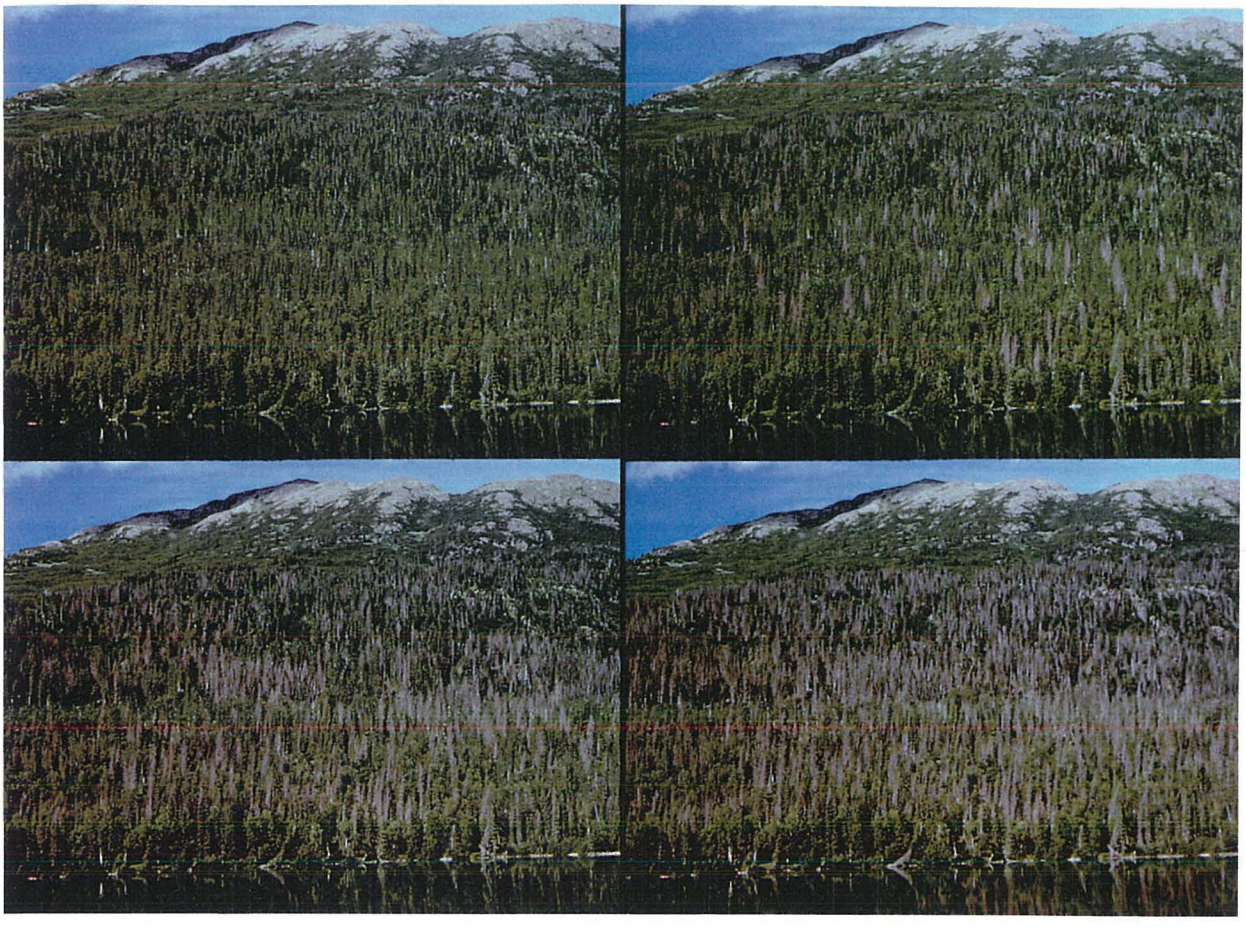

PUBLIC PERCEPTION AND ATTITUDES REGARDING SPRUCE BARK BEETLE DAMAGE TO FOREST RESOURCES ON THE CHUGACH NATIONAL FOREST, ALASKA

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prepared for:
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EXECUTIVE SUMMARY

The spruce bark beetle outbreak on the Kenai Peninsula, Alaska, poses a continuing threat to internationally significant scenic and recreational resources. Reported here are the results of an assessment of perceptually preferred forest conditions and acceptable forest management policies as judged by residents and visitors in the affected area.

Computer visual simulations were employed to depict a range of forest conditions projected to occur over the next 50 years as a result of bark beetle infestation. Conditions expected to result from alternative forest management actions were also simulated for comparison. Respondents rated individual simulated scenes for ***natural scenic beauty*** or selected between pairs of four-scene scenarios that depicted expected outcomes of **treatment** *vs* **no treatment** options for representative forest scenes.

Alternative management strategies were described and respondents rated the relative acceptability of (or their agreement with) each. Management options assessed included **general policies**, methods for **prevention** of future beetle outbreaks, **protection** of threatened stands during outbreaks, **restoration** of stands already affected and **expectations** for continuing spread of the current outbreak. Principal findings of the assessment included:

Sight-seeing was the predominant activity for visitors and ***views of natural scenery*** and ***viewing wildlife*** were the most important factors affecting the quality of their trip to Alaska.

Residents were very much aware of the bark beetle outbreak and reported ***loss of scenic beauty*** and ***increased fire danger*** as the most important impacts.

Based on computer simulations of forest scenes, residents' and visitors' **scenic beauty ratings** were highly consistent and significantly declined as the proportion of beetle-killed trees in the scene increased.

Respondents consistently preferred four-scene scenarios depicting forest conditions projected for **treatment** options over those for **no treatment**. A preventative **thinning** scenario was preferred to **no treatment** for threatened stands, and **cut/leave/burn** was the most preferred restoration scenario for stands with high beetle-caused tree mortality.

A substantial majority of respondents rejected ***let nature take its course*** as a policy for areas ***near*** developments where beetle effects were ***more severe***; this policy was most acceptable for areas ***far*** from developments where effects were ***less severe***.

Thinning was preferred over ***clear cutting small patches*** as a method for **prevention** of beetle outbreaks, and residents agreed that ***cut trees should be sold to private companies*** even when ***selling the trees will only pay part of the costs.***

The use of "environmentally approved" ***insecticides*** for **protection** of selected trees during an outbreak met with divided responses; the number "strongly agreeing" was essentially matched by the number "strongly disagreeing."

Restoration of areas already severely affected by bark beetles was a high priority for respondents and generally treatments that produced more rapid regeneration of spruce forests were preferred; ***cut/remove/burn*** (moderately hot fire) was the most preferred option, followed by ***cut/remove/scrape*** (mechanical scarification), with ***leaving the forest undisturbed*** least preferred. The use of "environmentally approved" ***herbicides*** produced strong responses almost equally split between support and non-support.

Respondents **expectations** were that the outbreak ***will continue to spread***, including ***to their own properties***, and that the effects will be severe, ***at least half of the spruce trees will die*** in affected areas.

Over 65% of respondents disagreed with ***allow(ing) most of the spruce trees in your area to be killed by bark beetles (rather) than to have the forest treated by cutting and spraying insecticides.***

The strongest differences among respondents were with respect to the use of insecticides and herbicides: Supporters of **chemical treatments** agreed that ***spraying insecticides is the best way to protect large trees near homes***; that sprayed trees are ***essentially 100% safe from beetle attack***; that ***approved insecticides are safe*** and they ***would be willing to use*** them; and supported ***applying environmentally approved herbicides*** to restore spruce in damaged areas. At the same time, supporters tended to disagree that ***other insects and animals might be harmed***, that insecticides are ***potentially dangerous to humans*** and that ***herbicides should not be used under any circumstances because of possible contamination of the environment***. Non-supporters of **chemical treatments** exhibited the opposite pattern of agreement/disagreement.

To be consistent, respondents who exhibited perceptual preferences for particular forest conditions should have supported management policies required to achieve those conditions. However, no consistent relationships were found between preferred perceptual *ends* and supported management *means*; preferences for forest conditions produced by **treatment** were not consistently associated with support for active management policies implied by those preferences.

In conclusion, results indicated that bark beetle-caused tree mortality has significantly reduced scenic beauty of forest scenes in the Kenai Peninsula study area. Future forest conditions resulting from active management policies were consistently preferred over conditions projected for non-intervention alternatives. There was substantial public support for active management response to the spruce bark beetle outbreak, but there was no clear consensus for any particular management strategy. The greatest divisions among the sampled publics revolved around the use of **chemical treatments**, with much of the controversy based on differing beliefs about the effectiveness of insecticides and the severity of environmental hazards associated with both insecticides and herbicides.

Forest managers can expect substantial public support for actions designed to protect or restore scenic values, but a concerted public information/environmental education program should be an important precondition for any application of insecticides or herbicides.

PUBLIC PERCEPTION AND ATTITUDES REGARDING SPRUCE BARK BEETLE DAMAGE TO FOREST RESOURCES ON THE CHUGACH NATIONAL FOREST, ALASKA

The spruce bark beetle outbreak on the Kenai Peninsula, Alaska, has had effects on timber resources and on the habitat of some wildlife species. In some areas, wildfire hazard has increased. As the outbreak and its aftermath continues there will be further effects on natural resources important to local communities, the state of Alaska and the nation.[1]

Unequaled scenic landscapes and outstanding recreational opportunities are among Alaska's most important natural resources, and these resources are among those most directly at risk from the spreading beetle outbreak. Management response to the outbreak must, therefore, address the protection and rehabilitation of scenic and recreational resources in affected areas. However, choosing the best management strategies is complicated by the fact that significant parts of the affected area are highly visible to the public. Moreover, Alaska, and the Kenai Peninsula in particular, is the focus of considerable concern by local and national constituencies which often have conflicting goals. Thus, management direction must be carefully designed to be effective and efficient in ecological and economic terms, and at the same time responsive to the perceptions, attitudes and values of the various local and national publics that have a stake in the outcome.

The assessment presented in this report focussed on determining public perceptions of the effects of the spruce bark beetle outbreak on forest scenic values, and on gauging public attitudes toward alternative forest management approaches. Participants for the studies were sampled from residents, visitors and tourists in and near the affected areas of the Kenai Peninsula. Computer generated visual simulations of forest scenic vistas were employed to assess public perception of insect-affected (or threatened) areas, and to determine preferences for possible alternative future forest conditions. Additional questions investigated participants' attitudes toward different insect-targeted management strategies associated with the simulated forest conditions.

Results from two studies are reported. The first study, conducted in the summer of 1990, primarily addressed bark beetle effects on tourists' perceptions of forest *scenic beauty*. A small number of Alaska residents were also sampled, and their attitudes and values associated with the insect outbreak and with alternative management strategies were explored. The second study, in the summer of 1991, focussed on residents of Kenai Peninsula communities directly affected or threatened by the spreading bark beetle outbreak. The primary objective of the second study was to further articulate residents' perceptions of alternative future forest conditions, and their attitudes toward alternative forest management approaches for the *prevention* of outbreaks, the *protection* of stands during outbreaks and the *restoration* of areas already affected by outbreaks.

STUDY APPROACH

Public perceptions of alternative future forest conditions were assessed by having samples of residents and visitors view and rate the *scenic beauty* of forest scenes sampled from bark-beetle affected forest areas on the Kenai Peninsula. Scenes represented the full range of outbreak conditions, from sites with no detectable effects to sites where virtually all of the trees in the scene were dead.

Digital video imaging techniques[2] were used to create simulations of future (hypothetical) forest conditions for a representative sample of scenes. These simulated scenes allowed experimentally controlled manipulation of specific forest features expected to change as a result of the bark beetle infestation and associated management options. This procedure insured that only selected features of the scenes were changed, while other features not associated with the targeted beetle or management actions were held constant. Visual simulations representing expected consequences of alternative management actions (including no action) for up to 50 years into the future formed the basis for the public perceptual assessment process.

In conjunction with perceptual assessments, respondents also indicated opinions and attitudes toward a variety of forest management practices associated with bark beetle outbreak prevention and control, and with restoration of forest stands after severe infestations. Issues addressed in this verbal component of the study included: public awareness of the bark beetle outbreak; values judged to be at risk; the perceived likelihood of the outbreak spreading; and the acceptability of several management options, including forest overstory manipulations by clear cutting or thinning, the use of insecticides, herbicides and fire, and "allowing nature to run it's course."

There was no effort to obtain formal random samples, but the study design allowed comparisons of the perceptions and attitudes of tourists/visitors and residents (1990 study), as well as comparisons among residents from different communities in affected and threatened areas on the Kenai Peninsula (1991 study). The relationships between perceptually preferred forest conditions, the desired *ends*, and the acceptability of the various management strategies required to achieve those conditions, the *means*, were also investigated.

