8.0 Appendices

Appendix A: Resource Equivalency Analysis

Background

There are two basic approaches to measuring the compensation for natural resources injuries. One is to focus on the demand side, the "consumer valuation approach"; the other is to focus on the supply side, the "replacement cost" approach. In the former, we seek to measure the monetary value that the public puts on the natural resources (i.e., how much the public demands the services of natural resources); in the latter, we seek to measure how much it costs to replace the natural resource services that the public loses as a result of the injury (i.e., how much it costs to supply natural resource services). See the Glossary for complete definitions of some of the terms used here.

Figure 1: Consumer Valuation versus Replacement Cost Approaches for Natural Resource Damage Calculation

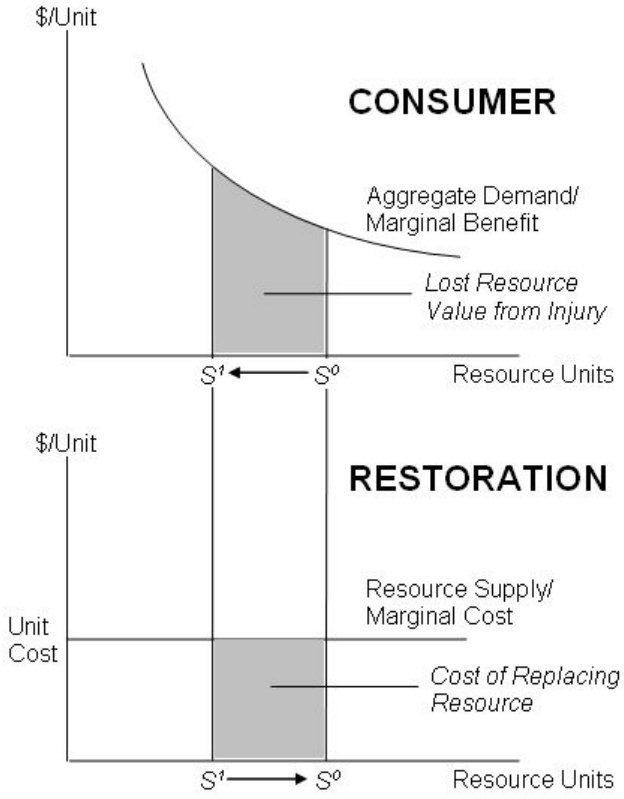

Figure 1 illustrates the difference between these two approaches. In both graphs, the supply of natural resources shifts from S^0 to S^1 as a result of an incident (e.g., oil spill, sediment discharge into a stream, illegal removal of vegetation). The shaded area in the top graph illustrates the dollar value of the resource loss as measured by the monetary payment that would make the public indifferent to the incident. For example, if each individual in a 30 million person society would need a $.05 payment (on average) to make them indifferent to the resource loss, the shaded area in the top graph would equal $1.5 million. Because the difficulty in observing market prices that reveal the level of

cash payment that would compensate individuals for resource losses, the quantitative characteristics of the demand curve(s), and consequently the size of the shaded area in the upper graph, are difficult to measure. Contingent Valuation (CV) and other types of analyses are designed to estimate this dollar value. These methodologies typically involve large surveys and can be costly.

The lower graph illustrates a replacement cost approach. Beyond noting that the injured resource has value, the actual extent to which the public values it is not directly considered. Instead, the determination of adequate compensation depends on the level of natural resource provision (versus monetary payments) that compensates society for what it has lost as a result of the incident. The cost of providing this compensation becomes the estimate of damages. Resource Equivalency Analysis (REA) is the primary methodology for conducting this type of measurement in natural resource damage assessment. It is depicted by a resource supply shift in the lower graph from S^1 back to S^0. The shaded area is the total monetary cost of funding the supply shift. For example, if 2 acres of wetland enhancement are estimated to compensate for an incident that temporarily reduced the service value of 1 acre of wetland habitat, the cost of performing 2 acres of wetland enhancement becomes the estimate of damages.

It is clear from Figure 1 that the public's valuation of the resource (the shaded area in the top graph) is not necessarily equal to the total replacement cost (the shaded area in the bottom graph). This is especially true when unique resources or rare species are involved, as the slope of the aggregate demand curve (top figure) may be much steeper due to resource scarcity. This would result in a much larger monetary payment being necessary to compensate the public. In such a case, the replacement cost approach of REA may result in damages far less than the losses as valued by the public. However, because it is easier and less costly to measure the total replacement cost than the total public value, REA has an advantage over other methods, especially for small to medium-sized incidents with minimal impact on rare species.

Resource Equivalency Analysis

In this assessment, REA has been used to determining compensatory damages. This method is relatively inexpensive and relies primarily on biological information collected in the course of determining natural resource injuries caused by the spill. It is consistent with approaches recommended in the language of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Oil Pollution Act of 1990 (OPA).

REA involves determining the amount of "natural resource services" that the affected resources would have provided had it not been injured, and it equates the quantity of lost services with those created by proposed compensatory restoration projects that would provide similar services. The unit of measure may be acre-years, stream feet-years, or some other metric. The size of the restoration project is scaled to the injury first; the cost of restoration is then calculated after the scaling has been done. The cost of restoring a comparable amount of resources to those lost or injured is the basis for the compensatory damages. In this sense, REA calculates the *replacement cost* of the lost years of natural resource services.

Future years are discounted at 3% per year, consistent with National Oceanic and Atmospheric Administration recommendations for natural resource damage assessments. Discounting of future years is done based on the assumption that present services are more valuable than future services. When it comes to natural resources, the question of whether or not society should value the present more than future is a philosophical question (e.g., one can recall the "greenhouse effect" and the question of how much expense we should incur today to preserve the future). However, the question of how much society actually discounts the value of future natural resources is an empirical one. The 3% figure is currently the standard accepted discount rate for natural resource damage assessments.

REA involves three steps: 1) the debit calculation, 2) the credit calculation, 3) the computation of the costs of restoration. These calculations may be done in a variety of ways, but the most common are to estimate the injury and the restoration benefits in terms of area years of habitat or animal years.

Habitat Example

For example, suppose a 10-acre area is degraded due to an oil spill such that it supplies only 30% of its previous habitat services during the year following the incident. In the second year after the incident, the habitat begins to recover, supplying 90% of its baseline services. By the third year it is fully recovered. In this case, the lost acre years of habitat services would be 70% x 10 acres x 1 year + 10% x 10 acres x 1 year = 8 acre years of habitat services. Figure 2 illustrates this example by showing the recovery path of the habitat over time.

As stated above, future years are discounted at a 3% rate, thus the injuries in the second year count a little less. Incorporating this, 7.97 acre years of habitat services were lost. This difference appears minimal here, but becomes significant (due to compounding) if injuries persist many years into the future.

The credit calculation focuses on the gain in habitat services that result from a restoration project. Creating acre years of habitat services is a function of both area and time. Hypothetically, compensation could involve taking 7.97 acres of land with no habitat value (e.g., a parking lot) and turning it into productive habitat for 1 year. Alternatively, we could achieve compensation by creating 1 acre for 7.97 years. In reality, most restoration projects involve taking previously degraded habitat (at another nearby location) and restoring it over a number of years, and maintaining it into the future.

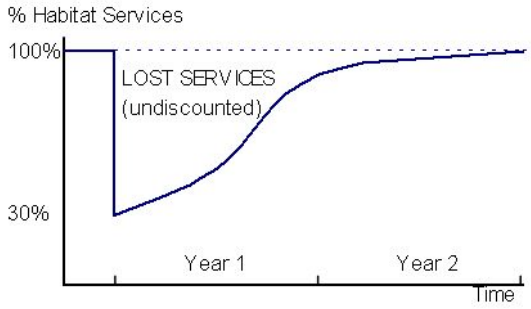

FIGURE 2: Biological Injury and Recovery

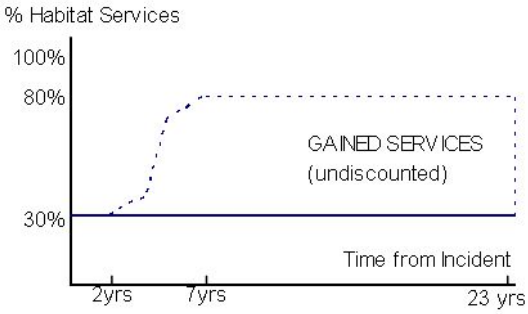

FIGURE 3: Restoration Trajectory/Credit

Suppose the restoration project improves the quality of a nearby degraded area, so that, if it previously provided only 30% of potential services, it would provide 80% of potential habitat services after restoration. Also suppose the project begins two years after the incident and it takes an additional 5 years for the 80% level to be achieved. Figure 3 provides an illustration of this restoration trajectory. In our hypothetical example, the project is expected to have a lifespan of 20 years. Note that, with future years discounted, the 20th year of the project (22-23 years after the incident) counts little; years after that are effectively completely discounted due to uncertainty regarding the future.

Mathematically, we seek to restore an area that will provide 7.97 acre years of services over the discounted 20-year phased-in life span of the restoration project. In this example, that would be an area of about 1.3 acres. That is to say, restoration of 1.3 acres for 20 years would compensate the public for the 7.96 lost acre years of habitat services due to the spill. Visually, the area identified in Figure 3 (multiplied by the affected acres and calculated to measure the present discounted value) should equal the area identified in Figure 4 (again, multiplied by the acres targeted for restoration and calculated to measure the present discounted value, thus discounting future years).

The percentage of habitat services lost (or gained, in the case of the restoration project) may be measured in a variety of ways. For our hypothetical oil spill case, three examples might include (1) the use of a habitat-wide evaluation index, (2) the use of one or more surrogate species, or (3) the use of an estimate based on the degree of oiling. Care must be taken when using a surrogate species to represent the entire affected habitat. Ideally, this surrogate is the population of one or more species that is immobile (that is, the animals do not move easily in and out of the affected area) and that has significant forward and/or backward ecological links to other species in the affected ecosystem. For example, the population of red crossbills, a bird that feeds primarily on pine cone seeds and migrates erratically from year to year, would be a poor surrogate for measuring injuries to a streambed. The aquatic macroinvertebrate community within the stream, however, provides an ideal surrogate, as they play a key role in the streambed food chain. Likewise, on the restoration side, care must taken when the project targets one or a few species rather than the entire habitat. Ideally, a project that seeks to restore the population of a key indicator species will also benefit the entire habitat and, thus, other species as well. Indeed, such projects typically focus directly on habitat improvements. However, it is important to verify that such a species-centered project is indeed benefiting the entire habitat.

Animal Example

When the injury is primarily to individual animals rather than a complete habitat, the REA may focus on lost animal-years. For example, suppose an oil spill causes negligible injury to a body of water, but results in the death of 100 ducks. Using information about the life history of the ducks (e.g., annual survival rate, average life expectancy, average fledging rate, etc.), we can estimate the “lost duck years” due to the spill. On the credit side, we can examine restoration projects designed to create duck nesting habitat and scale the size of the project such that it creates as many duck years as were lost in the incident.

Restoration Costs = Natural Resource Damages
Once the proposed restoration projects are scaled such that they will provide services equal to those lost due to the incident, the cost of the projects can be calculated. Note that this is the first time dollar figures enter the REA process. Until now, all the calculations of the "equivalency" have been in terms of years of resource services. The cost of the restoration projects is the compensatory damage of the incident.

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For another explanation of the REA methodology (in its more specific form for habitats), see "Habitat Equivalency Analysis: An Overview", prepared by NOAA. Copies of this document are available at http://www.darp.noaa.gov/library/pdf/heaoverv.pdf.

GLOSSARY

Aggregate demand

the demand of all consumers combined; e.g., if there are 20,000 people in a town and each person demands two pieces of bread each day, the aggregate demand is 40,000 pieces of bread per day.

Compensatory restoration

a restoration project which seeks to compensate the public for temporal or permanent injuries to natural resources; e.g., if a marsh is injured by an oil spill and recovers slowly over ten years, a compensatory project (which may be off site) seeks to compensate the public for the ten years of diminished natural resources.

Discount rate

the rate at which the future is discounted, i.e., the rate at which the future does not count as much as the present; e.g., a dollar a year from now is worth less than a dollar today; if the bank offers a 3% rate, whereby $1.00 becomes $1.03 in one year, the future was discounted at 3%.

Primary restoration

a restoration project which seeks to help an injured area recover more quickly from an injury; e.g., if a marsh is injured by an oil spill and would recover slowly over ten years if left alone, a primary restoration project might seek to speed the recovery time of the marsh and achieve full recovery after five years.

Replacement cost

the cost of replacing that which was lost; e.g., if fifty acre-years of habitat services were lost due to an oil spill, the cost of creating fifty acre-years of similar habitat services would be the replacement cost.

Appendix B: Bird Mortality Summary

ESTIMATED MORTALITY BY SPECIES AND SPILL EVENT

Species/Groups	Winter 1990-91	Winter 1992-93	Chronic 1993-1997	Winter 1997-98	Chronic 1998-2001	2001 - 2003	TOTAL
Waterfowl	7	0	1	835	2	17	**862**
Loons	129	0	2	843	14	326	**1,314**
Grebes	327	0	5	2,897	10	867	**4,106**
Procellarids	6	0	5	4,749	21	15	**4,796**
Brown Pelicans	22	0	0	198	2	56	**278**
Cormorants	209	0	1	711	10	529	**1,460**
Gulls	317	0	5	1,256	9	801	**2,388**
Snowy Plovers	2	0	0	23	0	5	**30**
Phalaropes	18	0	0	1,490	0	46	**1,554**
Other Shorebirds	12	0	2	0	0	31	**45**
Common Murre	2,348	47	37	23,152	63	6,159	**31,806**
Marbled Murrelet	4	0	0	32	0	9	**45**
Ancient Murrelet	42	0	0	281	0	105	**428**
Cassin's Auklet	31	0	0	1,395	5	78	**1,509**
Rhino. Auklet	59	0	1	379	5	149	**593**
Other Alcids	5	0	1	212	2	13	**233**
Land Birds	2	0	0	2	0	5	**9**
Other / Unknown	1	0	0	107	2	3	**113**
TOTAL	**3,541**	**47**	**60**	**38,562**	**145**	**9,214**	**51,569**

These figures include the totals estimated by the Beached Bird Model and other methods (for Snowy Plover and Marbled Murrelet), as described in Section 4.2.1.1.

Appendix C: Methods for Calculating Lost Bird-Years

Lost bird-years were calculated several different ways, depending upon the species. Theoretically, lost bird-years are the difference between two different population trajectories: without the spills (baseline) and with the spills (injured). Without restoration, the two trajectories only converge (i.e. the injured population only recovers to baseline levels) if there is a natural compensating mechanism dependent upon population size (at least at the local, or colony, level). Thus, the calculation of lost bird-years must be consistent with a biological explanation of natural recovery over time (or lack thereof) (Zafonte and Hampton 2005).

For most bird species, the Single-Generation Stepwise Replacement Model was used to calculate lost bird-years. This approach is described below. For the Ashy Storm-Petrel, Common Murre, and Marbled Murrelet, a location-specific population model was used. Those will be described in the relevant appendices. For all bird-year calculations, a 3% discount rate is employed (discounted to the year 2006), consistent with common practice in natural resource damage assessments (e.g., see NOAA 1999).

The demographic parameters used in the bird REAs are drawn from one or more of the citations listed. In many instances, some parameters were adjusted (within the range of that reported in the literature) so that the overall population was calibrated appropriately to avoid implying unrealistic rates of increase or decrease.

Single-Generation Stepwise Replacement Model

The single-generation stepwise replacement approach to calculating lost bird-years assumes that each year after a spill *the juvenile age class will be entirely replaced*. That is, despite the fact that some breeding adults have been killed, the population produces the same number of juveniles post-spill as it did pre-spill. Biologically, this could occur if the population was at carrying capacity with respect to breeding opportunities (perhaps limited by available nesting habitat or food base during the nesting season). The loss of some adults would open up room for other adults (i.e. "floaters") to take over the vacant nesting opportunities and thus maintain the population's annual production of juveniles. Thus, the youngest age class impacted by the spill will fully recover to its pre-spill level after the next breeding season. The second-year age class will fully recover two years after the spill, as the recovered first-year birds grow older. Likewise, the third-year age class will fully recover after three years, and so on. Mathematically, this is equal to calculating the number of years lost by the killed birds, based on the life expectancy of each age class. Details regarding the demographic parameters used to calculate lost bird years are presented in the relevant appendices for each species below.

This method roughly follows the same approach as used by Sperduto et al.(1999, 2003) for calculating "direct loss" for birds with "extended" recovery times in the *North Cape* oil spill NRDA. Calculations are based upon the following assumptions:

> ***Assumption 1:*** Acute spill mortality is distributed proportionately across the various age classes of the injured population. In this case, Nevins and Carter's

(2003) examination of Common Murres collected dead during the Point Reyes Tarball Incidents supports this assumption.

Assumption 2: Rates of juvenile and adult survivorship are constant before and after the spill.

Assumption 3: The pre-spill and fully recovered populations are roughly constant in size and stable in age-distribution, as determined by demographic characteristics of the species (specifically survivorship and fecundity).

Assumption 4: There is a maximum age beyond which no birds live.

Assumption 5: Surviving adult birds match the total reproductive output that the surviving and impacted birds would have had in the breeding seasons after the spill had the spill not occurred (i.e. the number of post-spill nests equals the number of baseline nests). This could occur because of non-breeding "floaters" in the area, reduced competition for high quality nesting sites, or decreased competition for foraging around the breeding area.

Figure 1 provides an example of how these assumptions combine to describe biological recovery in a hypothetical population with three one-year age classes. Year -1 depicts the population's pre-spill conditions. Year 0 shows population numbers prior to the first full year after the spill. The shaded area is the number of each age class killed, which is distributed proportionately between age classes (Assumption 1). The arrows describe how the recovered birds advance through each age class.

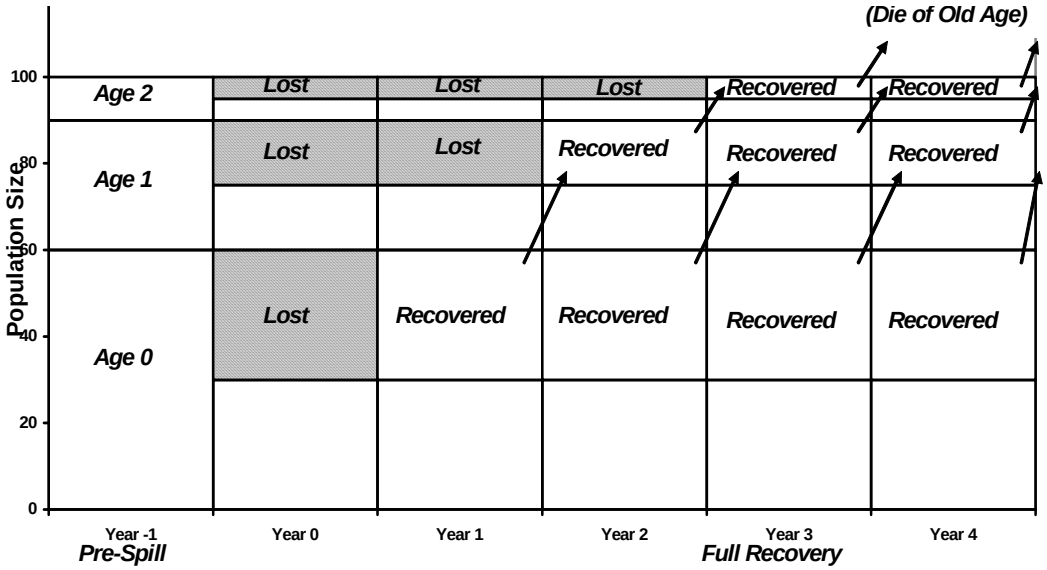


Figure 1: Recovery by Age Class over Time

In Year 1, the number of fledglings replaces the losses to the first age class (Assumption 5). The age classes from Year 0 all face annual mortality, with complete mortality for the third age class. This process continues in Year 2, with the recovered Age 0 juveniles from

Year 1 facing mortality and growing one year older to reach Age 1. In Year 3, there is full recovery. These calculations do not include impacts to future generations of birds (i.e., “indirect loss” as considered by Sperduto et al.1999, 2003).

Appendix D: Loon/Kokechik Flats REA Details

INJURY CALCULATION

Because breeding populations of the Pacific Loon, in particular, are thought to be limited by nest site availability (see Russell 2002), the Trustees applied the single-generation stepwise replacement approach to calculating lost bird-years as described in Appendix C. A lost bird-year multiplier (i.e. lost bird-years per bird killed) is first calculated, and then applied to the mortality events from the various years, discounted to 2006.

The North Cape REA (Spertudo et al. 2003) calculates injuries to loons based upon Common Loon demographics. While data on Pacific Loons is limited, the demographic parameters likely do not vary meaningfully for this analysis. The following set of roughly stationary demographic parameters is based upon their analysis:

- *Age of First Breeding:* 5 Years Old
- *Female Offspring per Female (Annual):* 0.27 (fecundity = 0.54)
- *Survivorship (From fledge to one year of age):* 76%
- *Survivorship (Age 1+):* 88.5%
- *Maximum Age:* 24 Years Old

The only difference between these parameters and those used by Sperduto et al. (2003) is that annual survivorship beyond the first year has been increased 0.5%. This adjusts the implied loon life history to maintain an approximately constant population size. These parameters are consistent with data from studies summarized in McIntyre and Barr (1997) (for Common Loons), Barr et al. (2000) (for Red-throated Loons), and Russell (2002) (for Pacific Loons). The result is that the bird-year multiplier is **6.29**.

This multiplier is then applied to the various mortality events, discounted to 2006.

Spill Event	Estimated Mortality	Discounted Lost Bird-Years
winter 1990-91	129	1,265
chronic 1993-97	2	17
winter 1997-98	843	6,722
chronic 1998-2001	14	102
2001-2003	326	2,242
TOTAL	**1,314**	**10,348**

Total discounted lost bird-years for loons: **10,348**.

CREDIT CALCULATION (projected restoration benefits)

Based on aerial surveys of Pacific and Red-throated Loons at Kokechik Flats, the Trustees estimated that the project will benefit approximately 360 loon nests. Benefits per nest, in terms of increased productivity (or increased nest density) are difficult to estimate, as no data exists from this area. In Sperduto et al. (2003), a project in New England to protect loon nests from disturbance was assumed to generate an additional 0.50 fledglings per nest, or almost triple fecundity (from 0.27 to 0.77). This equates to some of the highest productivity estimates for loons (McIntyre and Barr 1997). The

Trustees consider that level of gains as an upper bound, and believe that a figure approximately half of that (i.e. an increase of 0.25 fledglings per nest) would be more realistic. The REA restoration benefits offset the injury when the project lasts 10 years and the benefits are 0.32 fledglings per nest. The Trustees believe this is a reasonable estimate. Even though the project only provides funding for 10 years, it is anticipated that, even if enforcement were to cease entirely, residual benefits via public education would provide benefits (at a declining rate) for an additional 15 years. This is incorporated into the credit calculations.

Year	Protected Nests	Increased Fledges	Increased Bird-Years	Discounted to 2006
2007	360	115	703	703
2008	360	115	703	683
2009	360	115	703	663
2010	360	115	703	644
2011	360	115	703	625
2012	360	115	703	607
2013	360	115	703	589
2014	360	115	703	572
2015	360	115	703	555
2016	360	115	703	539
2017	360	108	659	491
2018	360	101	615	444
2019	360	94	571	401
2020	360	86	527	359
2021	360	79	483	320
2022	360	72	439	282
2023	360	65	396	246
2024	360	58	352	213
2025	360	50	308	181
2026	360	43	264	150
2027	360	36	220	122
2028	360	29	176	94
2029	360	22	132	69
2030	360	14	88	45
2031	360	7	44	22
		Based on increase of 0.32 fledges per nest.	Based on 6.104 bird-years per fledge (life expectancy of a fledge)	Discounted at 3% per year
			Total:	**9,616**

This project, protecting 360 nests for 10 years, approximately compensates for the lost bird-years. Given the uncertainties in estimating project benefits, the Trustees consider this sufficient to compensate for the injuries. This project will simultaneously benefit thousands of phalarope and waterfowl nests, providing sufficient restoration for those species as well.

Appendix E: Grebe/Colony Protection REA Details

INJURY CALCULATION

Because breeding populations of the Western Grebe, in particular, may be limited by suitable nest colony sites, the Trustees applied the single-generation stepwise replacement approach to calculating lost bird-years as described in Appendix C. A lost bird-year multiplier (i.e. lost bird-years per bird killed) is first calculated, and then applied to the mortality events from the various years, discounted to 2006.

Data on Western Grebes is limited. Storer and Nuechterlein (1992) assume that most birds breed in their first year. Data from Clear Lake suggests that, in good years without nest colony disturbance, productivity is approximately 1.0 fledges/nest (D. Anderson, pers. comm.) (or 0.5 female offspring per female). The following set of demographic parameters imply an approximately constant population size:

- *Age of First Breeding:* 1 Year Old
- *Female Offspring per Female (Annual):* 0.50 (fecundity = 1.00)
- *Survivorship (From fledge to one year of age):* 60%
- *Survivorship (Age 1+):* 70%
- *Maximum Age:* 20 Years Old

These parameters are consistent with data from information summarized in Storer and Nuechterlein (1992). The result is that the bird-year multiplier is **3.01**.

This multiplier is then applied to the various mortality events, discounted to 2006.

Spill Event	Estimated Mortality	Discounted Lost Bird-Years
winter 1990-91	327	1,533
chronic 1993-97	5	21
winter 1997-98	2,897	11,046
chronic 1998-2001	10	35
2001-2003	867	2,852
TOTAL	**4,106**	**15,487**

Total discounted lost bird-years for grebes: **15,487**.

CREDIT CALCULATION (projected restoration benefits)

For project scaling, the Trustees focused on one of the targeted lakes, Clear Lake, where data is available. The project will benefit approximately 940 grebe nests at Clear Lake. Benefits per nest may be calculated using data collected by Dan Anderson of UC Davis. In 13 years of surveys, Anderson noted that 7 years featured good production, with an average of 1.0 fledges/nest. The other 6 years were marred by disturbance events, in which nest productivity plummeted, averaging only 0.2 fledges/nest. This equates to an overall average of 0.63 fledges/nest. Assuming the project is 80% successful in eliminating these disturbance events and maintaining annual average productivity at 0.5 fledges per nest, the benefits per nest from the project will be 0.30 fledges/nest.

Year	Protected Nests	Increased Fledges	Increased Bird-Years	Discounted to 2006
2007	940	278	782	782
2008	940	278	782	759
2009	940	278	782	737
2010	940	278	782	716
2011	940	278	782	695
2012	940	278	782	675
2013	940	278	782	655
2014	940	278	782	636
2015	940	278	782	618
2016	940	278	782	600
		Based on increase of 0.30 fledges per nest.	Based on 2.817 bird-years per fledge (life expectancy of a fledge)	Discounted at 3% per year
			Total:	**6,873**

This project, protecting nests for 10 years, compensates for approximately half of the lost bird-years. The Trustees propose two similar projects: a 10-year project focused on Clear Lake and a 10-year project focused on other lakes (e.g., Eagle Lake, Lake Almanor, Tule Lake NWR, and the Thermolito Forebay) where the benefit/cost ratio is expected to be similar.

Appendix F: Procellarid/Farallon Islands and Taiaroa Head REA Details

INJURY CALCULATION

For lost bird-year calculations, Procellarids were divided into fulmars, shearwaters, and storm-petrels. Lost bird-years were calculated separately for each group.

