

RESTORATION PLANNING WORKING GROUP  
EXXON VALDEZ OIL SPILL OFFICE  
645 "G" STREET  
ANCHORAGE, ALASKA 99501

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MEMORANDUM

TO: RPWG Members DATE: November 30, 1992  
THROUGH: John Strand, Chairman  
FROM: Veronica Gilbert  
Mark Fraker  
SUBJECT: Cost

In this memo we describe a methodology for developing cost estimates for the options evaluation process. At the end of the memo we ask for your help in refining the proposed methodology and the cost estimates themselves. We need your contribution no later than noon, Friday, December 4 because the EIS contractors require this information as soon as possible.

Our best estimates of the cost of restoration options are contained in the attached spreadsheet. The source of these estimates is the compendium of options summaries published on the network. We have taken pains to retrace the genesis of these options from their first drafts early last summer to the latest combinations.

The spreadsheet includes 40 options and suboptions. Each option or suboption is assigned an annual cost and duration in years. These attributes are expressed as the expected value (or mean), lower range, and upper range. Total cost is computed by multiplying annual cost by duration.

We would like to discuss in some detail our methodology for presenting options and suboptions, estimates of annual cost, and estimates of duration; and mention a note on units of measurement. Then we specify the information we need from you, indicating the RPWG member responsible for writing the option summary. Finally, we describe the next steps and schedule for completing this task.

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I. Options and Suboptions

- A. The spreadsheet addresses 40 options and suboptions.
- B. Thirty-four (34) of the options are those RPWG has been considering for months.
- C. Option 28 (Acquisition of access) has been incorporated into option 37 (Purchase private land) and renamed "Habitat Protection and Acquisition" at the request of the Habitat Protection Work Group.
- D. Two new options for subsistence have been included at ADFG's request. We have assigned them numbers 41.0 and 42.0.
  - 41.0 Subsistence mariculture
  - 42.0 Access to new subsistence resources
- E. On the last page of the spreadsheet we have listed four programmatic options, which probably won't vary across alternatives. However, because they represent substantial amounts of money and there appears to be substantial interest in them, their costs should be estimated.
  - P1. Administration
  - P2. Monitoring
  - P3. Education/public information
  - P4. Agency management
- F. Because Options 40.0 (Special designations), P3 (Education/Public Information), and P4 (Agency Management) now consist of a combination of many older options for which cost had been estimated, we retained the detail of earlier components so the reviewers could determine which of the earlier estimates are still valid. However, this level of detail need not be retained in the final report.

II. Annual Cost

- A. Expected value of annual cost = mean of lower and upper cost estimates. However, in some cases it is derived from multi-year estimates, e.g. \$120,000 over 3 years = \$40,000/year.) In actuality most of the money may be needed in the first year and less in subsequent years. This level of refinement will be tackled in the annual work plans.
- B. We have separated initial costs from continuation costs and addressed each on a separate line underneath the name of the option or suboption. For example, construction is separated from maintenance [see option 12.1], planning and designation from implementation [see option 40.0], and start-up from continuation [see options 16.1 and 16.2]. In this way we can easily differentiate the duration and total cost of the initial part of a project from the duration and cost of its continuation.

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### III. Duration

- A. Some of the options summaries specify a limited duration, e.g., 5 years. Others imply ongoing activities, e.g., 1.1 (Archaeological site stewardship program) and P4 (Agency management). Still others state that the project will continue until the resource recovers.
- B. Unless the option summary indicates a specific number of years we have set the expected value of the duration of the option at "1 year." Please specify otherwise if you have better information. The lower- and upper-range columns are to be used to express uncertainty.
- C. For those projects whose duration depends on recovery of species we intend to use the figures Karen Klinge is gathering for each option through her telephone surveys of peer reviewers.