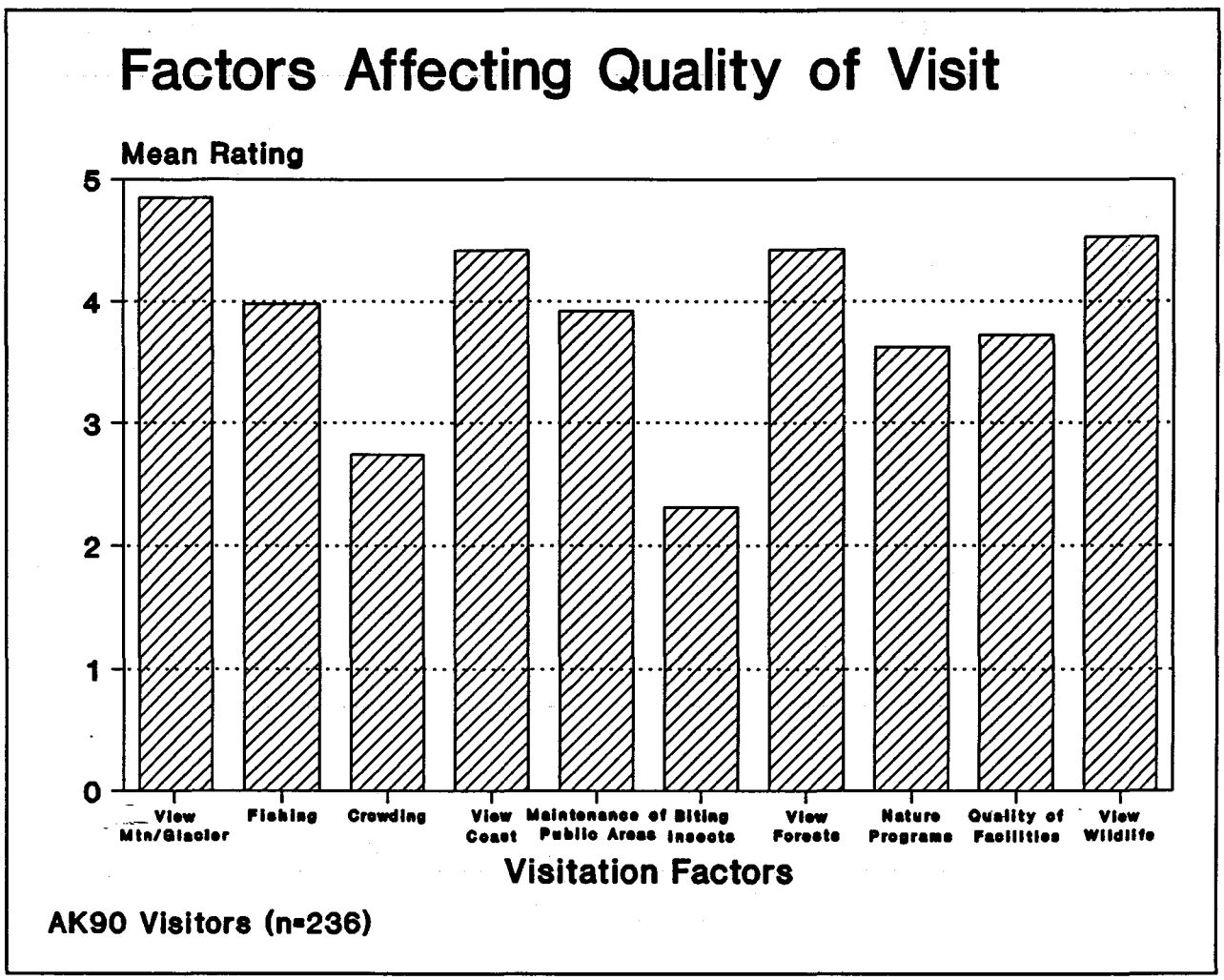
RESPONDENTS

A total of 84 Alaska residents and 306 visitors participated in the 1990 study. Participants were recruited at shopping centers and at major tourist/recreation facilities in the Anchorage/Kenai Peninsula study area. The visitor sample included participants from a wide geographic area in the US and abroad. Most of the residents in this "convenience sample" were from the Anchorage area, with smaller numbers from Kenai Peninsula communities.

The 306 visitors represented many of the lower 48 states and several foreign countries. Most of the visitors (73%) were in Alaska for the first time, 94% planned to stay a week or

more, and 50% were staying three weeks or more. Planned activities included *sight-seeing* (94%), *wildlife viewing* (75%), *hiking* (61%), *camping* (49%) and *fishing* (47%). Factors reported as having the greatest positive effect on the quality of the visit were (in order of rated importance): *viewing mountains and glaciers*, *viewing wildlife*, *viewing forest scenery*, and *viewing coastal scenery*. *Quality of fishing* was reported as either irrelevant or mildly positive for most visitors. The most negative factor reported was *biting insects*.

For the 1991 study 166 residents were recruited through civic organizations in targeted Kenai Peninsula communities. Participants responded individually to sets of color prints depicting alternative conditions for representative forest scenes and to management policy questions bound in "photo album" booklets. Participating groups ranged in size from 5 to 35 people..

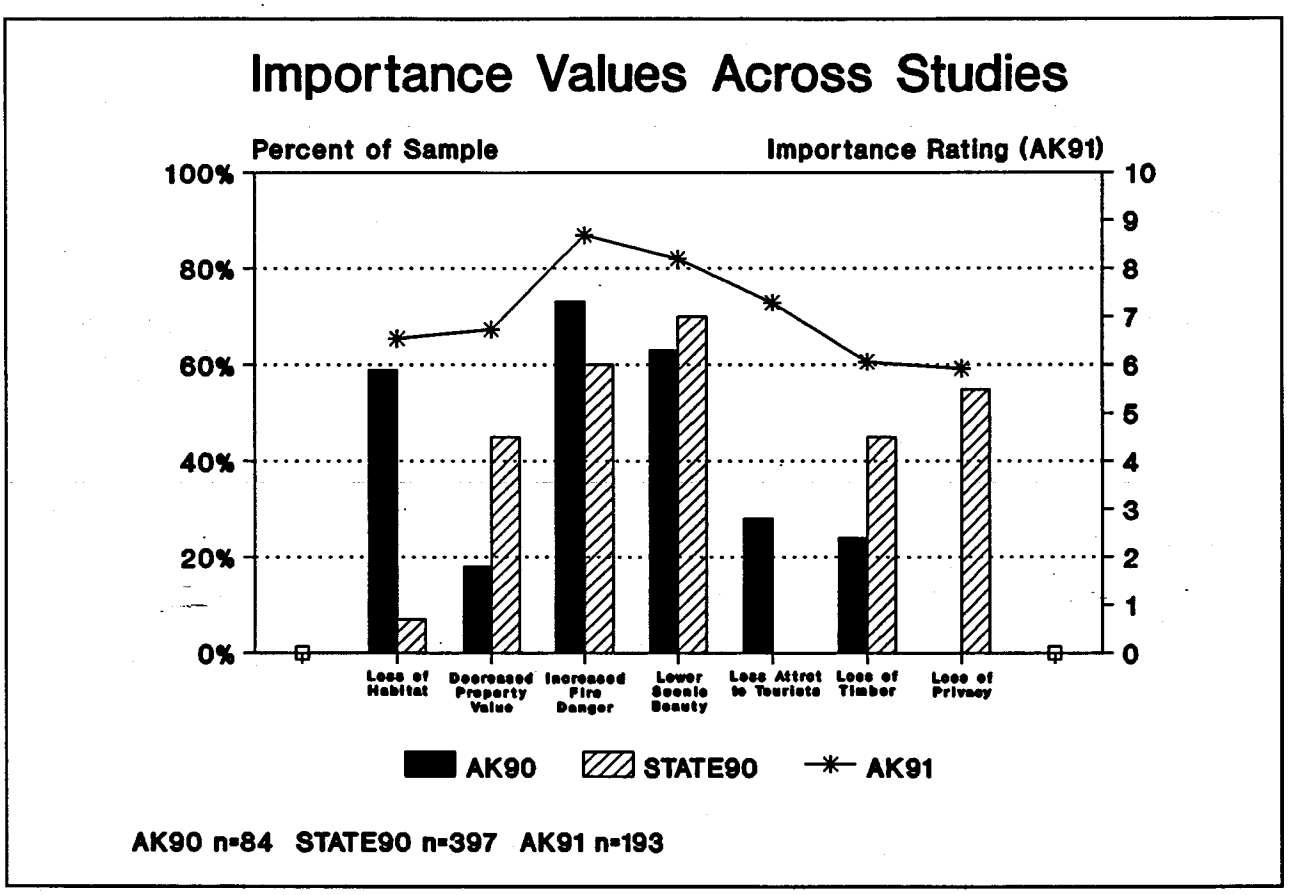


Awareness of the spruce bark beetle outbreak was very high among respondents in both the 1990 and 1991 studies. Of the residents sampled in 1990, 73% reported *noticing dead*

trees and 80% reported that they were *aware of the outbreak* prior to the study. For the resident sample in the 1991 study, 58% reported *noticing dead trees near their own community* and 79% *noticed dead trees elsewhere on the Kenai*. Over 80% reported being aware of the spruce bark beetle outbreak prior to the study. These results are very consistent with the Alaska State random telephone survey,[3] where an astonishing 88% of Kenai Peninsula residents cited "dying trees" or "beetles killing trees" in response to an open-ended question regarding the most serious problems with forests on the Peninsula.

For residents in the 1990 study the most important effects of the outbreak were *increased fire danger*, *loss of scenic beauty*, and *loss of wildlife habitat*. Less important effects were *decreased property values*, *decreased attractiveness to tourists* and *loss of timber values*.

The 1991 study produced essentially parallel results; effects rated most important were *increased fire danger*, *loss of scenic beauty*, and *lower attractiveness to tourists*. Judged less important were *loss of privacy*, *loss of timber values*, *loss of wildlife habitat* and *loss of property values*. The same basic pattern of concerns was also found in the Alaska State survey; *loss of scenic beauty* (70%), *increasing fire danger* (60%), *loss of privacy*(55%), *loss of timber values* (45%), *decrease in property values* (45%) and *loss of wildlife habitat* (4%).



Demographics - 1990/1991

1990 Residents		1990 Nonresidents		1991 Residents	
Anchorage	111	California	45	Ninilchik	34
Wasilla	17	Washington	22	Kenai C.C.	26
Eagle River	12	Oregon	19	Cooper Landing	25
Soldatna	11	Florida	15	Anchor Point	21
Fairbanks	6	Canada	13	Hilltop Youth	20
Kenai	5	Michigan	13	Kasilof	12
Girdwood	5	New York	13	Homer	10
North Pole	3	Minnesota	12	Salamatof	8
Homer	3	Arizona	10	Ninilchik Native	5
Sterling	3	Indiana	10	Association	
Other	27	Other	122		
Total	203	Total	306	Total	161

Summary

Most visitors to the Kenai Peninsula were there for the first time, as is typical of many major tourist destinations, and they stayed for a considerable period of time, most planning stays of one to three weeks. Sight-seeing and wildlife viewing were the dominant activities reported, and spectacular natural scenery was the most important factor contributing to the enjoyment of the visit. The emphasis on viewing scenery clearly justifies forest managers' concerns about spruce bark beetle effects on visual/aesthetic resources in the area.

Residents in both the 1990 and 1991 studies were very much aware of the spruce bark beetle outbreak and its effects. Reports in the media, special government bulletins and meetings, as well as direct observation all contributed to the high awareness levels.

Major areas of concern to residents were the loss of natural scenic beauty and increased fire danger, with lesser concern expressed for loss of timber values and wildlife habitat. Based on these findings, forest management policies directed at protecting or restoring scenic values and reducing risk of wildfires should be supported by Kenai Peninsula residents.

VISUALIZING FUTURE FOREST CONDITIONS

The visual effects of the spruce bark beetle outbreak on the Kenai Peninsula were represented by a sample of over 500 color slides of forest vistas collected in the summers of 1989 and 1990. View points were sampled from along roads and trails, and within designated campgrounds frequented by visitors to the area as well as from locations within and near developed communities. Slides depicted dramatic as well as common (for Alaska) scenes of forested areas, and included bark beetle impacts ranging from undetectable to essentially 100% tree mortality.

Typical of the study area, over half of the scenes included either lakes or streams, and many exhibited a backdrop of high peaks, some with caps or patches of snow. Scenes dominated by development features (roads, buildings, disturbed areas) were excluded from the sample. A representative subset of the scenes, all meeting high standards of photographic quality, were selected as the basis for the public perception studies.