For fulmars and shearwaters, the Trustees applied the single-generation stepwise replacement approach to calculating lost bird-years as described in Appendix C because breeding populations of most shearwaters appear limited by suitable nest colony sites, while fulmars appear limited by food availability (Hatch and Nettleship 1998). A lost bird-year multiplier (i.e. lost bird-years per bird killed) is first calculated, and then applied to the mortality events from the various years, discounted to 2006. The demographic parameters used for the Northern Fulmar were calibrated to imply a roughly constant population size:

- *Age of First Breeding:* 5 Years Old
- *Female Offspring per Female (Age 5):* 0.013
- *Female Offspring per Female (Age 6):* 0.026
- *Female Offspring per Female (Age 7):* 0.039
- *Female Offspring per Female (Age 8):* 0.053
- *Female Offspring per Female (Age 9):* 0.066
- *Female Offspring per Female (Age 10):* 0.079
- *Female Offspring per Female (Age 11):* 0.092
- *Female Offspring per Female (Age 12):* 0.105
- *Female Offspring per Female (Age 13):* 0.118
- *Female Offspring per Female (Age 14):* 0.131
- *Female Offspring per Female (Age 15):* 0.144
- *Female Offspring per Female (Age 16):* 0.158
- *Female Offspring per Female (Age 17):* 0.171
- *Female Offspring per Female (Age 18):* 0.184
- *Female Offspring per Female (Age 19):* 0.197
- *Female Offspring per Female (Age 20+):* 0.21
- *Annual Survivorship (Age 69-70):* 6.9%
- *Annual Survivorship (Age 68-69):* 16.9%
- *Annual Survivorship (Age 67-68):* 26.9%
- *Annual Survivorship (Age 66-67):* 36.9%
- *Annual Survivorship (Age 65-66):* 46.9%
- *Annual Survivorship (Age 64-65):* 56.9%
- *Annual Survivorship (Age 63-64):* 66.9%
- *Annual Survivorship (Age 62-63):* 76.9%
- *Annual Survivorship (Age 61-62):* 86.9%
- *Annual Survivorship (Age 5-6 to 60-61):* 96.9%
- *Annual Survivorship (Age 4-5):* 89.6%
- *Annual Survivorship (Age 3-4):* 82.4%
- *Annual Survivorship (Age 2-3):* 75.1%
- *Annual Survivorship (Age 1-2):* 67.9%

- *Survivorship (From fledge to one year of age):* 60.6%
- *Maximum Age:* 70 Years

To calibrate the model, we assumed that the survivorship from Ages 0-1 to 4-5 increased linearly each year such that 96.9% adult survivorship was achieved at Age 5-6. We then calibrated Age 0-1 survivorship so that the sequence was consistent with a population maintaining a constant population size. The result is that the bird-year multiplier for fulmars is **12.70**.

This multiplier is then applied to the various mortality events, discounted to 2006.

Spill Event	Estimated Mortality	Discounted Lost Bird-Years
winter 1990-91	6	119
chronic 1993-97	5	88
winter 1997-98	4,449	71,785
chronic 1998-2001	21	309
2001-2003	15	208
TOTAL	**4,496**	**72,509**

For shearwaters, the demographic parameters were calibrated to a slightly declining population (about 0.5% annually):

- *Age of First Breeding:* 6 Years Old
- *Female Offspring per Female:* 0.4 (fecundity = 0.8)
- *Annual Survivorship (Age 3-4+):* 90%
- *Annual Survivorship (Age 2-3):* 85%
- *Annual Survivorship (Age 1-2):* 70%
- *Survivorship (From fledge to one year of age):* 60%
- *Maximum Age:* 40 Years

The result is that the bird-year multiplier for shearwaters is **6.61**.

This multiplier is then applied to the various mortality events, discounted to 2006. For ease of calculation, all 266 birds were assumed killed in 1997-1998, implying **2,228** total discounted lost bird-years.

For storm-petrels, the Trustees utilized a Farallon Island-specific model of the Ashy Storm-Petrel described in the credit calculation below, assuming that 21 Ashy Storm-Petrels and 13 Least Storm Petrels were killed (all in 1997-98 for ease of computation). The result is that **1,044** discounted storm-petrel-years were lost.

In summary:

- total discounted lost bird-years for fulmars = **72,509**
- total discounted lost bird-years for shearwaters = **2,228**
- total discounted lost bird-years for storm-petrels = **1,044**

The total discounted lost bird-years for all Procellarids: **75,781**

CREDIT CALCULATION (projected restoration benefits)

The Trustees have selected two restoration projects to address Procellarids. These projects will benefit Sooty Shearwaters in New Zealand and Ashy Storm-Petrels at the Farallon Islands.

Despite the lack of suitable project for fulmars, this approach still maintains fair compensation for Procellarids as a whole. The Trustees have selected this approach for the following reasons:

1. it focuses restoration on storm-petrels, which face the most critical conservation needs;
2. it is the least cost alternative, as additional fulmar restoration is relatively expensive and with questionable feasibility;
3. these projects are "lumpy" and not easily divisible; and
4. it is in response to public comments (see Appendix N).

Farallon Islands

For scaling the Farallon Islands project, the Trustees focused on potential increases in the Ashy Storm-Petrel population breeding at the Farallon Islands, using a species and location-specific population model. The Ashy Storm-Petrel model relied on demographic parameters estimated from data collected at the Farallon Islands. These islands are home to over half of the world's population of the species, almost certainly the source location for the impacted birds, and the location of the restoration project. The sources of the data are Sydeman et al. (1998) and Nur et al. (1999). The parameters have been calibrated so that the population falls from 6,461 birds in 1972 to approximately 4,284 birds in 1992, consistent with estimates from Sydeman et al. (1992).

- *Age of First Breeding:* 5 Years Old
- *Female Offspring per Female:* 0.338 (fecundity = 0.676)
- *Annual Survivorship (Age 3-4+):* 88%
- *Annual Survivorship (Age 2-3):* 85%
- *Annual Survivorship (Age 1-2):* 70%
- *Survivorship (From fledge to one year of age):* 60%
- *Maximum Age:* 40 Years

The restoration project will eradicate non-native mice from the islands. This, in turn, will affect productivity, by ending mouse predation of eggs and chicks, and the annual survival rate of adults, by decreasing predation by Burrowing Owls. The project may impact those parameters in these ways:

- *Female Offspring per Female: increases 5% to 0.355*
- *Annual Survivorship (Age 4-5+): increases from 88.0% to 90.2%* (this would imply that current Burrowing Owl predation is approximately 42 birds per year, given the Ashy Storm-Petrel breeding population of about 1,500 birds on the Farallon Islands).

These changes would stop the current population decline and cause the population to exactly stabilize. The model assumed project benefits would begin in 2008 and continue through 2100. The assumption of the long-term benefits is based upon the Trustees'

confidence that the islands will remain free of introduced species through the oversight of the Farallon NWR. The model calculates that the project will generate **36,277** bird-years.

Using alternative and more optimistic parameters whereby the project causes productivity to increase 10% (to 0.371 female offspring per female) and annual survivorship to increase to 90.8% (implying the current Burrowing Owl predation is approximately 50 birds per year), the storm-petrel population would begin to increase at approximately 1% per year and generate **57,390** bird-years through 2100.

This range of project benefits may be conservative. Some recent estimates suggest that Burrowing Owls have taken 100 to 200 adult Ashy Storm-Petrels annually in recent years (J. Irwin, pers. comm.), suggesting a more precipitous population decline than in the past (i.e., between 1972 and 1992) and thus the potential for even greater restoration benefits. Because no population surveys are available to confirm a steeper decline since 1992, the model used here mimics the earlier documented rate of decline.

New Zealand

For scaling the Taiaroa Head colony protection project, the Trustees used the same approach as with the Farallon project, focusing on increases in productivity and adult survivorship for Sooty Shearwaters. The same demographic parameters as described above were used, except with the following changes to fecundity and adult survival to mimic the 4.3% annual decline of the Taiaroa Head colony caused by depredation of nests and adults.

- *Female Offspring per Female:* 0.3 (fecundity = 0.6)
- *Annual Survivorship (Age 3-4+):* 87.5%

The restoration project will protect the nesting colony from depredation of nests and adults by non-native mammals. Thus, both productivity and annual adult survival should increase, enabling the colony to stabilize at its current size, rather than decrease at 4.3% per year. The project may thus impact the parameters in these ways:

- *Female Offspring per Female: increases 20% to 0.36*
- *Annual Survivorship (Age 4-5+): increases from 87.5% to 90.9%*

These changes would stop the current population decline and cause the population to stabilize and slightly increase over time. The model assumed project benefits would begin in 2008 and continue through 2100. The model calculates that the project will generate **13,334** bird-years. Under the most optimistic scenario, where productivity increases to 0.4 female offspring per female, the colony would increase in size and produce **17,922** bird-years.

Summary

Combining the range of projected benefits from the two projects, they will generate **49,611** to **75,312** gained bird-years. While most of this range is below the estimated 74,835 lost bird-years, the Ashy Storm-Petrel model may be conservative for reasons

described above, and thus that project may produce greater benefit than the range presented here. The Trustees believe these two projects will address the injury to Procellarids.

Appendix G: Pelican, Cormorant, and Cassin's Auklet/Baja California Islands REA Details

INJURY CALCULATION

Because the pelicans and cormorants breeding along the Pacific coast of Baja California, where the restoration actions will take place, appear to be limited by suitable disturbance-free nest sites, the Trustees applied the single-generation stepwise replacement approach to calculating lost bird-years as described in Appendix C. This provides a rather conservative estimate, as there is considerable speculation that most sub-populations of pelicans and cormorants are limited by density-*independent* events such as food supply induced by oceanographic events (Shields 2002; D. Anderson, pers. comm., Wallace and Wallace 1998). In such situations, it is most correct to use the injury-into-perpetuity approach when calculating lost bird-years (Zafonte and Hampton 2005), which would have generated nearly five times as many lost bird-years. All losses were discounted to 2006.

For Cassin's Auklets, the Trustees also applied the single-generation stepwise replacement approach because breeding populations appear limited by suitable nest sites (Manuwal and Thoresen 1993). For example, Cassin's Auklets studied at the Farallon Islands are believed to have substantial numbers of non-breeding floaters, consistent with limitations on nest sites.

Estimates of annual productivity (fledges/pair) for cormorants and auklets was based upon 32-year means from data collected for Brandt's Cormorants and Cassin's Auklets at the Farallon Islands (Warzybok et al. 2003). Annual productivity for pelicans is based upon Anderson et al. (1982). For Brown Pelican data, we relied upon Williams and Joanen (1974) and Anderson et al. (1996). For cormorants, we relied upon Wallace and Wallace (1998) and Hatch and Weseloh (1999). For Cassin's Auklets, little data exists on annual survivorship. We used known information on age of first breeding and a long-term mean on annual productivity from the Farallon Islands (Warzybok et al. 2003). We then calibrated annual survival based upon other alcids and subject to the constraint that the population be constant.

Brown Pelicans

- *Age of First Breeding:* 3 Years Old
- *Female Offspring per Female:* 0.33 (fecundity = 0.66)
- *Annual Survivorship (Age 3-4+):* 88%
- *Annual Survivorship (Age 2-3):* 80%
- *Annual Survivorship (Age 1-2):* 72%
- *Survivorship (From fledge to one year of age):* 64%
- *Maximum Age:* 34 Years

Cormorants (based on Brandt's and Double-crested Cormorant)

- *Age of First Breeding:* 4 Years Old (plus 50% of 3 year-olds)
- *Female Offspring per Female:* 0.725 (fecundity = 1.45)
- *Annual Survivorship (Age 2-3+):* 80%
- *Annual Survivorship (Age 1-2):* 77%

- *Survivorship (From fledge to one year of age):* 50%
- *Maximum Age:* 18 Years

Cassin's Auklet

- *Age of First Breeding:* 3 Years Old
- *Female Offspring per Female:* 0.36 (fecundity = 0.72)
- *Annual Survivorship (Age 2-3+):* 87.1%
- *Annual Survivorship (Age 1-2):* 70%
- *Survivorship (From fledge to one year of age):* 60%
- *Maximum Age:* 30 Years

The results are that the bird-year multiplier is **5.97** for pelicans, **3.89** for cormorants, and **5.65** for Cassin's Auklets.

These multipliers were then applied to the various mortality events, discounted to 2006.

	Pelicans		**Cormorants**		**Cassin's Auklets**	
Spill Event	**Estimated Mortality**	**Discounted Lost Bird-Years**	**Estimated Mortality**	**Discounted Lost Bird-Years**	**Estimated Mortality**	**Discounted Lost Bird-Years**
winter 1990-91	22	205	209	1,267	31	273
chronic 1993-97	0	0	1	5	0	0
winter 1997-98	198	1,498	711	3,504	1,395	9,986
chronic 1998-2001	2	14	10	45	5	33
2001-2003	56	366	529	2,249	78	482
TOTAL	**278**	**2,083**	**1,460**	**7,070**	**1,509**	**10,773**

Total discounted lost bird-years for pelicans: **2,083**
Total discounted lost bird-years for cormorants: **7,070**
Total discounted lost bird-years for Cassin's Auklets: **10,773**

CREDIT CALCULATION (projected restoration benefits)

For project scaling, the Trustees focused on potential increases in populations at islands off the Pacific Coast of Baja California, Mexico (or prevention of decreases). By removing disturbance and opening up these islands as suitable nesting habitat, the project will protect existing populations from further disturbances and allow them to expand and take advantage of new nesting areas at these islands. The benefits will be for Brown Pelicans, cormorants, and Cassin's Auklets.

To calculate benefits, we assumed a population growth rate of at least 10 new nests per year for each species on each island, or colony growth of 3% per year, whichever was larger (or alternatively, the protection of 150 Cassin's Auklet nests/year at San Jeronimo and 1,000 nests/year at West San Benito that could otherwise be destroyed by human disturbance). If no birds were currently present on an island, but the project anticipated attraction of them, the starting point for the benefits trajectory was 10 nests beginning in 2008.

For each island, the number of increased nests, increased fledges, and increased bird-years from those fledges was estimated for the duration of the 6-year project.

The results, as well as the current breeding populations with each island, are presented in the table below. Gained nests refer to the estimated number of new (or protected but otherwise lost) nests created as a result of the project. This number increases over time in cases where we anticipate population increases. Thus, "10 to 60" would mean 10 new nests at the beginning of the project, and 60 new nests at the end, after six years. The calculations assume that benefits begin in 2008, and all benefits are discounted to 2006.

ISLAND		PELICANS	CORMORANTS	CASSIN'S AUKLETS
San Martín	Current # nests	200	625	1,500
	Gained nests	10 to 60	19 to 121	45 to 291
San Jeronimo	Current # nests	0	20	5,000
	Gained nests	0	10 to 60	150
San Benito	Current # nests	200	142	35,000
	Gained nests	10 to 60	10 to 60	1,000
Natividad	Current # nests	55	800	10
	Gained nests	10 to 60	24 to 155	10 to 60
San Roque	Current # nests	10	100	10
	Gained nests	10 to 60	10 to 60	10 to 60
Asunción	Current # nests	0	10	10
	Gained nests	0	10 to 60	10 to 60
TOTAL GAINED NESTS:		**40 to 240**	**83 to 517**	**1,225 to 1,621**
FLEDGES PER NEST:		0.66	1.45	0.72
BIRD-YEARS PER FLEDGE:		4.36	3.09	4.13
TOTAL GAINED BIRD-YEARS (discounted to 2006):		**2,.067**	**6,831**	**17,152**

The results show that the project will provide 99% of the compensation needed for injuries to pelicans, 97% of that required for cormorants, and 205% of that required for Cassin's Auklets. Given the uncertainty associated with these estimates, the Trustees concluded that this project, by addressing the needs of several species simultaneously, was the most cost-effective way to provide the needed restoration.

Appendix H: Snowy Plover/Point Reyes REA Details

INJURY CALCULATION

Because breeding populations of the Snowy Plover are limited by the availability of suitable disturbance-free nest sites (Page et al. 1995), the Trustees applied the single-generation stepwise replacement approach to calculating lost bird-years as described in Appendix C. A lost bird-year multiplier (i.e. lost bird-years per bird killed) is first calculated, and then applied to the mortality events from the various years, discounted to 2006.

Data regarding most demographic parameters are derived from Page et al. (1995) and data from PRNS. Survivorship from fledging to age one is calibrated to a population decline of slightly more than 1% per year.

- *Age of First Breeding:* 1 Year Old
- *Female Offspring per Female (Annual):* 0.50 (fecundity = 1.00)
- *Survivorship (From fledge to one year of age):* 60%
- *Survivorship (Age 1+):* 80%
- *Maximum Age:* 15 Years Old

The result is that the bird-year multiplier is **3.95**.

This multiplier is then applied to the various mortality events, discounted to 2006. Mortality by spill event was distributed proportionately according to total estimated bird impacts by spill event and is closely correlated to the number of observed oiled Snowy Plovers.

Spill Event	Estimated Mortality	Discounted Lost Bird-Years
winter 1990-91	2	12
chronic 1993-97	0	0
winter 1997-98	23	115
chronic 1998-2001	0	0
2001-2003	5	22
TOTAL	**30**	**150**

Total discounted lost bird-years for Snowy Plovers: **150**.

CREDIT CALCULATION (projected restoration benefits)

The project has been scaled to 30 acres in size. Based on data from the pilot study, this will lead to the establishment of at least four nests, generating an equal number (1.0 fledges per female per year) of fledges each year. Project benefits ramp up over two years, the time to implement the project. Because the project budget does not fund on-going maintenance to control non-native vegetation, project benefits begin to ramp down after 8 years, assuming a modest rate of re-colonization by non-native vegetation (2 acres per year).

Year	Restored Acres	New Nests	Increased Fledges	Increased Bird-Years	Discounted to 2006
2007	15	2.0	2.0	7.1	6.9
2008	30	4.0	4.0	14.2	13.4
2009	30	4.0	4.0	14.2	13.0
2010	30	4.0	4.0	14.2	12.6
2011	30	4.0	4.0	14.2	12.2
2012	30	4.0	4.0	14.2	11.9
2013	30	4.0	4.0	14.2	11.5
2014	30	4.0	4.0	14.2	11.2
2015	28	3.7	3.7	13.3	10.2
2016	26	3.5	3.5	12.3	9.2
2017	24	3.2	3.2	11.4	8.2
2018	22	2.9	2.9	10.4	7.3
2019	20	2.7	2.7	9.5	6.4
2020	18	2.4	2.4	8.5	5.6
2021	16	2.1	2.1	7.6	4.9
2022	14	1.9	1.9	6.6	4.1
2023	12	1.6	1.6	5.7	3.4
2024	10	1.3	1.3	4.7	2.8
2025	8	1.1	1.1	3.8	2.2
2026	6	0.8	0.8	2.8	1.6
2027	4	0.5	0.5	1.9	1.0
2028	2	0.3	0.3	0.9	0.5
2029	0	0.0	0.0	0.0	0.0
		Based on 0.13 nests/acre from the pilot study.	Based on increase of 1.0 fledges per nest.	Based on 3.55 bird-years per fledge (life expectancy of a fledge)	Discounted at 3% per year
				Total:	**160**

This project, restoring 30 acres of Snowy Plover nesting habitat, compensates for the lost bird-years.

Appendix I: Common Murre REA Details

INJURY CALCULATION

Lost bird-years were calculated using a local population model of the Common Murre. Because Common Murres are still recovering from historical declines, population growth appears to be linked to general oceanic conditions rather than density-dependent factors such as nest site availability (N. Nur, pers. comm.). The current central California population is approximately 250,000 breeding birds (G. McChesney, pers. comm.). Historically, there may have been well over a million (Carter et al. 2001). Due to favorable oceanic conditions in recent years, the central California population has begun to recover and has grown at an average rate of over 5% per year (from 1990 to 2004 at the Farallon Islands). In good years, the population grows as much as 7-9% per year. In bad years, a fraction of the population attends the breeding colonies. Recovery to historical levels has been impacted and delayed by the spills. Nur et al. (1997) estimated that chronic oil pollution (now largely attributed to the *Luckenbach*) may have lowered population growth rates by as much as 3% per year. The modeling here, using the mortality estimates described in Appendix B, show an average annual reduction in population growth rates of under 1% per year for the entire population between 1990 and 2003, although growth rates likely varied between colonies and certain colonies may have been more impacted from oil spill loss.

The Trustees scaled restoration based upon a local population model that incorporated both "good years" (occurring 80% of the time) and "bad years" (20% of time). The model is based on the assumptions that, while no density dependent mechanism is currently operating in the population, reproductive output at high population levels is ultimately affected by: (1) an absolute limitation of the number of birds that breed in the region; (2) potential variability in nest sites both within and across colonies; and (3) possible food source limitations around the breeding areas (i.e., that might results in longer, more energetically intensive, food searches during breeding season). The underlying population model is similar to the approach used by Swartzman (1996) in his analysis of impacts to the Common Murre from the *Apex Houston* oil spill.[1]

Common Murre demographics were derived based on a various sources (Nur et al. 1994; Swartzman 1996; Carter et al. 2001; W. Sydeman, pers. com). The model was calibrated using historical breeding population estimates, estimated mortality from the various spill years, known oceanic conditions from the past (i.e., "good years" and "bad years"). The following set of demographic parameters reflects that calibration:

- *Female Offspring per Female in Pop. (Age 7+):* 0.40 (good year); 0.04 (bad year)
- *Female Offspring per Female in Pop. (Age 6):* 90% of fully mature (age 7+)

[1] The multiple breeding rocks within the spill area suggest the possibility that a "meta-population" model might better reflect the response to both the mortality events and restoration projects. We mostly focus on a single population model because: (1) we have insufficient information to specify immigration-emmigration parameters between colonies inside the spill area; (2) the majority of birds are in a single colony (South Farallon Island complex) and the dominant portion of birds is in two closely proximate colonies (South and North Farallon Island complexes).

- *Female Offspring per Female in Pop. (Age 5): 60*% of fully mature (age 7+)
- *Female Offspring per Female in Pop. (Age 4): 35*% of fully mature (age 7+)
- *Proportion of Females Breeding (Age 4):* 48% (good year); 15% (bad year)
- *Proportion of Females Breeding (Age 5):* 71% (good year); 23% (bad year)
- *Proportion of Females Breeding (Age 6+):* 95% (good year); 30% (bad year)
- *Survivorship (From fledge to one year of age):* 60% (good year); 30% (bad year)
- *Annual Survivorship (Age 1-2):* 83% (good year); 80% (bad year)
- *Annual Survivorship (Age 2-3):* 90% (good year); 87% (bad year)
- *Annual Survivorship (Age 3+):* 96% (good year); 92% (bad year)

For future losses and gains, the Trustees used "average conditions" to examine the population. Average was based upon the proportion-weighted geometric means of parameters from both good- and bad-years.[2] When approximating future population growth, the Trustees assume that there is a maximum of 1,000,000 breeding birds (per Carter et al. 2001), that density dependence will begin to operate at 50% of this maximum, and that mature fledging success will decline linearly with breeding population size until it reaches the stationary value when there are 1,000,000 breeding birds in the population.

Figure 1 plots the combined good-year and bad-year growth rates against estimates of breeding birds based upon historic colony counts. The error bars around the estimates are 10% to reflect the 8-12% error in using a constant correction factor (k = 1.6) to transform colony counts to breeding population size (Nur and Sydeman 2002). 1992 and 1998 are assumed to be "bad years" because of the 1992-93 and 1998-99 El Nino events. The solid line is the estimated trajectory that includes spill mortality. The model underestimates the 2002 and 2003 colony counts, which is reasonable as the 2002 and 2003 counts may include an uncharacteristically large number of non-breeding sub-adults that are a result of several sequential productive years (W. Sydeman, pers. comm.). The dashed line is the predicted population trajectory assuming that the estimated spill mortality did not occur. The injury is the area between the solid and dashed lines.

[2] A stochastic population model was compared with the "average population" model to ensure consistency of the deterministic approximation.

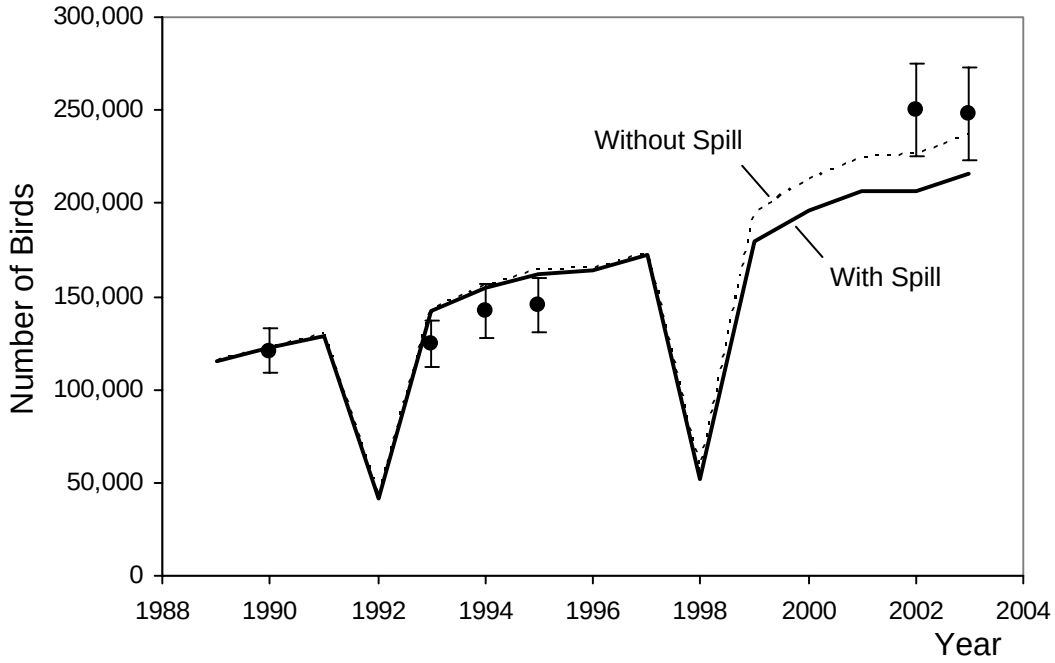


Figure 1: Calibrated population trajectories and breeding bird estimates from colony counts

Spill mortality is described in the table below:

Spill Event	Estimated Mortality
Winter 1990-91	2,348
Winter 1992-93	47
Chronic 1993-1997	37
Winter 1997-98	23,152
Winter 2001-02	5,091
Winter 2002-03	1,068
Chronic 1998-2001	63
TOTAL	**31,806**

CREDIT CALCULATION (projected restoration benefits)

To address the injuries, the Trustees are proposing three restoration projects: 1) regional colony protection, 2) corvid management at Pt. Reyes, and 3) Reading Rock colony restoration.

1. Colony Protection

The seabird colony protection project, which seeks to reduce human disturbances at nesting colonies throughout the region, was examined as the same time as the injury using the same population model. This project will add to and extend an on-going project being implemented by the Command Trustee Council. Three population trajectories were examined:

- **Baseline:** a projection of the number of Common Murres in the spill area, including benefits of the initial colony protection program implemented by the *Command* Trustees (which increases nest success for the years 2006 to 2009).

- **Injury:** a projection of the number of murres in the central California population that incorporates both the spill mortality from the *Luckenbach* (and other local orphan spills) and the colony protection project implemented by the *Command* Trustees.

- **Restoration:** a projection of the number of murres in the central California population, given: (1) the various spill events; (2) colony protection from the *Command* Trustees; and (3) colony protection funded from a project that begins providing benefits to Common Murres in 2010 (once the *Command* project ceases).