### IV. Units of Measurement

#### A. Costs

- 1. All costs are expressed in units of \$1,000.
- 2. For simplicity, all costs are expressed in 1993 dollars with a note that the present value of the settlement is about \$600 million. The alternative is to estimate a start date of each project and project future costs using an average rate of inflation of about 4%. We thought the simpler method we have recommended is sufficient provided everyone thinks in terms of \$600 million instead of \$1 billion.
- 3. We had discussed the possibility of expressing costs in broad categories, e.g., up to \$250.0, \$250.0-\$500.0, \$500.0-\$1,000.0, etc. However, of the 40 options and suboptions being considered, we have at least partial estimates for 30. Some of these estimates appear to be expressed as an order of magnitude, e.g., \$250.0-\$300.0; others are quite precise, e.g., \$143.8. Through its inclusion of lower and upper ranges for both annual costs and duration, the spreadsheet gives ample latitude to express cost as a broad category. We do not propose to standardize the cost categories that could be selected.
- 4. Cost estimates for only two of the options are expressed per unit, specifically, 17.1 (COST PER ISLAND) and 40.0 (Modify management plans and policies - COST PER PLAN). This convention is used only because the options summary estimated cost per unit. However, this measure of cost can only be used if the peer reviewers assess the effectiveness of the options using the same unit of measurement.

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B. Duration

1. Duration is in years. If partial years are specified the figure is rounded up to the nearest whole number.
2. The options summaries expressed no estimates for lower and upper ranges of duration. However, for ease of computation we copied the expected value of duration into cells for lower and upper ranges whenever lower and upper ranges of annual cost were expressed. The expected value of total cost could then be computed as the expected value of annual cost times expected value of duration; lower range of total cost could be computed as the lower value of annual cost times the lower value of duration; etc. As we refine this spreadsheet with more informed estimates of both cost and duration we expect the values for lower and upper ranges to become more meaningful.

Requests of RPWG Members

We need the following contributions from RPWG members:

1. Please review the proposed methodology and submit comments to Veronica.
2. Please fill in the blanks and, if necessary, modify old information for each of the options summaries for which you were responsible. To jog your memory, we have noted on the far right of the attached spreadsheet the name of the staff primarily responsible for each options summary. Because no one had been closely associated with P1 (Administration) it has been assigned to Veronica.

Unfortunately, we need your contributions by noon Friday, December 4 because the EIS contractors need this information by then.

Next Steps

During the week of December 7 we plan to submit this methodology to peer review. During the week of December 14 we plan to make final changes in the cost element and submit it to us all for use in the options evaluation process. We will then depart for the holidays with a clear conscience.

Thank you.

Attachment

Option	Description	Annual Cost			Duration (Yrs.)			Total Cost		
		Exp	Lower	Upper	Exp	Lower	Upper	Exp	Lower	Upper
1.1	Archaeological site stewardship program	135.0			1			135.0		
2.0	Fish management plans - pink salmon	4,043.0			4			16172.0		
2.0	Fish management plans - sockeye salmon	813.0			5			4065.0		
2.0	Fish management plans - dolly varden/cutthroat trout	236.0			4			944.0		
2.0	Fish management plans - pacific herring	456.6			4			1826.4		
2.0	Fish management plans - rockfish	593.0			4			2372.0		
4.3	Reduce disturbance at marine bird colonies, marine mammal haul-out sites and rubbing beaches.									
8.1	Temporarily restrict or close harvests of injured species.				1					
8.2	Educate public to encourage voluntary reductions of subsistence harvest levels.	143.8			1			143.8		
8.3	Educate public to encourage voluntary reductions of sport harvest and trapping levels.									
9.0	Minimize incidental take of marine birds by commercial fisheries.	275.0	250.0	300.0	1	1	1	275.0	250.0	300.0
10.0	Preservation of archaeological sites and artifacts.	300.0			3			900.0		
11.1	Supplement fry production using such methods as egg boxes and net pens for fry rearing.	579.0			6			3474.0		
11.2	Improve access to spawning areas (e.g., fish passes, remove barriers).	481.0			3			1443.0		
11.3	Improve spawning and rearing habitat (e.g., create spawning channels, add woody debris, improve substrate, lake fertilization).	800.0			6			4800.0		
12.1	Construct new public recreation facilities. 1) Construction 2) Maintenance									
12.2	Planning for and marketing public land for new commercial facilities.									
13.0	Eliminate sources of persistent contamination from mussel beds.	<sup>491</sup> <del>344.8</del>	340	641	<sup>5</sup> <del>2</del>	4	7	<sup>2655</sup> <del>680.6</del>	1837	3465
14.0	Accelerate recovery of upper intertidal zone.	156.2			2			312.4		
15.0	Supplement intertidal substrates for spawning herring.	256.0			5			1280.0		

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\* First two years directed to testing feasibility; latter three years are for implementation.  
 It is furthermore assumed that this approach will be used sparingly, e.g. at 15-25 most severely impacted, slowest recovering, and most biologically valuable areas in spill zone.