Digital Video Image Processing

All color slides selected for inclusion in the study were commercially scanned to produce digital computer files. This process allows translation of the color slide into a high resolution image (up to 512 by 482 lines) with over 32,000 different levels of color. When these images are displayed on high quality video monitors, or output as color slides or prints, the quality of the image is essentially equal to that of a good color photograph.

There are several important advantages of the digital format. First, the computer image can be quantitatively analyzed to determine precisely differences in color and other characteristics of features in the scene, e.g., differences between hardwoods and conifer trees, or between living and dead spruce trees. Second, selected features of the scene can be systematically altered to represent changes projected to occur as a result of insect infestation or of forest management activities.

For example, if increasing tree mortality is projected for selected areas in a forest scene, green trees can be "killed" by applying color "filters" to shift their color values from living green to the reddish or grey colors typical of beetle killed trees. If some trees are to be removed or some area is projected to burn, existing trees in that region of the scene can be "cut" out of the scene and replaced by "pasting" in appropriate open or burned area textures. Examples are shown in the color illustrations.

Simulations of the forest conditions that were the focus of the perceptual assessments reported here were developed at the Imaging Systems Laboratory at the University of Illinois. A combination of geographic information system view-modeling techniques and customized digital video image editing routines were used.[4] Different levels of insect damage and a number of alternative future forest conditions associated with selected management scenarios were simulated using image processing and pattern substitution techniques developed for this purpose. Digital image files for unaltered and for simulated scenes were used to produce color prints and slides, or they were directly displayed on a

high quality color video monitor. All representations achieved near photographic quality levels for color, resolution and realism.

Selection of representative scenes and the detailed features of each simulation were guided by available forest inventory data, maps of stand boundaries, computer generated "perspective views" and by the expert judgements of forest silviculturalists and pest management specialists working in the area. In addition, the members of a multi-disciplinary citizen/professional panel charged with planning forest management responses to the bark beetle outbreak in the Cooper Landing study area served as expert judges for selecting representative forest scenes, and for validating the simulations of hypothetical forest conditions.

Alternative Future Conditions

Using the selected representative scenes as a starting point, two general types of "future forest" scenarios were created. Some scenarios depicted changes in forest scenes expected to occur over time as a result of a continuing bark beetle infestation, either assuming some preventative actions (e.g., thinning the susceptible spruce trees) or that no action was taken. The *no treatment* scenarios extended from "green" scenes, where very few or no dead trees were detectable, and progressed through scenes of intermediate stages to a condition where virtually all of the spruce trees in the scene were dead.

The infestation scenarios were created retrospectively, beginning with scenes of dead trees and using historic data to progressively "green up" the scene until it appeared as it did prior to the infestation (see color Plates 1 - 3a). Other scenarios were created to depict future conditions expected to occur over a 50-year period as a result of a number of different forest management actions that might be taken to restore areas already severely affected by the bark beetle infestation (color Plates 4 - 9).

Six ***base*** scenes were selected for modification to represent expected changes in forest characteristics relevant to the spruce bark beetle outbreak. Four of the base scenes were manipulated (retrospectively) to develop scenarios reconstructing the progressive changes that had occurred over the preceding twelve years of the outbreak. Beginning with the scenes as they appeared in the summer of 1990 (unaltered photographs showing over 90% mortality of spruce) simulations were constructed (nominally) representing how each of these four scenes looked 12, 9, 6 and 3 years in the past. These scenarios showed the typical progression from green forest to increasing numbers of dead trees. In addition, an alternative retrospective scenario was constructed covering the same time period for one of the scenes (Kenai River/Schooner Bend), but assuming that the affected stands had been thinned by removing 50% of the spruce (in two separate operations) and encouraging a mixed age forest with a greater proportion of hardwoods (see Plate 3b).

For the 1990 study four of the base scenes were manipulated to depict conditions expected to result at 5, 10, 20 and 50 years in the future from two alternative strategies for managing areas where spruce tree mortality was already severe (90% or more of spruce are dead). Strategies represented were; *no treatment*, postulating a moderately severe wildfire followed by unaided natural regeneration dominated by brush, grasses and

hardwoods; and a *treatment* scenario in which dead spruce trees were clearcut and removed followed by a prescribed "site preparation" burn to encourage spruce regeneration (Plates 4 - 7). All other features of the scenes were held constant.

For the 1991 study additional 5-to-50 year scenarios were developed for the Kenai Lake/Snug Harbor base scene. All scenarios postulated clearcutting of the dead spruce followed by:

1. a high intensity burn (achieved by felling and leaving the dead spruce), leading to better spruce regeneration with some hardwoods (Plate 8a);

2. a light intensity burn (after removing the dead spruce), leading to predominately grass and some hardwoods (Plate 8b);

3. no special site preparation or regeneration efforts (only normal disturbance that occurs from summer logging operations), leading to predominately grass with a few hardwoods (Plate 9a); or

4. mechanical ground scarification, leading to better spruce regeneration with few hardwoods (Plate 9b).

Two additional scenarios were developed for one *near-view* scene representing views within the forest canopy, as would be typical in campgrounds or along trails. The near-view scene modification techniques required extensive "cutting and pasting" and relied largely on an artistic process. These simulations were intended only as an exploratory effort not central to the present study and thus they are not shown in the illustrations.

Summary of Visual Simulations

Retrospective Scenarios	3-6-9-12 years	Plate #
Jean Lake	• No Treatment	1
Kenai Lake/S. of Snug Harbor	• No Treatment	2a
Kenai Lake/Snug Harbor	• No Treatment	2b
Kenai River/Schooner Bend	• No Treatment	3a
	• Thinning	3b
Restoration Scenarios	**5-10-20-50 years**	
Cooper Creek Campground	• No Treatment	5a
	• Cut-Remove-Burn	5b
Cooper Creek from Resurrection Pass Trail	• No Treatment	6a
	• Cut-Remove-Burn	6b
Kenai River/Schooner Bend	• No Treatment	4a
	• Cut-Remove-Burn	4b
Kenai Lake/Snug Harbor	• No Treatment	7a
	• Cut-Remove-Burn	7b
	• High Intensity Burn	8a
	• Moderate Intensity Burn	8b
	• Normal Ground Dist.	9a
	• Mech. Scarification	9b
Near-View/Campground	• No Treatment	not shown
	• Thinning/Insecticide	not shown

Public Perception and Attitudes Regarding Spruce Bark Beetle Damage to Forest Resources on the Chugach National Forest, Alaska

Color Plates

Each of the four-scene sets displayed in the following color plates shows simulations of the effects of a spruce bark beetle outbreak, or of a hypothetical forest management activity on a representative Kenai Peninsula forest scene. Simulations show progressive changes (3, 6, 9, 12 years for some scenarios and 5, 10, 20, 50 years for others) expected as a result of bark beetle infestation and/or some forest management activity. In each case, the image at the upper left represents conditions at the earliest time point (3 or 5 years) and the lower right represents the latest time period (12 or 50 years) after the postulated infestation or management action.

Plate 1

Jean Lake - Scene AJ 1319
3, 6, 9, 12 year scale

Simulations show progressive changes due to spruce bark beetle infestation with no management intervention. Simulations were created "retrospectively"; the year 12 (bottom right) representation shows the scene as it appeared in the summer of 1990.

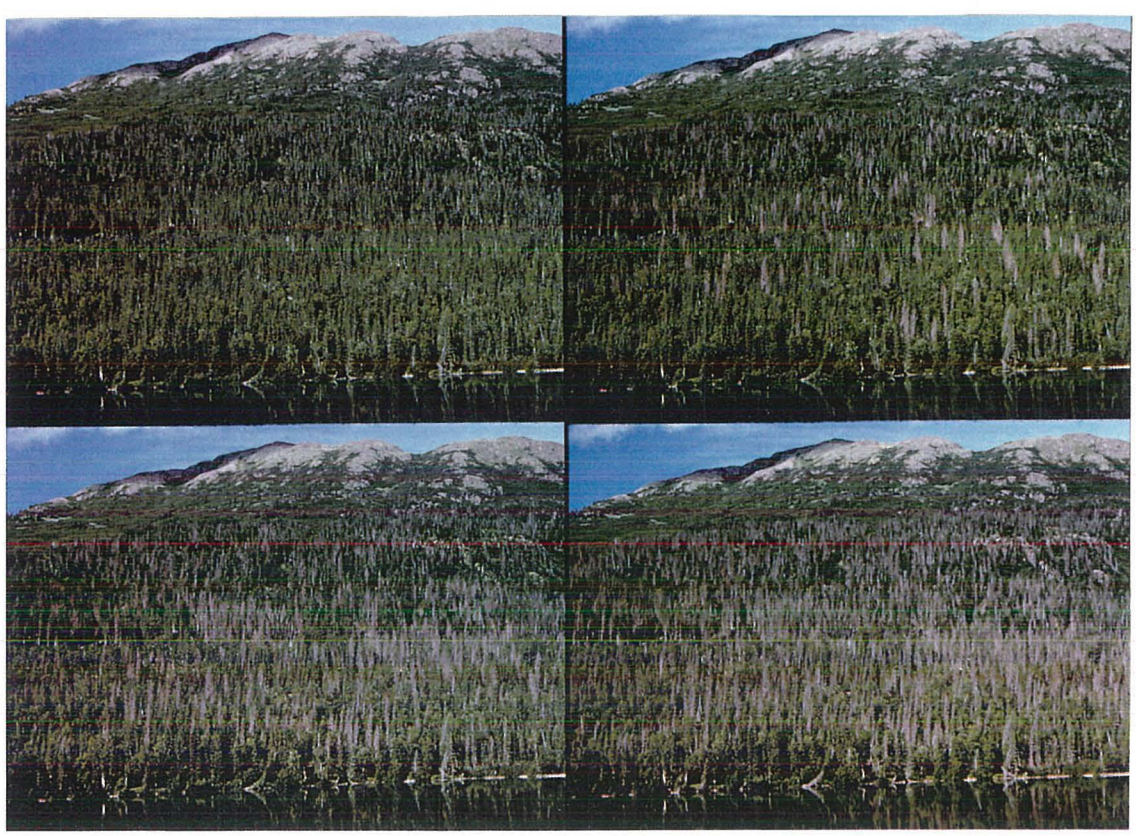


Plate 2a

Kenai Lake/South of Snug Harbor - Scene AI 1531
3, 6, 9, 12 year scale

Simulations show progressive changes due to spruce bark beetle infestation with no management intervention. Simulations were created "retrospectively"; the year 12 (bottom right) representation shows the scene as it appeared in the summer of 1990.

Plate 2b

Kenai Lake/Snug Harbor - Scene AI 1532
3, 6, 9, 12 year scale

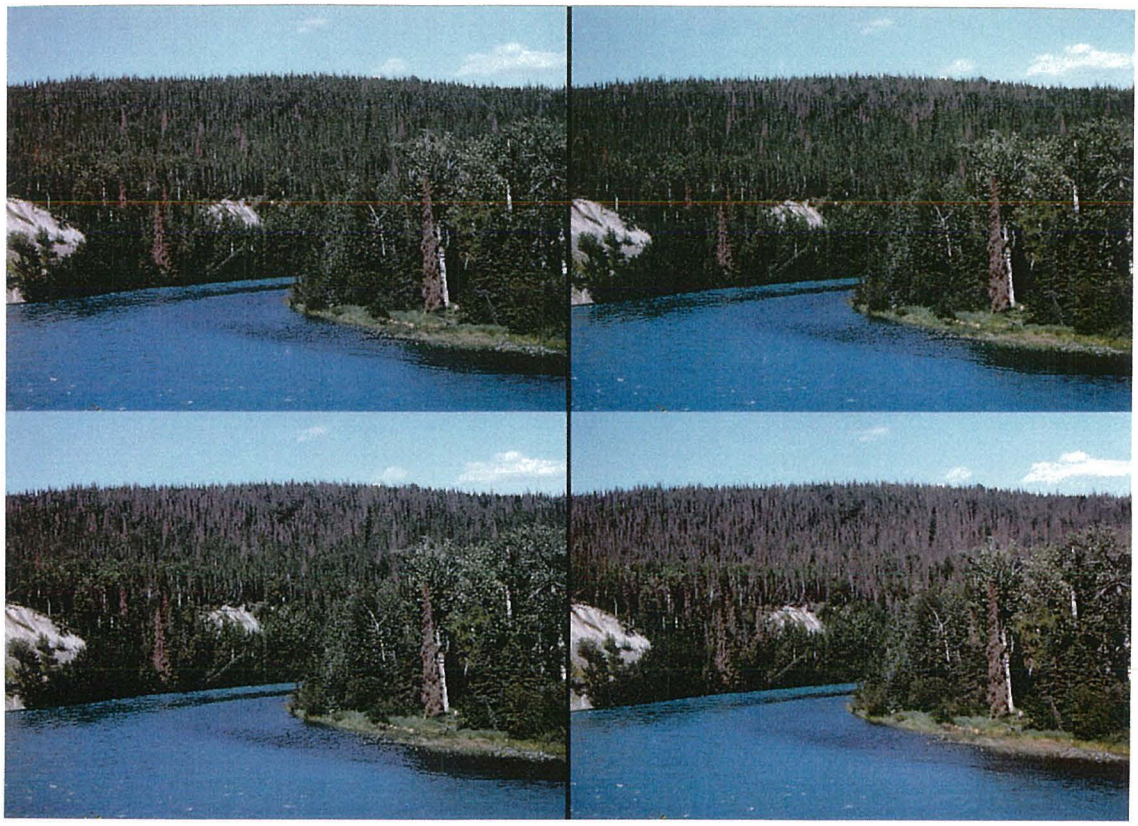


Plate 3a

Kenai River/Schooner Bend - Scene AI 0617
3, 6, 9, 12 year scale

Simulations show progressive changes due to spruce bark beetle infestation with no management intervention (Plate 3a). Plate 3b shows expected results following a pre-infestation thinning (at year 0) of susceptible spruce and subsequent thinning prior to year 9 (total thinning of 50%). The no-treatment simulations shown in Plate 3a were created "retrospectively"; the year 12 (bottom right) representation shows the scene as it appeared in the summer of 1990.