Figure 2 illustrates the spill injuries and colony protection benefits using the trajectories. The injury depicted in Figure 2 is the difference between the Baseline and Injury trajectory (i.e., "How much did the public lose compared to Baseline?"). The restoration credit is the difference between the Restoration and Injury trajectories (i.e., "How much does the public gain now that the restoration project benefits the injured population?"). The modeling showed that a 20-year seabird colony protection project, which increases fecundity by 5%, compensates for approximately 38% of the spill injuries (in discounted bird-years).

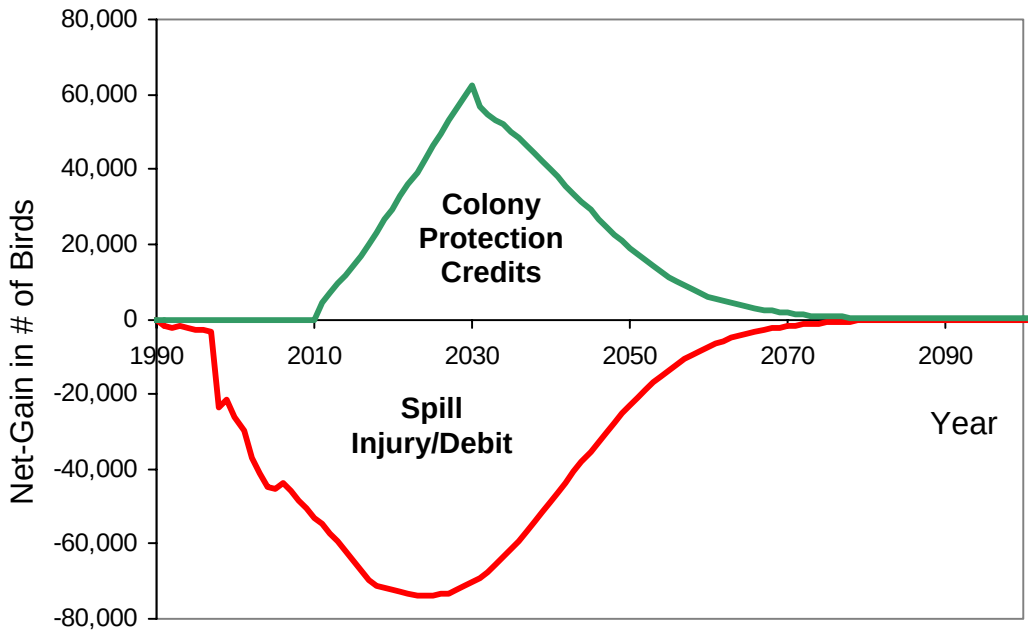


Figure 2: *Luckenbach* spill injury/debit of COMU and restoration gains from colony protection

2. Corvid Management

The project is based upon the observation that nest predation by corvids has resulted in lower nest success at Pt. Reyes than the overall average in the spill area (Parker et al. 2000, Parker et al.2001, Knectel et al.2003). Since the corvid management option will only benefit the Pt. Reyes colony, we focus on increases in productivity at that site. The benefits are based upon the comparison of two population trajectories:

- **Baseline (without restoration):** Pt. Reyes Headlands murre population size over time given post-spill colony numbers and the positive impacts of the human disturbance colony protection project noted above.

- **Restoration:** This is the baseline condition with the increased nest success at Pt. Reyes Headlands that results from reducing corvid predation.

The gain from the corvid management project is the difference between these two trajectories.

Average nest success (i.e., fledges per nest) at study plots in the Pt. Reyes colony was approximately 81% of the nest success at plots at the Farallones over the 1999-2002 period (Parker et al.2000, Parker et al.2001, Knectel et al.2003, Worzybok et al.2003). For the purpose of quantifying restoration benefits, the Trustees assume that the

"baseline" nests at Pt. Reyes are 81% as successful as the current area-wide average. This nest success assumption calibrated to past changes in colony counts. The Trustees also assumed that the nests will be 90% successful as the area-wide average after the corvid management program is implemented. The Trustees do not credit the project with achieving a full 100% of the Farallones nest success because: (1) corvid management may not be 100% successful; and (2) other factors may also be contributing to a reduced nest success at the Pt. Reyes colony.

The underlying population model used to calculate corvid management benefits is similar to the one used to model the entire spill injury and colony protection benefits. The Trustees use the same density dependent mechanisms and same survivorship parameters. However, a limit of 100,000 birds is used instead of one million breeding birds, and the project is assumed to provide benefits for 100 years. This long duration assumes that PRNS will continue to manage its corvid populations. Figure 3 depicts the trajectories with and without the restoration project. The difference between them is the net-gain from this project, which compensates for approximately 21% of the injury.

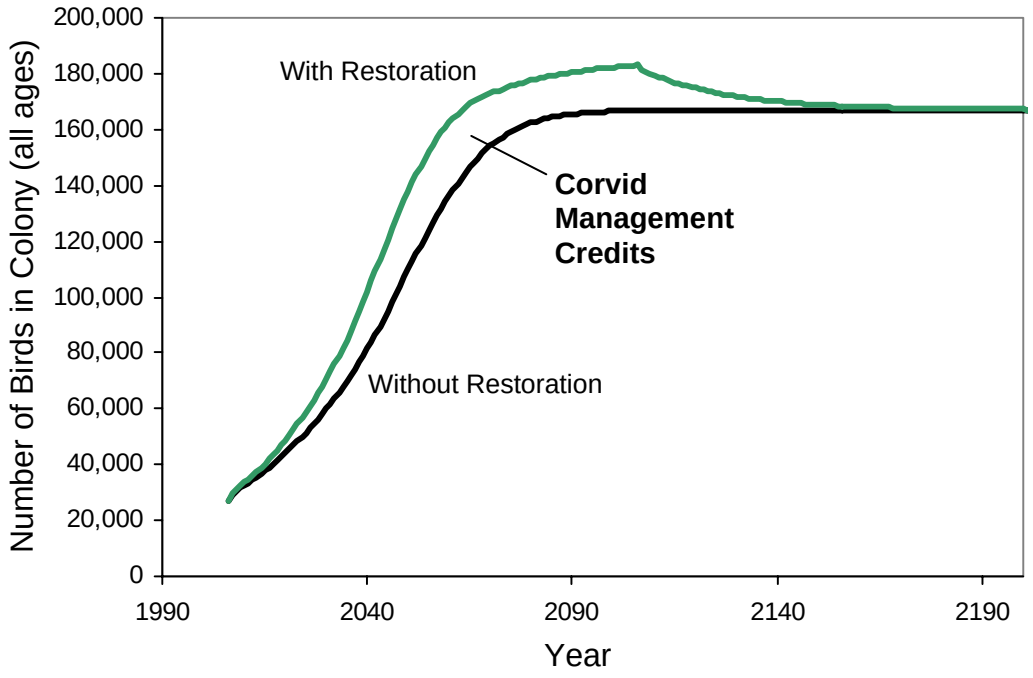


Figure 3: Restoration gains from corvid management at the Pt. Reyes colony

(3) Reading Rock Colony Restoration

Calculation of the restoration benefits of the Reading Rock murre colony restoration project is based upon the assumption that social attraction at Reading Rock would draw "not otherwise breeding" adults associated with other colonies in the region. The rate at

which social attraction resulted in new nests was quantified using data from recent restoration efforts at the Devil's Slide Rock, and assuming a 5% growth rate in nests beyond the available data (until a maximum of 1,800 nests are achieved). This is summarized in the following table:

Year	Increased Nests	Increased Fledges	Increased Bird-Years	Discounted to 2006
2008	0	0	0	0
2009	6	4	17	16
2010	9	6	26	23
2011	14	10	40	34
2012	70	51	199	167
2013	98	71	279	227
2014	115	83	327	258
2015	123	89	350	268
2016	109	79	310	231
2017	190	137	540	390
Continues to 2107	Continues at 5% annual growth until maximum at 1,800 nests.	Based on 0.722 fledges per nest.	Based on 3.94 bird-years per fledge (life expectancy of a fledge)	Discounted at 3% per year
			Total:	**53,772**

Note: First seven years of nest numbers and fledges per nest based on data from Devil's Slide Rock Murre Re-colonization Project (McChesney et al.2004).

Estimates of gained bird-years per fledge are based upon demographic parameters that were calibrated to the roughly constant Common Murre population levels off the North Coast. A more detailed description of these parameters (and the scaling) can be found in Stuyvesant Trustee Council (2004).

Other funding sources are expected to contribute 81% of the funding to conduct the Reading Rock project. This leaves a 19% contribution available for funding via the *Luckenbach* claim. A project that contributes 19% of the funding would account for 19% of the gained bird-years (i.e., 10,217 bird-years discounted to 2006).

Summary of Common Murre Project Scaling

Altogether, these three projects address approximately 61% of the injury to Common Murres. Due to the size of the injury and the fact that several other projects benefiting Common Murres (associated with other oil spills) are already being implemented (e.g. see Command Trustee Council (2004), Stuyvesant Trustee Council (2004), and McChesney et al.(2005)), the Trustees have not identified any additional projects at this time.

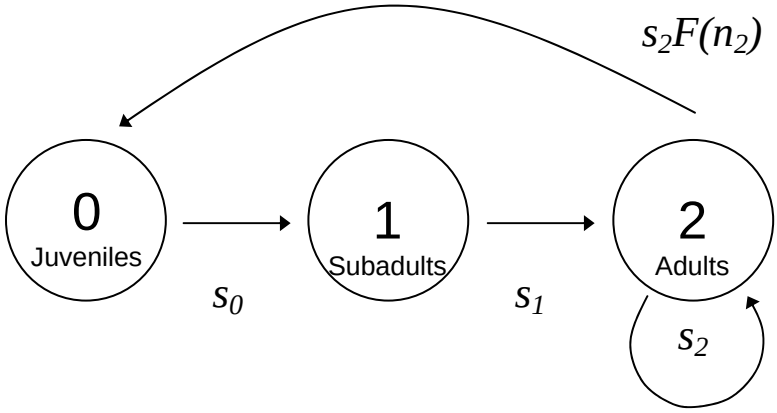
Appendix J: Marbled Murrelet REA Details

INJURY CALCULATION

The Trustees calculated the injury to Marbled Murrelets using a species-specific model incorporating data from the declining Santa Cruz Mountain population. First, the Trustees modeled both baseline and injured trajectories of the population. The injured trajectory started with the same initial population level as the baseline trajectory, but the birds were removed consistent with estimated spill mortality.

Spill Event	Estimated Mortality
winter 1990-91	4
chronic 1993-97	0
winter 1997-98	32
chronic 1998-2001	0
2001-2003	9
TOTAL	**45**

Both population trajectories relied on the following adaptation of the Beissinger (1995) model.



The parameters s_0, s_1, and s_2 are the survivorships for juveniles, subadults and adults, respectively. The term $s_2F(n_2)$ reflects the "post-breeding" census convention (i.e., bird-years are counted in the fall). This implies that adult murrelets (n_2) must survive (s_2) before they are able to attempt successful breeding ($F(n_2)$). In the model, fecundity increases as the population becomes smaller. This reflects the possibility that, as a population declines, it will tend to decline faster in more marginal areas leaving the remaining birds in higher quality habitat. The estimate of lost bird-years is the difference between the two trajectories. The parameters are presented below.

CREDIT CALCULATION (projected restoration benefits)

The Trustees are proposing two restoration projects to address the injury to Marbled Murrelets. Land acquisition would protect nests that would otherwise be subject to total loss through logging. The corvid management project in Santa Cruz Mountain

campgrounds would increase nest success by decreasing the predation of eggs and chicks by corvids. At present, nest success in the Santa Cruz Mountains is extremely low.

There is sufficient data regarding murrelet reproduction to scale the land acquisition project. Unfortunately, because murrelet nests are so difficult to monitor, there is little data regarding changes in nest success as a result of corvid management. The Trustees have conducted the scaling based upon the land acquisition project, assuming that, because it will be concurrent with the corvid management project, the nests to be protected by land acquisition will be "good nests" (i.e. they will produce enough fledglings to stabilize the population level and stop further declines). Thus, the implementation of the corvid management project justifies this critical assumption regarding nest success in the lands to be protected.

The land acquisition project is scaled based upon the number of good nests that must be protected in order to offset the injury. The number of acres that must be acquired is simply a function of average nest density. The benefit per protected nest is the difference between fecundity at the protected site (without logging) and what fecundity would be if the birds were forced to nest elsewhere (with logging). Because the corvid management project will be implemented simultaneously, we assume that: (a) with acquisition, nests are sufficiently productive to maintain population levels; and (b) without acquisition, the birds associated with these nests will reproduce at a lower fecundity after logging occurs.

The model was calibrated using population estimates (see McShane et al.2004), estimated mortality from the various spill years, and estimates of Marbled Murrelet demographic parameters (Beissinger 1995, Cam et al.2003, McShane et al.2004, Nur 1993). Because there is uncertainty with regard to several of the parameters, the Trustees conducted a Monte Carlo analysis that examined ranges of parameter inputs, subject to constraints for biological consistency (e.g., was consistent with "juvenile ratio" observations at-sea). 2,000 combinations of parameter inputs were explored. The potential parameter ranges for the main inputs were:

- *Annual Survivorship (Age 2+):* 83-93%
- *Annual Survivorship (Age 1-2):* 83-95% of Age 2+ Survivorship
- *Survivorship (From fledge to one year of age):* 60-82% of Age 2+ Survivorship
- *Female Offspring per Female (Annual):* Selected to be consistent with 5-10% annual population decline, given survivorship
- *Logging Time:* Between October 2010 and March 2011

Eliminating the first and last quartiles from the simulation results, the Monte Carlo analysis suggests that protecting 5.7 to 7.7 nests would compensate for the injury. Using an average of 20 acres per nest (Conroy et al.2002), 114 to 154 acres would need to be protected from logging.

Appendix K: Ancient Murrelet/Queen Charlotte Islands REA Details

INJURY CALCULATION

Because breeding populations of the Ancient Murrelet may be limited by suitable nest colony sites (Gaston 1994), the Trustees applied the single-generation stepwise replacement approach to calculating lost bird-years as described in Appendix C. A lost bird-year multiplier (i.e. lost bird-years per bird killed) is first calculated, and then applied to the mortality events from the various years, discounted to 2006.

The following set of demographic parameters implies an approximately constant population size:

- *Age of First Breeding:* 3 Year Old
- *Female Offspring per Female (Annual):* 0.825
- *Survivorship (From fledge to one year of age):* 59%
- *Annual Survivorship (Age 1-2):* 62%
- *Survivorship (Age 1+):* 77%
- *Maximum Age:* 20 Years Old

These parameters are consistent with data from information summarized in Gaston (1994). The result is that the bird-year multiplier is **3.48**.

This multiplier is then applied to the various mortality events, discounted to 2006.

Spill Event	Estimated Mortality	Discounted Lost Bird-Years
winter 1990-91	42	228
chronic 1993-97	0	0
winter 1997-98	281	1,240
chronic 1998-2001	0	0
2001-2003	105	400
TOTAL	**428**	**1,867**

Total discounted lost bird-years for Ancient Murrelets: **1,867**.

CREDIT CALCULATION (projected restoration benefits)

For project scaling, the Trustees focused on potential benefits from rat eradication at Ellen Island and the Bischof Islands. Full compensation for the injury can be achieved if re-colonization from adjacent islands occurs at a rate of just 2 nests per year, beginning in the year 2010 and continuing through 2100. This calculation also assumes a 1% annual risk of rat reintroduction for the first 10 years, increasing by 1% in each of the following decades. This effectively incorporates uncertainty into the discount rate. The risk of rodent reintroduction is greater here than on the Farallones because the islands are difficult to monitor. The Farallones, in contrast, have full-time research staff and every boat landing can be monitored. Benefits per nest were assumed to be 1.65 fledges/nest, at the high end of the range reported by Gaston (1994). The table below presents these results.

Year	New Nests	New Fledges	New Bird-Years	Discounted to 2006
2007	0	0	0	0
2008	0	0	0	0
2009	0	0	0	0
2010	2	3	10	8
2011	4	7	19	16
2012	6	10	29	23
2013	8	13	39	29
2014	10	17	48	35
2015	12	20	58	41
2016	14	23	68	46
2017	16	26	77	50
2018	18	30	87	54
2019	20	33	97	51
2020	22	36	106	54
2021	24	40	116	56
2022	26	43	126	58
2023	28	46	136	59
2024	30	50	145	60
2025	32	53	155	61
2026	34	56	165	62
2027	36	59	174	63
2028	38	63	184	63
2029	40	66	194	51
2030	42	69	203	50
	Increases at 2 nests per year, continuing thru 2100.	Based on 1.65 fledges per nest.	Based on 2.93 bird-years per fledge (life expectancy of a fledge)	Discounted at 3% per year
			Total:	**1,813**

The Trustees believe that these assumptions can be met. If so, this project compensates for the lost bird-years.

Appendix L: Rhinoceros Auklet/Año Nuevo Island REA Details

INJURY CALCULATION

For Rhinoceros Auklets, the Trustees applied the single-generation stepwise replacement approach because breeding populations appear limited by suitable nest sites (Gaston and Dechense 1996). A lost bird-year multiplier (i.e. lost bird-years per bird killed) is first calculated, and then applied to the mortality events from the various years, discounted to 2006.

Thayer et al.(in prep) estimated age of first breeding, annual productivity, and adult annual survival at Año Nuevo Island and Southeast Farallon Island. The Trustees relied upon this data and estimates from other alcids, calibrating the parameters subject to the constraint that the population be constant.

Rhinoceros Auklet

- *Age of First Breeding:* 4 Years Old
- *Female Offspring per Female:* 0.325
- *Annual Survivorship (Age 1-2+):* 85%
- *Survivorship (From fledge to one year of age):* 75%
- *Maximum Age:* 30 Years

The result is that the bird-year multiplier for Rhinoceros Auklets is **5.52**.

This multiplier is then applied to the various mortality events, discounted to 2006.

Spill Event	Estimated Mortality	Discounted Lost Bird-Years
winter 1990-91	59	507
chronic 1993-97	1	8
winter 1997-98	379	2,650
chronic 1998-2001	5	32
2001-2003	149	899
TOTAL	**593**	**4,095**

Total discounted lost bird-years for Rhinoceros Auklets: **4,095**

CREDIT CALCULATION (projected restoration benefits)

These injuries will be addressed by restoration efforts at Año Nuevo Island. The restoration work on Año Nuevo is expected to increase the number of nests on the island. Without the project, the auklet colony would likely decline rapidly due to soil erosion. Thus, the restoration benefits derive from the difference between modest colony growth with the project and total loss of the colony without the project.

For scaling purposes, without the project, the number of nests on the island falls from its current level of 106 to zero over 21 years (losing 5 nests per year). With the project, the colony is maintained and the number of nests increases at 2% per year, from 106 to 134 at the end of the project life. Once the project ceases, there is considerable uncertainty about the persistence of the colony. If the native vegetation cover is not firmly

established, erosion processes may repeat. The Trustees have accounted for uncertainty after the life of the project by assuming a decrease in the number of nests at a rate of 5 nests per year. Thus, the project is assumed to provide some level of benefits through 2045. The table below presents these results.

Year	Nests w/o Project	Nests w/ Project	Gained Nests	Gained Fledges	Gained Bird-Years	Discounted to 2006
2007	106	106	0	0	0	0
2008	100	108	8	5	27	26
2009	95	110	15	10	51	48
2010	90	112	22	15	75	69
2011	85	115	30	19	100	89
2012	80	117	37	24	124	107
2013	75	119	44	29	149	124
2014	70	122	52	34	173	141
2015	65	124	59	38	198	157
2016	60	127	67	43	223	171
2017	55	129	74	48	249	185
2018	50	132	82	53	274	198
2019	45	134	89	58	300	210
2020	40	129	89	58	300	204
2021	35	124	89	58	300	198
2022	30	119	89	58	300	192
2023	25	114	89	58	300	187
2024	20	109	89	58	300	181
2025	15	104	89	58	300	176
2026	10	99	89	58	300	171
2027	5	94	89	58	300	166
2028	0	89	89	58	300	161
2029	0	84	84	55	283	148
2030	0	79	79	52	266	135
		Continues to lose 5 nests per year; reaches 0 in 2045.	Continues thru 2045.	Based on 0.65 fledges per nest.	Based on 5.15 bird-years per fledge (life expectancy of a fledge)	Discounted at 3% per year
					Total:	**4,299**

Under these assumptions, this project compensates for the lost bird-years.

Appendix M: Sea Otter/Public Education REA Details

INJURY CALCULATION

Because the otters saved by the restoration action are assumed to be from the same demographic age classes as those impacted by the spills (and thus have the same contribution to future population size), calculating lost otter-years is not necessary. Instead, the Trustees simply counted lost and gained otters, discounted to 2006.

The Trustees estimate that eight sea otters were killed by mystery spills between 1995 and 2002.

Spill Event	Estimated Mortality	Discounted Otter Loss
winter 1995-96	2	2.77
winter 1998-99	2	2.53
winter 2001-02	4	4.64
TOTAL	**8**	**9.9**

The total loss is 9.9 sea otters, discounted to 2006.

CREDIT CALCULATION (projected restoration benefits)

The injuries will be addressed by a public education project intended to reduce the mortality of sea otters that results from certain human actions. Quantifying the decreased level of pollution and the resulting increased survival of sea otters from a public education project involves considerable uncertainty. To evaluate the potential of the project to achieve the necessary compensation, the Trustees instead asked how many otters must be "saved" by the project in order to offset the injury, and whether or not this level of decreased otter mortality was likely to be achieved by the project.

If the project saves two sea otters per year over a six-year period, a total of 10.8 "discounted" otters would be saved, thus compensating for the injury.

Year	Otters Saved	Discounted Otter Gain
winter 2007-08	2	1.94
winter 2008-09	2	1.89
winter 2009-10	2	1.83
winter 2010-11	2	1.78
winter 2011-12	2	1.73
winter 2012-13	2	1.67
TOTAL	**12**	**10.8**

Based on Gerber et al.(2004), approximately 325 sea otters die each year. 59 of these (18%), and possibly as many as 156 (48%), die from diseases, some of which will be addressed by the project. If the project can reduce this mortality just 4%, the goal of saving two otters per year will be achieved. The Trustees believe this is possible.

Appendix N: Summary of Public Comments and Trustee Replies

This appendix summarizes the written and verbal public comments by topic and provides the response of the Trustees to each issue. A copy of the written public comments is provided in Appendix O.

Restoration Priorities

One commenter noted that the Luckenbach Trustee Council should prioritize restoration for rare species (i.e. those with limited ranges and smaller population sizes) over more common species. Another comment encouraged the Trustees to preferentially select restoration projects that have the greatest lasting benefits for affected populations, which focus on the most significant driving factors regarding population change or ecosystem function, and to give priority to projects that benefit multiple species.

Trustee Reply:

The first comment highlights an important difference between general resource agency goals and the specific natural resource damage assessment and restoration process. Resource agencies are often concerned with rare and endangered species and devote significant efforts toward these species. Acting as trustees for injured natural resources under OPA, the same resource agencies may seek restoration only for the resources injured in an oil spill. In most spill scenarios, it is the common species that are impacted in the greatest numbers. Using restoration scaling guidelines (which focus on lost and gained bird-years), compensatory projects for these common species are often quite large. Restoration projects for rare species may be significant as well, as greater effort (and expense) is often required to restore their fragile populations.

In either case, it is our goal under OPA to achieve the appropriate amounts of compensation for all injured resources, whether common or rare. Because of our concern for rare species, we are especially careful to ensure that their injuries are directly addressed. For example, in this case, because over 50 bird species were impacted, we have combined many of the more common species into family groups and proposed a single restoration project that addresses the group as a whole, although only one or two species from the group are acting as a surrogate and directly benefit from the project. In the case of rare species, we were careful to ensure that they will directly benefit from restoration actions. In this case, the rare species that we are most concerned about are the Ashy Storm-Petrel, Snowy Plover, Marbled Murrelet, and California Sea Otter. Many of the other species also have important conservation needs and their populations are either depressed from historic levels or are currently declining. We have attempted to address their needs to the extent possible.

Regarding the second comment on restoration criteria, we concur. A full list of the criteria we used to evaluate proposed projects is in section 4.2.2 of the DARP. At the same time, cost efficiency is an important consideration when choosing among projects. It was because of these criteria that we proposed some projects on breeding

grounds far away from the spill site (e.g. Alaska, Canada, Mexico), as we believe these projects addressed biological bottlenecks in the most efficient manner and, in many instances, provided benefits to multiple species.

Expert Review of the Projects

One commenter expressed concerns that it is unreasonable to expect many detailed public comments on such a large document. The commenter proposed that the Trustees contract with selected experts to provide a detailed review of the proposed projects.

Trustee Reply:

The Draft DARP was subjected to a detailed review by selected experts prior to its release. Specifically, the injury quantification, restoration project description, and restoration project scaling sections (in the Appendices) for each species group were reviewed by some of the most well-known experts in seabird restoration in North America. A list of all of the experts consulted during the injury assessment and restoration planning is provided in Section 7.0.

Additionally, we received public comments from several of the foremost seabird ornithologists on the West Coast, as well as from several organizations known for their scientific credentials (e.g. Pacific Seabird Group, Seymour Center at the Long Marine Lab). Public comments often range from expert to layman in nature. We are satisfied with the scope, quality, and quantity of public comments received and value all comments received. The Draft DARP is also an Environmental Assessment pursuant to the National Environmental Policy Act (NEPA). A fundamental purpose of NEPA is to ensure an opportunity for public involvement in federal decision or actions that may affect the quality of the human environment.

Monitoring

One commenter stressed the importance of monitoring the changes attributed to the projects. They pointed out that it is important to demonstrate the effects of projects as well as providing baseline information for future assessments.

Trustee Reply:

All of the projects include a monitoring component, as is provided under OPA regulations. While the primary intent of our monitoring is to document the success or failure of the project, the data collected may be suitable for baseline information in the event of a future spill.

Outreach/Education

One commenter recommended that some restoration funds go toward supporting educational facilities and outreach at state parks listed in the DARP in addition to educational materials described for some of the projects.

Trustee Reply:

We recognize the importance of outreach and education as a means of engaging the public in restoration in general and in the *Luckenbach* case in particular. Many of the

restoration actions that we have selected will include an outreach and education element, typically targeted at a particular user-group (e.g., pilots, boaters, etc.). If there is opportunity to include state parks in these activities, we will do so.

Process

One commenter questioned the process by which pre-planning funding was allocated. For example, they noted that some contracts, such as funding the scoping of certain projects, were not made available to the general public, such as in a request for proposals format. The commenter expressed concern that those projects developed for the Draft DARP may be "favored" over projects suggested after the document has been put out for public review.

Trustee Reply:

In conducting natural resource damage assessments, restoration planning, and restoration project implementation, we rely on both government agency resources and the private sector. When relying on contractors from the private sector, it is our intent to use open competitive bidding whenever possible. There are some special circumstances when we may elect to use a non-competitive process (i.e. "sole source") when selecting a contractor. Because seabird restoration is a highly specialized field with relatively few experts, we have elected to use certain contractors in a non-competitive process in certain situations. For example, when focusing on projects in foreign countries (e.g., New Zealand, Mexico, Canada), especially when indigenous peoples are involved, we have sometimes selected contractors that had a previously established relationship with the governing authorities and peoples of these regions. We feel this has ensured the greater caution and sensitivity required to implement these projects.