Option	Description	Annual Cost			Duration (Yrs.)			Total Cost**		
		Exp	Lower	Upper	Exp	Lower	Upper	Exp	Lower	Upper
1.1	Archaeological site stewardship program	135.0			1			135.0		
2.0	Fish management plans - pink salmon	4,043.0			4			16172.0		
2.0	Fish management plans - sockeye salmon	813.0			5			4065.0		
2.0	Fish management plans - dolly varden/cutthroat trout	236.0			4			944.0		
2.0	Fish management plans - pacific herring	456.6			4			1826.4		
2.0	Fish management plans - rockfish	593.0			4			2372.0		
4.3	Reduce disturbance at marine bird colonies, marine mammal haul-out sites and rubbing beaches.									
8.1	Temporarily restrict or close harvests of injured species.				1					
8.2	Educate public to encourage voluntary reductions of subsistence harvest levels.	143.8			1			143.8		
8.3	Educate public to encourage voluntary reductions of sport harvest and trapping levels.									
9.0	Minimize incidental take of marine birds by commercial fisheries.	275.0	250.0	300.0	1	1	1	275.0	250.0	300.0
10.0	Preservation of archaeological sites and artifacts.	300.0			3			900.0		
11.1	Supplement fry production using such methods as egg boxes and net pens for fry rearing.	579.0			6			3474.0		
11.2	Improve access to spawning areas (e.g., fish passes, remove barriers).	481.0			3			1443.0		
11.3	Improve spawning and rearing habitat (e.g., create spawning channels, add woody debris, improve substrate, lake fertilization).	800.0			6			4800.0		
12.1	Construct new public recreation facilities. 1) Construction 2) Maintenance									
12.2	Planning for and marketing public land for new commercial facilities.									
13.0	Eliminate sources of persistent contamination from mussel beds.	344.8			2			689.6		
14.0	Accelerate recovery of upper intertidal zone.*	<del>150</del> 156.2	100	200	5 <del>2</del>	4	7	<del>810</del> 332.4	540	1078
15.0	Supplement intertidal substrates for spawning herring.	256.0			5			1280.0		

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\* First two years directed to testing feasibility; latter three years are for implementation.  
 \*\* It is further assumed that approach will be used sparingly, e.g. at 3-5 most severely damaged areas, slowest recovering, and most biologically valuable areas in spill zone  
 NB: All costs are expressed in units of \$1,000 (1993 \$). The present value of the settlement is about \$600 million.

\*\* based on 40% inflation rate

Option	Description	Annual Cost			Duration (Yrs.)			Total Cost		
		Exp	Lower	Upper	Exp	Lower	Upper	Exp	Lower	Upper
16.1	Restore murre productivity through enhancing social stimuli.									
	1) Initial year	250.0			1			250.0		
	2) Continuation	150.0								
16.2	Restore murre productivity through improving physical characteristics									
	1) Initial year	250.0			1			250.0		
	2) Continuation	150.0								
17.1	Eliminate introduced foxes from islands important to nesting birds. COST PER ISLAND	140.0			5			700.0		
17.2	Reduce predator access to seabird colonies.									
	1) Initial year	350.0			1			350.0		
	2) Continuation	150.0								
18.1	Establish additional hatchery runs.	784.0			1			784.0		
18.2	Transplant hatchery-reared fish to depleted areas.	472.0			2			944.0		
18.3	Use wild egg takes from noninjured streams.	615.0			1			615.0		
19.0	Update and expand the state's Anadromous Stream Catalogue.	259.0			1			259.0		
30.0	Test subsistence foods for hydrocarbon contamination.	100.0			1			100.0		
33.2	Visitor center									
36.0	Marine environmental institute									
35.0	Identify institutions and individuals with artifacts from the spill area and offer to purchase specific pieces for the public.	225.0	150.0	300.0	3	3	3	675.0	450.0	900.0
37.0	Habitat protection and acquisition									

Karen

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Carol

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Mark/Chris



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NB: All costs are expressed in units of \$1,000 (1993 \$). The present value of the settlement is about \$600 million.