Plate 3b

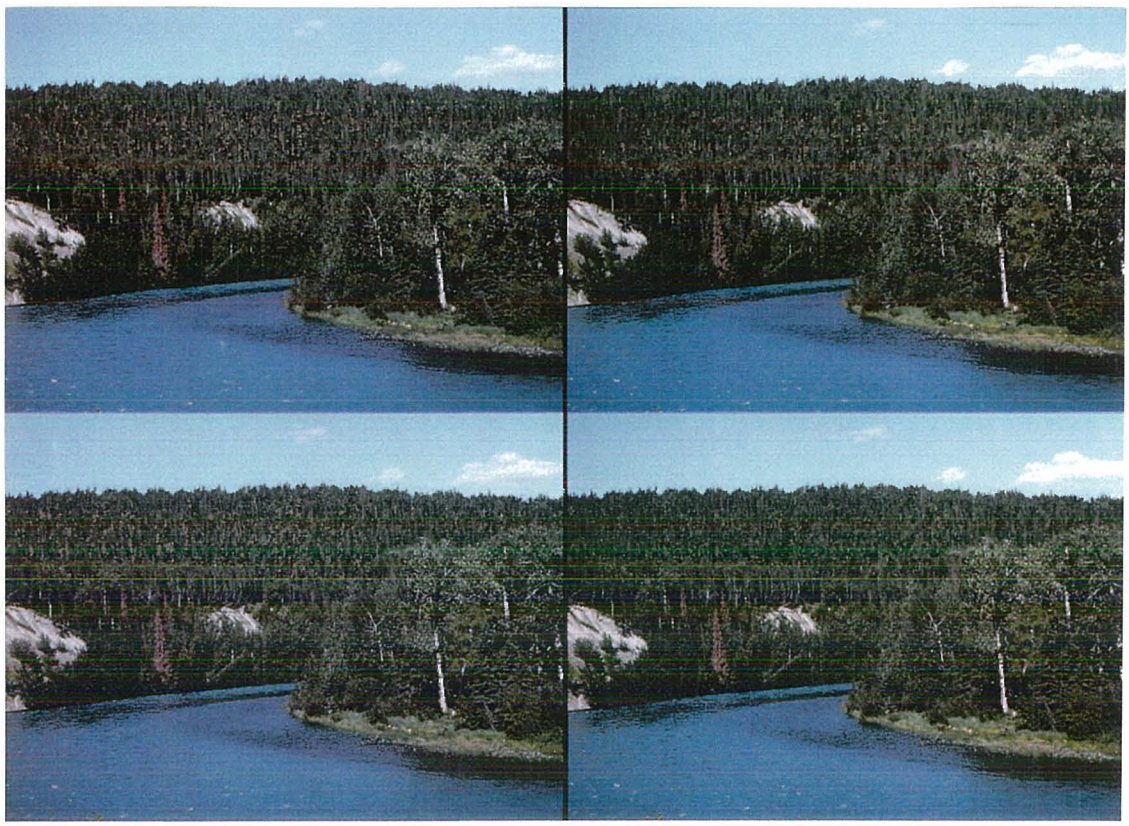


Plate 4a

Kenai River/Schooner Bend - Scene AI 0617
5, 10, 20, 50 year scale

Simulations show conditions as the forest recovers from a spruce bark beetle outbreak. In both cases, an anticipated wildfire occurs on the far slope with natural regeneration taking place over time. Plate 4a depicts natural regeneration in the foreground (along both river banks) as a result of no management intervention. Plate 4b shows natural regeneration in the foreground after an initial salvage removal of dead trees.

Plate 4b

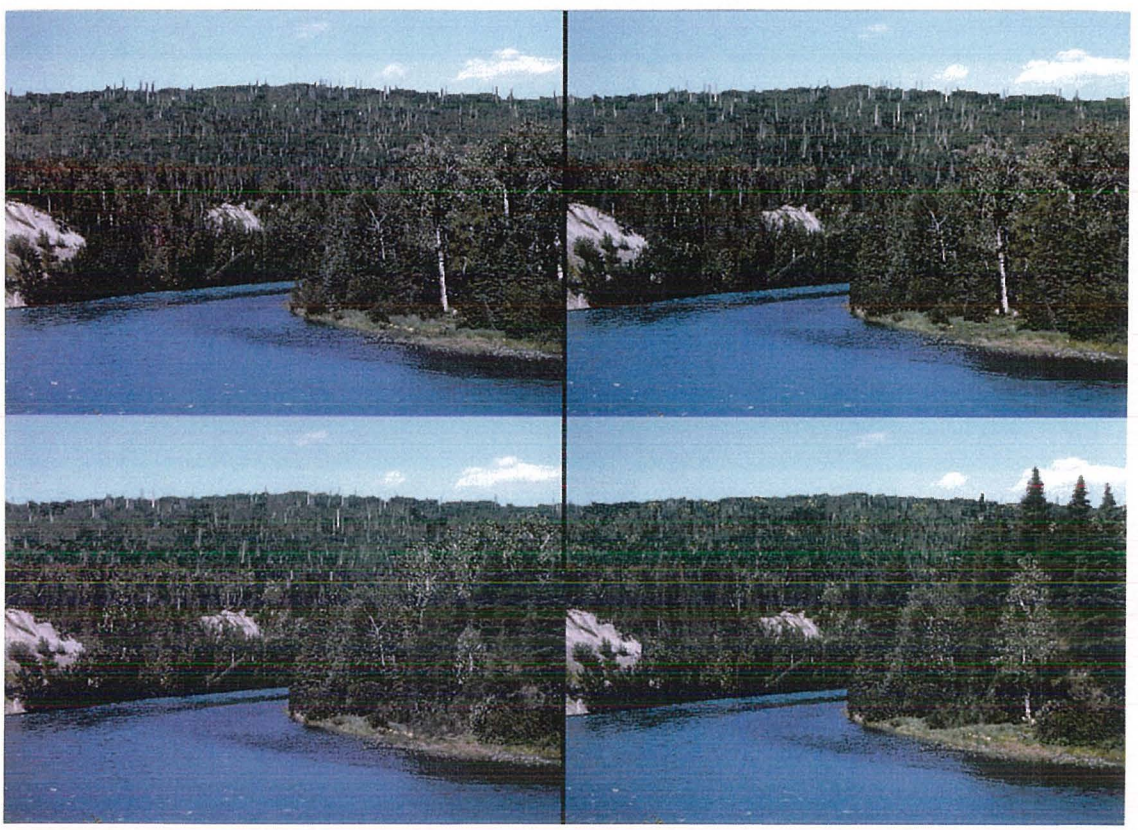


Plate 5a

Cooper Creek Campground - Scene AI 0614
5, 10, 20, 50 year scale

Simulations show conditions as the forest recovers from a spruce bark beetle outbreak. Plate 5a depicts no management intervention and natural regeneration occurs over time. Plate 5b shows natural regeneration after an initial salvage removal of dead trees.

Plate 5b

Plate 6a

Cooper Creek from Resurrection Pass Trail - Scene AI 0714
5, 10, 20, 50 year scale

Simulations show progressive changes as the forest recovers from a spruce bark beetle outbreak. Plate 6a shows natural regeneration after an anticipated wildfire. Plate 6b shows conditions after the salvage removal of dead trees on the lower slope and a controlled burn to promote natural regeneration of spruce.

Plate 6b

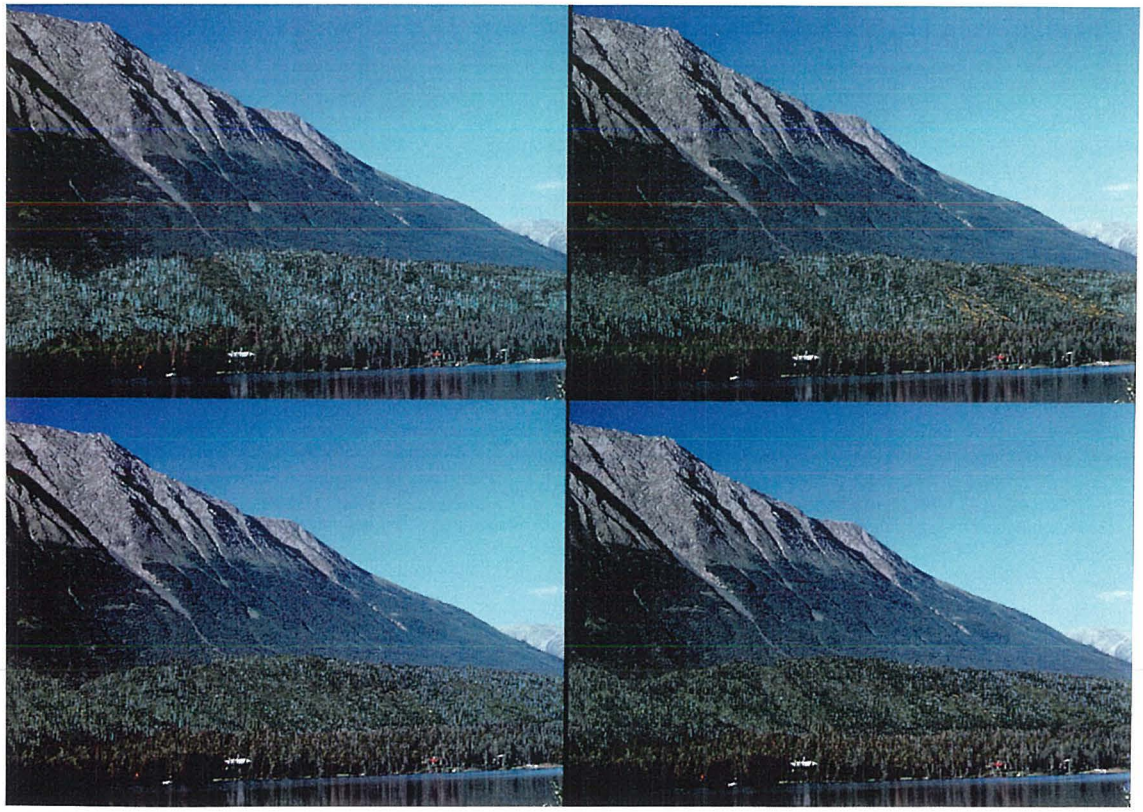
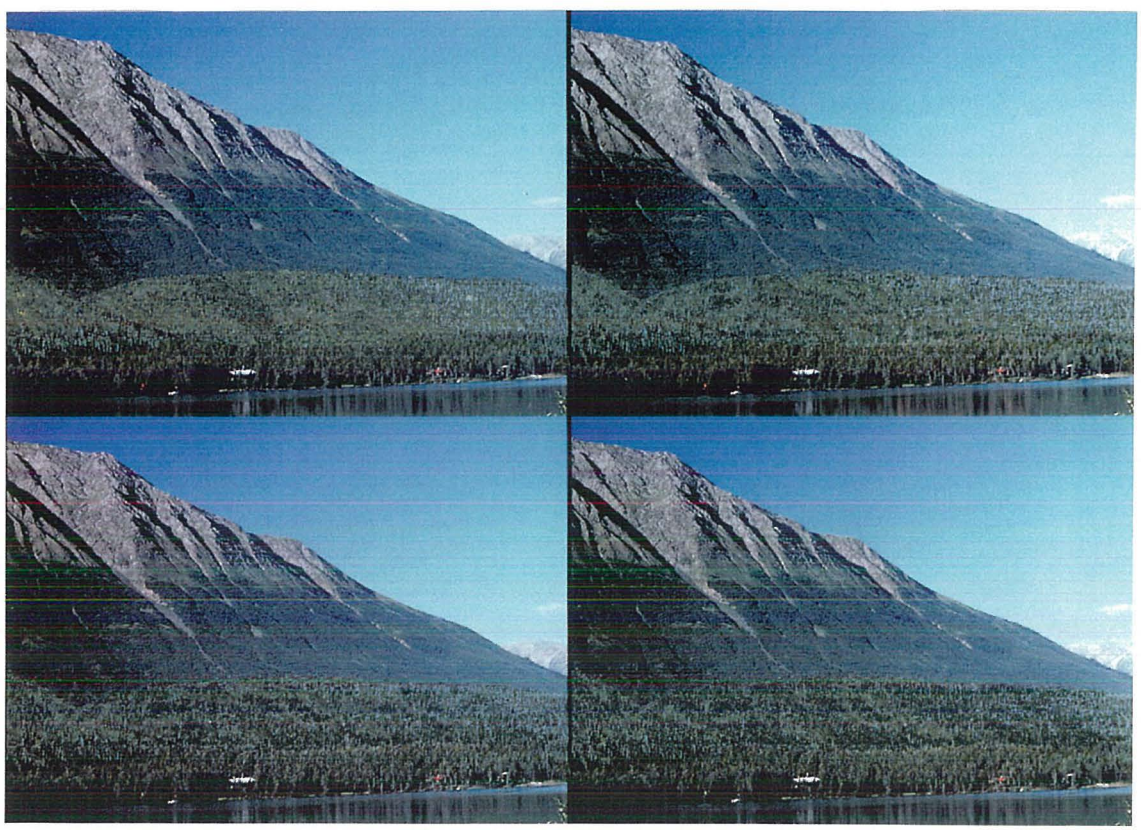