We subject all potential projects to the same screening criteria, whether they are identified by a government agency, someone under contract to a Trustee, or a member of the general public. In several recent instances, the trustees have added new projects to the Final DARP that were suggested during the public comment period. Recent examples are two projects to restore Sooty Shearwaters, one in this Final DARP and one by the Command Trustee Council.

Overall Support for the Restoration Plan

We received many supportive comments related to the restoration projects outlined in the draft plan. We appreciate these comments and, like all comments received, weighed them as part of our decision-making process when developing the final plan. These comments are summarized below:

- Several comments were received commending the Trustees for their forward-thinking approach to developing restoration projects in Mexico, Canada, and inland regions where much conservation value can be gained for the diverse migratory species affected by the chronic oiling off the California coast.

- One commenter expressed support of the corvid management projects at Point Reyes and Santa Cruz Mountains and pointed out that addressing habitat factors for Snowy Plovers and murrelets is valuable for these species as well.

- Several commenters appreciated the diversity and complexity of issues addressed in the draft plan.

- One commenter expressed support for the projects on Baja California islands, stating that protection and outreach/education at these breeding colonies provide unparalleled opportunity for effective and economical conservation of seabirds.

- One comment expressed support for the eradication projects identified in the plan. The commenter expressed that in their opinion, one of the most effective restoration actions for seabirds, seabird communities, and island ecosystems in general, is to remove non-native invasive species that significantly alter island ecosystems.

- Many comments where received in support of the Sea Otters Pathogens Education and Outreach Project and of the benefits it will provide to the public that visit the Seymour Center in large numbers.

- A letter of support was received from Parks Canada –Gwaii Haanas National Park Reserve and Haida Heritage Site, regarding the rat eradication project in the Queen Charlotte Islands that will occur within that preserve. The letter voiced support for the project and stated that it was consistent with the Reserve's goal of restoring ecological integrity to the Gwaii Haanas preserve.

Procellarid Restoration

Several people commented that restoration for Procellarids was not addressed for several important species, most notably Laysan Albatross, Northern Fulmar, and Black-vented, Pink-footed, and Sooty Shearwater. These species were either injured in the spills or were likely injured, albeit in small numbers. The trustees placed all of these species into the Procellarid group for restoration purposes, and proposed to address their injuries via the Farallon Island mouse eradication project, which will only directly benefit Ashy Storm-Petrels. While one commenter expressed support for the Ashy Storm-Petrel project on the Farallones, they pointed out that this project will not benefit the other Procellarid species within this restoration category. The commenter suggested that restoration for other Procellarids would most effectively be accomplished by addressing conservation issues in other regions (e.g., New Zealand, Chile, Alaska, Mexico) in addition to the Farallones. Ideas included Arctic Ground-Squirrel eradication on the Semidi Islands, Alaska to benefit Northern Fulmars and other species (for which a detailed project description was provided); various projects in Chile and New Zealand to

benefit Pink-footed and Sooty Shearwaters, respectively; and actions to benefit Black-vented Shearwaters in Baja California, Mexico.

Trustee Reply:
The Trustees acknowledge that, under the Draft DARP, Ashy Storm-Petrels would be the only Procellarid to directly benefit from restoration actions. They are, however, among the most threatened and nest in closest proximity to the spill, with nearly half of their remaining population breeding on the Farallon Islands.

We have decided to add a project in the Final DARP. This project was proposed during the public comment period and addresses restoration for other Procellarid species. The project will protect the largest remaining Sooty Shearwater colony on mainland New Zealand from disturbance and depredation by non-native mammals. It is described in Section 4.3.4.

We also investigated a potential restoration project for Northern Fulmars and other species at the Semidi Islands in Alaska. This project would eradicate Arctic Ground-Squirrels from one to five islands as a way to increase nest productivity. While this project may have merit, it is not yet ready for inclusion in this restoration plan. First of all, it has yet to be determined if the ground-squirrels are native or introduced. They would only be eradicated if they are determined to be non-native and introduced. Second, while there is anecdotal evidence of ground-squirrel depredation on Rhinoceros Auklet nests and circumstantial evidence of impacts to storm-petrels and some small alcids, there is currently little information on the impacts of predation and little evidence of impacts to Northern Fulmars specifically. To resolve these unknowns, funding and time for study are needed. The trustees prefer projects that are presently known to be feasible and have a high likelihood of providing measurable benefits. The Semidi Islands project does not yet meet these criteria. For these reasons, we have not included the project in the Final DARP.

With regard to Laysan Albatross, Black-vented Shearwater, and Pink-footed Shearwater, only four individuals of these species were recovered (one Pink-footed and three Black-vented). Black-vented Shearwaters will experience ancillary benefits from restoration actions at Natividad Island in Baja California, Mexico. Because of these factors, we feel additional species-specific restoration actions for these species are not warranted.

Mouse Eradication at the Farallon Islands
One commenter expressed concerns regarding the Mouse Eradication Project on the Farallon Islands. They claimed that: (1) the direct impact of mouse predation on Farallon Ashy Storm-petrels is not well substantiated; (2) the project does not address the problem of gull predation and mouse eradication will not restore the Ashy Storm-petrel population unless combined with gull control; and (3) habitat restoration, by using concrete slabs or artificial nesting boxes to create suitable nesting areas without gulls, would be a relatively low-cost solution to use in combination with mouse eradication and gull control.

Trustee Reply:
We discussed these issues with the Farallon Islands NWR. While there is some documented and anecdotal evidence that house mice eat storm-petrel chicks or eggs, the most significant impact is indirect mortality to the adult storm-petrel breeding population, through owl predation, as described in the restoration plan. The owls' diet shift from mice to petrels in the breeding season has been well-documented through the systematic collection of owl pellets on Southeast Farallon Island since 2000. Even though only a small number (3-5) of owls over-winter, they kill a considerable number of petrels each year. 70% of the owl pellets analyzed during the early spring contained petrel remains. These are almost certainly breeding birds that arrive on the island to establish nesting sites. Such high adult mortality of a long-lived, slow-reproducing seabird is of concern to population viability.

The mouse eradication project is just one of several ongoing or planned actions being undertaken by the Farallon Islands NWR to reverse the petrel decline. Night lighting has been eliminated around and emanating from the buildings, reducing gull predation in lighted areas. The NWR has also tried to exclude nesting gulls from suitable petrel areas by erecting gull barriers (horizontal cables), but gulls began re-nesting in the areas after a very short time. Limited gull control of problem (i.e., petrel-eating) individuals is a proposed management action in the Comprehensive Conservation Plan (CCP), currently being prepared by the USFWS. The NWR has used ultra low-light video cameras in an attempt to pinpoint petrel-eating gull specialists. The NWR is also trying to better quantify the relative impact of gull and owl predation on petrels by a more thorough analysis of petrel remains and owl pellets. During the 1980s and 90s, it was assumed that all petrel wings (remains) found or collected were killed by gulls. Only recently (since the late 1990s) have burrowing owls been found to be a larger mortality factor than previously thought. Systematic collection of petrel wings began in 2000, and these are being more thoroughly examined and analyzed to determine the role each predator plays.

Over the past ten years the NWR has unsuccessfully implemented a number of habitat restoration projects to benefit Ashy Storm-Petrels. Several concrete foundations were broken up and rocks stacked to create petrel-sized crevices. Bricks and other materials have also been used to create crevices. These were unsuccessful in attracting nesting petrels, so nesting boxes were added to the rock piles, and also placed in other areas around the island thought to lack natural crevices. When petrels still remained un-enticed, olfactory attractants (petrel feathers) and petrel sound recordings were used to better lure petrels to boxes and crevices. Unfortunately, all of these attempts have failed; although other crevice nesters such as auklets and Pigeon Guillemots have used some of the habitat. Western Gulls have expanded their nesting areas on Southeast Island Farallon to the point where there is virtually no suitable petrel habitat that is not in close proximity to nesting gulls. Even though habitat restoration has thus far been unsuccessful, the NWR continues to experiment with new ideas as funding permits. Solutions have not proven to be easy or low-cost.

For these reasons, we have decided to continue with the Farallon mouse eradication project as planned and not to incorporate additional habitat alteration features.

Seabird Colony Restoration at Baja California Islands Project

One comment suggested that the proposed work at islands off Baja California, Mexico will not likely restore Cassin's Auklets because their numbers have declined drastically due mainly to climate, oceanographic, and prey changes. However, long-term benefits may be attained by protecting vacant nesting habitat from human destruction.

The commenter suggested that Cassin's Auklets should instead be restored at the South Farallon Islands as a low-cost alternative. According to the commenter, predation reduction through habitat restoration (by providing predator-proof artificial habitat) and removing individual problem gulls and owls would have great benefits to this population and would only be a small extension of the Farallon Island Project.

Several commenters expressed support of the project in Mexico for the benefits it will provide for the Xantus's Murrelet and further recommended that this species become a target species for restoration actions and monitoring in the context of the Mexico project. The commenters suggested that this species was almost certainly killed by *Luckenbach* oilings based on timing and location of oiling events in relation to murrelet at-sea distribution.

Trustee Reply:

We anticipate restoration benefits for Cassin's Auklets at all six of the Baja islands where work is proposed. The vast majority of the benefits will occur at San Benito Island, where a colony of 35,000 pairs should experience significant protection from the kinds of disturbances that can potentially destroy thousands of nests. We understand that all seabird populations are potentially subject to the vagaries of oceanographic conditions and prey availability. To account for this, we have used long-run average demographic parameters in estimating project benefits. This logic applies to all of the projects. Based upon our scaling, we anticipate that the Baja project will compensate for 205% of the Cassin's Auklets estimated killed by the oil spills. While this is may imply over-compensation, the Baja project also addresses restoration for other species (e.g., pelicans, cormorants, gulls) and was thus deemed the most cost-effective way to restore these species. Cassin's Auklets will also benefit in small ways (not quantified) from the Año Nuevo and Farallon Island projects.

With regard to Xantus's Murrelets, we agree that some individuals of this species may have been oiled in the spill events, even though none were collected. The public comments correctly note that this species will receive ancillary benefits in many ways from the Baja project. We believe that these ancillary benefits likely more than compensate for any injury that may have occurred to this species and thus have not proposed any additional restoration actions. With regard to monitoring, the monitoring for the Baja project may simultaneously collect data on Xantus's Murrelets, although we will not direct specific monitoring toward this species.

Seabird Colony Protection Project

Several commenters stated that the Seabird Colony Protection Project creates little demonstrable population-level effects, seems excessive in its budget, and is too restricted in location for the amount of funds requested.

Several commenters felt that the evaluation of the success of the project and true measurable benefits to target populations are hindered by our lack of understanding regarding what factors truly regulate these populations (i.e., juvenile, sub-adult, and adult survival, etc.).

In addition, the commenters also felt that this project may be duplicating ongoing restoration efforts (e.g., of the Command Trustee Council) and should be funded under the mandate of a resource agency such as the USFWS or BLM.

Finally, several people commented that the time for the project to provide benefits and feasibility seems low given that the *Apex Houston*-funded murre colony project has been documenting disturbance since 1995 and yet the problem continues. The comment suggested that the Trustees consider re-directing a great deal of the funds towards projects that have a greater conservation value.

Trustee Reply:

In general, we disagree with these assessments and present some information here to address these concerns. First, in developing this restoration project, we consulted with experts in seabird conservation. Through these consultations, we developed a list of threats to seabird populations in central California, with a strong focus on the Common Murre. Human disturbance to Common Murre nesting colonies was listed as one of the primary threats that are not being addressed by any coordinated conservation action. Additionally, significant disturbance events have been documented recently at most of the colonies targeted by this project (e.g., Hurricane Point/Castle Rock, Devil's Slide Rock, Drake's Bay, Point Reyes Headlands, and Farallon Islands).

Common Murres were the species most heavily impacted by the *Luckenbach* releases, with an estimated total mortality of nearly 32,000 birds. The size and duration of this project was scaled to compensate for the size of the injury to the Common Murre. A total of 1,857,471 lost bird-years were calculated for the murre injury. These lost bird-years represent the interim losses between the time of the spills and the projected return of this population to pre-spill conditions.

The size of the project (in area) was determined by both the human metropolitan region necessary to reach in order to educate boaters and pilots, and by the distribution of the Common Murre. In both cases (human and murre distribution), there is a strong population concentration from Monterey to Marin County. South of Monterey County, there are no murre colonies. North of Marin County, there are few murre colonies until Humboldt County. The duration of the project was scaled using

a population model of the Central California murre population, comparing the benefits of increasing nest success to the loss of breeding birds associated with the oil spills. The model includes information regarding juvenile, sub-adult, and adult survival from the Farallon Islands, and thus allows for an examination of how each demographic parameter influences population growth. Specifically, the modeling shows that a project that lasts 20 years and increases fecundity by 5% would compensate for 38 percent of the injuries to this species from the spill. There are two other projects described in the plan that also address injuries to murres. We are satisfied with our scaling effort and the conclusion that this project is sufficient to compensate in part for injuries to Common Murres.

The cost of the project is based upon pre-existing pilot project costs and similar work conducted on behalf of the Apex Houston and Command Trustee Councils, as well as on a similar project in Oregon. Considering the duration of the project (20 years), we consider the cost to be reasonable and proportionate to other restoration work.

We expect this project will mirror the success of a program developed in Oregon to protect nesting seabirds at Three Arches National Wildlife Refuge. Monitoring during the breeding season following the implementation of that disturbance reduction program revealed a 39% reduction in disturbance events.

This project will be an expansion of the pilot project that is currently being funded by the Command Oil Spill Trustee Council. The Command council is funding the project for four years with the first two years being mostly project development. This project will take the Command project and extend it for 20 additional years. Agencies such as the USFWS and BLM do not have funding available to address the disturbance problems at these colonies.

The goal of the Apex Houston Common Murre Restoration Program (CMRP) has been to restore historic murre colonies at Devil's Slide Rock, San Pedro Rock, and Castle and Hurricane Point Rocks. That project was not developed to address the issue of human disturbance at those colonies. The CMRP has, in the course of their restoration work, been instrumental in identifying the significant threat that human disturbance poses to Central California murre colonies. That project, however, does not have the funds or dedicated staff that the *Luckenbach* project will contain to adequately address this threat. We agree that this project requires a large investment in order to be successful; the long duration of this project will thus be an asset toward its success.

Corvid Management to Protect Common Murres

One commenter suggested that the corvid removal aspects of the Point Reyes Corvid Management Project should be extended to include work at other active and historic Common Murre colonies in Central California.

Trustee Reply:
We agree that it would be beneficial to consider targeted corvid removal at murre colonies and have included this as a deferred secondary component of the Seabird Colony Protection Project in Central California. This means that limited removal of problem corvids will be evaluated and considered as an adaptive management component of the project and may be implemented if needed in the future.

Marbled Murrelet Restoration

One commenter expressed concern that the proposed projects for Marbled Murrelets will not provide sufficient compensation for the injury to this species. Specifically, the amount of habitat protected is too small and the corvid management project may not yield increased breeding success. The commenter suggested that the Trustees host a workshop of agency personnel and outside experts to discuss specific murrelet restoration concepts.

Another commenter noted that any habitat purchased for Marbled Murrelets should be conveyed to an organization that will manage it in a way that will guarantee preservation for murrelets and to avoid organizations whose primary focus is human recreation.

Trustee Reply:
We have scaled the murrelet nesting habitat protection project based upon a detailed murrelet population model (developed during the *Kure* and *Stuyvesant* oil spill NRDAs) and using demographic parameters derived from the Santa Cruz Mountain population. To buttress our assumption that nests protected will be productive nests (i.e., producing enough birds to offset mortality), we have also proposed continuing funding of the existing (ongoing) corvid management project in the Santa Cruz Mountains. While this corvid management project is still in its early stages (implemented by the California Department of Parks and Recreation (CDPR) and funded by the Command Trustee Council), early results suggest that the key project components can be implemented and that raven numbers and reproduction have declined in the targeted areas as a result of the project. We believe that our scaling exercise that resulted in the conclusion that 140 acres (benefiting 7 nests) are sufficient to compensate for injuries to the Marbled Murrelet is sound. Regarding the assumption about productive nests and the success of the on-going corvid management project, we are monitoring that project closely and will employ adaptive management strategies if the reductions in corvids around campgrounds are not met.

We selected these two projects based upon a trustee/expert workshop like the one suggested, as well as on continuing discussions with murrelet experts in the course of this and other NRDA cases. The workshop was held in October 2002 at Henry Cowell Redwoods State Park and was convened by the Command Trustee Council. The focus of the workshop was the restoration needs of the Marbled Murrelet in the Santa Cruz Mountains. Participants included many of the prominent murrelet experts in Central California, including Steve Beissinger, Esther Burkett, Rick Golightly, Tom Hamer, Laird Henkel, Zach Peery, Steve Singer, Gary Strachan, and David Suddjian. Additional personnel from CDFG, CSLC, USFWS, CDPR, and USGS were also present. Various participants in the workshop identified corvid

management and habitat protection as the two most feasible and important restoration options for murrelets in the Santa Cruz Mountains.

With respect to habitat protection, no specific parcel has been identified for protection/acquisition and no decision has been made regarding which agency or organization should take over ownership and/or management. That said, CDPR is the dominant public landholder in the vicinity of murrelet nesting habitat in the Santa Cruz Mountains. Trustees in other oil spill cases have acquired land for murrelet nesting habitat protection in this area on two prior occasions: 1) The Apex Houston Trustee Council contributed to the acquisition of the Gazos Mountain Camp parcel (110 acres); and 2) the Command Trustee Council contributed to the acquisition of the Girl Scout Creek parcel (80 acres). In both instances, CDPR agreed to take ownership and management guidelines were created with the intent to enhance protection of the Marbled Murrelet. While there have been concerns expressed over the interpretation of guidelines in the former case (and involved agencies have revisited those guidelines to address the balance of habitat and recreational values), we believe that murrelet nesting will not be compromised with implementation of the appropriate management actions. In the latter case, the guidelines have been made more explicit and the legal tools strengthened in order to prevent confusion and ensure that management decisions potentially affecting the murrelet will be made jointly among CDPR and other trustee agencies. While CDPR does have a mission to promote public recreation as one of its goals, it also lists “helping to preserve the state’s extraordinary biological diversity” and “protecting its most valued natural resources” as goals in its mission statement. This is consistent with its statutory authority over, and management responsibilities concerning state “natural reserves” and “natural preserves” pursuant to Public Resources Code sections 5019.65(a) and 5019.71, respectively. CDPR’s leadership in implementing the corvid management project at Big Basin, Butano, and Portola State Parks has been exemplary.

Appendix O: Public Comments

This appendix contains copies of the written public comments received, in the following order:

1. Harry Carter, Mar 1
2. Josh Adams, Apr 14 (and Semidi Island project description)
3. Donald Croll, Apr 14
4. Harry Carter et al, Apr 14
5. R. William Henry, Apr 14
6. Brad Keitt, Apr 14
7. Hannah Nevins, Apr 12
8. Nancy Lenz, Apr 7
9. Al Smith, Apr 9
10. Edwin Aiken, Apr 7
11. Bill Hunt (Parks Canada), Apr 4
12. Sarah Johnson, Apr 9
13. Craig Harrison (Pacific Seabird Group), Apr 13
14. Julie Heffington (Seymour Center, Long Marine Lab), Apr 6
15. Jim Rourke, Apr 14

To: Steve Hampton (CDFG-OSPR)
From: Harry Carter (Carter Biological Consulting, 1015 Hampshire Road, Victoria, British Columbia V8S 4S8 Canada; 250-370-7031)
Date: 1 March 2006
Re: Public comments on *Luckenbach* Draft Restoration Plan

In response for your request for public comments on this draft plan, I offer the following from a brief scan but please contact me to discuss further as needed:

- ***Public Review Process***: It is unreasonable to expect to get many detailed public comments from such a large document. To augment expected limited public comments, it would be appropriate to contract with selected experts to ensure reasonable and detailed review of proposed projects. Detailed review by experienced experts in the species and sites involved is critical to ensure adequate planning for many of these restoration projects presented in such a large single draft plan. While it is great to see such a major effort to restore seabirds and many good projects are identified, a few examples of major plan flaws in areas most familiar to me that rapidly came to mind are outlined below.

- ***Mouse eradication at the South Farallon Islands***: This project has not been well justified or planned. The degree of direct mouse predation on Ashy Storm-Petrel nests has not been properly described from available literature (Ainley and Boekelheide 1990) or unpublished data and is lower than implied. Disappearance of petrel eggs occurs at Santa Cruz Island when no mice are present and apparently results to a great extent from adults removing eggshells after breakage. Thus, egg disappearance cannot be assumed to result entirely from mouse predation. Removal of house mice likely will reduce predation by small numbers of owls but there is no mention of the fact that most petrel predation is from the tens of thousands of breeding Western Gulls. Successful restoration of Ashy Storm-Petrels will not occur from mouse eradication and reduced owl effects, unless the gull predation issue is also addressed to a significant degree. This point has been discussed many times by trustees and others so to omit this problem in this draft plan is improper. As a relatively low-cost solution and addition to the mouse eradication project, I suggest that both habitat restoration and removal of problem-individual gulls would help address gull predation. Much loss of nesting habitat occurred in the 1800s when rocks were collected to make walls and buildings on the island (Carter et al., in review. Ashy Storm-Petrel. In: California Bird Species of Special Concern). This habitat change forced petrels into nesting in concentrated areas where avian predators can focus their efforts. From working for several years on the South Farallon Islands in the 1980s, I saw many dead petrels at certain problem-individual gull nests: a) located near rock walls where petrels nest; b) around researcher quarters and the power house where gulls on nearby nests eat petrels in lighted areas; and c) located near human-impacted areas where gulls can dig out birds from shallow nest sites. By spreading out predator-proof petrel nesting habitat (especially in areas without gulls or with few gulls), removing small numbers of problem-individual gulls, eradicating mice,

and reducing owl predation, future predation risk would be reduced to a great degree. To mimic natural conditions, small amounts of artificial nesting habitat for Ashy Storm-Petrels (e.g., low maintenance cement slabs with sufficient space to allow petrel use but not allow access by auklets or gulls, plus allow access for monitoring without dismantling the site) need to be placed all over the South Farallon Islands. At these sites, petrels would be better protected by reducing direct predation of adults entering and departing from sites, as well as preventing gulls from digging out nest sites and consuming adults, eggs, and chicks on the nest itself. However, no visual or sound social attractants should be used to bring petrels to new sites because this would attract gull predators. Perhaps limited petrel odor could be used to speed attraction of birds to new sites. Overall, it would be better to let these sites be colonized gradually by petrels over time which will lead to long-term predation reduction. However, in the short term, problem-individual gulls need to be removed to provide immediate relief, especially where they occur near rock walls and buildings. The gull population is very large and loss of a few birds will not affect overall colony size. I have been working on similar habitat concepts for potential Ashy-Storm-Petrel restoration at Santa Cruz Island (with potential funding through the Montrose Trustee Council) and would be interested in working with others to devise artificial habitat and implement habitat restoration at the South Farallon Islands and Santa Cruz Island.

- ***Corvid management to restore Common Murres at Point Reyes National Seashore:*** Removal aspects of this project should be extended to include work at other active and historic murre colonies at San Pedro Rock, Castle Rocks & Mainland and Hurricane Point Rocks. The Common Murre Restoration Project (CMRP) has noted substantial raven predation problems at Point Reyes and these other locations and has made substantial efforts to remove problem birds and nests at San Pedro Rock. However, this project does not have sufficient time and resources to continue to address this problem. I'd suggest that the CMRP should lead or cooperate with any new removal efforts at Point Reyes (and hopefully other colonies) because new efforts can benefit from their past experiences and the CMRP is already conducting monitoring of murres at Point Reyes and other colonies related to work for the *Apex Houston* and *Command* Trustee Councils.

- ***Acquisition of old-growth forest nesting habitat and corvid management to restore Marbled Murrelets***: The proposed projects will preserve insufficient habitat and have insufficient benefits to breeding success to have any long-term benefit to Marbled Murrelets. This population is in serious peril and a much greater improvement in nesting conditions is needed to prevent its extirpation in the near future, as currently predicted (McShane et al. 2004). While some efforts are being made through various trustee councils, the combined restoration benefit to Marbled Murrelets of all currently proposed or implemented projects in central California is likely to be zero because the population is likely to disappear, unless much greater restoration efforts are made to prevent population loss. Various restoration concepts have been considered by trustee agencies over several years which are not outlined as alternatives. I'd suggest further examination of

restoration for Marbled Murrelets in the Santa Cruz Mountains through *Luckenbach* trustees hosting a specific workshop to discuss specific concepts with various agency staff and experts. I'm sure that better restoration planning would result, although increased funds and effort are likely involved. Marbled Murrelet restoration should be the most important restoration goal tackled with *Luckenbach* funds but it has been improperly reduced to a small component.

- ***Cassin's Auklet Restoration***: Proposed work at Mexican islands probably will not restore Cassin's Auklets because their numbers have declined drastically due mainly to climate, oceanographic, and prey changes. Impacts of such natural phenomena likely will be greatest at the southern end of their distribution in Baja California where colonies already are largely abandoned. Any restoration efforts at these small colonies will likely not benefit Cassin's Auklets in the near future, although long-term benefits of protecting vacant nesting habitat from human destruction would be attained. Very long-term monitoring would be needed to determine any future benefits but such monitoring is not likely in remote areas of Baja California. As a low-cost alternative, I suggest that Cassin's Auklets should be instead restored at the South Farallon Islands. This very large colony has a perfect nexus with the *Luckenbach*, has declined due to climate change as well as high gull predation, and is located in an accessible area with long-term protection and monitoring (Ainley and Boekelheide 1990; Carter et al. 1992). Predation reduction through habitat restoration (i.e., widely providing predator-proof artificial habitat) and removing problem-individual gulls and owls would have great benefits to this declining population and would only be a small extension of that proposed above under Ashy Storm-Petrel. I have been working on similar concepts for potential Cassin's Auklet restoration at Santa Cruz Island (with potential funding through the Montrose Trustee Council) and would be interested in working with others to devise artificial habitat and implement habitat restoration at the South Farallon Islands and Santa Cruz Island.

Josh Adams
190 Benito Ave.
Santa Cruz, CA 95039

Steve Hampton
California Department of Fish and Game
Office of Spill Prevention and Response
1700 K Street
Sacramento, CA 95814

14 April 2006

Re: Draft Assessment and Restoration Plan / Environmental Assessment for the *S.S. Jacob Luckenbach* and Associated Mystery Oil Spills

Dear Steve Hampton,

I would like to thank the Trustee Council for the Assessment and Restoration Plan / Environmental Assessment for the *S.S. Jacob Luckenbach* and Associated Mystery Oil Spills (hereafter, The Trustees) for coordinating damage assessment and restoration planning to recover the damages primarily to seabirds caused by the sinking of the *Luckenbach.* Thank you also for making this a public process and for encouraging public review and comment—prior to designing a Final Restoration Plan.

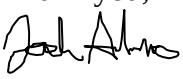
Overall, the Draft Plan is well constructed and presents a wide variety of projects that will aid in the recovery of damages for some of the affected seabird species. It is my opinion that true "restoration" should have significant benefits to populations affected or targeted, and that these benefits should always be measured and evaluated. I encourage The Trustees to preferentially select restoration projects that will have the greatest lasting benefits for affected populations, and if such restoration projects can achieve multiple species or ecosystem-level benefits—these should be encouraged and given first priority over plans that target single-species or less significant driving factors of species population change or ecosystem function.