Option	Description	Annual Cost			Duration (Yrs.)			Total Cost		
		Exp	Lower	Upper	Exp	Lower	Upper	Exp	Lower	Upper
40.0	Special designations									
	1) Designate the Nellie Juan-College Fjord Wilderness area as				1					
	2) Designate a portion of the Chugach National Forest as a National Recreation Area				1					
	3) Designate new Alaska State Parks	22.3	8.0	36.7	3	3	3	67.0	24.0	110.0
	Implement park management plan and enforce regulations	60.0								
	4) Designate new ADFG special areas	35.0			2			70.0		
	Implement special area management plan and enforce regulations	12.0								
	5) Designate National Marine Sanctuary	166.7			3			500.1		
	6) Designate National Estuarine Reserves									
	7) Modify management plans and policies COST PER PLAN	125.0	50.0	200.0	2	2	2	250.0	100.0	400.0
	8) Designate National Estuarine Research Reserve Sites	33.3			2			66.7		
	Subtotal	454.4								
41.0	Subsistence mariculture	589.0			4			2356.0		
42.0	Access to new subsistence resources	53.0			3			159.0		
P1	Administration									
P2	Monitoring									
	1) Design <i>phase 2 (beyond technical protocols)</i>	250.0			1			250.0		
	2) Implement	5000	4000	6000	10	10	10	46061	36848	47382
P3	Education/public information									
	1) Archaeology resource protection - expand public education efforts	150.0	100.0	200.0	1			150.0		
	2) Educate tour- and charter-boat operators about the need for, and ways to decrease disturbance near sensitive marine bird and mammal use	40.0	30.0	50.0	1	1	1	40.0	30.0	50.0
	3) Use public education to encourage conservation for sport-fishing	20.0	15.0	25.0	2	2	2	40.0	30.0	50.0
	4) Educate public about minimizing their impacts on recovering	25.0			2			50.0		
	5) Develop program to provide and distribute updated information and educational products	100.0			1			100.0		
	Subtotal	335.0								

Chris/Sandy

Mark/Chris



Veronica

John

Sandy

\* assumes 8-year program with first implementation in 1994. Program could be extended beyond life of settlement by establishing an endowment. Intensity of program would then depend on size of endowment and available annual support.

\*\* based on 4% inflation rate

MB: All costs are expressed in units of \$1,000 (1993 \$). The present value of the settlement is about \$600 million.



Option	Description	Annual Cost			Duration (Yrs.)			Total Cost		
		Exp	Lower	Upper	Exp	Lower	Upper	Exp	Lower	Upper
P4	Agency management									
	1) Archaeology resource protection	390.0			1			390.0		
	2) Increase field presence of trustee agencies to enforce federal and state laws designed to reduce disturbance at marine bird colonies, marine mammal haul-out areas, and rubbing beaches .	438.0	390.0	486.0	1			438.0		
	3) Increase field presence of management agencies within the affected	438.0	390.0	486.0	1			438.0		
	Subtotal	1,266.0								

*Karen*

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HB: All costs are expressed in units of \$1,000 (1993 \$). The present value of the settlement is about \$600 million.

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**II. Injured Resources and Services**

**B. Conclusions - Subsistence**

**SUMMARY**

Surveys conducted by the State of Alaska before the spill and in 1990 indicated that subsistence use in the oil spill area was significantly reduced in 1989, primarily because of concern for potential health effects associated with use of contaminated resources. While subsistence harvests increased in some Native communities (Ouzinkie, Port Graham, English Bay, Larsen Bay, Karluk) in 1990 and 1991, other Native communities (Cherega, Tititlek) continued below average harvests. Warnings were issued by the State in 1989 for subsistence users to avoid consumption of intertidal invertebrates (mussels and clams) found along shorelines contaminated by oil. Based upon chemical analyses of a wide spectrum of subsistence resources (fish, shellfish, deer, ducks, marine mammals), most resources (with the exception of some mussels and clams) were determined to be safe for human consumption.

