Tom Gelatt	National Marine Mammal Laboratory
Tonya Zepplin	National Marine Mammal Laboratory
Libby Logerwell	Alaska Fisheries Science Center
Sandra Lowe	Alaska Fisheries Science Center
Pat Livingston	Alaska Fisheries Science Center and Chair

	of Scientific and Statistical Committee
Dave Fluharty	CIE Panel Review Chair and University of Washington
Kevin Stokes	Consultant, CIE expert
Don Bowen	Bedford Inst. Of Oceanography, CIE expert
Brent Stewart	Hubbs Sea World Institute, CIE Expert
Glenn Reed	Fishing Industry
Donna Parker	Fishing Industry
Tom Gemmell	Consultant
David Bernard	Consultant
Andrew Trites	University of British Columbia
Shannon Atkinson	UAF
Marcus Horning	Oregon State University
Steve MacLean	North Pacific Fishery Management Council
Dave Benton	Consultant
Paul McGregor	Fishing Industry
Vladimir Burkanov	Russian SSL Researcher
John Lepore	NOAA General Counsel
Susanne McDermott	Alaska Fisheries Science Center
Jeremy Sterling	National Marine Mammal Laboratory
Brian Bataille	University of British Columbia
Mike Levine	Oceana
John Warrenchuk	Oceana
Merrick Burden	Marine Conservation Alliance
Matt	Fishing Industry
Bill Tweit	North Pacific Fishery Management Council and Washington Dept. of Fish and Wildlife
Katie Sweeney	National Marine Mammal Laboratory
Steve Ignell	Alaska Fisheries Science Center
Stephanie Madsen	At Sea Processors Association
Steve Barbeaux	Alaska Fisheries Science Center
Frank Kelty	Dutch Harbor

Appendix 4. CIE Terms of Reference

Background and Context

The purpose of this independent CIE Peer Review is to evaluate a Final Biological Opinion issued by NOAA Fisheries on November 24, 2010. The Endangered Species Act (ESA) requires NOAA Fisheries to consult with federal agencies proposing actions that may affect ESA listed species. The consultation results in a Biological Opinion (BiOp) that describes the action, reviews species biology, and makes a conclusion as to whether or not the action is likely to jeopardize the continued existence of the listed species or to adversely modify its designated critical habitat. Adverse modification is determined to occur when the direct or indirect effects of an action "appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species" (FWS/NMFS 1998). The consultation process is not required to employ a "prove-disprove" or statistical evaluation process, but instead may evaluate the best available information in a "weight of evidence approach" to make a determination. The process follows the ESA statute, related regulations, and case law; with guidance to authors provided within the Endangered Species Consultation Handbook (FWS/NMFS 1998) and the Final Recovery Plan for the Eastern and Western Distinct Population Segments of Steller Sea Lion (NMFS 2008).

Tasks specific to developing Chapter 1 (conducting the desk review):

1. Read the Final BiOp (November 24, 2010) on the BSAI and GOA groundfish fisheries; and state waters parallel fisheries for groundfish fisheries and related background documents (list of documents provided is attached) and the recovery plan. Refer to Annex 3 for listing of Final BiOp report and background documents.
2. Provide a scientific peer review and comment on the final BiOp, including scientific information available to NMFS through the end of the public comment period (Sept. 3, 2010) for the Draft BiOp, evaluate the scientific information and its interpretation that developed the rationale and the subsequent findings regarding factors potentially affecting Steller sea lion population status, vital rates, critical habitat, risk of extinction, and recovery including in particular the findings regarding the effects of fisheries on Steller sea lion population status, vital rates, and critical habitat. Address the following

a. Does the BiOp thoroughly and accurately (i.e. using the best available scientific information) describe what is known about the status of the listed species?
b. Does the BiOp thoroughly and accurately describe what is known about groundfish fishery practices and catch statistics under the current ongoing "status quo" action, as defined in the BiOp?
c. While the agency is directed to evaluate the effects of the action on listed species and critical habitat, does the BiOp also adequately address alternative scientific explanations to the apparent population dynamics of the WDPS of Steller sea lion, such as (but not limited to) predation, disease, ecosystem/carrying capacity, or emigration?
d. Does the BiOp thoroughly and accurately assess the effects (direct and indirect) of the action on the listed species and its critical habitat?
e. Evaluate the scientific weight of the evidence presented in the BiOp. Does the evidence provide strong, moderate or weak support for the discussion, findings and conclusions made in the document?