The birds affected during this event include many that visit the affected central coast offshore area during the winter—many of these birds breed far from California and restoration activities will be most effective at colonies or breeding locations. One of the most effective restoration actions for seabirds, seabird communities, and island ecosystems in general, is to remove non-native invasive species that significantly alter island ecosystem function by such means as removing seabird biomass through time and thereby initiating irreversible changes to entire floral and faunal communities. Such communities often support rare, endemic members that comprise biologically diverse assemblages. Provided with the opportunity to remove introduced species from island ecosystems, this action should always rank as a top priority for restoration. I support the Trustee's plan to support the eradication of non-native predators from Southeast Farallon Island and the Queen Charlotte Islands.

I do not think that the plan to evaluate and attempt to minimize disturbance to seabirds (primarily Common Murre and Brandt's Cormorant) off central California achieves a high level of true restorative value. Of course I am entirely in favor of reducing disturbance to nesting seabirds, but evaluation of success and true measurable benefits to target populations are hindered by our lack of understanding regarding what factors truly regulate these populations (i.e., juvenile, sub-adult, and adult survival, etc.). Furthermore, evaluation and reduction of disturbance to nesting seabirds has been one of the main objectives for existing programs, agency tasks, and law enforcement. It is my view that the Draft plan for the central California portion to reduce disturbance to seabirds be re-evaluated with close attention to true restoration benefits that are scaled to the proposed funding amount in this category.

Additional consideration for effective restoration actions that address species affected should be considered. Attached to this letter is one such suggestion that would benefit a suite of species affected by the sinking of the *Luckenbach* by restoring important island ecosystems in the Gulf of Alaska. The construction of this potential project was encouraged by the Trustee's at the public meeting held in San Francisco on 14 March 2006. The ideas and information therein have been discussed and evaluated by USFWS invasive species experts at the Alaska Maritime National Wildlife Refuge. Any comments or questions should be directed to me at 831-771-4138 (phone) or to Steve Ebbert, Wildlife Biologist, Alaska Maritime National Wildlife Refuge, 907-235-4610 (phone).

Thank you,



Josh Adams

cc: Steve Ebbert, USFWS, Alaska Maritime National Wildlife Refuge, Homer, Alaska

attached: Draft Proposed Plan: The removal of introduced arctic ground squirrel (*Spermophilus parryii*) from the Semidi Islands, Alaska to recover multi-species damages resulting from oiling events attributed to the sunken freighter *S.S. Jacob Luckenbach*

Draft Proposed Plan: The removal of introduced arctic ground squirrel (*Spermophilus parryii*) from the Semidi Islands, Alaska to recover multi-species damages resulting from oiling events attributed to the sunken freighter *S.S. Jacob Luckenbach*

Preliminary Draft prepared by Josh Adams with review and comment by Steve Ebbert

14 April 2006

Background

From August 1990 through December 2003 repeated oil spill events attributed to the sunken freighter *S.S. Jacob Luckenbach* killed an estimated 51,000 seabirds off central California. Of 50 species of birds impacted, Northern Fulmar dominated the impacted procelariiform seabirds (94% of recovered specimens among 8 procelariiform species/groupings). Other species impacted include a suite of aclids: Common Murre, Rhinoceros Auklet, Ancient Murrelet, Cassin's Auklet, and lesser numbers of Pigeon Guillemot and Tufted Puffin. This assemblage represents a significant proportion of the marine avifaunal community of the Semidi Islands within the Alaska Maritime National Wildlife Refuge (AMNWR) ecosystem. We propose to directly recover damages caused by the wreck of the *S.S. Jacob Luckenbach* to multiple seabird species by removing introduced arctic ground squirrels from the Semidi Islands.

Conservation Issues

Alaska Maritime National Wildlife Refuge arguably is the premier seabird refuge in the world. Approximately 80% of the estimated 50 million breeding seabirds in Alaska nest on Alaska Maritime Refuge's more than 2,500 islands, islets, rocks, and headlands. Unfortunately, many islands have suffered extreme ecosystem altering effects from introduced mammalian predators including foxes, arctic ground squirrels, rats, deer mice, voles, and shrews. Although most rodent introductions were accidental, fox ranchers intentionally stocked other rodents such as ground squirrels either for fur harvest or as supplemental prey for foxes.

The Semidi Islands, located 76 km southwest of Kodiak Island in the outer Shelikov Straight region of the Gulf of Alaska, consist of 9 islands that are among the Alaska Maritime National Wildlife Refuge's premier seabird colonies. Five of the nine islands have ground squirrels: Aghiyuk, Anowik, Chowiet, Kateekuk, and Kiliktagik.

Although exact wintering distributions are not known, many of the affected species that breed during the summer in Alaska migrate into the California Current System where they are vulnerable to winter oil pollution. For example, recent evaluation of beachcast Northern Fulmar carcasses deposited in central California indicate that based on color morph ratios (majority dark phased), the majority of birds described likely originated from Gulf of Alaska colonies, of which the Semidis host the vast majority of breeding pairs (H. Nevins pers. comm.). Furthermore, satellite telemetry applied to post-breeding adult fulmars marked on the Semidis showed dispersal to the California Current and areas affected during wintertime oiling events (S. Hatch unpublished data). Rhinoceros

Auklets, Ancient Murrelets, Cassin's Auklets, Glaucus-winged Gulls are also suspected to be migrants from Gulf of Alaska colonies.

Injury Calculations

Summarized here is the injury calculation for a partial species assemblage that was affected by the *S.S. Jacob Luckenbach*. This assemblage occurs at the Semidi Islands, Alaska, and we propose that the following seven target species are likely to benefit from the proposed restoration project that seeks to recover damages to this multi-species assemblage. A total of 375 procellariiform seabirds were collected during the spills that occurred between 1997 and 2003. Additional birds were collected between 1990 and 1996, however information regarding species composition for this time period is limited. The total estimated dead procelariiform seabirds from all spills is 5,703 (assuming 94% were **Northern Fulmar,** this equates to 4,506 fulmars); *at present, the draft plan does not address restorative compensation for this species.* **Glaucous-winged Gull** was the second most affected species of the 11 Lariidae (assuming 16.5%, this equates to 393 Glaucous-winged Gulls); *at present, the draft plan does not address restorative compensation for this species.* **Cassin's Auklet** was the second most affected member of the Alcidae (1,509 estimated killed), followed by **Rhinoceros Auklet** (593 estimated killed), **Ancient Murrelet** (428 estimated killed), and other Alcidae (including **Pigeon Guillemot** and **Tufted Puffin**; 233 estimated killed).

Proposed Project

Removal of arctic ground squirrels from the Semidi Islands NWR to benefit island ecosystems by protecting seabird nesting habitat

This project targets existing USFWS Alaska Maritime NWR invasive species management goals and seeks to design and implement a focused program to eradicate introduced arctic ground squirrels from the Semidi Islands.

Phase I – design and preparation for effective eradication

- Determine distribution, abundance, foraging range, timing of emergence, food selection and key biological parameters for ground squirrels on Semidi Islands
- Collect pre-eradication data on abundance, reproductive success, and ground squirrel-seabird interactions (includes integrating summary information collected since mid 1970s and partially supported by ongoing AMNWR monitoring)
- Determine impacts of ground squirrels on seabird productivity and identify island priority for ground squirrel eradication.
- Test potential toxicants, bait formulation, bait attractiveness and acceptance, and baiting strategies by arctic ground squirrels
- Assist ongoing FWS efforts to design, test, and achieve regulatory compliance for effective, lethal ground squirrel baits

Phase 2 – trial, evaluation, eradication, and risk assessment

- Conduct bait trial on smaller Semidi Island (i.e., one of the smaller islands such as Kateekuk or Kiliktagik) to verify bait strategy efficacy.[1]
- Evaluate non-target risk.
- Eradicate ground squirrels from larger island(s) (i.e., Chowiet and Aghiyuk, on the order of $3.5M for both islands).

Phase 3 – evaluating restoration success

- Measure and report restoration success.
- Recommend strategies for future eradications (i.e., Kavalga Island, Big Koniuji Island).

The Alaska Maritime NWR has already initiated a program to address threats to island ecosystems by introduced invasive rodents, included within this program are necessary planning steps, surveys, studies, techniques, prevention measures, and outreach. Major elements of this program include: National Environmental Policy Act (NEPA) compliance, state and federal rodenticide registrations, rodent quarantine measures, non-target hazard evaluation, ecosystem recovery documentation, and public outreach. All methods will be evaluated and subject to review and guidance by the National Invasive Species Council (NISC) and guided by established DOI and FWS policies to ensure that activities are coordinated, safe, and effective. Alaska Maritime NWR invasive species biologists have completed initial bait trials targeting ground squirrels (S. Ebbert pers. com.). Pesticide registration staff (National Wildlife Research Center) together with USFWS have worked to secure EPA registrations for two rodenticides (brodifacoum and diphacinone) for the expressed use of eradicating rodent populations from islands to protect native flora and fauna.

Anticoagulant baits (brodifacoum and diphacinone) already are recommended for controlling ground squirrels in some states, and the AMNWR has made progress toward achieving permission and permitting to use these rodenticides for eradicating invasive rodents on refuge islands. Funds made available during past Oil Spill restoration Trustee councils have or are currently being used to apply similar methods toward restoring island impacted by introduced invasive species. For example, the American Trader Restoration Council supported the complete removal of introduced ship rat (*Rattus rattus*) from Anacapa Island in the Channel Islands National Park, and the Command Trustee Council is currently supporting the removal of ship rats from globally significant islands off southern New Zealand. Once completed, these programs are recognized world-wide as having extraordinarily beneficial ecological outcomes that can be rapidly documented with effective monitoring.

[1] According to FWS invasive species biologists, eradication of squirrels from Kiliktagik could easily be done with hand broadcast and bait stations. The actual application on Kiliktagik could take as few as two days, spaced a week a part or so, with several weeks of subsequent monitoring.

This program is unique and by necessity will require adaptive management to successfully achieve its goal of eradicating ground squirrels from the Semidi Islands. The selection for eradication strategies depends on the unique life cycle and behavior of ground squirrels. For example, baiting with treated grain is expected to be most effective in summer and fall because squirrels primarily feed on seeds during this period. However, it may be desirable to remove squirrels during the early spring when animals increase activity after hibernation and increase food demands while natural food availability in still low prior to reproduction.

Budget

The total budget for this project would be scaled according to desired restoration goal; a full range estimate is **$700,000 to $3,500,000**. It would be implemented by the USFWS, USGS, NGOs, and private contractors as needed. This budget range includes additional project planning and permitting, implementation, and post-eradication monitoring. The Alaska Maritime National Wildlife Refuge will contribute in-kind services to assist in logistics and monitoring.

Scaling for Primary and Compensatory Restoration

The total injury (>89,204 lost bird-years) resulting from the *S.S. Luckenbach* events to seabird species that occur in the Semidis is as follows: Northern Fulmar (72,470), Ancient Murrelet (1,867 lost bird-years), Rhinoceros Auklet (4,094 lost bird-years), Cassin's Auklet (10,773), and Glaucous-winged Gull (*not calculated in Draft DARP EA*)

Affected Environment

This project would be located within the Semidi Islands within the Alaska Maritime National Wildlife Refuge. Alaska Maritime NWR maintains a seasonal research field station on Chowiet Island. This project would augment current long-term seabird monitoring efforts in the Semidis. The removal of arctic ground squirrels overseen by AMNWR would be conducted in full accordance federal, state, and tribal regulations and accords.[2]

Environmental Consequences (Beneficial and Adverse)

This project will benefit multiple species that were affected during the *S.S. Jacob Luckenbach* and will benefit the Semidi Island ecosystem by removing introduced arctic ground squirrel which negatively impact a unique and biologically diverse floral and faunal island community.

This proposes action is not expected to result in any significant (i.e., population-level) adverse impacts. As in any program that seeks to eradicate an introduced invasive rodent with toxicants (anticoagulant baits), care must be taken to minimize the risk of secondary poisoning. There are no native terrestrial mammals inhabiting the Semidi Islands. This project will be designed to minimize risk to Bald Eagle, other predatory birds (raptors), waterfowl, raven, and additional passerines.

[2] All the Semidi Islands are selected by the Koniag Corporation in accordance with ANSCA. The AMNWR is required to solicit Koniag Corporation for their views, but not necessarily consent, to a proposed management action such as the eradication of invasive species on their selected lands.

Probability of Success

The goal of the Refuge's invasive species program is *to protect and restore the natural diversity of refuge islands*. This project is expected to have a high level of success and will help propel the Alaska Maritime NWR program toward it goal to remove introduced invasive rodents from additional Refuge islands.

The Alaska Maritime NWR has a 50-year history of restoring island ecosystems by eradicating introduced mammals from Refuge lands. Preventing new introductions of exotics and removing existing infestations are the most effective management actions to protect the native wildlife given in trust to Refuge stewards. Foxes were the most widespread invasive mammal on the Alaska Maritime Refuge and they were the first non-native predator targeted for eradication. Since the mid-1970s, foxes have been removed from one or two islands annually. Aleutian Canada geese were reintroduced to fox-free, former nesting islands and the population of increased from 300 to 30,000 allowing FWS to remove the species from the endangered species list in 2001. Evermann's rock ptarmigan, a rare subspecies that survived fox introduction on only one island, recently established a new population on Agattu Island, now fox-free, after the refuge transplanted them there in 2003 and 2004. Seabirds quickly re-colonized the larger islands after fox eradication. Additionally, waterfowl, shorebirds, ptarmigan, and possibly passerines increase following fox eradication. Judging from the responses in monitored areas, the project to remove alien foxes has likely increased populations of 15 to 20 bird species by more than 200,000 individuals.

Performance Criteria and Monitoring

We propose a *phase-based* approach to assess the success and ecological post-eradication responses based on long-term monitoring protocols already in place.

Invasive Species on the Alaska Maritime National Wildlife Refuge

Seabirds often breed in colonies on islands that have evolved without mammalian predators, and therefore, seabirds are inherently vulnerable to introduced invasive mammals. Like most of the islands throughout the Pacific, many islands of Alaska Maritime NWR have not been spared the devastating effects of non-native predator and ungulate introductions. Alien or non-native wildlife introductions began more than 200 years ago, soon after the Russians first visited Alaska and continued until just after World War II. As early as 1750, Russian merchants intentionally released arctic and red foxes onto many large Aleutian Islands that had seabird colonies. After the Aleutian Islands became a wildlife refuge in 1913, refuge management initially encouraged fox ranching. Between 1900 and 1929, lease-holders and trappers released foxes on islands. By the end of the fox-ranching era, nearly every island with beach access south of the Alaska Peninsula and in the Aleutian Islands was stocked, and ground nesting birds were extirpated or reduced to low population levels over broad ranges. Rats invaded several islands as recently as World War II. Foxes were stocked on islands with bird colonies as late as 1945 for fur ranching. Caribou were released on Adak Island in the late 1950s. Foxes and rats have caused significant impacts to Alaskan seabird populations. Entire colonies were wiped out by just a few hungry animals. For example, foxes that managed

to cross pack ice during the early 1970s, wiped out the large murre colony at Walrus Island in the Pribilof Islands.

Arctic ground squirrels (*Spermophilus parryii*) were farmed on some islands for the same reasons foxes were raised—as a source of marketable furs. Kavalga Island in the Aleutians is a clear example of where ground squirrels were introduced; although Kavalga is the first island targeted for restoration by ground squirrel removal, the Semidi Islands currently are impacted and present a clear *nexus* to the seabird assemblage affected by oiling from the *S.S. Jacob Luckenbach*. Grounds squirrels are known to prey on eggs and chicks of waterfowl and seabirds. Whereas storm-petrels and other burrow nesters are absent or greatly reduced on Semidi Islands with ground squirrels (Chowiet, Kaliktagik), nearby islands without ground squirrels retain these species in extraordinary abundance (Suklik). Once ground squirrels are removed from the Semidis, slope and burrow nesting seabirds (e.g., Northern Fulmar, Rhinoceros Auklet, Ancient Murrelet, and Forked-tail and Leach's Storm-Petrel) and waterfowl (e.g., Common Eider, and the Semidi form of the Aleutian Goose[3]) likely will benefit and over time may reoccupy the coastal bluffs, vegetated foreshore areas, and island interiors. Additional species such as Glaucous-winged Gull, Black Oystercatcher, and several ground-nesting passerines also are expected to benefit.

[3] Despite protection on both the breeding and wintering grounds, the small group of Aleutian Canada geese nesting in the Semidi Islands has been unable to increase its population above the high point of 120 birds achieved in 1993. Poor survival rates among young birds appear to be behind this lack of growth. http://alaska.fws.gov/media/finalqanda.html

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DEPARTMENT OF ECOLOGY & EVOLUTIONARY BIOLOGY
DIVISION OF NATURAL SCIENCES
CENTER FOR OCEAN HEALTH, LONG MARINE LABORATORY
100 SHAFFER RD.
SANTA CRUZ, CALIFORNIA 95060

April 14, 2006

Dear Luckenbach Trustee Council:

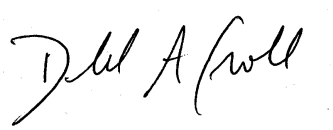
I have studied marine birds and mammals in the waters impacted by the Luckenbach oil spill for more than 27 years. I am familiar with the ongoing oiling incidents which have now been attributed to the S.S. Jacob Luckenbach and applaud the agencies responsible for tracking down the source and assessing the damages to our natural resources.

The 13 proposed restoration projects are broad in scope and attempt to mitigate for the majority of the estimated damages to both birds and mammals. I am especially supportive of the Trustees' proposals that attempt restoration at a species breeding location, even if it outside of the spill impact zone. Many of the seabirds that use the marine waters between San Francisco and Monterey are winter visitors from outside the area. By focusing restoration efforts at the breeding colonies, regardless of their location, the Trustees are able to suggest projects that will have the maximum benefit for the money spent. By protecting these species where they breed the Trustees are guaranteeing that future generations will continue to observe and enjoy them long into the future. In addition, by restoring the population numbers of impacted species the Trustees will maintain the important role these species play in the marine ecosystem off the coast of San Francisco.

The main recommendation that I would suggest that the Trustees consider is the importance of monitoring the changes attributed to their projects. It is important to demonstrate the effects of the projects they are proposing as well as providing baseline information for future assessments of the natural resources in the region.

Thank you for this opportunity to comment on the Draft Restoration Plan for the S.S. Jacob Luckenbach.

Sincerely,



Donald A. Croll, Ph.D.
Associate Professor

Steve Hampton
California Department of Fish and Game
Office of Spill Prevention and Response
1700 K Street, Suite 250
Sacramento, CA 95814 USA

14 April 2006

Re: Public comments on Draft Restoration Plan/Environmental Assessment for S.S. *Jacob Luckenbach* and Associated Mystery Oil Spills

Dear Members of the *Luckenbach* Trustee Council:

As seabird biologists concerned with research and conservation of the Xantus's Murrelet, we have reviewed the proposed seabird restoration projects related to *Luckenbach* oiling events and here provide our public comments. We are very supportive of the project "Seabird Restoration and Protection on Baja California Islands, Mexico**"** for the benefits it will provide for the Xantus's Murrelet. However, we recommend that additional focus be placed on restoring Xantus's Murrelets and that this species should become a target species for restoration in the proposed activities for this project. Much of the world Xantus's Murrelet population spends the non-breeding season in late summer and fall off central California where *Luckenbach* oilings occurred. No oiled Xantus's Murrelet carcasses were recovered and thus this species has not been considered a main target species of the restoration plan. However, this species was almost certainly killed by *Luckenbach* oilings based on timing and location of oiling events in relation to murrelet at-sea distribution. During the non-breeding season, Xantus's Murrelets tend to occur mainly on the middle and outer parts of continental shelf in central California where they would have a high probability of *Luckenbach* oiling but oiled carcasses have a low likelihood of beaching and any beached carcasses have a high scavenging rate and a low probability of detection. Especially given its Mexico endangered status, California state threatened status, and candidate U.S. status, we feel that the Xantus's Murrelet also should be considered a focal species for restoration.

The current project proposes restoration activities for pelicans, cormorants, and Cassin's Auklets that also will benefit Xantus's Murrelets. Specifically, beneficial restoration activities at three important Xantus's Murrelet breeding colonies (i.e., San Martín, San Jeronimo, and San Benito Islands) should be very effective in reducing injury to murrelets and increasing their breeding success at these colonies. These include a) prevention of reintroduction of cats or rats which have likely caused great reduction in Xantus's Murrelet population size, especially in Mexico; b) protection of Cassin's Auklet nesting habitats because Xantus's Murrelets likely breed in auklet burrows to a limited extent; c) shielding light sources on colonies will likely reduce collisions of adults or disorientation of chicks as they depart from the colony; d) education/outreach to reduce human disturbance; and e) protection and restoration of native vegetation may allow for continued or future use of shrub nesting habitat. We are very supportive of all these activities, particularly for their restoration benefits to murrelets.

We also recommend additional restoration activities for Xantus's Murrelets: f) reducing and shielding nocturnal light sources at sea near colonies, which would benefit the Cassin's Auklet as well; and g) efforts to recolonize Xantus's Murrelets at San Roque and Asunción Islands where most recent surveys in 1999 were not able to detect presence of Xantus's Murrelets. We also recommend development of Xantus's Murrelet monitoring programs at all islands to document long-term benefits from restoration activities. Since little or no baseline data exist and population changes may occur over a long time period, we suggest that 3 years of baseline data should be collected: a) population size should be measured at each colony using spotlight surveys; b) breeding success should be studied at San Benito Islands; and c) nest surveys should be conducted at other colonies as feasible. In addition, monitoring data would help identify other possible restoration actions that may be needed. Without adequate monitoring of Xantus's Murrelets, benefits from restoration cannot be measured, assumed, or maximized. We feel that extensive benefits for Xantus's Murrelets could be attained with greater funding and attention on this imperiled species. However, we also recognize that restoration actions should not be delayed until after baseline data is obtained and may need to be initiated before, during, or soon after restoration efforts.

We again express our support for this project and ask the *Luckenbach* Trustee Council to consider even greater restoration actions and related monitoring to benefit Xantus's Murrelets as feasible. Thank you for the opportunity to provide comments on this restoration plan.

Sincerely,

Harry R. Carter, 1015 Hampshire Road, Victoria, BC V8S 4S8 Canada
Esther Burkett, 7119 Clearbrook Way, Sacramento, CA 95823 USA
Lyann Comrack, 4646 Campus Avenue, San Diego, CA 92116 USA
Frank Gress, 3408 Whaler Avenue, Davis, CA 95616 USA
Tom Hamer, P.O. Box 2561, Mount Vernon, WA 98273 USA
Christine Hamilton, 454 Deodar Avenue, Oxnard, CA 93030 USA
Paige L. Martin, 14511 Knoll Ridge Drive, Tampa, FL 33625 USA
Bill McIver, 454 Deodar Avenue, Oxnard, CA 93030 USA
Elizabeth Mitchell, P.O. Box 933, Eugene, OR 97440 USA
Darrell L. Whitworth, Via delle Vignacce 12, Staggiano 52030 Arezzo Italy

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100 SHAFFER RD. SANTA CRUZ, CALIFORNIA 95060

Steve Hampton
California Department of Fish and Game
Office of Spill Prevention and Response
PO Box 944209, Sacramento, CA

Dear Mr. Hampton and Luckenbach Trustees,

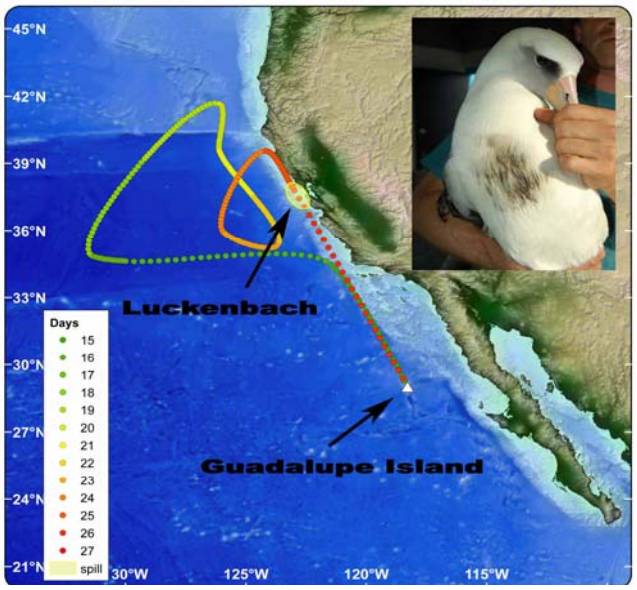


Figure 1. Interpolated geolocation track of adult incubating Guadalupe Laysan Albatross during oiling event (Jan 15-27, 2006 RW Henry, Tagging of Pacific Pelagics).

I am writing regarding wise investment of seabird conservation funds from the Luckenbach settlement. I am a native resident San Francisco Bay Area and currently in the Biology PhD program at UC Santa Cruz. My dissertation work focuses on tracking and contaminant loading of Laysan Albatrosses on Guadalupe Island, MX. As you know, *seabirds sustained the most take during the Luckenbach legacy*, these migrants are wide ranging and do not recognize international boundaries, frequently ranging multiple ocean basins. However, because they often spend little time at any given at sea location, it follows that wise conservation efforts should focus on areas that have high densities of seabirds and where increases population growth rates can be maximized. Specifically, effective conservation efforts should focus on breeding colonies.

Seabirds breeding in Baja California Islands are known to disperse into central California. A case example involves the nascent population of Laysan Albatross breeding on Guadalupe Island, MX. In fact recent tracking studies show breeding albatrosses frequent the Luckenbach's sphere of influence. In January 2006 a geolocation tracked albatross visited waters near the Luckenbach immediately following ocean conditions known to promote oil release. This tracked bird returned, freshly oiled, to resume its incubation shift on Guadalupe (Figure 1). Many other seabirds follow similar patterns on larger time scales: breeding on Pacific Islands off Mexico while spending nonbreeding periods in coastal of California. Many of these species, such as Brown Pelicans, are known victims of the Luckenbach. Other species, including this Laysan Albatross and others like the Xantus' Murrelet are rare and likely went undetected during post spill monitoring events. It is these *rarer species that are in most in need of conservation efforts*.

We also know that the *benefits of restoration action at breeding colonies can far exceed at sea efforts*. For example, modest investment in local feral cat control at the Guadalupe albatross colony halted cat predation of adult albatrosses. This mortality source alone was equivalent to ~10% of the annual North Pacific Longline Fishery Bycatch.

In summary, if compensatory mitigation goals from the Luckenbach settlement aim to boost populations of taxa most injured from the spill, namely seabirds, protection and education at breeding colonies in the Mexican Islands of Baja California provides an unparalleled opportunity for effective and economical conservation of seabirds. Furthermore, funding conservation on Mexican islands warrants not only immediate action, but needs to support long-term monitoring to ensure lasting conservation benefits.

Thank you,

R. William Henry III
henry@biology.ucsc.edu

Steve Hampton
California Department of Fish and Game
Office of Spill Prevention and Response
1700 K Street, Suite 250
Sacramento, CA 95814 USA

14 April 2006

Dear Members of the Luckenbach Trustee Council,

Thank you for the opportunity to comment on the draft restoration plan for the S.S. Jacob Luckenbach. I have reviewed the plan and wish to thank the council for developing such a thorough and comprehensive plan to mitigate for damages caused by the Luckenbach oil spill. I think it is important the council has made it a priority to maximize the benefits of the restoration actions by proposing to carry them out at the breeding sites of the species that were injured, even if these locations are not adjacent to the actual spill site. We know for a fact that the same birds that were damaged by the Luckenbach oil spill come from distant breeding locations such as Mexico and Canada. By targeting breeding sites the council will be able to achieve their restoration targets more quickly, with less money, and with greater guarantee of success in the short and long term. For these reasons I want to express my support for the "Seabird Restoration and Protection on Baja California Islands, Mexico" and for the Ancient Murrelet restoration projects.