Plate 7a

Kenai Lake/Snug Harbor - Scene AI 1532
5, 10, 20, 50 year scale

Simulations show progressive changes as the forest recovers from a spruce bark beetle outbreak. Plate 7a shows natural regeneration after an anticipated wildfire. Plate 7b shows conditions after the salvage removal of dead trees and a controlled burn to promote natural regeneration of spruce.

Plate 7b



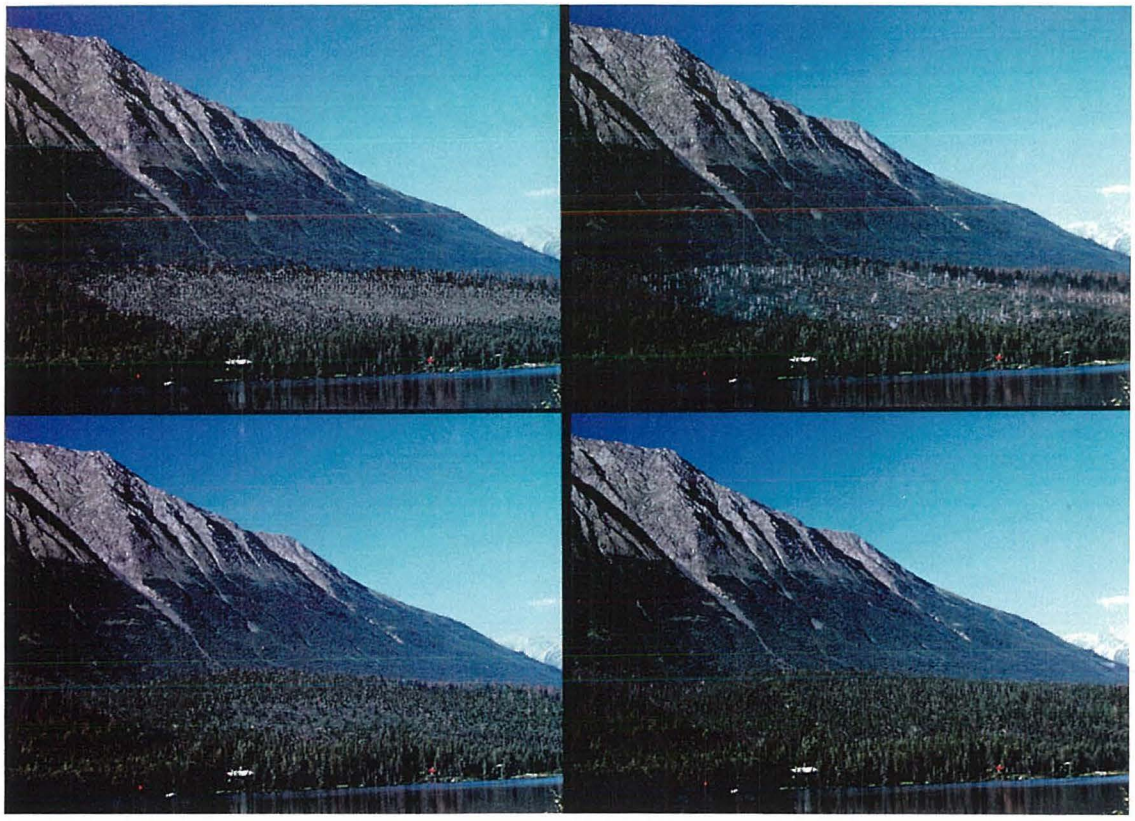
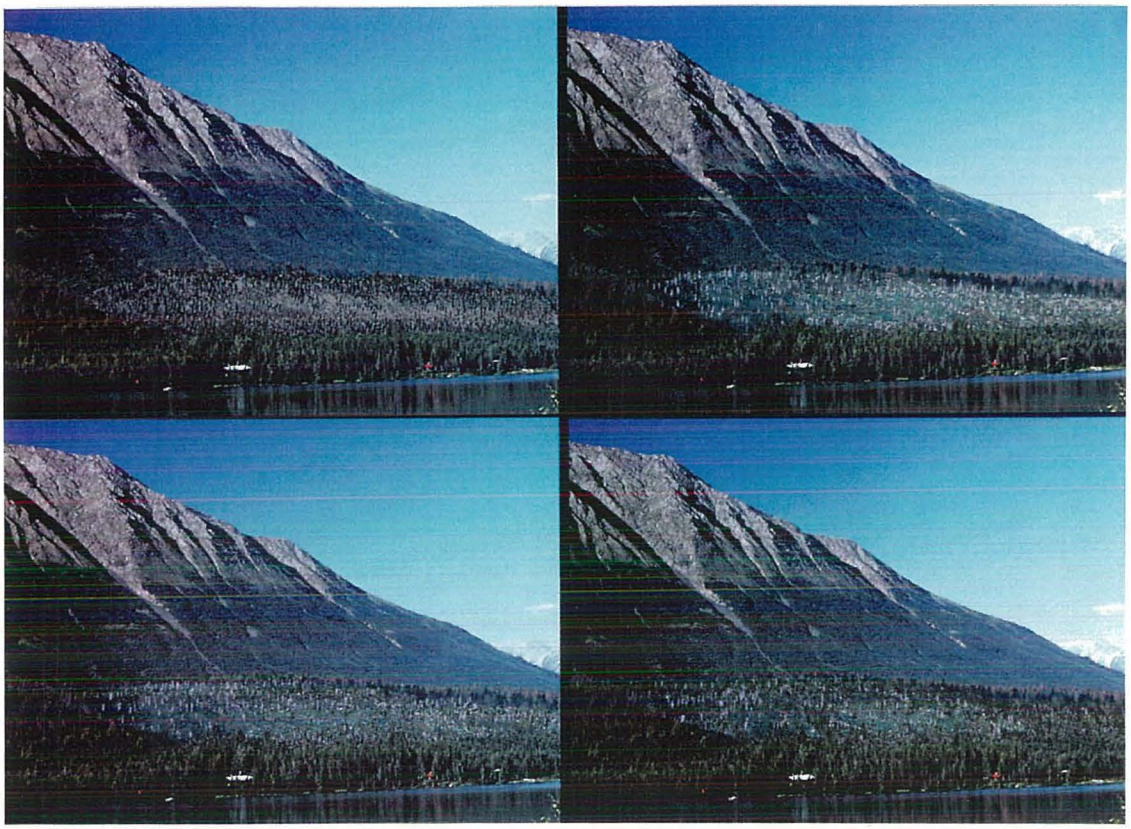


Plate 8a

Kenai Lake/Snug Harbor - Scene AI 1532
5, 10, 20, 50 year scale

Simulations show effects of prescribed burns over time. Plate 8a shows natural regeneration after cutting and burning the dead trees on site which results in a "hot" fire. Plate 8b shows natural regeneration after cutting and removing dead trees before burning which results in a fire of less intensity.

Plate 8b



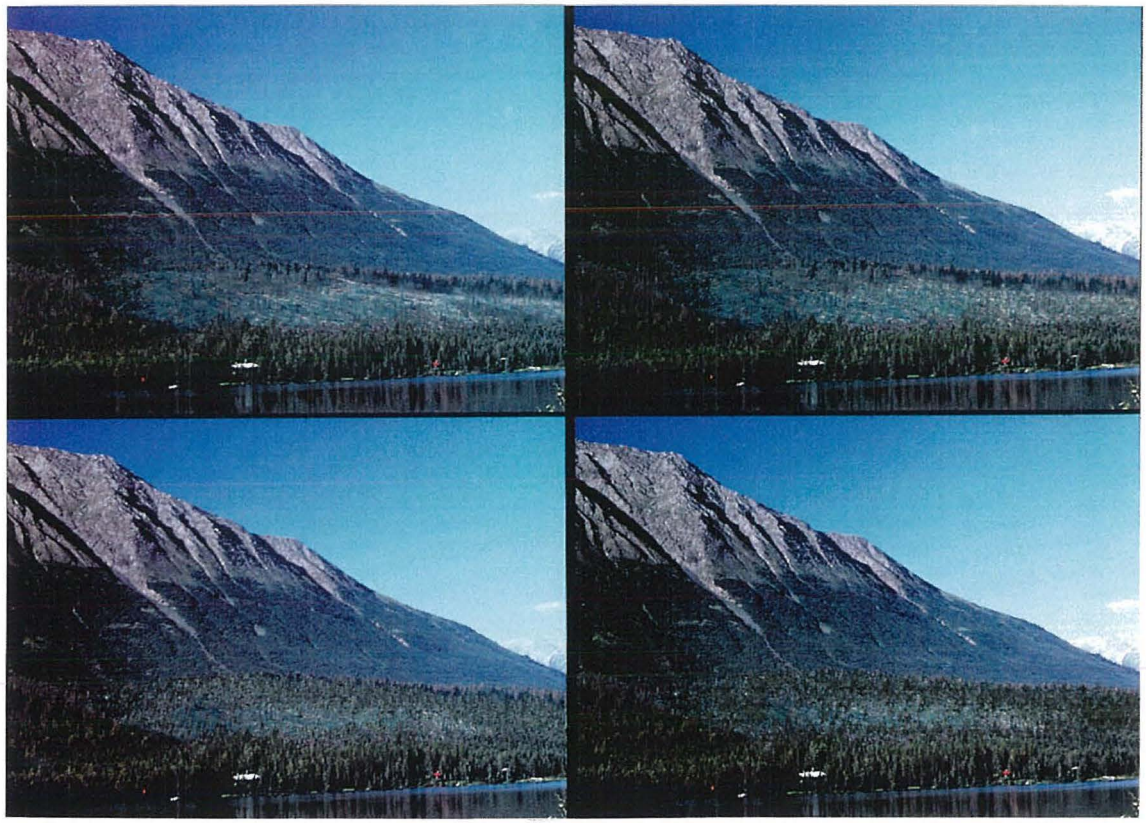
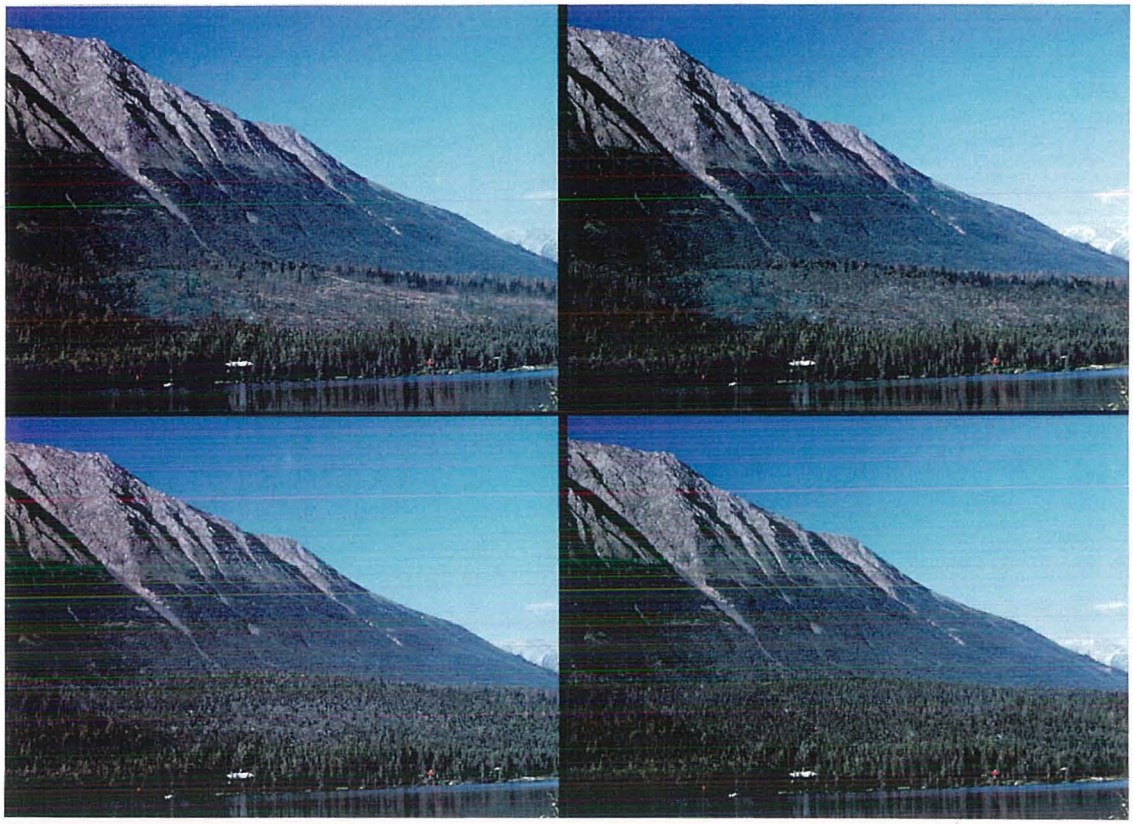