Proposed restoration options addresses the need to restore the confidence of subsistence hunters and fishers in the safety of subsistence resources within the oil spill area. Testing subsistence foods for residual petroleum hydrocarbons is designed to identify traditional subsistence areas still contaminated as well as measuring residual hydrocarbon levels in individual subsistence resources. Proposed restoration also assumes that recovery will be gradual and that there is a need to exploit alternative subsistence resources, either by providing access to subsistence areas not impacted by the spill, or by providing assistance in the development of totally new subsistence resources (Pacific oyster). Finally, a restoration option to develop voluntary reductions in subsistence harvests is proposed. While the duration of the proposed program will depend on the rate of recovery of subsistence services, costs associated with a 10-year program are \$2,306,000.

**INJURY**

The Division of Subsistence, Alaska Department of Fish and Game determined before the *Exxon Valdez* oil spill, that the 15 Native Alaskan communities (with about 2200 people) of Prince William Sound, Lower Cook Inlet and the Alaska Peninsula relied almost exclusively on subsistence resources. These were fish including salmon, halibut, rockfish and Dolly Varden; marine invertebrates such as clams, crabs, and octopus; marine mammals (harbor seals and sea lions); land mammals such as deer (Prince William Sound and Kodiak Island), black bear and goats (Prince William Sound and

Lower Kenai Peninsula): birds including ptarmigan, waterfowl, and gulls eggs; and wild plants. The mean number of resources used per household ranged from 10 to 25, and generally every household participated in subsistence harvests. The per capita subsistence harvest ranged from nearly 200 pounds to over 600 pounds per year.

In the first year (April 1989 to March 1990) following the spill, subsistence harvests of fish and wildlife in 10 of these villages (Chenega Bay, Tatitlek, English Bay, Port Graham, Karluk, Old Harbor, Ouzinkie, Port Lions, Chignik Lagoon) declined from 14 to 77% compared to pre-spill averages (Fall 1991). The reasons for this decline varied among communities, households, and resources, but most dealt with the real or perceived consequences of the oil spill, especially the concern for potential health effects as a result of consuming subsistence resources from the spill area.

An Oil Spill Health Task Force (OSHTF) determined the safety of using subsistence foods from the spill area. Chemical analytical studies conducted by the U.S. Food and Drug Administration (ADHSS 1989a) and the National Oceanic and Atmospheric Administration (Varanasi et al. 1990) measured levels of polycyclic aromatic hydrocarbons (PAHs) in the bile and edible tissues of subsistence foods. These studies found that most resources tested (fish, shellfish, deer, ducks, marine mammals) contained no or very low levels of PAHs, and eating foods with those levels posed no health risk. Some samples of shellfish, however, had unacceptably high levels of PAHs prompting the OSHTF to conclude that shellfish "should not be collected from obviously oil-contaminated areas (ADHSS 1989b)."

## RECOVERY

In the second year following the spill (April 1990 to March 1991), Hall (1992) determined that the per capita harvest of subsistence resources in Chenega remained unchanged (143.1 lbs). In Tatitlek, the per capita harvest was even lower (155.2 lbs) than the 214.5 lbs reported the previous year. In contrast, five other villages studied during the second year showed an increased subsistence harvest. At English Bay, the per capita harvest was 181.1 pounds during the second year compared to 141.0 lbs for the first post-spill year. Ouzinkie's per capita harvest increased to 204.9 pounds per person from a low of 88.8 pounds per person, but this was significantly below the pre-spill baseline of 402.8 pounds per person. In Port Graham, the harvest increased from 122.0 pounds in 1989 to 213.5 lbs, essentially the pre-spill harvest level. The Larsen Bay harvest also increased significantly from 209.0 lbs to 340 lbs, but is still below the pre-spill level of 403.5 lbs. Karluk's harvest of 395.2 lbs in 1990-1991 essentially matched the 385.2 pound harvest of 1986. This was substantially lower than an 1982-1983 estimate of 863.0 lbs.