Despite my support of the restoration plan as written there remain several issues I would like the council to consider. First, I think the council should prioritize restoration to species with limited ranges and smaller population sizes than more widely distributed and numerous species. Both Black-vented Shearwaters and Xantus's Murrelets occur in the region where oil was spilled. While one Black-vented Shearwater was found, no Xantus's Murrelets were recovered in the spill. However, because Xantus's are small and are found near the shelf break they are less likely to wash ashore and be collected. Given the at sea distribution of Xantus's Murrelets and Black-vented Shearwaters it is likely both these species were impacted by the spill. Fortunately, several of the proposed activities in the "Seabird Restoration and Protection on Baja California Islands, Mexico" will benefit both Xantus's Murrelets and Black-vented Shearwaters. However, neither of these species are listed as targets for restoration. I request the council add these species as priorities for the restoration plan. Some additional activities beyond those already proposed could include efforts to re-colonize Xantus's Murrelets at the islands of Asuncion and San Roque where the formerly bred, and trying to stop the development of new roads on the shearwater colony at Natividad.

In addition to adding direct actions to protect the murrelet and shearwater I also recommend the council include monitoring schemes to measure the benefits of the restoration activities they propose.

Sincerely,
Brad Keitt
326 John Street
Santa Cruz, CA USA 95060

190 Benito Ave
Santa Cruz, CA 95062

April 12, 2006

Steve Hampton
California Department of Fish and Game
Office of Oil Spill Prevention and Response
1700 K Street, Suite 250
Sacramento, CA 95814
shampton@ospr.dfg.ca.gov

RE: *S.S. Jacob Luckenbach* DARP and Restoration Project

Dear Steve & Luckenbach trustees;

I attended the public meeting in the Presidio on March 14, 2006 where the trustees presented the draft *S.S. Jacob Luckenbach* DARP and proposed restoration projects and solicited requests for public comment. In this letter, I reiterated some of the same comments I made at the meeting because I think there are some important considerations regarding migratory seabirds. In general, I thought the case for the DARP was well-founded and addresses damages to a diverse group of species. As a member of the research community in central California, I have personally recovered, documented and witnessed wildlife damages from the chronic winter oiling from the vessel *Luckenbach* and other mystery spills since 1997. I am very supportive of the trustees' efforts to quantify and mitigate this chronic source of mortality and agree that is a good use of these funds to mitigate these damages with proposed restoration. I applaud your efforts.

It is my intension to provide constructive criticism and offer some suggestions to aid the council in finalizing the damage claim for this serious impact to the California marine bird community. I have tried to be brief, so please contact me if you need further details.

- Restoration of migratory seabirds was not addressed for species which nest outside of North America, most notably the shearwaters. Damages to pink-footed and sooty shearwaters, which nest in the southern hemisphere, have a number of well-defined conservation issues at colonies (e.g. habitat destruction, depredation by invasive species) and these restoration actions could be feasible, cost-effective and provide multi-species benefits.

- Of the restoration categories [p.48], "Procellarids" is a varied taxomic group and should not have been lumped into one category for restoration purposes. The species affected within this group (i.e. fulmars, shearwaters, storm-petrels) have diverse life-history traits, habitat requirements, and will not all be addressed by the Farallon Islands Project. I am supportive of the Ashy Storm-petrel project, but this project will in no way benefit the other species within this restoration

category. Restoration for the procellarids would most effectively be accomplished by addressing conservation issues in other regions (e.g. New Zealand, Chile) in addition to the Farallones.

- I disagree with the statement that Ashy Storm-petrels are "more threatened" than Pink-footed Shearwaters and therefore merit the only restoration for procellarids [p. 50]. Because the ASSP is ranked based on a North American breeding status and by virtue of other species nesting in the southern hemisphere, they will never be ranked the same in this management construct. The PFSH is categorized as "Vulnerable" under ICUN listing and considerable effort has gone into determining conservation status by a tri-national committee, the council should re-consider a project to address damages to this species. There are many feasible alternative projects available for PFSH given funding. For example, see COSEWIC,[1] breeding habitat {attached document, p. 7}.

- The restoration effort would benefit from <u>inviting the participation of international stakeholders</u> including Chile's Corporación National Forestal (CONAF) for Pink-footed shearwaters, and Rakiura Maori (Indigenous New Zealanders) and Department of Conservation NZ for Sooty Shearwaters.

- The council recognizes "shearwaters face various threats at colonies", but notes that "…some of these issues are being addressed" [p. 65]. I have been directly involved in the *Command*-funded shearwater restoration project mentioned in NZ, and while this project will greatly benefit the seabirds and ecosystems they inhabit, I would like to point out that there is much restoration work to be done to benefit this species. Specifically, I suggest funding for three small-scale projects to benefit this trans-Pacific migratory species which should be considered by the *Luckenbach* trustees:

    - <u>Mainland Sooty Shearwater colony protection from invasive species</u>. One of the few mainland colonies in NZ at Taiaroa Head, Dunedin, is in private ownership by Perry Reid and family. The colony holds less than 200 nest sites, and is affected by grazers (sheep), disturbance from humans, non-native brush-tailed possums, hedge-hogs, rats, rabbits and other mammals. The colony is small enough to be surrounded by a predator-proof fence. Mr. Reid has agreed to have a fence built on his property and would maintain the fence and give access to researchers (through the University of Otago, NZ) provided that the council fund the material costs for the fence (expected cost: $20 to 50,000 USD).

    - <u>Offshore North-Eastern Tïtï Islands</u> – predator eradication. Bunker and Tia Islands are two of the few small (< 14 ha, 28 acres) islands with nesting Sooty Shearwaters where rats are present, and far enough away from the mainland to avoid re-invasion. Many shearwaters were killed chronic spillage by *Luckenbach* and other mystery sources, and genetic,

[1] COSEWIC Status Report on the Pink-footed Shearwater *Puffinus creatopus* in Canada 2004.

banding, and tracking studies link the at-sea population in central CA with nesting colonies in NZ (J. Adams & J. Harvey, unpublished data, C. Baduini, unpublished data). The ongoing Command-funded rat eradication will have made a substantial reduction in rat-infested island, but there are still some on the NE Tïtï Islands where rats are affecting the seabird and island ecosystems. These projects are of great conservation benefit and are often technically feasible, cost-effective, and have a high probability of success given the expertise of Pete McClelland and the Department of Conservation. (expected cost: < $200,000 USD)

- Sooty Shearwater burrow- camera live linked for education in CA and NZ. The mainland colony at Acher's Point, Stewart Island, has less than 100 breeding pairs, but is accessible by trail to the public and an extensive on-going community-lead restoration project. This would be an ideal project to conduct outreach via remote camera at the colony showing birds on nest-sites in the study area. Such technology is relatively straightforward and in-expensive. I suggest a "sister-city" approach to connect NZ and CA visitor centers via web-based video feed. The Department of Conservation visitor center in Half Moon Bay, Stewart Island could serve as a public display area in NZ and a number of visitor centers in California including Half Moon Bay could be connected. Kari Beaven, Rakiura Community Trust would collaborate (estimated cost: <10k USD).

- Staff and volunteer docents at the CA state parks in Monterey and Santa Cruz Counties have been directly responsible for recovering and transporting numerous oiled birds during the many years of chronic oiling. It would certainly benefit these staff and serve as an educational tool for the public to have simple displays about the number of past oiled wildlife and damages at visitor centers on themes such as "History of oil spills in CA", "Clean beaches = healthy oceans", "oiled wildlife, what you can do to help". I recommend that some restoration funds go toward supporting educational facilities and outreach at state parks listed in the DARP in addition to educational materials listed under the 13 proposed projects.

- The Seabird Colony Protection Project seems entirely overly excessive in the budget, presents little demonstrable population-level effects, is too restricted in location (for the amount of funds requested) and may also be seen as duplicating ongoing efforts by the Command and other restoration councils. The technical feasible seems low given past success, and seems like it might be better suited to an ongoing base funding by an agency rather than a one-time restoration fund. Funding activities which should already be under the mandate of existing agencies (FCC, NOAA, BLM, USFWS) and will take a substantial amount of money away from efforts which would otherwise not be supported on a regular basis (e.g. predator eradication, conservation). The time to provide benefits also seems low, the *Apex Houston* funded murre colony project has been documenting

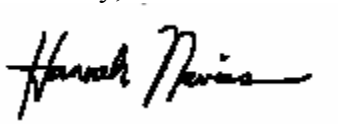
disturbance since 1995 and yet problems continue. This suggests that there is a much longer-term investment needed. There is no mechanism by which the project with little criteria for evaluation and consideration of re-funding (i.e. re-evaluation every 5-years). In general, I would suggest the council consider re-directing a great deal of the funds towards projects which have greater conservation value than the proposed outreach.

- Finally, I would like to comment on the process - The process by which pre-planning funding was allocated does not seem entirely transparent. For example, it is not readily apparent why some contracts, such as funding the scoping of certain projects was not made available to a wider public, such as in a request for proposals format. Simply put, it seems as though those projects developed with funds from the council prior to public review will be "favored" over other comments that brought in after the draft document has been put out for public review.

- On a positive note, the council is forward-thinking in its approach to developing restoration projects in Mexico, Canada, and inland regions where much conservation value can be gained for the diverse migratory species affected by the chronic oiling off the California coast. In addition, mitigating habitat factors for snowy plovers and murrelets is valuable for the species, as is the mitigation of un-naturally high levels of corvids near nesting areas. I commend the council for the diversity and complexity of issues addressed in this document.

Thank you for allowing me to provide feedback to the trustees and be involved in the public process. I commend your efforts to promote seabird conservation for migratory species including waterfowl and Ancient Murrelets and look forward to hearing about your positive results in years to come. Should you require further information regarding my recommendations and comments, please contact me via email or phone.

Sincerely,



Hannah Nevins

Seabird biologist

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h 831.427.2540
w 831.771.4422

From: Nancy Lenz <nanlenz@cruzio.com>
To: <shampton@ospr.dfg.ca.gov>
Date: 4/7/2006 4:04:07 PM
Subject: Lukenbach restoration project

Dear Mr. Hampton:
I would like to comment on the aspect of the Lukenbach restoration project that would provide an informational exhibit on sea otter health at the Seymour Visitors' Center at UCSC Long Marine Lab.
I have been a volunteer at the visitors center for over 10 years guiding tours and interpreting exhibits.
Our visitors are a curious lot and the more they learn about the oceans, the more they are looking for ways to help preserve and enhance our environment. Children and adults both are fascinated with the story of California sea otters -- how they almost faced extinction, how their fur must keep them warm while they are in the water, how their high metabolism requires them to search for food day and night.
An exhibit that would help us explain to visitors the need to protect sea otters by preventing cat litter etc. from entering the ocean would be a positive step in informing the public about research that they could use to make changes in their waste disposal habits.
Thanks for considering my opinion,
Nancy Lenz
230-B Pilkington Ave.
Santa Cruz, CA 95062
<nanlenz@cruzio.com>

From: Al Smith <goneboating@webtv.net>
To: <shampton@ospr.dfg.ca.gov>
Date: 4/9/2006 9:29:35 AM
Subject: S.S. Jacob Luckenbach Disaster

Please add my name in Support of the subject Restoration Plan.

I was an adult living in San Francisco in 1953: And now I'm a docent with Seymore Center, UCSC. I am also a Lifetime member of Friends of the Sea Otters.

At the Seymore Center there is great public interest in Sea Otters and many questions about their status. On our outside tours at Seymour Center we often see Otters and that generates many comments and questions. Our visitors seem to want protection for all of their marine wildlife.

Thank You for accepting public comments.

Regards, Alfred Smith

From: Ed and Jean Aiken <eandjaiken@sbcglobal.net>
To: <shampton@ospr.dfg.ca.gov>
Date: 4/7/2006 5:30:48 PM
Subject: Support for Luckenbach DARP Sea Otter Project

Dear Mr. Hampton,

The purpose of this e-mail is to express my strong support for the "Sea Otter Pathogens Education and Outreach" project contained in the draft version of the Luckenbach Damage Assessment and Restoration Plan. The Seymour Marine Discovery Center in Santa Cruz is a particularly appropriate venue for locating the proposed kiosk to educate the public about the importance and vulnerability of the sea otter. I look forward to seeing this kiosk included among the many fine exhibits at the Seymour Center.

Very truly yours,

Edwin W. Aiken
663 Torrington Drive
Sunnyvale, CA 94087

PROJECT: Sea Otter Pathogens Education and Outreach
BENEFITS: Sea Otters
This project would fund an education and outreach project in the Monterey Bay region to communicate to the public the threats posed to Sea Otters by various human activities.
Recent scientific research has found that the current decline in California's Sea Otters is a result of pathogens that enter the water through human and domestic animal feces. The project will suggest changes in how people manage pets and livestock, as well as boat and home septic tank systems. Cost: $120,000.

Parks Canada | Parcs Canada

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April 4, 2006

Steve Hampton
California Department of Fish and Game
Office of Spill Prevention and Response
1700 K Street
Sacramento CA 95814

RE: S.S. Lukenbach and associated mystery spills – Draft Damage Assessment and Restoration Plan/Environmental Assessment

Dear Steve,

My staff have reviewed the above document and I would like to offer the following comments. Gwaii Haanas National Park Reserve and Haida Heritage Site fully supports the proposal outlined in Appendix K to eliminate rats from Bischof and Ellen Islands. This project will not only free former colonies of Ancient Murrelets and other nesting seabirds from unnatural predation and allow them to recover, it will also assist Parks Canada Agency achieve its primary mandate of restoring ecological integrity to the islands within Gwaii Haanas. If this project is funded, Gwaii Haanas is prepared to provide logistical support to ensure that the project is a success.

I wish you every success with the implementation of the projects that you have proposed.

Yours sincerely,

Bill Hunt for/
Dennis Madsen
Field Unit Superintendent
Gwaii Haanas National Park Reserve and Haida Heritage Site

Canada

4-9-06

Steve Hampton
California Fish and Game
Sacramento. CA

Dear Mr Hampton

As a volunteer at Seymour Discovery center in Santa Cruz County I know the impact on public attitudes towards defending the environment public information about prevention, response and restoration have on individual's viewpoints. I have great optimism that projects to restore natural resources harmed by the sinking of freighter ss. Jacob Luckenbach and other oil spills affecting sea birds and otters will make a difference in public perceptions and by extension in support for further protection and remediation. Please do all in your power to support the projects.

Sincerely

Sarah Johnson

sarah johnson
322 Woodrow Ave
Santa Cruz CA 95062

Pacific Seabird Group

DEDICATED TO THE STUDY AND CONSERVATION OF PACIFIC SEABIRDS AND THEIR ENVIRONMENT

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April 13, 2006

Steve Hampton
California Department of Fish and Game—OSPR
1700 K Street, Suite 250
Sacramento, CA 95814

Re: Comments on Draft Restoration Plan/Environmental Assessment for S.S. *Jacob Luckenbach* and Associated Mystery Oil Spills

Dear Mr. Hampton:

On behalf of the Pacific Seabird Group (PSG), we offer the following comments on the Draft Restoration Plan/Environmental Assessment for the *S.S. Jacob Luckenbach* and Associated Mystery Oil Spills ("Restoration Plan") that was issued in February 2006. The Restoration Plan will spend oil-spill restoration funds for damages to seabirds and other natural resources related to multiple oil spills that occurred off the coast of San Francisco from 1990 to 2003. PSG is an international, non-profit organization that was founded in 1972 to promote the knowledge, study, and conservation of Pacific seabirds. It has a membership drawn from the entire Pacific basin, including Canada, Mexico, Peru, Chile, Russia, Japan, South Korea, China, Australia, New Zealand, and the USA. Among PSG's members are biologists who have research interests in Pacific seabirds, government officials who manage seabird refuges and populations, and individuals who are interested in marine conservation. PSG has been involved with issues relating to the restoration of seabirds after human-caused disasters such as oil spills for decades.

In general, PSG is very supportive of the draft Restoration Plan. As discussed below, we support all of the seabird restoration projects in the Restoration Plan, including projects devoted to loons, grebes, shorebirds and sea-ducks. We express no opinion regarding the proposed expenditure of funds on sea otters because otters are beyond PSG's mandate. However, our silence should not be interpreted as opposition to that project.

Specifically, PSG endorses the following projects in the Restoration Plan:

- Protection of nesting habitat of nesting Pacific loons, red-throated loons, and red phalaropes at Kokechik Flats, Alaska, from human disturbance;
- Protection of western/Clark's grebe nesting colonies at northern California lakes;
- Mouse eradication at the Farallon Islands that is anticipated to benefit nesting ashy storm-petrels;
- Seabird restoration and protection on Baja Islands, Mexico, that should benefit Cassin's auklets, California brown pelicans, and cormorants;
- A seabird colony protection program that will extend a current program by 20 years to protect common murres off the central California coast from human disturbance;
- A corvid management at Point Reyes National Seashore that will improve nesting success of common murres at the Point Reyes headlands;
- Reading Rock murre colony restoration in Humboldt County;
- Corvid management program in the Santa Cruz Mountains that is designed to improve marbled murrelet nesting success;
- Old-growth forest acquisition and protection that would acquire and manage old-growth forest parcels to benefit marbled murrelets;
- Dune habitat restoration at Point Reyes National Seashore that should create more nesting habitat for snowy plovers;
- Norway rat eradication in the Queen Charlotte Islands [Ellen Island and Bischof Islands] , Canada, that would benefit ancient murrelets; and
- Nesting habitat restoration on Año Nuevo Island that would benefit rhinoceros auklets.

We applaud the Trustees' decision to fund projects in Mexico and Canada that were affected by the oil spills off San Francisco. There is ample precedent to spend restoration funds outside of the United States when circumstances warrant. Several years ago, PSG supported the proposal and ultimate decision of the *American Trader* Oil Spill Trustee Council to restore a brown pelican colony in Baja, Mexico, that was affected by an oil spill in Southern California. In 2003, PSG supported the proposal and ultimate decision of the *Command* Oil Spill Trustee Council to restore a sooty shearwater colony in New Zealand that was affected by an oil spill near Monterey, California. Last year, PSG supported the proposed Montrose settlements that provided funds for numerous projects that benefit seabirds in Baja California.

Finally, PSG notes that the seabird restoration and protection project in Baja California also will benefit Xantus's murrelets, in addition to target species. The Xantus's murrelet has been designated threatened by the State of California and is a candidate species for federal listing. Much of the Xantus's murrelet population spends the non-breeding season in late summer and fall off central California where the Luckenbach oilings occurred. The project proposes restoration activities at three important Xantus's murrelet breeding colonies — San Martín, San Jeronimo, and the San Benito Islands — that would notably benefit Xantus's murrelets. In particular, shielding of lights at colonies and at sea, prevention of reintroduction of cats or rats which have likely caused great reductions in Xantus's murrelet population size, and education/outreach to reduce human disturbance should be effective in reducing injury to murrelets and in increasing their breeding success at these colonies. Therefore, we express our support of this project for the additional reason that it has a high potential to provide conservation benefits for Xantus's murrelets.

Thank you for the opportunity to comment on the Restoration Plan. We will gladly provide additional comments or expertise at your request.

Sincerely,

Craig S. Harrison
Vice-Chair for Conservation

SEYMOUR MARINE DISCOVERY CENTER
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April 6, 2006

Steve Hampton
California Department of Fish and Game
Office of Spill Prevention and Response
PO Box 944209
Sacramento, CA 94244-2090
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shampton@ospr.dfg.ca.gov

Dear Mr. Hampton,

Please accept this letter of support for the Luckenbach Damage Assessment and Restoration Plan, prepared by CDFG and its federal partners, especially as it applies to education and outreach of the citizens of California and our many visitors from around the world. As the Director of the Seymour Marine Discovery Center, I can tell you that the meaningful experiences the public has in informal science centers can have lasting effects on human behavior and hence the future of California's wildlife and natural resources.

The Seymour Center, a self-supporting institution located at the UC Santa Cruz Marine Science Campus, is open six days a week, year round, and provides high quality, in-depth educational experiences for the visiting public – currently more than 50,000 people visit annually. All of our visitors experience the in-depth kiosk exhibits, such as is described in the Restoration Plan. A new exhibit on one of the most charismatic and interesting animals along our coast – the sea otter -- would clearly be a draw for each person who visits the Center. Additionally our skillful docents engage our visitors around these exhibits, emphasizing wildlife values, management and restoration efforts, as well as science and natural history. Volunteer docents attend an in-depth 10-week training session before they serve in this capacity; in fact 32 new docents graduated from this 25-year-old program in the past month alone. More than 200 volunteers currently serve the public through the Seymour Center. They would be very excited about this new exhibit as well as the enriched educational opportunities surrounding it, including public lectures and other outreach activities.

Protection of existing, and restoration of future sea otter populations is of great interest to all of us at the Seymour Center. **The Center** excels at providing the public with a welcoming environment that interprets complex marine science concepts such as this. Thank you for your consideration this aspect of the Restoration Plan.

Julie Barrett Heffington, Director
Seymour Center at Long Marine Lab

(1)

APR 14, 2006
VIA FAX · 916-324-8829

STEVE HAMPTON
CALIFORNIA DEPT OF FISH & GAME
OFFICE OF SPILL PREVENTION AND RESPONSE
1700 K STREET
SACRAMENTO, CALIF 95814

RE: LUCKENBACH ET AL DRAFT DAMAGE ASSESSMENT

DEAR MR HAMPTON:

I HAVE READ IN ITS ENTIRETY THE "LUCKENBACH AND ASSOCIATED MYSTERY OIL SPILLS", DRAFT DAMAGE ASSESSMENT AND RESTORATION PLAN PREPARED BY THE "TRUSTEES".

FIRST I BELIEVE IT NECESSARY TO COMPLIMENT YOU AND THE TRUSTEES YOU REPRESENT ON THE THOUGHT DRAFT WORK, YOU PRESENT IN THE DRAFT ASSESSMENT AND RESTORATION PLAN OFFERED FOR PUBLIC REVIEW AND COMMENT DATED FEB 26, 2006.

HAVING READ THE DRAFT PLAN I AGREE WITH THE TRUSTEES CHOICES WHICH INCLUDE THE 13 DRAFT PROJECTS AND THE BENEFITS PROPOSED, WITH THE FOLLOWING COMMENTS AND RESERVATIONS.

IN REVIEWING THE 13 PROJECT PROPOSALS IT APPEARS THAT 7 OUT OF 13 PROJECTS HAVE A COMMON GOAL, THAT IS THE PROTECTION OF A SPECIES FROM "HUMAN DISTURBANCE".

IT SEEMS THAT TRUSTEES CONSIDER "HUMAN DISTURBANCE" AN IMPORTANT ISSUE WHEN IT COMES TO RESTORING AND REPLACING INJURED SPECIES THROUGH RESTORATIVE ON THE GROUND ACTIONS, THIS INCLUDES FOCUSING RESTORATION ON THEIR BREEDING GROUNDS.

SPECIFICALLY DIRECTING MY COMMENTS TO PROJECT (#10) OLD GROWTH FOREST ACQUISITION AND PROTECTION BENEFITS: MARBLED MURRELETS. YOU ARE AWARE THAT "RECENT STUDIES OF THE SANTA CRUZ MOUNTAINS POPULATION SUGGEST THAT REPRODUCTIVE SUCCESS HAS FALLEN TO NEAR ZERO." AND THAT "WITHOUT IMMIGRATION FROM OTHER POPULATIONS (MURRELETS) WILL BE EXTIRPATED WITHIN 25 YEARS" (PEERY ET AL 2004) ... "AND THE OLD GROWTH ACQUISITION PROJECT WILL SEEK TO PROTECT IMPORTANT MURRELET NESTING HABITAT." — ... "PROJECTS HAVE BEEN IDENTIFIED BY EXPERTS AS CRITICAL TO THE SURVIVAL OF THE SPECIES IN CENTRAL CALIFORNIA." "HABITAT LOSS HAS CAUSED THE REMAINING MARBLED MURRELETS TO NEST IN SMALLER AND MORE MARGINAL PATCHES, POSSIBLY SUBJECTING THEM TO GREATER NEST PREDATION AND LOWER FECUNDITY." "PROTECTION OF OLD GROWTH FOREST IS RECOMMENDED AS A PRIMARY GOAL TOWARD THE LONG-TERM SURVIVAL OF THE MARBLED MURRELET IN THE SANTA CRUZ MOUNTAIN

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(BAKER ET AL 2005)." "THIS PROJECT PURPOSES TO PROTECT AND ENHANCE MARBLED MURRELET NESTING HABITAT THROUGH THE ACQUISITION AND MANAGEMENT OF UP TO 140 ACRES OF FOREST LAND THAT SUPPORTS NESTING MARBLED MURRELETS." "... EXAMINING THE BENEFITS OF PROTECTING NESTS FROM LOGGING OR OTHER INCOMPATIBLE USES." EMPHASIS ADDED. "THIS PROJECT WILL PROTECT NESTING MARBLED MURRELETS HABITAT AND GUARANTEE THAT IT REMAINS IN EXISTENCE INTO THE FUTURE." "GIVEN THAT ONLY PARCELS CURRENTLY IN PRIVATE HANDS WILL BE CONSIDERED, THERE ARE CURRENTLY NO PUBLIC USES AND THUS THERE WILL BE LIMITED ADVERSE IMPACTS TO RECREATIONAL USES." "ONCE ACQUISITION IS ACHIEVED, THE LIKELIHOOD OF SUCCESS IN PROTECTING MURRELET NEST IS QUITE HIGH. SUCH LAND ACQUISITIONS HAVE BEEN DONE IN THE PAST (Eg. BY THE AFA HOUSTON . . . . SPILL TRUSTEE COUNCILS) AND SUCH LANDS REMAIN PROTECTED AND STILL CONTAIN NESTING MARBLED MURRELETS. THERE IS NO REASON TO EXPECT MARBLED MURRELETS TO ABANDON SUITABLE NESTING HABIT."

IN ORDER TO ATTAIN THE GOALS OUTLINED

(4)

ABOVE IN YOUR DRAFT REPORT IT IS IMPERATIVE TO CONVEY THE PROPERTY TO AN ORGANIZATION WHO WILL MANAGE THE ACQUISITION IN A WAY THAT IS CONSISTENT WITH YOUR INTENDED PURPOSE, TO PRESERVE THE ~~HABITAT~~ OF THE MARBLED MURRELETS.