3. Reviewers shall evaluate the quality and completeness of the scientific and commercial information used in the BiOp analysis, and identify if the BiOp analysis is comprehensive or if there are relevant scientific or commercial data or information that were not used in the BiOp analysis.
4. Reviewers are specifically asked to evaluate the scientific basis for the nutritional stress findings of the final 2010 BiOp. Reviewers shall evaluate and comment on the strength of the linkages among fish biomass estimates, fishery removals, Steller sea lion reproductive rates, and recovery of the WDPS. Does the BiOp accurately evaluate the inter-relationships between Steller sea lion population status and trends, foraging ecology, and groundfish fisheries effects across broad geographic areas (ecosystems to highly localized regions) and temporal scales (years to seasons)?
5. Reviewers will determine if there is any additional literature, assessments, or analyses that should have been considered in this BiOp (as of the end of the public comment period for the Draft BiOp, September 3, 2010).
6. In making these evaluations, reviewers shall consider and address the following questions:

a. Are the findings of the BiOp contradicted by any scientific information available as of Sept 3, 2010 presented in, or omitted from, the BiOp?
b. As part of this consideration, reviewers shall also assess the scientific record to determine whether adequate consideration has been given to the likelihood that factors other than fishing are negatively affecting the population status, critical habitat or recovery of the WDPS including predation, changes in the ecosystem or carrying capacity, emigration, exposure to contaminants, or other factors.

Tasks specific to Chapter 2 (panel review meeting):

1. Reviewers will convene as a Panel and will conduct a scientific peer review during the panel review meeting in TBD. In addition to scientific presentations regarding the BiOp analysis and related scientific information, the meeting will include presentations by experts from environmental organizations, the fishing industry, affected communities, and other agencies and institutions. The Panel will conduct the peer review in accordance with the ToRs for Chapter 2 and consider all relevant scientific information available up to the date of the Panel meeting. Refer to Annex 3 for listing of report and background documents.

2. Following the same ToR identified for Chapter 1 (above), the reviewers will reexamine the Final BiOp, its scientific record and any new information available subsequent to the issuance of the Final BiOp and may provide additional commentary on the findings they made in Chapter 1 based on scientific information that arises through the panel presentations. This re-visitation of Chapter 1 shall be part of Chapter 2 of the report. As part of this commentary the reviewers are tasked to reevaluate the scientific basis for the conclusions of the final 2010 BiOp, that fisheries are causing nutritional stress in Steller sea lions, which in turn is adversely impacting the survival and recovery of the WDPS of the Steller sea lion. The reviewers shall evaluate and comment on the strength of the relationship between fishery removals and recovery of the WDPS.

3. The Reasonable Prudent Alternative (RPA) presented in the BiOp (Section 8.3.4) and as implemented through an Interim Final Rule (75FR77535; December 13, 2010) may present an opportunity for an adaptive management experiment to test the response of fisheries and Steller sea lions to the fisheries closures implemented by the RPA/IFR. Reviewers will be asked to (1) comment on the utility of this opportunity, (2) evaluate the

metrics identified in the BiOp (e.g., trends in Steller sea lion abundance, trends in biomass of Atka mackerel and other groundfish, etc.), and (3) suggest other metrics not described in the BiOp that could be used to evaluate the efficacy of the action in ensuring the groundfish fisheries are not likely to adversely affect the survival and recovery of western distinct population segment (WDPS) of the Steller sea lion.

Appendix 5. Agenda for Public Meeting on 1 & 2 August 2012 in Seattle, Washington.

Center for Independent Experts Panel Review Meeting for the
Review of the 2010 Biological Opinion on the Effects of the
Alaska Groundfish Fisheries on Steller Sea Lions and Other Endangered Species

Seattle, Washington
August 1-2, 2012

David Fluharty, Ph.D., Meeting Chair

August 1, 2012

9:00 – 9:10 Welcome and introductions (Dave Fluharty)

9:10 – 9:30 Purpose of the meeting, overview of the CIE Review and Terms of Reference (Dave Fluharty)

9:30 – 12:00 Presentations by Alaska Fisheries Science Center

SSL counts, telemetry data, food habits (Tom Gelatt)
[Break]
Stock assessment updates for SSL prey (Sandra Lowe, Steve Barbeaux, Grant Thompson)
Spatial distribution and abundance of SSL prey (Libby Logerwell)