The finding that subsistence harvests had increased in five villages during the 1990-1991 timeframe suggested a renewed confidence in using some subsistence resources. However, the continued very low levels of harvest at Chenega Bay and Tatitlek, the continued below average harvests at English Bay and Ouzinkie, and the continued concern in some households in all seven villages that some subsistence foods remained unsafe to eat, suggested that the injury persisted through the second year following the spill (Hall 1992).

While comparable data are not available for the period April 1991 to the present, it is not believed that subsistence harvests have returned to pre-spill averages in all affected native communities, especially Chenega Bay and Tatitlek. Concern over potential long-term health effects of consuming resources from the spill area, a loss of confidence on the part of subsistence hunters and fishers in their abilities to determine if traditional foods are safe to eat, and the real or perceived reduction in available resources, are all factors likely to affect recovery of subsistence use.

**RESTORATION OPTIONS** (For detailed description of applicable restoration options, see Appendix A).

### **30A - Test Subsistence Foods for Residual Hydrocarbon Contamination**

This option is designed to restore the confidence of subsistence hunters and fishers in the safety of subsistence resources within the spill area. Samples of mussels, clams, rockfish and other resources will be collected from the harvest areas of 16 locations (Chenega, Tatitlek, English Bay [Nanwalek], Port Graham, Ahkiok, Karluk, Oil Harbor, Ouzinkie, Port lions, Chignik Lagoon, Kodiak City, Cordova, Valdez, Seldovia, Kenai, and Seward). Community representatives will assist in site selection, as well as collection of samples. Additionally, bile and blubber samples will be taken from five seals harvested by subsistence hunters in Prince William Sound. The samples will be analyzed for residual petroleum hydrocarbons. The results of these tests, along with the findings of other damage assessment and restoration studies, will be interpreted by the OSHTF, and reported to the communities in an informational letter and community visits.

Sample collection, chemical analysis, and interpretation of results will take three years to implement and cost approximately \$1,000,000. At the end of this period, the degree of recovery of the resources, as well as the subsistence economy, will be evaluated to determine if the program should continue. The confidence of the subsistence users in the safety of subsistence foods is likely to lag behind the recovery of individual resources to some extent.

### **30B - Provide Access to Alternative Subsistence Foods**

The goal of this option is to minimize interruption of subsistence activities at those native communities most affected by the oil spill. As a result of the oil spill, some resource populations have declined, while others (especially shellfish) continue to be chronically contaminated by persistent pockets of buried oil. This project will provide funds for subsistence hunters from Chenega to travel to eastern Prince William Sound to harvest traditional subsistence resources not injured or contaminated by the oil spill. Funding also would be provided to facilitate subsistence hunters in other native communities (Tatitlek) to assist the Chenegans by gathering, preserving and forwarding subsistence foods to Chenega. This support will continue until the resources in the subsistence area traditionally used by the Chenegans are no longer contaminated by oil, the resource populations have recovered to pre-spill levels, or the native community is no longer concerned that their traditional foods are contaminated. Cost to implement this option is \$50,000 per year or \$500,000 over a 10-year duration.

### **30C - Develop Shellfish Mariculture in Impacted Subsistence Areas**

This program will provide the villages of Chenega, Tatitlek, Port Graham, English Bay, Ouzinkie, and Ahkiok with a means to develop an alternative bivalve resource for both subsistence and commercial harvest. The basic strategy for the village mariculture program is to initially concentrate on oyster culture, and subsequently test the feasibility of establishing clam and scallop mariculture.

Tititlek, Eyak and Chenega Bay already have begun to develop oyster culture. Seed of Pacific oyster has been obtained from Washington and Oregon, and excellent growth rates have been achieved with bag and net culture techniques in eastern Prince William Sound. A good market exists for oysters grown in Alaska, and oysters have proven to be an acceptable substitute for local subsistence shellfish species (oysters are not native to Alaska).