IT IS UNCONSCIONABLE TO USE PUBLIC FUNDS IN ANY AMOUNT TO PURCHASE PROPERTY FOR HABITAT AND THEN TRANSFER OWNERSHIP TO AN ORGANIZATION WHO'S PUBLICLY STATED MISSION IS PUBLIC RECREATION. ONCE THE PROPERTY THAT HAS BEEN PURCHASED TO PROTECT AND ENHANCE IS TRANSFERRED "FEE SIMPLE" TO SUCH AN ORGANIZATION THEN POLITICAL INFLUENCE, NOT UNBIASED SCIENTIFIC INVESTIGATION, TAKES PRECEDENCE. ANY MITIGATIONS PLACED ON A USE ARE UNENFORCEABLE. AGENCIES CHARGED WITH ENFORCEMENT ARE UNDERSTAFFED OR ARE POLITICALLY MOTIVATED. THE END RESULT IS NOT IN KEEPING WITH THE ORGIONAL TRUSTEE'S INTENT. ONCE THE TRUSTEE'S WORK IS PRIMARILY COMPLETED THE ORIGIONAL TRUSTEES' RELINQUISH RESPONSIBILITY TO FOLLOW UP. THERE MUST BE AN ENFOLCEABLE METHOD TO SEE THAT THE INTENDED PURPOSE IS

(5)

CARRIED OUT AND NOT THWARTED. YOUR ASSERTION THAT "SUCH LAND ACQUISITIONS HAVE BEEN DONE IN THE PAST (E.G. BY THE MPK HOUSTON ---- SPILL TRUSTEE COUNCILS) AND SUCH LANDS REMAIN PROTECTED AND STILL ----." IS INCORRECT. YOU NEED ONLY REVIEW THE CALIFORNIA COASTAL COMMISSION'S INVESTIGATIVE STAFF REPORT AND ADDENDUM'S TO THAT REPORT AND RECOMMENDATIONS TOGETHER WITH THE RESULTING MEETING AND DECISION TO SEE THAT THE ORIGIONAL PURPOSE WAS NOT SERVED (SEE COASTAL PERMIT APPLICATION A-2-SMC-04-005 PESCADERO CONSERVATION ALLIANCE. — ITEM TH 5B HEARD ON APRIL 13, 2005 IN SANTA BARBARA.

THANK YOU FOR ALLOWING ME TO COMMENT ON YOUR DRAFT PLAN

Jim Rourke

JIM ROURKE
P. O. BOX 222
PESCADERO, CALIF 94060
650-879-0368

Appendix P: NEPA Compliance Documents

Two documents are enclosed here:

- Finding of No Significant Impact (FONSI) from NOAA
- NEPA Decision Document/FONSI from USFWS for the Department of the Interior

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Environmental Assessment of the Final Restoration Plan for the *S.S. Jacob Luckenbach* and Associated Mystery Oil Spills

Background:

Under the Oil Pollution Act of 1990 (OPA), the National Oceanic and Atmospheric Administration (NOAA) was a cooperating agency in the preparation of the *S.S. Jacob Luckenbach and Associated Mystery Oil Spills Final Damage Assessment and Restoration Plan/Environmental Assessment (RP/EA)*. The other Natural Resource Trustee Agencies were the U.S. Fish and Wildlife Service (FWS), the National Park Service, and the California Department of Fish and Game (CDFG) (Luckenbach Trustees). The RP/EA assesses damages and evaluates restoration alternatives for natural resource injuries incurred during multiple oil spills off the coast of San Francisco, California from 1990 to December 2003. The spills were caused from oil leaking from the freighter *S.S. Jacob Luckenbach* and associated mystery spills. The DARP/EA proposes restoration projects that compensate for natural resource injuries caused by the oil spills. The major documented injuries include oiling and killing of over 51,000 birds and 8 sea otters from Salmon Creek (North of Bodega) to Point Lobos (South of Monterey). These include 51 species of birds and four federally and state listed threatened and endangered species.

On July 14, 1953, the freighter *S.S. Jacob Luckenbach* collided with another vessel and sank in the Gulf of the Farallones. As it decayed on the ocean floor, it leaked oil and became the source of many oil spills, primarily during large winter storms when currents rocked the vessel. Major oiling events have occurred every few winters since at least 1973-74. It was not until January 2002 that these "mystery spills" were linked to the *Luckenbach*. These spills manifested themselves in the appearance of oiled seabirds on beaches from Bodega Bay to Monterey Bay. Oil chemistry analysis has confirmed the presence of *Luckenbach* oil on dead birds for every winter since 1992-93 (the earliest date for which samples are available).

A smaller percentage of the oiled wildlife has been attributed to other mystery oil spills besides the *Luckenbach*. These other mystery spills are likely the result of unreported discharges at sea from various vessels because oil fingerprinting suggests the oil came from a wide variety of sources. This document also addresses injuries from those spills. In compliance with the Oil Pollution Act of 1990 (OPA), this document focuses on injuries that occurred after August 1990. It includes oiling events through December 2003.

The major documented injuries were to birds and sea otters. Impacts to shoreline habitats, cultural resources, and the water column were minimal. Likewise, there were no beach closures and no significant impact to recreational beach use. Most of the affected birds were oiled while foraging at sea, but a small number were oiled by tarballs on beaches. Oiled birds came ashore from Salmon Creek (north of Bodega) to Point Lobos (south of Carmel). During the period of spills covered by this plan (August 1990 thru December 2003), over 51,000 birds and 8 sea otters are estimated to have been killed.

Although over 50 species of birds were impacted, the species impacted in the greatest numbers were Common Murres, Red Phalaropes, Northern Fulmars, Rhinoceros Auklets, Cassin's Auklets, and Western Grebes. Four federally- and state-listed species, the Brown Pelican, Western Snowy Plover, Marbled Murrelet, and California Sea Otter, were impacted as well. Additionally, Ashy Storm-Petrels were impacted in significant numbers relative to their population size.

Both federal and California statutes establish liability for natural resource damages to compensate the public for injury, destruction, and loss of such resources and their services resulting from oil spills. Natural resource trustees are authorized to act on behalf of the public under state and federal statutes to assess and recover natural resource damages and to plan and implement actions to restore natural resources and resource services injured or lost as a result of a discharge of oil.

The owners of the *Luckenbach* are no longer financially viable, and the sources of the other spills are unknown. However, the U.S. Coast Guard's National Pollution Funds Center (NPFC) is authorized to pay claims for uncompensated costs associated with oil removal and natural resource damage assessment, restoration, and compensation in cases where there is no financially viable responsible party or in mystery spill cases. With the completion of this final RP/EA, the Trustees will submit a claim to the NPFC to fund the preferred restoration projects.

Restoration Alternatives:

The Trustees cooperatively developed the final RP/EA, which examines and evaluates the effects of the proposed restoration actions on the environment. It concludes, with respect to those projects for which the RP/EA constitutes final environmental review, that the action does not constitute a major federal action that would significantly affect the quality of the human environment. Therefore, an Environmental Impact Statement has not been prepared.

The RP/EA considered in detail the "No Action Alternative" and many individual projects to address the injured resources in a public process. The Trustees developed criteria to evaluate and prioritize the entire suite of projects that were under consideration. These criteria included the project's ability to restore those resources directly impacted by the oil spill and relevant federal and state law provisions governing use of recoveries for natural resources. The final RP/EA contains 14 projects that met the screening criteria and were selected for implementation.

The Trustees rejected the "No-Action Alternative" because it does not allow for recovery of interim losses suffered by the resources. The Oil Pollution Act clearly establishes trustee responsibility to seek compensation for interim losses pending recovery of natural resources. Furthermore, technically feasible alternatives for restoration are available.

The preferred alternative consists of the following suite of restoration projects:

- Nest Protection at Kokechik Flats, Alaska
- Grebe Colony Protection at Northern California Lakes

- Mouse Eradication on the Farallon Islands
- Shearwater Colony Protection at Taiaoroa Head, New Zealand
- Seabird Colony Restoration on Baja California Islands, Mexico
- Dune Habitat Restoration at Point Reyes National Seashore
- Common Murre Colony Protection Project
- Corvid Management at Point Reyes National Seashore
- Reading Rock Common Murre Colony Restoration
- Corvid Management in the Santa Cruz Mountains
- Old Growth Forest Acquisition and Protection
- Rat Eradication in the Queen Charlotte Island, Canada
- Nesting Habitat Restoration on Ano Nuevo Islands
- Sea Otter Pathogens Education and Outreach

Based upon the information contained in the RP/EA, the Trustees have determined that these projects will not significantly affect the quality of the human environment. This determination applies to all of the projects listed above except Mouse Eradication on the Farallon Islands, which is undergoing further environmental review, and Old Growth Forest Acquisition and Protection, which may require further environmental analysis when a specific parcel is identified.

Public Involvement:

The Luckenbach Trustees involved the public during development of the RP/EA. The Luckenbach Trustees held a 45 day public comment period on the draft RP/EA from February 28, 2006 to April 14, 2006. The Luckenbach Trustees conducted a public meeting during the comment period at the Golden Gate Club of the Presidio in San Francisco on March 14, 2006. The Luckenbach Trustees received 15 written comment letters on the Draft DARP/EA. These letters are included in appendix O of the Final RP/EA. The Luckenbach Trustee responses to the letters are included in Appendix N of the Final RP/EA. None of the parties who commented on the RP/EA opposed restoration projects as appropriate compensation for the resources injuries resulting from the oil spills. Rather, the comments focused on the assessment process or advocated for improvements to certain projects. As a result of the public comments, the Luckenbach Trustees added the Shearwater Colony Protection Project in New Zealand to the Restoration Plan.

Environmental Consequences:

To comply with the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), and other related State and Federal requirements, the Trustee Council analyzed the effects of each restoration project on the quality of the human environment. Mitigation measures are included, as appropriate, in some of the proposed projects to mitigate potential impacts. The Luckenbach Trustee Council, which was formed to address the injuries resulting from the oil spills, is responsible for ensuring that each project will be implemented as prescribed in the RP/EA. One of the projects (Mouse Eradication on the Farallon Islands) will undergo a subsequent phase of environmental analysis as project specific details are developed, and one of the projects (Old Growth Forest Acquisition and Protection) may undergo a

subsequent phase of environmental analysis when a specific location(s) for habitat protection is identified.

As documented in the RP/EA, the Trustees determined the proposed actions will substantially benefit the wildlife targeted by the RP/EA, and can be implemented without significant adverse effects to soil, air quality, water resources, floodplains, wetlands, vegetation, fisheries, wildlife, visual quality, aesthetics/recreation, wilderness, subsistence, cultural resources, park management, and the local economy. The proposed actions are designed to make the environment and the public whole for injuries to, or lost use of, natural resources and services from the Luckenbach and Associated Mystery Oil Spills.

In drawing these conclusions, NOAA relied upon guidance in the NEPA regulations at 40 C.F.R. § 1508.27, which describe the criteria that federal agencies should consider in evaluating the potential significance of proposed actions. The regulations explain that significance embodies considerations of both context and intensity. In the case of site-specific actions such as those proposed in this draft RP/EA, the appropriate context for considering significance of an action is local, as opposed to national or worldwide.

National Oceanic and Atmospheric Administration Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. '1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria.

These factors, along with the Trustees' conclusions concerning the likely significance of impacts of the proposed restoration action, are discussed in more detail below.

1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Federal Management Plans (FMPs)?

> Response: The proposed actions will cause no damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Federal Management Plans (FMPs). The only project in the Restoration Plan that may involve EFH is the Mouse Eradication on the Farallon Islands, which is undergoing further environmental review. Project specific EFH compliance will be handled under the project specific environmental document.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

> Response: These projects will have a substantial impact on ecosystem function and a minor impact on species biodiversity. The proposed restoration projects were designed

to benefit natural resources; therefore, the Trustees expect the vast majority of the impacts associated with the proposed projects to be beneficial in nature. Any adverse impacts to certain species (e.g., to mice on the Farallon Islands or corvids in the Santa Cruz mountains) are expected to be insignificant and of a nature that will return the environment to a more natural state. Certain impacts from project implementation (e.g., use of heavy equipment in dune restoration) are expected to be insignificant, of short duration, and timed so as to reduce the potential for adverse impacts.

As documented in the RP/EA, the Trustees determined the proposed actions will substantially benefit the wildlife targeted by the RP/EA, and can be implemented without significant adverse effects to soil, air quality, water resources, floodplains, wetlands, vegetation, fisheries, wildlife, visual quality, aesthetics/recreation, wilderness, subsistence, cultural resources, park management, and the local economy. The proposed actions are designed to make the environment and the public whole for injuries to, or lost use of, natural resources and services from the Luckenbach and Associated Mystery Oil Spills The Trustees believe that the projects selected in the final RP/EA will not cause significant adverse impacts to natural resources or the services they provide. The Trustees further do not believe that the proposed projects will affect the quality of the human environment in ways deemed "significant."

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health and safety?

Response: The proposed restoration projects are not expected to have any impacts on public health and safety. The implementation of the proposed restoration projects would not present any unique physical hazards to humans.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response: The FWS has determined the proposed restoration actions will not adversely affect any species which it has listed under the federal Endangered Species Act, nor are the actions expected to adversely affect any species protected under California state law. Several threatened or endangered species were injured by the Luckenbach Oil Spills, and any impact from the proposed restoration projects is expected to be beneficial. Furthermore, the general locale where the restoration actions would be sited is not critical habitat for any listed species.

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: There are no significant adverse social or economic impacts interrelated with natural or physical environmental effects brought by the proposed actions.

6) Are the effects on the quality of the human environment likely to be highly controversial?

Response: The proposed restoration projects are not expected to be controversial. Due to the environmentally beneficial nature of the proposed projects, the Trustees anticipate that the citizens of California and local residents of the project areas will be supportive.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

Response: The physical characteristics of the area in which the proposed restoration projects would be implemented do not increase the risk of significant impacts. The affected environment encompasses a 6,577 square mile area of Pacific Ocean along with near shore tidal flats, wetlands, rocky intertidal areas, coastal beaches, subtidal reefs, kelp forests, and underwater canyons. In addition, the physical environment encompasses rocks and islands contained within the California Coastal Monument managed by the BLM, public beaches that are under the jurisdiction of the CDPR, the Farallon National Wildlife Refuge managed by the USFWS and the Point Reyes National Seashore managed by the NPS. While this area does contain unique characteristics, the proposed projects are expected to be either beneficial to these areas or have no impact. Furthermore, no unique or rare habitat would be destroyed due to restoration of wetlands to those areas that previously supported wetlands.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The Trustees do not believe that the proposed restoration projects pose any uncertain effects or unknown risks to the human environment. The areas in which the projects will be implemented are well known to the project implementers, and none of the project methods are unique, controversial, or untried. In fact, some projects are continuations of ongoing efforts. Furthermore, the Trustees would conduct appropriate site surveys to address any uncertainties before implementing the proposed restoration projects.

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: The proposed restoration projects are not expected to contribute to potentially significant cumulative impacts. The reasons for this conclusion are detailed in the final RP/EA "Cumulative Impacts" section. Furthermore, since the proposed restoration projects are designed to achieve recovery of injured natural resources, any cumulative environmental consequences will be largely beneficial.

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: The proposed restoration projects are not expected to impact any cultural, scientific, or historic resources. The Trustees are aware of no previously recorded archeological sites located in the area of the proposed projects.

11) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Response: No, the action will not result in the introduction or spread of non-indigenous species but will result in the reduction of such.

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: The proposed restoration projects are not expected to set precedents for future actions that would significantly affect the human environment or represent a decision in principle about a future consideration. In fact, all of the project concepts (e.g., eradication of non-native species, habitat improvement, outreach) are extensions of well established and frequently used restoration methods.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: Implementation of the proposed restoration projects would not require any violation of federal, state or local laws designed to protect the environment. The restoration actions proposed will be implemented in compliance with all applicable environmental laws.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: The proposed action will not result in a substantial cumulative adverse effect on target species and non-target species. The proposed restoration projects are not expected to contribute to potentially significant cumulative impacts. The reasons for this conclusion are detailed in the final RP/EA "Cumulative Impacts" section. Furthermore, since the proposed restoration projects are designed to achieve recovery of injured natural resources, any cumulative environmental consequences will be largely beneficial.

DETERMINATION

Based upon an environmental review and evaluation of the final RP/EA for the *S.S Jacob Luckenbach* and Associated Mystery Oil Spills as summarized above, the nature of comments from agencies and the public, and the incorporation of mitigation measures to avoid or reduce potential direct, indirect and cumulative impacts, other than the two projects identified above, one of which will and the other which may be subject to further environmental analysis, NOAA has determined the implementation of the RP/EA does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such, an environmental impact statement is not required for the Restoration Plan and Environmental Assessment.

Date 10·20·6

William T. Hogarth, Ph.D.
Assistant Administrator for Fisheries
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

October 18, 2006
U.S. Fish and Wildlife Service for the Department of the Interior
NEPA Decision Document/Finding of No Significant Impact

For the S.S. Jacob Luckenbach and Associated Mystery Oil Spills Damage Assessment and Restoration Plan/Environmental Assessment

Background:

Under the Oil Pollution Act of 1990 (OPA), the Natural Resource Trustee Agencies, including the U.S. Fish and Wildlife Service (Service), the National Park Service, the National Oceanic and Atmospheric Administration, and the California Department of Fish and Game (Luckenbach Trustees) have prepared the *S.S. Jacob Luckenbach and Associated Mystery Oil Spills Final Damage Assessment and Restoration Plan/Environmental Assessment (DARP/EA)*. The DARP/EA assesses damages and evaluates restoration alternatives for natural resource injuries incurred during multiple oil spills off the coast of San Francisco, California from 1990 to December 2003. The spills were caused from oil leaking from the freighter *S.S. Jacob Luckenbach* and associated mystery spills. The DARP/EA proposes restoration projects that compensate for natural resource injuries caused by the oil spills. The major documented injuries include oiling and killing of over 51,000 birds and 8 sea otters from Salmon Creek (North of Bodega) to Point Lobos (South of Monterey). These include 51 species of birds and four federally and state listed threatened and endangered species.

On July 14, 1953, the freighter *S.S. Jacob Luckenbach* collided with another vessel and sank in the Gulf of the Farallon Islands. The vessel, loaded with 457,000 gallons of bunker fuel, sank about 17 miles offshore of San Francisco. The vessel decayed on the ocean floor, leaked oil and became the source of many oil spills, primarily during large winter storms. It caused major oiling events of wildlife every few winters since at least 1973-74. In 2002, oil associated with several "mystery spills" was linked to the Luckenbach, including the Pt. Reyes Tarball Incidents of winter 1997-1998 and the San Mateo Mystery Spill of 2001-2002. In 2002, the U.S. Coast Guard and the Trustees facilitated the removal of most of the oil from the vessel and sealed the remaining oil inside.

In addition to oiling of wildlife from the Luckenbach, a smaller percentage of oiled wildlife is attributed to mystery oil spills coming from other sources. Oil fingerprinting suggests the oil comes from a wide variety of sources. These other mystery spills are likely the result of unreported discharges at sea from various vessels.

The DARP/EA includes injuries from spills related to the Luckenbach and the associated mystery spills. In compliance with OPA, the DARP/EA focuses on injuries that occurred after August 1990. It includes oiling events through December 2003.

The owners of the *S.S. Jacob Luckenbach* no longer exist and the sources of the other mystery oil spills are unknown. However, the OPA authorizes the use of the Federal Oil Spill Liability Trust Fund for payment of claims for uncompensated costs associated with removal and natural resource damage assessment (NRDA), restoration, and compensation in cases where there is no responsible party or in mystery spill cases. The Luckenbach Trustees are authorized to act on behalf of the public to recover natural resource damages and to plan and implement actions to restore natural resources and resource services injured or lost as a result of discharges of oil. The Trustee Council cooperatively evaluated alternatives for restoration actions to address natural resource injuries and damages related to the spill and jointly prepared the DARP/EA.

The Luckenbach Trustees and the National Pollution Fund Center (NPFC) became involved with the Luckenbach and Mystery Oil Spills in 1997 when the Trustees responded to the winter 1997-98 Point Reyes Tarball Incidents. The NPFC approved and paid $333,145.62 for an initiation of NRDA as a result of the incidents. After additional spills in 2001-2002, the NPFC again authorized initiation of NRDA and paid $80,464 in assessment costs. In the summer of 2002 the NPFC authorized and paid $20 million for oil removal operations at the sunken Luckenbach vessel. The Trustees remain in contact with the NPFC, informing it of the status of DARP/EA activities with the intent of submitting a claim for natural resource damages to NPFC to fund the proposed restoration projects and to reimburse the Luckenbach Trustees for the additional assessment costs incurred.

Restoration Alternatives:

The DARP/EA evaluated several categories of restoration alternatives, including evaluation of a "no action" alternative, and developed criteria to evaluate and prioritize the entire suite of restoration projects under consideration. The Luckenbach Trustees rejected the no-action alternative because it does not allow for recovery of interim losses suffered by the resources. The Oil Pollution Act clearly establishes trustee responsibility to seek compensation for interim losses pending recovery of natural resources. Furthermore, technically feasible alternatives for restoration are available.

The fourteen selected restoration actions are:

Nest Protection at Kokechik Flats, Alaska;
Grebe Colony Protection at Northern California Lakes;
Mouse Eradication on the Farallon Islands;
Shearwater Colony Protection at Taiaroa Head, New Zealand;
Seabird Colony Restoration at Baja California Islands;
Dune Habitat Restoration at Point Reyes National Seashore;
Common Murre Colony Protection along the Central California Coast;
Corvid Management at Point Reyes National Seashore;
Reading Rock Common Murre Colony Restoration;
Old Growth Forest Acquisition and Protection;
Corvid Management in the Santa Cruz Mountains;

Rat Eradication in the Queen Charlotte Islands; Canada;
Nesting Habitat Restoration on Ano Nuevo Island; and
Sea Otter Pathogens Education and Outreach.

This decision document concludes that a Finding of No Significant Impact (FONSI) is appropriate for all of the restoration actions selected for implementation by the Luckenbach Trustees as identified in the DARP/EA and summarized here, except for Mouse Eradication on the Farallon Islands which is undergoing further environmental review and Old Growth Forest Acquisition and Protection which may require further environmental analysis when a specific parcel is identified. (See Attachment 1).

Public Involvement:

The Luckenbach Trustees involved the public during development of the DARP/EA. The Luckenbach Trustees held a 45 day public comment period on the draft DARP/EA from February 28, 2006 to April 14, 2006. The Luckenbach Trustees conducted a public meeting during the comment period at the Golden Gate Club of the Presidio in San Francisco on March 14, 2006. The Luckenbach Trustees received 15 written comment letters on the Draft DARP/EA. These letters are included in appendix O of the Final DARP/EA. The Luckenbach Trustee responses to the letters are included in Appendix N of the Final DARP/EA. None of the parties who commented on the DARP/EA opposed restoration projects as appropriate compensation for the resources injuries resulting from the oil spills. Rather, the comments focused on the assessment process or advocated for improvements to certain projects. As a result of the public comments, the Luckenbach Trustees added the Shearwater Colony Protection Project in New Zealand to the Restoration Plan.

Alternatives Considered:

In order to focus alternative restoration projects for the 51 affected species of birds and sea otters, the Luckenbach Trustees used specific criteria to group impacted species in the DARP/EA. These groups are as follows: Waterfowl; Loons; Grebes; Procellarids; Brown Pelicans, Cormorants and Gulls; Western Snowy Plovers; Other Shorebirds; Common Murres; Marbled Murrelets; Other Alcids; and California Sea Otters.

The DARP/EA evaluates specific project alternatives for each group of wildlife specified above against chosen criteria. The initial screening criteria include Consistency with Trustees' Restoration Goals, Technical Feasibility, Cost-Effectiveness, Relationship to Injured Resources and/or Services, Time to Provide Benefits, Duration of Benefits, Multiple Resource and Service Benefits, and Comprehensive Range of Projects. Additional Screening Criteria include Avoidance of Adverse Impacts, Likelihood of Success, Compliance with Applicable Federal, State, and local Laws and Policies, Public Health and Safety, Maintenance and Oversight of Project, Opportunities for Collaboration, Total Cost and Accuracy of Estimate. Supplemental screening criteria include Ability to Document Benefits to the Public, Educational/Research Value and

Non-Duplication. The Luckenbach Trustees then selected the preferred alternatives based on the merits shown in the evaluation.

The specific project alternatives the Trustees considered for each group of wildlife are listed below with the selected projects in italics.

Waterfowl:
Nest Protection at Kokechik Flats, Alaska;
Nesting habitat protection via land acquisition at Yukon Flats, Alaska;
Nesting habitat protection via land acquisition near Togiak NWR; and
Land protection advocacy in MacKenzie River area, Canada.

Loons:
Nest Protection at Kokechik Flats, Alaska and
Social attractions to reestablish Common Loon nesting in California

Grebes:
Grebe Colony Protection at Northern California Lakes and
Acquisition of land around Lake Earl, California to allow for higher lake levels and increase Western Grebe nesting.

Procellarids:
Mouse Eradication on the Farallon Islands;
Shearwater Colony Protection at Taiaroa Head, New Zealand;
Reduction of plastic waste at sea;
Rabbit eradication on Santa Clara Island, Chile;
Shearwater colony protection at Isla Mocha, Chile;
Other breeding habitat restoration in Chile;
Habitat improvement at the Farallon Islands;
Rat eradication at Northeast Titi Islands, New Zealand;
Sooty shearwater burrow-camera in New Zealand; and
Ground-Squirrel eradication at the Semidi Islands, Alaska.

Brown Pelicans, Cormorants and Gulls:
Seabird Colony Restoration at Baja California Islands;
Roost site protection in northern California; and
Pelican entanglement education on fishing piers in California.

Western Snowy Plovers:
Dune Habitat Restoration at Point Reyes National Seashore and
Corvid management at Point Reyes National Seashore.

Other Shorebirds:
Nest Protection at Kokechick Flats, Alaska

Common Murres:
Common Murre Colony Protection along the Central California Coast;
Corvid Management at Point Reyes National Seashore;
Reading Rock Common Murre Colony Restoration;
Land acquisition at Cape Viscaino; and
Extending Devil's Slide Rock Murre Restoration Project.

Marbled Murrelets:
Old Growth Forest Acquisition and Protection;
Corvid Management in the Santa Cruz Mountains;
Silviculture of second growth forest to create nesting habitat;
Captive breeding; and
Artificial nest platforms.

Other Alcids:
Rat Eradication in the Queen Charlotte Islands, Canada;
Seabird Colony Restoration at Baja California Islands;
Nesting Habitat Restoration on Ano Nuevo Island;
Saunders Island (Canada) raccoon eradication;
Murchison and Faraday Islands (Canada) rat eradication;
Rat Island (Alaska) rat eradication;
Langara Island (Canada) rat quarantine project; and
Habitat improvements at the Farallon Islands.

California Sea Otters:
Sea Otter Pathogens Education and Outreach

Environmental Consequences:

To comply with the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), and other related State and Federal requirements, the Trustee Council analyzed the effects of each restoration project on the quality of the human environment. Mitigation measures are included, as appropriate, in some of the proposed projects to mitigate potential impacts. The Luckenbach Trustee Council, which was formed to address the injuries resulting from the oil spills, is responsible for ensuring that each project will be implemented as prescribed in the DARP/EA. As contemplated in the NEPA regulations, one of the projects will undergo a subsequent phase of environmental analysis as project specific details are developed and one of the projects may undergo a subsequent phase of environmental analysis when a specific location(s) for habitat protection is identified. Attachment 1 includes a summary of the proposed projects, environmental consequences and any mitigation required at this time.

As documented in the DARP/EA, the Luckenbach Trustees determined the proposed actions will substantially benefit the wildlife targeted by the DARP/EA, and can be implemented without significant adverse effects to soil, air quality, water resources, floodplains, wetlands, vegetation, fisheries, wildlife, visual quality, aesthetics/recreation,

wilderness, subsistence, cultural resources, park management, and the local economy. One of the restoration actions will require additional environmental analysis and the other may require additional environmental analysis: Mouse Eradication on the Farallon Islands and Old Growth Forest Acquisition and Protection. The Service has determined the proposed actions will not adversely affect any species which it has listed under the federal Endangered Species Act. The proposed actions are designed to make the environment and the public whole for injuries to, or lost use of natural resources and services from the Luckenbach and Associated Mystery Oil Spills.

Cumulative Impact:

As required by NEPA, the DARP/EA addresses potential overall cumulative impacts of implementing the preferred alternative projects. The DARP/EA specifically examines Seabirds, Corvids, House Mice and Human Use.