Plate 9a

Kenai Lake/Snug Harbor - Scene AI 1532
5, 10, 20, 50 year scale

Simulations show effects of site treatments following summer salvage removal of dead trees. Plate 8a shows natural regeneration after moderate ground disturbance from salvage removal operations. Plate 8b shows the effects of intense mechanical scarification after salvage removal to stimulate natural regeneration.

Plate 9b



Summary

A total of 48 digital-video simulation images were developed for the 1990 study and 24 new simulations were added for the 1991 study, resulting in 72 different simulation images. Two primary types of simulation sequences were developed: *retrospective* scenarios depicting the historic progression of bark beetle impacts over a 12 year period; and *restoration* scenarios showing alternative futures over a 50 year period following *no treatment* contrasted with one or more forest regeneration *treatment* scenarios.

All of the simulations were selected and developed in close interaction with forestry and pest management experts familiar with the Kenai Peninsula areas represented. Images were repeatedly evaluated and modified until the experts agreed that a high level of accuracy in the representation of the targeted forest conditions had been achieved. Base scenes and the simulation sequences developed for each are presented and briefly described in the preceeding color plates.

PERCEPTUAL ASSESSMENT

The simulation sequences described above formed the basis for the assessment of public perception of the effects of the bark beetle outbreak, and of possible forest management reactions. All responses in the 1990 assessment were collected in interviews with selected individual residents of, or visitors to bark beetle affected areas on the Kenai Peninsula. Two different presentation formats were used: sequences of single scenes were viewed and rated on a 10-point *scenic beauty* scale; and pairs of four-scene displays, each depicting alternative future scenarios for a given base scene, were presented and respondents were required to choose which set of future conditions provided the *best overall scenic quality*. The single scene format was repeated for color slides, prints and digital video images for different subsets of the 1990 respondents. The four-scene format was presented only in the form of color prints to a small sample in the 1990 study and to all respondents in the 1991 study.

Individual Scenes

For the single-scene format four sets of 63 forest scenes each were selected for presentation to respondents. Within each 63-scene set 51 scenes were common to all sets, and included a sample of scenes typical of the study area, as well as two retrospective "greening" sequences (four versions each of Jean Lake and Kenai Lake/South of Snug Harbor). The remaining 12 scenes were unique to each set, and were composed of a sample of the experimentally manipulated sequences (simulations of projected future conditions) for the other four base scenes.

Generally no more than three versions (simulations) of any given base scene were included in any one set of scenes, and these were always distributed among the other scenes in each presentation. Each of the 63-scene sets was organized into three different random orders, with each order being assigned randomly to individual respondents.

The goal of this "mixed" presentation procedure was to make the scene presentations as representative as possible of the conditions typically encountered by a forest visitor. On any given visit to the Kenai Peninsula study area a visitor would be expected to see a variety of different forest scenes, and to encounter several different levels of spruce bark beetle impact, but no specific scene would exhibit multiple levels of insect impact during a single visit.

Most of the participants in the 1990 study rated the *natural scenic beauty* of individual scenes representing a wide range of forest and insect damage conditions. Approximately equal numbers of participants were shown the scenes as color prints (bound in "photo-album" books), projected color slides or as displays on a video monitor. Respondents reported their judgements for each scene using a 10-point rating scale ranging from 1 (very low scenic beauty) to 10 (very high scenic beauty). Ratings were subsequently transformed to *Scenic Beauty Estimates* (SBEs), a standardized interval scale index that adjusts for arbitrary differences in the way individual respondents used the rating scale.[5]

As is typical for similar environmental perception studies, there was very high consensus in the scenic beauty ratings within each of the participant groups sampled. Internal reliability coefficients ranged from .88 to .96 (median = .93) within each of the twelve set-by-presentation medium (slides, prints, video) groups. These reliability measures estimate statistically the expected agreement between the ratings of the tested group and those of any other group that might be selected at random from the same population of respondents; perfect agreement would be indicated by a coefficient of 1.00.

No significant differences were found in ratings of the common base scenes between the different presentation sets, nor among the random orders within each set. Correlations of ratings of common scenes among the four groups of participants judging the different presentation sets ranged from .86 to .90 for visitors and from .87 to .95 for Alaska residents (again, a correlation of 1.00 would indicate perfect agreement between the groups).

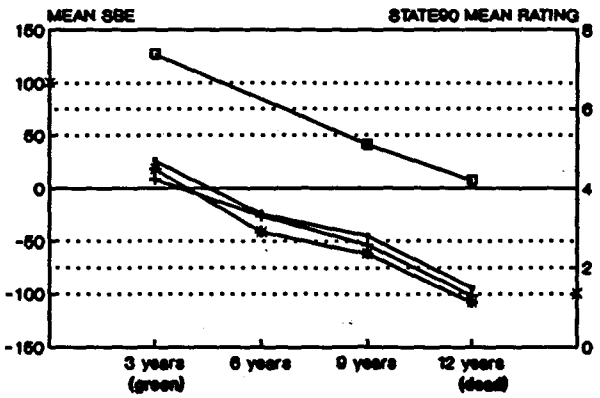
Comparison of scenic beauty judgements across the three presentation media (slides, prints and video) also indicated nearly perfect agreement. Correlation coefficients based on the ratings of the scenes that were common to all presentation sets and participant groups (n = 43) ranged from .93 to .97.

By all these indications there was a very high level of consensus in perceived scenic beauty among the tested groups, and a strong indication that essentially the same results would be expected for any other groups of similar people that might be assessed, as well as for alternative presentation formats. Further, there is substantial environmental perception literature confirming that public scenic beauty judgements based on color slides agree very closely with direct judgements made on-site in the depicted environments. Thus, the results of the studies reported here can confidently be generalized to the direct viewing conditions typically experienced by visitors to the represented forest areas.

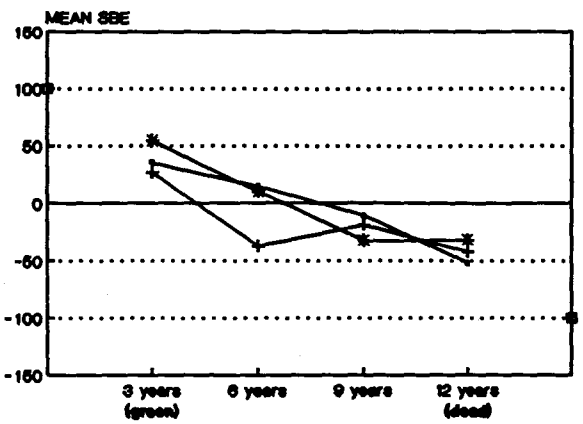
Comparison of Residents and Visitors

The scenic beauty judgements of residents and visitors were in very good agreement, regardless of the presentation format used. Overall, the correlations between resident and

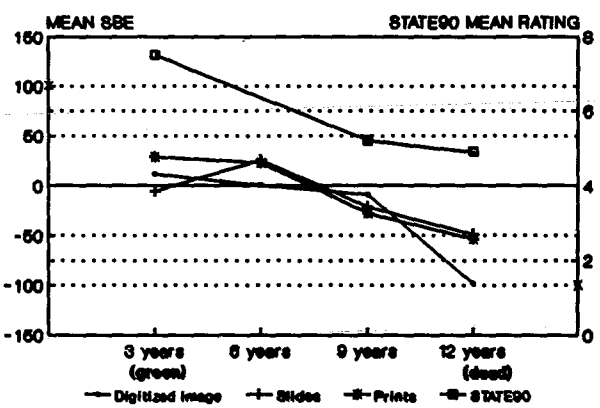
Individual Scenes - Retrospective
AI1319 - Jean Lake



AI1532 - Kenai Lake/Snug Harbor



AI0617 - Kenai River/Schooner Bend



DI n=135 S n=84 P n=144 STATE90 n=103

visitor ratings was .90. As a further test of the consistency of scenic beauty judgements across different public groups, samples of undergraduate college students at the University of Arizona and the University of Illinois (most of whom had never visited Alaska) also rated the scenes. Ratings by the two college student samples were in very good agreement with each other (r = .93), and with the visitors sampled on-site in Alaska (r = .89 and .90 for Arizona and Illinois samples, respectively). Correlations between the student samples and the Alaska residents were somewhat lower (both = .73), but still indicated substantial agreement.

The Alaska State survey also included a replication of the perceptual assessment for some of the forest scenes. Color prints of 16 of the 1990 study scenes (including depictions of naturally occurring and computer simulated insect impacts) were mailed to a subset of the randomly sampled respondents, and they subsequently reported scenic beauty ratings for the scenes in a telephone interview. Ratings exactly paralleled those found in the 1990 study. Thus, scenic beauty perceptions were not only shown to be consistent between residents and visitors over different presentation formats, but they were replicated by a random sample of south central Alaska residents, justifying substantial confidence in the generality of the findings summarized in the next section.

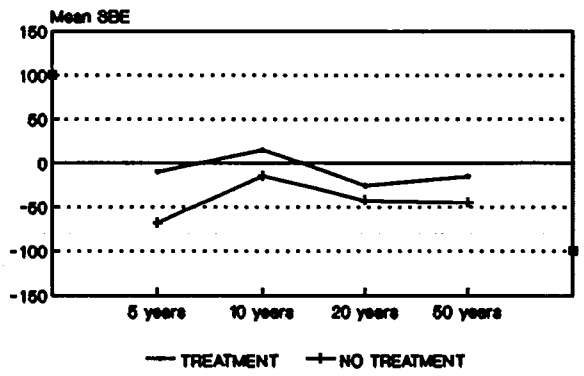
Scenic Beauty Perceptions

The results of the 1990 perceptual assessment, based on individual scene judgements, clearly and consistently showed that scenic beauty values declined significantly as the proportion of bark-beetle killed trees visible in the scene increased. When insect-caused mortality was concentrated in the mid-ground of the scene (Jean Lake and Kenai River/Schooner Bend scenes, Plates 1b, 3 and 4), perceived scenic beauty decreases were especially pronounced. This pattern obtained across unaltered scenes (which included scenes with varying amounts of insect impacts), and was strongly confirmed by the judgement patterns for the simulated scenes where insect impact was systematically manipulated.