For those villages already permitted (Eyak, Tatitlek, Chenega), settlement funds will be used to establish new oyster culture operations or increase existing operations to commercial production levels. A mariculture specialist will be hired to organize village operations, help initiate and sustain a training program, and prepare and implement mariculture development plans. For those villages without permits (Port Graham, English Bay, Ouzinkie, Ahkiok), initial efforts will focus on identification of potential culture sites and the development of permit applications. Activities in ensuing years will include preparation of mariculture development plans, training, establishing production, and development of markets.

The bulk of costs for this program is associated with developing a mariculture management structure in each village and training

village residents in mariculture techniques. The intent is to develop a self-sustaining program in three years at a cost of \$600,000.

### **30D - Bivalve Shellfish Hatchery Research Center**

The initial objective of this program is to assess the feasibility of establishing a shellfish hatchery and mariculture technical center in the oil spill area to restore, replace or enhance injured bivalve shellfish populations. This is a paper study designed to identify which shellfish species best lend themselves to hatchery propagation, what types of facilities will be required, what potential uses will be served, where will they be sited, and what are the potential benefits and associated costs. A consultant with both biological and engineering background will be hired to conduct the feasibility analysis. Costs of this one-year project are estimated to be \$56,000. Native communities and organizations in the affected area are expected to participate in the design and conduct of the feasibility project.

### **8B - Implement a Cooperative Program for Developing Voluntary Subsistence Harvest Reductions**

This option provides a means for agency biologists and subsistence users to cooperatively assess the need for voluntary harvest reductions. Harvest reductions, if necessary, will serve to enhance the rate of recovery of injured species (fish, marine mammals and birds) by reducing harvest pressures. As a result, subsistence harvest and other services dependent on target species also will benefit in the long-term.

Funding from the settlement will be used to pay for biologists travel to subsistence areas and facilitate meetings with subsistence users to discuss the status of recovery for important subsistence resources injured by the oil spill. Funding also will be used to reimburse subsistence hunters and fishers for assistance provided in collecting relevant biological information or samples. If it was agreed that an injured species was being over harvested, biologists and subsistence users will determine voluntary reductions in subsistence harvests, which will remain in effect until populations had recovered from oil spill injuries. If harvest levels were reduced, funding also will be provided to facilitate exploitation of alternative sources of traditional foods.

It is anticipated that this option will be implemented at six sites (Chenega, Tatitlek, Port Graham, Nanwalker, Ouzinkie, Ahkiok) within the oil spill area and will continue for 10 years or until recovery. At an annual cost of \$15,000, the total cost is \$150,000.

## References

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1 September 23, 1992  
OPTION

4 INJURED RESOURCES AND SERVICES

5  
6 SUMMARY

7  
8 (Shorten, if possible)

9  
10 SUBOPTION

11  
12 DESCRIPTION

13  
14 (Include as appropriate: implementation actions, time needed to  
15 implement and other information needed to describe the suboption.)

16  
17 MEANS AND POTENTIAL TO IMPROVE RECOVERY

18  
19 (Merge these sections to be a "user-friendly" discussion of the  
20 science supporting this suboption. If it is important to the  
21 discussion of the suboption, include feasibility and time needed to  
22 implement.)

23  
24 INDIRECT EFFECTS

25  
26 (Summarize.)

27  
28 OTHER INFORMATION

29  
30 (Include unique information from legal considerations, additional  
31 information or other pertinent information that wasn't considered  
32 elsewhere in the summary.)

33  
34 CITATIONS

35  
36 Other decisions that were made:

37  
38 A general discussion of legal considerations will be included  
39 in the appendix which will encompass information found in  
40 most or all of the various options/suboptions.

41  
42 "Means to Evaluate Success" will be discussed as part of  
43 Chapter VI. new section B. Monitoring and Evaluation.

44  
45 Cost will be discussed only in a general sense in Chapter VI.,  
46 new D. Development of Annual Work Plans. The discussion  
47 will be on how cost information will be used to evaluate  
48 projects rather than what actual costs will be.

49  
50 Sections on "Relationship to Other Restoration Actions" and  
51 "Other Options Achieving Same Objectives" will not be  
52 included in the summary. They will be used in evaluation  
53 of options by RPWG.