Seabirds

The Trustees believe the preferred alternative projects selected in the DARP/EA that address injuries to seabirds, in conjunction with other existing and anticipated seabird restoration projects, including those funded from damage recoveries from other OPA cases, will have a local and regional, long term, moderate beneficial impact on seabird populations.

Corvids

The Trustees have selected three projects that will affect local jay and raven numbers near seabird nesting and roosting sites in and around PRNS, the Santa Cruz Mountains, and Common Murre colonies south of Point Reyes. Project components include: (1) public education and outreach, (2) removing anthropogenic food sources, (3) removing raven roosting or nesting areas, and (4) potentially lethally removing a small number of Common Ravens.

Because the selected projects are focused on relatively small geographical areas, and because only small numbers of corvids may be displaced or removed relative to their regional populations levels, the Trustees believe these alternatives will have a minor, medium term, negative impact on the local and regional population of corvids.

House Mice

The Trustees are unaware of any other past or reasonably foreseeable projects that will impact the House Mouse, and therefore do not believe there are cumulative effects to be considered regarding this species. However, as indicated above, some projects will undergo their own NEPA/CEQA processes. The Mouse Eradication Project on the Farallon Island is currently undergoing further environmental review and will be evaluated for cumulative effects in that subsequent NEPA process.

Human Use

The Trustees selected six projects that may limit or change human use of natural resources in Monterey Bay, Santa Cruz Mountains, various northern California lakes,

Kokechik Flats, Alaska, and on islands off Baja California, Mexico. Project components include: (1) public education and outreach, and (2) limiting access to sensitive areas.

These projects are expected to have only localized, minor, negative impacts on recreational opportunities given that extensive alternate areas for human recreation are available in the immediate proximity to each of them.

The Luckenbach Trustees believe the preferred alternative projects selected in the DARP/EA, when considered along with past and reasonably foreseeable future projects, will have cumulative long term local and regional beneficial impacts to natural resources, as well as short term, minor negative impacts to human recreation.

Environmentally Preferred Alternative:

The environmentally preferred alternative is the alternative that will promote NEPA, as expressed in Section 101 of NEPA. The environmentally preferred alternative is the one that best meets the following:

- Fulfill the responsibility of each generation as trustee of the environment for succeeding generations;
- Ensure for all Americans a safe, healthful, productive, and aesthetically and culturally pleasing surrounding;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;
- Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Based upon analyses of the proposed action when compared to the alternative projects (non-preferred) and the no action alternative, the proposed actions meet the criteria above and are therefore also the agencies environmentally preferred alternative.

Basis for Decision:

Implementation of the proposed action will have minimal short-term impacts on natural, cultural, and social resources. Attachment 1 contains a summary of the proposed action, environmental consequences and any mitigation proposed at this time. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative negative effects, or elements of precedence have been identified, and implementing the proposed and preferred alternative will not violate Federal, State, or local environmental protection laws.

Conclusion:

Based upon an environmental review and evaluation of the Final DARP/EA for the *S.S Jacob Luckenbach* and Associated Mystery Oil Spills as summarized above, the Service has determined, except as noted below, that implementation of the restoration plan does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). Accordingly, an environmental impact statement is not required for this action. However, the Mouse Eradication on the Farallon Islands project is undergoing further environmental review and will be subject to a subsequent NEPA determination. In addition, the Old Growth Forest Acquisition project may receive further environmental review. The Final DARP/EA is available upon request from the Service's Sacramento Fish and Wildlife Office, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825.

Acting

Acting Manager, California/Nevada Operations Office
Authorized Official, Department of the Interior

10-31-06
Date

Attachment 1 to SS Jacob Luckenbach and Associated Mystery Oil Spills Damage Assessment and Restoration Plan/Environmental Assessment (DARP/EA) NEPA Decision Document/Finding of No Significant Impact

Each alternative project evaluated in the DARP/EA is presented below according to the wildlife group for which it is evaluated. Selected alternatives are presented in *italic*. Alternative projects not selected are presented in regular type. The rationale for selecting or rejecting the project is given. Selected projects are described as well as impacts to humans and any mitigation required.

1) Waterfowl:

Nest Protection at Kokechik Flats, Alaska

The Luckenbach Trustees selected this project because it will provide the most benefits at a relatively lower cost. The primary objective of this project is to contribute toward enforcement of a conservation easement at Kokechik Flats, Alaska. The parcel, a private in-holding within the Yukon Delta National Wildlife Refuge, is home to nesting waterfowl, Pacific loons, red-throated loons, and red phalaropes (as well as other species), all species which were impacted by the S.S. *Luckenbach* and Associated Mystery Oil spills. All-terrain vehicle riders and others have continually threatened this nesting area with disturbance. The Service, using funds from other sources, will be purchasing a conservation easement for this parcel. This project will fund educational outreach and annual enforcement of the easement for 10 years to ensure that the nesting areas are protected from disturbance. This project will enhance the National Wildlife Refuge management of the area. This proposed action is not expected to result in any significant adverse impacts. By design, human uses of this parcel will be reduced and concentrated, but these impacts are not expected to be significant, as there are alternative locations for human uses in the vicinity of Hooper Bay. (Cost: $561,631)

Nesting habitat protection via land acquisition at Yukon Flats, Alaska,
Nesting habitat protection via land acquisition near Togiak NWR,
Land protection advocacy in MacKenzie River area, Canada.

These projects were not selected in the preferred alternative to address injuries to the waterfowl group because they would provide fewer benefits at increased cost.
The Yukon Flats and Togiak NWR projects protect a relatively small number of nests, and from less imminent threats when compared to the selected project. Thus, they would provide far fewer benefits than the selected project, and at a higher cost. The MacKenzie River advocacy proposal focused on lobbying for protection, rather than achieving it with certainty. Although lobbying for protection may ultimately lead to natural resource benefits, the inherent uncertainty associated with it caused the Luckenbach Trustees to question its likelihood of success in providing benefits in the short term.

2) Loons:

Nest Protection at Kokechik Flats, Alaska

The Luckenbach Trustees selected this project because it is the only feasible project. This project was also selected for Waterfowl. Please refer to that discussion for more information on the project.

Social Attractions to re-establish Common Loon nesting in California

The Luckenbach Trustees did not select this project because it may not be technically feasible. The use of social attraction to re-establish Common Loons as a breeder in California would be an experimental project with unknown benefits. Presently, it is rare to even find Common Loons over-summering at historical nesting locations in California. The Trustees are not aware of restoration projects designed to benefit these species on their wintering grounds in California.

3) Grebes:

Grebe Colony Protection at Northern California Lakes

The nesting colony protection project is selected as the preferred project because it will provide widespread benefits at lower cost than the other project considered. This proposal would contribute funds to implement many of the recommendations of the California Grebe Management Plan, designed to protect Western and Clark's Grebe nesting colonies from human disturbance, for 10 years. These recommendations include public education and outreach, as well as the establishment of small seasonal buffers around grebe nesting colonies. The primary colonies targeted for protection are located at Clear Lake, where a pilot project is underway. Additional work will be implemented to protect colonies at other areas: Eagle Lake, Thermolito Forebay, Lake Almanor, and Tule Lake National Wildlife Refuge. There are no significant adverse impacts anticipated for other species of wildlife and habitat because this project will protect areas from human disturbance. Experience indicates that there will be only minor inconveniences to boaters and users of personal watercraft because grebe colonies will be seasonally protected by buffers that restrict boating access. However, these buffers are relatively small, extending only 50 to 100 meters from shore, and span only the length of shoreline where the colonies are located. Given the large size of these lakes, these buffers typically represent less than 1 percent of the total lake surface area. Additionally, the buffers are seasonal because they are only needed during the breeding season (primarily May through August). As such, any impacts to human use of these areas are expected not to be significant. (Cost: $965,435)

Acquisition of land around Lake Earl, California to allow for higher lake levels and increase Western Grebe nesting.

The Lake Earl project is not preferred because it provides fewer benefits at a much higher cost. Additionally, scaling calculations suggest that only a partial contribution to the project would be sufficient to compensate for the injury. However, without an additional contribution from other funds (which have not been identified), this project could not be implemented.

4) Procellarids:

Mouse Eradication on the Farallon Islands
Shearwater Colony Protection at Taiaroa Head, New Zealand

The Trustees selected Mouse Eradication of the non-native House Mouse on the Farallon Islands and the Shearwater Colony Protection project at Taiaroa Head, New Zealand as the preferred projects to address injuries to this species group. The mouse eradication project has the full support of the Farallon Islands NWR, which has already begun to plan and budget it (with some partnering funds already received), is located near the spills and will benefit the species of greatest concern (Ashy Storm-Petrel). Members of the public proposed the shearwater colony protection project in New Zealand during the public comment period. While the project is relatively small, it provides significant benefits to Sooty Shearwaters, one of the other impacted Procellarids.

Mouse Eradication on the Farallon Islands

To benefit ashy storm-petrels, the proposed project will fund efforts designed to eradicate the non-native house mouse (*Mus mustelus*) from the southeast Farallon Islands. The mice depredate ashy storm petrel eggs and chicks, and, as a forage source for a limited time, the mice support a small population of non-resident burrowing owls. Once winter rains arrive, the mouse population plummets, and burrowing owls seek other prey and depredate seabird species. The use of rodenticide bait pellets is the preferred method to eradicate and control the population of the house mouse on the southeast islands. Bait stations would be placed manually (by hand) or broadcast by helicopter at a density of about one pellet per square meter during late fall through early winter when mouse abundance declines. This coincides with the time of year when the fewest numbers of sensitive or breeding wildlife individuals would be affected (Cost: $975,597).

Potential negative impacts include incidental poisoning of non-target species and disturbance to wildlife from the personnel conducting the eradication. A number of factors contribute to the risks to non-target species including: (1) toxicology of the rodenticide, (2) bait composition and application method, (3) behavior of target species, (4) behavior of non-target species, and (5) local environmental factors. Understanding the risks associated with the use of the rodenticide allows for planning and implementation of effective measures to reduce those risks and for predicting more specifically any negative impacts. Each of these variables, among others, will be considered by the Farallon Islands NWR in project level detailed planning phase that will include additional NEPA analysis

Wildlife such as roosting seabirds and marine mammals hauled out on beaches may be temporarily disturbed during either an aerial or bait station operation. However, the operation will be timed to coincide with seasonal minimums in the number of seabirds and marine mammals on the island. The disturbance will be of very short duration, and there will always be alternative roosting/haul out location at any point in time. Therefore, any such disturbances are expected to be minor.

Should negative impacts occur, they are expected to be temporary and minor and will be offset by the long-term benefit of the removal of mice. As discussed above, any potential negative effects will be fully evaluated during the subsequent project-planning phase and related environmental analysis of this specific project.

Shearwater Colony Restoration at Taiaroa Head, New Zealand

To benefit Sooty Shearwaters, the proposed project will fund efforts to protect one of the last remaining mainland nesting colonies of Sooty Shearwaters in New Zealand. The Sooty Shearwater is the most abundant seabird in the California Current System during the summer months. However, it faces threats on its breeding grounds in New Zealand and has declined in California. The largest remaining mainland colony is at Taiaroa Head, Dunedin, which currently has about 750 pairs and is threatened by predation. This project will protect the colony by constructing a 700-meter long predator-proof fence. The fence will provide needed protection and will forestall further colony declines. Several outreach signs will be posted to prevent human disturbance as well as to educate the public regarding the importance of this conservation action.

The land is privately owned by Perry Reid and family. The Reids operate Natures Wonders Eco-tours. The Reids are conservation-minded land stewards and are willing partners in this effort to protect one of the few remaining mainland colony areas. The Reids have agreed to have the fence built on their property and would maintain the fence and give access to researchers. Although implemented by an American organization, this project will be located in New Zealand. The project will comply with all relevant New Zealand laws and includes a budget for appropriate local permits and environmental compliance. The Service defers to the determination by the government of New Zealand that this project is appropriate under its environmental laws. (Cost $55,649)

Reduction of plastic waste at sea
Rabbit eradication on Santa Clara Island, Chile
Shearwater colony protection at Isla Mocha, Chile
Other breeding habitat restoration in Chile
Habitat improvement a the Farallon Islands
Rat eradication at Northeast Titi Islands, New Zealand
Sooty shearwater burrow-cam in New Zealand
Ground-squirrel eradication at the Semidi Island, Alaska

The projects listed above were not selected for Procellarids. The other two projects to benefit Sooty Shearwaters were not selected. The rat eradication project was deemed too

large relative to the injury, while the burrow-cam was strictly an educational project that provided no direct benefits to the birds. A project intended to reduce plastic waste at sea was not selected because there is no known feasible method for achieving this. Several projects benefiting Pink-footed Shearwaters in Chile were also less preferred because this species is among the least impacted and there are feasible projects benefiting more impacted species. A project to improve nesting habitat for burrow and crevice-nesting seabirds at the Farallon Islands was not selected for feasibility concerns, as well as the fact that Cassin's Auklets are already receiving significant benefits from the Baja California project. Finally, a project to eradicate Arctic Ground-Squirrels from one or more of the Semidi Islands, Alaska, may provide an excellent opportunity for seabird restoration in the future. However, at present, the project still requires substantial investigation into its feasibility.

5) Brown Pelicans, Cormorants and Gulls:

Seabird Colony Restoration at Baja California Islands, Mexico

The Trustees selected the colony protection work on the Baja California islands as the preferred project. This project provides direct benefits to Brown Pelicans, cormorants, and gulls at their breeding grounds in Mexico, where the vast majority of California's pelicans originate. This project will contribute to on-going efforts to protect these nesting seabirds from human disturbance and non-native animals on various islands off the Pacific Coast of the Baja California Peninsula (San Martin, San Jeronimo, San Benita, Natividad, San Roque, and Asuncion). Planned actions include constructing boardwalks, trails, and other facilities to focus human traffic and prevent trampling of burrows and disturbance of nesting and roosting seabirds, education regarding the re-introduction of non-native animals, construction of nest boxes and deployment of social attraction techniques. Although implemented by an American organization (and their Mexican affiliates), this project will comply with all relevant Mexican laws.

Although there is the potential for mild soil disturbance impacts from the project activities, the Luckenbach Trustees have determined that these impacts will not be significant. Activities such as nest box and social attraction device placement, boardwalk construction, and vegetation restoration will be timed to minimize disturbance of birds.

This project also seeks to limit human disturbance near seabird colonies, but the Trustees have determined that there will be no significant human use impacts. This action will likely impact fisherman on the islands; however, alternative trails will be provided. This impact is not anticipated to be significant due to the minimal number of people that inhabit the islands and the provision of alternative trails to reach fishing locations. The project will not result in impacts to cultural resources, transportation, or health and safety.

The Mexican government, in a letter dated August 31, 2004 in connection with the Montrose Restoration Plan, has affirmed its support for actions to protect the natural resources of its islands off the Pacific Coast of Baja California. (Cost: $3,736,475)

Roost site protection in northern California
Pelican entanglement education on fishing piers in California

The Luckenbach Trustees did not select these projects because other projects will benefit these species when they are foraging and roosting in California and other oil spill trustee councils and agencies are already implementing them.

6) Western Snowy Plovers:

Dune Habitat Restoration at Point Reyes National Seashore

The Luckenbach Trustees have selected dune restoration at Point Reyes National Seashore (PRNS), California as the preferred project to address injuries to this species. This project has the full support of PRNS, which has already implemented a small but successful pilot version of this project.

In order to create more nesting habitat for snowy plovers, this project will contribute to on-going efforts to remove non-native vegetation from coastal fore dunes. Project activities include systematic removal of European beachgrass (*Ammophila arenaria*) and iceplant (*Carpobrotus edulis*) from 30 acres of dune habitat with heavy equipment, the disposal of the vegetation by burying, and follow-up maintenance efforts. The removal of the beachgrass and iceplant would facilitate recolonization by native plants and allow re-establishment of the natural processes controlling dune development. A potential impact of this project is the temporary disturbance created by implementing the project, which requires the use of heavy equipment and the presence of many personnel on the beach. However, the Luckenbach Trustees have determined that this will not be a significant impact, as implementation of the project will be timed to avoid the plover nesting season and to minimize disruption to the birds. Moreover, PRNS has previously determined that his project is categorically exempt under its NEPA regulations. (Cost: $501,447)

Corvid Management at Point Reyes National Seashore

This project is not selected as the preferred alternative for Snowy Plovers because the National Park Service is implementing it using other funds.

7) Other Shorebirds:

Nest Protection at Kokechick Flats, Alaska

The Trustees did not specifically research or select a restoration project for this species group because it will benefit substantially from the restoration project providing benefits for waterfowl and loons. The project is described in the loon section above.

8) Common Murres:

The Trustees have selected three projects as preferred. The murre colony protection project will provide the most benefits, protecting several of the largest colonies in the state from human disturbances. The corvid management program at Point Reyes, consisting primarily of implementing land use changes at ranches at Point Reyes National Seashore, will protect an important murre colony from excessive depredation by ravens. Finally, funding for a portion of this project is expected pursuant to a pending settlement of another oil spill case. This proposal will contribute the remaining funds needed to allow the project to be implemented.

Corvid Management at Point Reyes National Seashore

The intent of this project is to improve nesting success of common murres *(Uria aalge)* at the Point Reyes Headlands by implementing a suite of land management actions designed to reduce raven populations at Point Reyes National Seashore. Dairy and beef production operations in the area provide unnatural forage opportunities for ravens when they feed on cattle feed and carcasses, resulting in high numbers of raven populations near common murre colonies. This leads to increased predation of murre nests by these opportunistic corvids. A key component of this project targets modification of land use management at dairy and beef ranches. Participating ranchers will be compensated for changes in land use practices that would impact their farming operations. Another component of the project includes elimination of a key raven roosting area. If subsequently determined by Point Peyes National Seashore to be necessary, the project may include removal of certain resident ravens known to specialize in predation of the murre colony.

This proposed action is not expected to result in any significant adverse impacts. If the project subsequently includes removal of ravens, it is given that ravens are abundant in California and this small-scale removal will not adversely impact any regional raven populations. Because ravens are protected under the Migratory Bird Treaty Act, appropriate permits from the USFWS Migratory Bird Permit Office are required prior to any raven removal. (Cost: $500,000.)

Common Murre Colony Protection along the Central California Coast

This project will provide funds to extend a current program for 20 additional years to protect common murre nesting colonies off the coast of central California from human disturbance. This program includes education and outreach to pilots, boaters, and others regarding the location and sensitivity of nesting colonies, as well as maintaining seasonal warning buoys in the vicinity of the colonies. The colonies included in this project are located from Point Reyes south to the coast of Big Sur, including the Farallon Islands.

This proposed action is not expected to result in significant adverse impacts. The restriction of recreational activities around sensitive areas may be perceived by some to limit the enjoyment and scope of the public's recreational experience. However, given the small number of seabird colonies in the region and the limited nesting season, the

actual size and time of any restriction is expected to be minimal. Wherever these colonies are located, there exist similar recreational opportunities nearby that do not have seabird colonies and that may be utilized by anglers, kayakers, and other ocean users. Signs used in any of the above projects will be carefully designed and placed so as not to detract from the natural aesthetics of any area. (Cost: $9,526,603)

Reading Rock Common Murre Colony Restoration

This project will contribute funds to a project initiated as a pilot designed to re-establish a nearly-extirpated colony of common murre at Reading Rock in Humboldt County, California. Social attraction techniques will be used to attract birds back to the colony. The project will also fund education and public outreach efforts to minimize human disturbance of the murre colony site.

This proposed action is not expected to result in any significant adverse impacts. The restriction of recreational activities around sensitive areas may be perceived by some to limit the enjoyment and scope of the public's recreational experience. However, given the small number of seabird colonies in the region and the limited nesting season, the actual size and time of any restrictions is expected to be minimal. Wherever these colonies are located, there exist similar recreational opportunities nearby that do not have seabird colonies and that may be utilized by anglers, kayakers, and other ocean users. Signs used in any of the above projects will be carefully designed and placed so as not to detract from the natural aesthetics of any area. (Cost: $225,307)

Land Acquisition at Cape Viscaino
Extending Devil's Slide Rock Murre Restoration Project

These projects are not preferred. The feasibility of land acquisition at Cape Viscaino is uncertain. Moreover, at present those colonies are increasing and are not threatened with development. The Devil's Slide Rock project, created and funded from damages collected as a result of the *Apex Houston* oil spill, has been successful and needs little additional work.

9) Marbled Murrelets:

Old Growth Forest Acquisition and Protection
Corvid Management in the Santa Cruz Mountains

The Trustees have selected two projects as preferred: The corvid management program will extend a current project with limited funds, and the old growth acquisition project will seek to protect important murrelet nesting habitat. Both of these projects are identified by experts as critical to the survival of the species in central California.

Old Growth Forest Acquisition and Protection

This project involves setting aside funds to acquire and manage critical old-growth forest parcels that are: 1) currently at risk of logging or other development; 2) known to contain nesting marbled murrelets; and 3) located in the Santa Cruz Mountains. Because land may only be acquired from a willing seller, and such opportunities are limited and difficult to predict, funds will be held for a period of 5 years, awaiting an opportunity to acquire threatened habitat. This project will benefit marbled murrelets which depend on old-growth forest habitat for nesting.

This proposed action is not expected to result in any significant adverse impacts. Given that only parcels currently in private hands will be considered, there are currently no public uses and thus there will be limited adverse impacts to recreational uses. However, when a specific parcel(s) is identified, depending on the circumstances, further environmental analysis may be undertaken. (Cost: $1,745,000)

Corvid Management in the Santa Cruz Mountains

This project will benefit and improve marbled murrelet nesting success by contributing funds to continue and support on-going corvid management efforts in various state and county parks in the Santa Cruz Mountains for 5 years. Corvid populations are high in areas where human food waste is readily accessible. This leads to increased predation of murrelet nests by corvids. The program endorses management efforts which include education of park campers and visitors regarding control of food waste, improved garbage facilities, limited shooting of ravens, and outreach to nearby communities where food waste may support artificially high corvid numbers.

This project may have direct impacts upon campers and jays, ravens, and possibly other animals that scavenge food waste at four campground areas. However, this project is not expected to result in any significant adverse impacts.

Campers may experience more rules and restrictions upon their food management and may be subject to an enforcement action should they fail to comply. Although this may inconvenience some campers, such measures are commonplace in campgrounds where bears pose a threat to campers (e.g., Yosemite National Park, Redwood National Park, and Olympic National Park) and do not impact abundance of or access to recreational opportunities. Because locations with bear problems are popular camping destinations, most campers are accustomed to dealing with the inconveniences associated with food management restrictions. As it is most effective to address the root causes of raven predation pressure rather than to simply remove ravens, efforts to control anthropogenic food sources are critical in the long term (Goodrich and Buskirk 1995). (Cost: $695,363)

Silviculture of second growth forest to create nesting habitat
Captive breeding
Artificial nest platforms

The silviculture project was not selected because it would not begin to provide benefits for over a hundred years. By this time, much other second-growth habitat, already in conservation hands, should be suitable for murrelet nesting. Captive breeding and a project to create artificial nest platforms were not selected because these actions have never been done with this species and have large feasibility concerns.

10) Other Alcids:

The Trustees have selected one project that will benefit Ancient Murrelets, one that will benefit Cassin's Auklets, and one that will benefit Rhinoceros Auklets.

Ancient Murrelets

Rat Eradication in the Queen Charlotte Islands, Canada

For Ancient Murrelets, the Ellen and Bischof Islands project was compared with the other projects from Canada and Alaska, all of which were proposed for the Trustees by outside experts conducting a restoration planning study. Ellen Island and Bischof Islands were selected because of their ease of access for implementation and monitoring, opportunities for partnership in monitoring from Gwaii Haanas National Park Reserve rangers, relatively low cost and because each alone is too small to provide sufficient benefits. Additionally, because of their proximity, cost-savings will be realized by implementing them together.

This project will fund eradication efforts of non-native Norway rats (*Rattus norvegicus*) from Ellen Island and the Bischof Islands, part of the Queen Charlotte Islands, off the coast of British Columbia, Canada. Removal of the rats would benefit nesting ancient murrelets (*Synthliboramphus antiquus*). Norway rats are predators of murrelet eggs and chicks and have seriously depressed (or completely eradicated) seabirds on many of their nesting islands.

This proposed action is not expected to result in any significant adverse impacts. In a letter dated, April 4, 2006 and included in Appendix O of the DARP/EA the Canadian government, through its National Parks agency, has endorsed this project. Because of the small size of these islands and because bait boxes specially targeted for rats will be used, there is little risk of impacting non-target species. Other species will have difficulty accessing the poison bait, and past experience has shown that most of the rats die in their burrows. Thus, no adverse impacts are anticipated.

Although implemented by an American company (with Canadian partners), this project will be located at several relatively remote islands within the Queen Charlotte Islands, Canada. The islands are all part of the Gwaii Haanas National Park Reserve. The project will comply with all applicable Canadian laws. (Cost: $188,405.)

Saunders Island (Canada) raccoon eradication
Murchison and Faraday Islands (Canada) rat eradication
Rat Island (Alaska) rat eradication
Langara Island (Canada) rat quarantine project

The Murchison/Faraday and Rat Island projects are quite large and expensive and exceed what is necessary to compensate for the injury from the spills. After a site visit, the Saunders Island project was ruled out because the risk of re-colonization by raccoons is high and monitoring the island is difficult due to its remote location. The Langara Island project aims to protect an earlier rat eradication project by installing quarantine measures to prevent reintroduction of rats. This project was less-preferred because it stands a higher chance of obtaining alternative funding

Rhinoceros Auklets

Nesting Habitat Restoration on Ano Nuevo Island

Because Rhinoceros Auklets nest at only a few sites in California, restoration options within the state are limited. The Trustees have been aware of the ongoing restoration efforts for this species at Año Nuevo Island, which is located in the middle of the oil spill zone. Since this project meets all threshold and selection criteria and no other viable projects are known, the Luckenbach Trustees did not seek out alternative projects for this species.

This project will contribute to on-going native vegetation restoration efforts on Año Nuevo Island, off the central California coast. The goal of this project is to restore low-lying vegetation cover to the central part of the island, prevent erosion, and thereby support rhinoceros auklets, which nest in burrows on the island.

This proposed project is not expected to result in significant adverse impacts.
(Cost: $974,037.)

Cassin's Auklets

Seabird Colony Restoration at Baja California Islands

The Luckenbach Trustees conclude that the Baja California islands project selected for pelicans, cormorants and gulls also provides sufficient compensation for Cassin's Auklets and is the most cost effective.

Habitat improvements at the Farallon Islands

The Farallon Island project, while benefiting Cassin's Auklets, does not provide sufficient restoration to address the degree of injury.

11) California Sea Otters:

Sea Otter Pathogens Education and Outreach

This project will fund an education and outreach project in the Monterey Bay region to inform the public about threats posed to sea otters by various human activities. Recent scientific research found that the current decline in California's sea otters is a result of pathogens that enter the water through human and domestic animal feces. The project will suggest changes in how people manage pets and livestock wastes, as well as boat and home septic tank systems.

The Trustees selected this project because it addresses the leading anthropogenic cause of otter mortality, and thus one of the primary factors impacting Sea Otter recovery. Many of the problems with fishing gear entanglement have already been addressed in recent years through new restrictions on commercial fishing activities in Monterey Bay and elsewhere.

Because this is an education and outreach project that relies upon voluntary actions by the public to reduce pollution, this proposed action is not expected to result in any significant adverse impacts. (Cost: $121,155)