The Cooper Creek Campground scene (Plate 5) depicted a closer, more confined view including only a few bark beetle killed trees, and scenic judgements were somewhat less sensitive to the depicted changes in forest conditions. Insect effects were least noticeable in the most distant scene, the view toward Cooper Creek from Resurrection Pass Trail (Plate 6), and scenic beauty judgements were understandably less sensitive for this scene. The Kenai Lake views (/Snug Harbor and /South of Snug Harbor, Plates 2, 7, 8 and 9) evidenced intermediate levels of scenic beauty sensitivity to the beetle and forest management changes depicted.

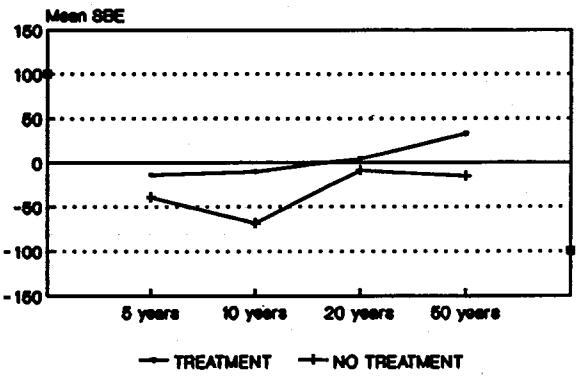
For the simulated scenarios representing the effects of various forest management actions, several major trends were revealed. First, for the retrospective infestation *vs* protective thinning scenario (Kenai River/Schooner Bend, Plate 3), the individual scenes depicting the expected effects of protection by *thinning* were consistently rated higher than the associated scenes from the *no treatment* scenario. Second, ratings of the scenes from the alternative restoration treatment scenarios indicated a consistent overall preference for *treatment* alternatives that accelerated recovery to forested conditions. While these trends were evident in the single-scene ratings, whether presented as video, prints or slides,

Individual Scenes - Restoration
AI0614 - Cooper Creek Campground



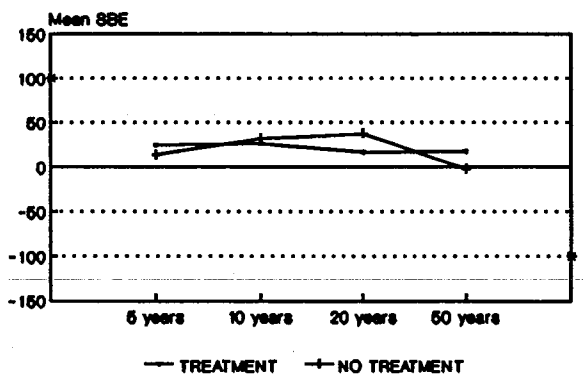
n=363

Individual Scenes - Restoration
AI0617 - Kenai River/Schooner Bend



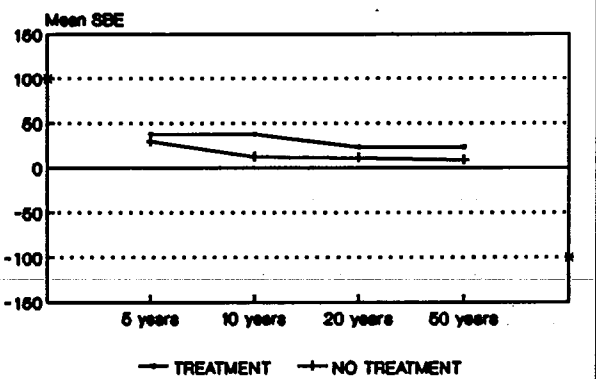
n=369

Individual Scenes - Restoration
AI0714 - Cooper Creek/Res. Pass Trail



n=363

Individual Scenes - Restoration
AI1532 - Kenai Lake/Snug Harbor



n=369

relative preferences for the various forest management alternatives were most clearly revealed in the four-scene, forced choice format discussed in the next section.

Preferred Future Forest Conditions

Some of the residents sampled in the 1990 study and all of the 1991 participants made forced choices between pairs of four-scene sets depicting future conditions expected to result from different possible forest management actions. The four-scene sets were all presented as color prints, with four individual prints arrayed on an 8 x 10 inch page. Most of the individual scenes were the same as those presented in the single-scene format discussed above.

Each of the paired sets presented two different four-scene scenarios (on facing pages of a photo-album book) for a given base scene, e.g., the scenes in Plate 3a *vs* those in 3b. Thus, sets were paired so that each four-scene member of a pair depicted a different "future" for a given base scene. The pairs were bound into photo-album books, with the order of pairs in each book determined by one of two random sequences. Both retrospective and future forest conditions were simulated for each base scene, as described above, and illustrated in the color Plates.

In the 1990 study, each participant made choices between *treatment* and *no treatment* restoration scenarios for each of the four base scenes. The four scenes in each set consisted of visual simulations of a given base scene as the expert panels expected it to look 5, 10, 20 and 50 years following the postulated treatment or no-treatment scenarios. For all four of the base scenes, the *treatment* scenario depicted future forest conditions expected to result from a salvage removal of dead spruce overstory (clear cut), followed by site-preparation burning to encourage spruce regeneration. The *no treatment* scenario depicted the projected consequences of a postulated wildfire (occurring at year zero) followed by natural regeneration, resulting in predominately grass and brush with some hardwood overstory. These scene sets are presented in Plates 3 through 7.

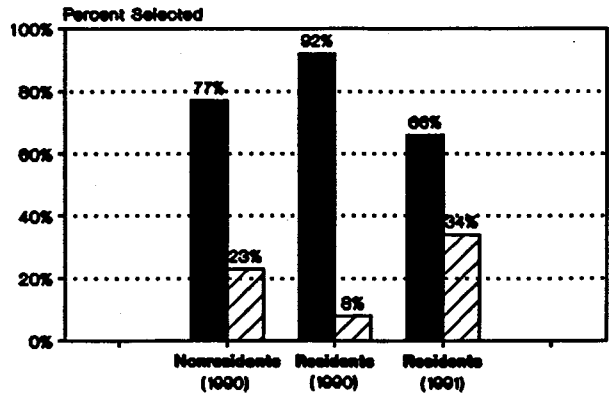
The final pair presented the two retrospective scenarios for the Kenai River/Schooner Bend scene (Plate 3). One four-scene set depicted the progressive stages of bark beetle infestation (from approximately 1978) based on historic data, with the final scene being the unmanipulated (digitized) picture of the scene with virtually all of the spruce dead (1990). The alternative four-scene set depicted the expected progression of the scene over the same years, based on the postulated 50% thinning treatment.

The results of the paired-comparisons among the four-scene sets in the 1990 study were consistent with the individual scene assessments. For the retrospective scenarios, the *thinning* option was consistently preferred over the *no treatment* infestation scenario.

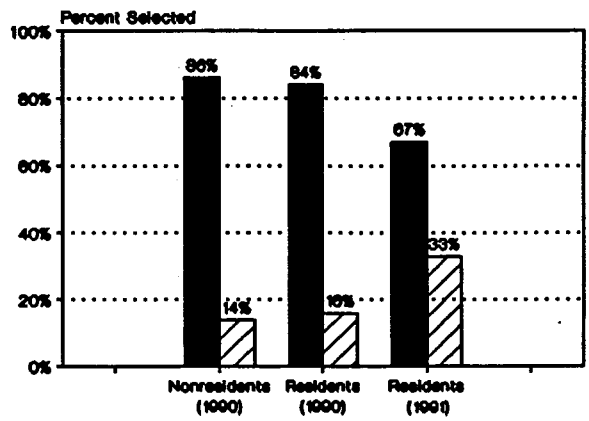
For the restoration alternatives, the *treatment* scenarios, which more quickly and completely restored a predominately spruce forest, were consistently preferred over the *no treatment* scenarios, where recovery was slower and resulted in more grass, brush and hardwoods.

The results of the 1991 paired comparisons mirrored the 1990 findings for the same scenarios. In addition, a more detailed study was conducted comparing four different management options for the Kenai Lake/Snug Harbor scene. Comparisons among the

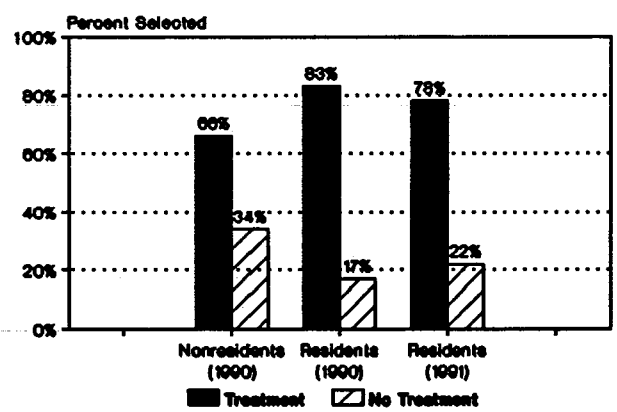
Preferred Future Forest Conditions
Cooper Creek Campground



Kenai River/Schooner Bend

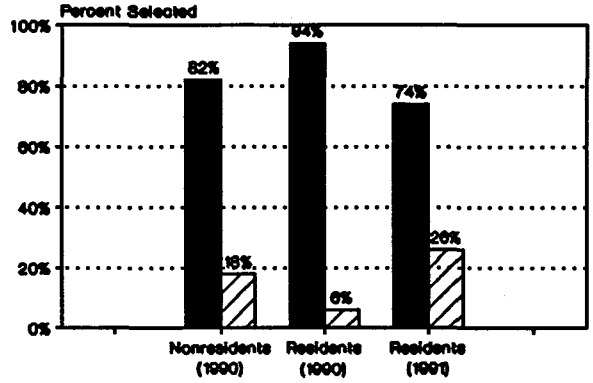


Cooper Creek from Res. Pass Trail

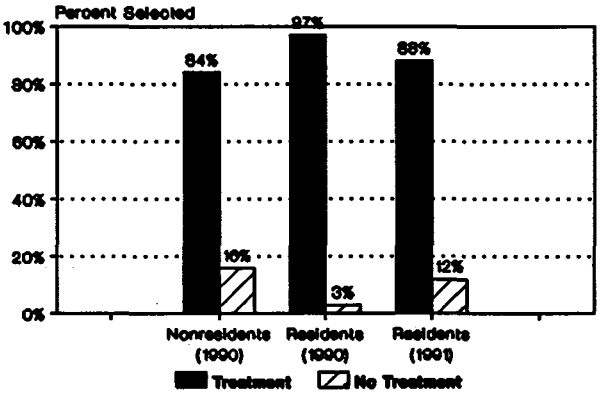


AK90 NR n=70 R n=45 AK91 n=110

Preferred Future Forest Conditions
Kenai Lake/Snug Harbor

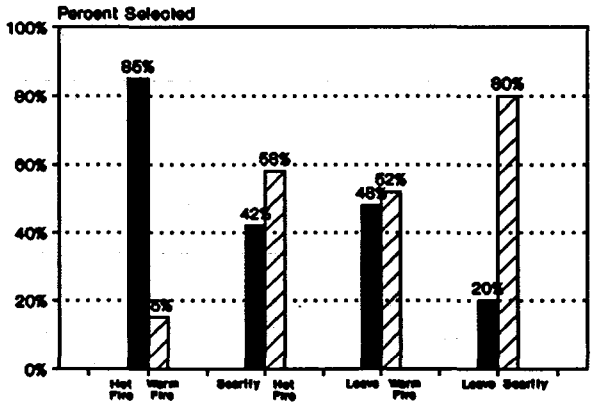


Kenai River/Schooner Bend (Retrosp.)



AK90 NR n=70 R n=45 AK91 n=109

Kenai Lake/Snug Harbor (1991)



AK91 H/W & L/S n=110 S/H n=49 L/W n=58

alternative forest restoration options, following a clearcut of the dead spruce, revealed that the strongest preference was for the *very hot fire* option (where felled dead trees were left to burn). The second most preferred option was *mechanical scarification*, followed closely by *moderately hot fire* (felled trees removed before burning), which was only slightly favored over the no-treatment *leave* option. For the one exploratory near-view scene, the *thinning protection* treatment was consistently preferred over the *no treatment* option.

Summary

The expressed preferences among the four-scene scenarios were consistent with the results of the single-scene assessments. The retrospective simulation of *thinning* spruce prior to infestation was rated higher and chosen more often than the *no treatment* option which resulted in large numbers of dead spruce. The individual scene ratings and choices among alternative restoration scenarios indicated a clear preference for *treatment* options that accelerated the recovery of forest cover, especially those, such as *hot fire* and *mechanical scarification*, that restored a significant cover of spruce. In short, respondents preferred to keep forests green if possible and, when significant numbers of trees were already dead, they preferred scenarios that featured faster recovery of forest cover, especially spruce.