12:00 – 1:00 Lunch

1:00 – 3:00 Presentations by the States of Alaska and Washington

1. Introductory summary (Doug Vincent-Lang and Bill Tweit)
2. AK/WA science review panel findings (Dave Bernard and Andrew Trites)
3. Update on additional, recent data and research results (Doug Vincent-Lang)
4. Concluding summary (Doug Vincent-Lang and Bill Tweit)

3:00 – 3:15 Break

3:15 – 4:30 Presentations by the North Pacific Fishery Management Council (Steve MacLean)

1. Review of Council comments regarding development of RPA
2. Review of SSC comments on available science and analysis
3. Council views on need for additional information

4. Council concern about the level of information that must exist to support a link between natality, nutritional stress, and fisheries interactions
5. Any new information identified by the SSL Mitigation Committee to date

August 2, 2012

9:00 – 9:10 Welcome and introductions (Dave Fluharty)

9:10 – 9:20 Structure for presentations, consistent with the Terms of Reference (Dave Fluharty)

9:20 – 11:30 Fishing Industry Presentations

1. Gerry Merrigan, Fisherman and former NPFMC member
2. John Gauvin, Scientific advisor to trawl industry participants
3. Dave Fraser, Longtime Aleutian Islands fisherman

[Break]

4. Kenny Down, Representative of the freezer longliner fleet
5. Todd Loomis, Director of government affairs for Ocean Peace, Inc.

The industry panel will provide perspectives regarding the scientific analysis used in the BiOp, the operational characteristics of Aleutian Island fisheries and their interaction with SSL and critical habitat, the management measures adopted pursuant to the 2010 SSL Biological Opinion, and possible alternative management measures or adaptive management experiments.

11:30 – 12:30 Lunch

12:30 – 1:30 Jon Warrenchuk, Oceana (also on behalf of Ocean Conservancy and Greenpeace)

The presentation will address new information since 2010 and whether such information affects the analysis or conclusions of the BiOp, including a discussion of updated stock assessment and trends of SSL prey abundance, and recent relevant publications.

1:30 – 2:15 Markus Horning, Oregon State University

1. Update contemporary survival rate estimates for the eastern Gulf of Alaska region from Horning & Mellish, PLoS ONE 2012 (Chapter 2 mandatory document that presented results based on 12 mortalities detected via implanted telemetry transmitters in juvenile SSL from Nov. 2005 through Nov. 2011) with data based on 16 mortalities detected through June 30, 2012.
2. Update our contemporary regional (eastern GoA) predation estimate to at least 14 predation events in 16 detected mortalities (we previously reported at least 11 in 12).
3. Clarify the intent and applicability of the density dependent SSL population conceptual model we presented in the referenced PLoS ONE paper. The intent of this conceptual model is not to make inferences on causes of the past population trajectories of western SSL. The intent is to highlight linkages between the hypothesized, age-structured

and density-dependent predation and vital rates including survival, female recruitment, and pup production.
4. Present an additional output from this conceptual model that pertains to the use of pup to non-pup ratios (P/nP) from surveys to make inferences on natality (birth rates), as applied by the NMFS to the western Aleutian Islands. Our conceptual model suggests that P/nP can be substantially depressed even with constant natality for declining populations under high predation pressure.

2:15 – 2:30 Break

2:15 – 3:00 Andrew Trites, University of British Columbia

1. An update of Trites et al. (2010) that includes additional data and analyses that addressed review comments received from NMFS.
2. Results of ongoing proximate analysis of Atka mackerel that addresses the nutritional quality of this prey species relative to the energetic requirements of Steller sea lions.
3. Predicted biomass of Atka mackerel, Pacific cod and walleye pollock available to Steller sea lions in the western Aleutians relative to the designated critical habitats (from Gryba et al. 2012).

3:00 – 3:45 Shannon Atkinson, University of Alaska Fairbanks

Summarize results from recent feeding trials (Calkins et al. 2012) demonstrating juvenile SSL experienced rapid growth on pollock diets in fall and spring: 1) measurement of average daily mass gain or loss, 2) measurement of average daily intake, 3) proximate analysis of the pollock diet, and 4) assessment of body composition. The results are not consistent with existing published mechanisms regarding digestive capacity of growing (juvenile) SSLs (Rosen and Trites 2000, 2004). Further, the ability to understand the feeding ecology of SSLs and the associated dietary implications is greatly aided by protocols well developed in the animal science literature and we propose directions that this line of work should pursue. In particular, information on the proximate analysis of diets of different prey species and their implications on SSL bioenergetics is likely to be of considerable importance to managing for the recovery of this ESA listed species.

3:45 – 4:30 Final questions from the CIE reviewers for any of the presenters