An Important Caveat

While the results of the perceptual assessment were quite clear, it is important to acknowledge two important limitations on their interpretation. First, the "future forest conditions" represented in the computer simulations were based on the best available forest data and expert consensus regarding the most likely outcomes of the management alternatives considered. Still, human ability to predict complex biological processes is significantly limited, and many important factors (such as climate variations, wildfires, etc) can neither be predicted nor controlled. It follows that the specific details of the conditions depicted in the simulations represent "average" conditions based on the experts' "best estimates," and should not be viewed as absolutely certain outcomes.

Finally, the perceptual assessments pertain only to expressed preferences for the ***visual*** outcomes of the alternative management options evaluated. Many important issues, such as the economic costs of achieving the outcomes and the environmental consequences associated with each, cannot be directly represented by visual simulations, and these factors undoubtedly have significant effects on public reactions to forest management actions. Some of these non-visual issues were more directly addressed in the verbal portion of the assessment, described below.

ACCEPTABILITY OF ALTERNATIVE MANAGEMENT POLICIES

Following the forced-choice evaluations of alternative future forest conditions, some of the respondents in the 1990 study and all of the 1991 respondents answered questions about bark beetle-related forest management policies. Issues addressed in this part of the assessment were identified through individual interviews with forest and pest management specialists in the US, State and local Bureau forest management agencies, local residents,

tourist facility operators and recreators and tourists visiting facilities in the study area. The specific statements and format for the assessment were evaluated and refined in a pilot test on a sub-set of the 1990 respondents.

The management policy section of the assessment was introduced by a general description of the life cycle of the spruce bark beetle and how it attacks and kills trees. The outbreak on the Kenai Peninsula was described, including an oblique aerial photograph of a severely affected area just north of the Kenai River near Cooper Landing.

The policy assessment was divided into five sections, each preceded by a brief description. Individual sections included questions pertaining to the acceptability of management policies in different contexts, including:

1. **general policies** regarding whether to allow the outbreak to follow its natural course or to actively try to stop it;

2. **prevention** of the conditions that may lead to outbreaks;

3. **protection** of trees in threatened areas once an outbreak is already underway;

4. **restoration** of forest areas that have already been severely affected by an outbreak; and

5. questions pertaining to **expectations** regarding the future spread of the current Kenai Peninsula outbreak.

A copy of the complete assessment instrument, including introductory information and instructions is provided in the attatched Appendix to this report.

General Policies

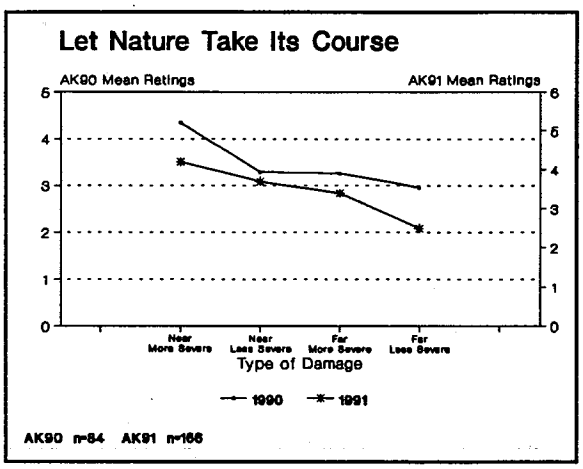
This section sought to determine in general the circumstances under which respondents would favor not taking any explicit management action in response to the bark beetle infestation. The introductory statement for this section was:

One response to the spruce bark beetle outbreak is to accept it as a natural process and to just "let nature take its course." In remote areas this may be the only possible response. In some Parks and Wilderness Areas it may be the only alternative allowed by law. Where managers have a choice, the best policy is to let nature take its course, so long as the area is:

Four situations were described which differed in the severity of the beetles' effects on the forest and where the effects occurred relative to human developments. *More severe* effects were represented as areas where most of the spruce trees would be killed and "only grass and brush is expected to grow back." *Less severe* effects specified less tree mortality and that "new trees are expected eventually to grow back." The location of the effects was described as *near* or *far away* from homes and recreation areas.

For both residents and visitors in the 1990 study, and for the residents in the 1991 study, the greatest willingness to **let nature take its course** was for areas described as *far away* from developments where damage was described as *less severe*. There was split agreement and disagreement for this policy in *far away/more severe* and *near/less severe* conditions. The majority of respondents disagreed strongly with the **let nature take its course** policy for areas *near* developments

where damage was described as *more severe*.



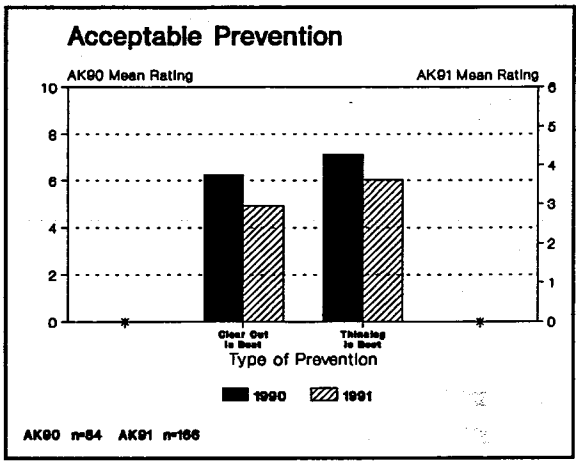
Prevention Before an Outbreak

This section focussed upon actions that might be taken in forest areas that are not currently infested, but are threatened by bark beetle infestation. In particular, this section addressed the acceptability of vegetation management options, such as thinning or clear cutting susceptible spruce stands.

The text that introduced this section was:

One method for protecting forest areas that are threatened by the bark beetle outbreak is to remove about half of the trees. This is intended to reduce the number of places for the beetles to breed and to help the remaining trees grow more vigorously so that they are better able to resist beetle attacks.

There was substantial agreement that removing some trees (about 50%) is an effective and acceptable method for protecting threatened stands. Consistent with the Alaska State survey, residents in both the 1990 and 1991 studies indicated that *thinning* was the most preferred method for tree removal. In both studies there was generally less agreement with *clear cutting small patches*, though about 22% of the 1990 resident sample rated this option as "completely acceptable," and 15% of the 1991 sample "strongly agreed" with this approach.



Respondents in the 1991 study agreed that *cut trees should be sold to private companies*, and that cutting and revegetation treatments should be implemented even if *selling the trees will only pay for part of the costs*.

Protection During an Outbreak

The focus of this section was on forest areas currently involved in an active bark beetle infestation. Based on available pest management options in these circumstances, the only management alternative offered was to spray insecticides. The questions posed addressed the particular conditions under which various spraying policies would be approved.

The introductory statement was:

During a bark beetle outbreak it is possible to protect selected trees by spraying environmentally approved insecticides directly on the bark. Spraying costs about 5 to 10 dollars per tree and lasts for up to three years.

The use of insecticides, even when presented as "environmentally approved," produced very divided responses. The 1990 study yielded a pattern of widely split opinion, with slightly more residents finding insecticide spraying "completely acceptable" (21%) as compared to "completely unacceptable" (14%). Visitors showed a much stronger pattern for this question, with only 2% indicating completely acceptable and 30% completely unacceptable. In the 1991 study 44% strongly or moderately agreed vs 30% strongly or moderately disagreeing that insecticides *are perfectly safe for use around homes and recreation areas*; the middle 25% tended more to mild agreement.

Interestingly, the Alaska State survey found a pattern of greater acceptability for *encouraging property owners to use insecticides* the farther the respondent was from the affected sites; there was 65% approval by residents in the affected areas, 72% by residents of other (unaffected) Kenai Peninsula areas, and 80% by Anchorage residents. At the same time, only 39% of Kenai residents favored the use (by the State) of insecticides to protect trees in campgrounds. The indication is that insecticide use evokes strong reactions, and involves more than one dimension of public concern.

The more detailed pattern of responses provided by the 1991 study indicated that insecticides were generally accepted as the most effective protection method. Defining "agreement" as a rating of 1 through 4, and "disagreement" as ratings 7 through 10), a larger proportion (47%) of 1991 respondents agreed that *spraying insecticides is the best way to protect large trees*, with 36% disagreeing. Only 22% agreed that spraying makes trees *essentially 100% safe from bark beetle attack* vs 42% who disagreed. Objections to insecticides were based on their potential harm to *other insects and animals* (40% vs 30%) and because they are *potentially dangerous to humans* (42% vs 30%). At the same time 57% indicated they would be *willing to use environmentally approved insecticides to protect important trees near your home* as apposed to 31% who would not.

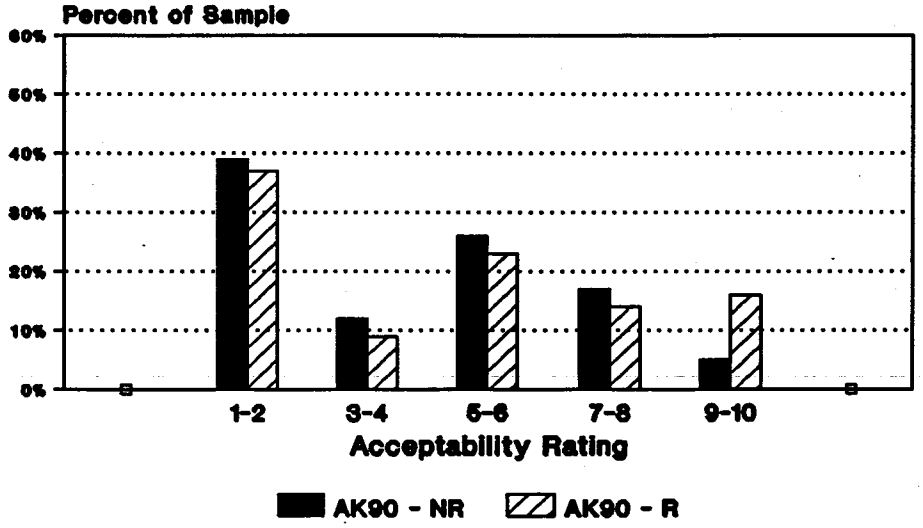
Restoration After an Outbreak

For many parts of the Kenai Peninsula the primary concerns are no longer prevention or even protection, but **restoration** of large areas of forest already severely affected by the bark beetle infestation. The introduction to this section of the policy assessment stated:

After a major beetle outbreak, a primary concern for forest areas that are frequently visited or seen by people is with how to treat the large areas of dead trees. Often more than 90% of the spruce trees are dead. New spruce trees need bare soil and sunlight to get started, and they need protection against competing grasses and brush for the first few years. The best treatment for beetle-affected forest areas is:

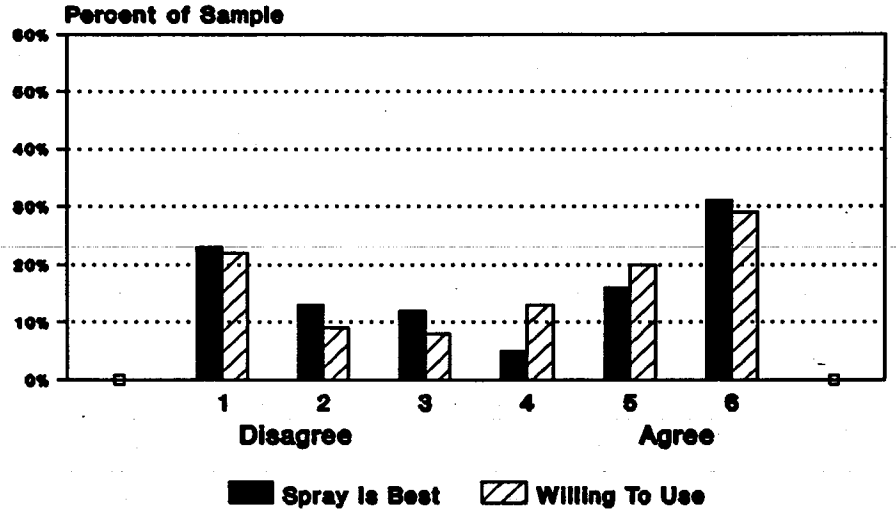
Options offered in this context included methods of dealing with the large numbers of dead trees (*leaving the forest undisturbed*,

Protection During An Outbreak
1990 Sample



R n=84 NR n=67

Protection During An Outbreak
1991 Sample



AK91 n=166

cutting and leaving or *cutting and removing* the dead trees), and with alternative methods of regenerating the forest. Alternatives for getting new trees to grow on affected sites primarily involved reducing competition from grass and brush by use of fire, *very hot* or *moderately hot, scraping the ground bare in some areas* (mechanical scarification) or *applying environmentally approved herbicides.*

In the 1991 study there was strong support for "doing something," as apposed to leaving bark beetle affected areas untreated. Less than 1% strongly agreed with a policy of *leaving the forest undisturbed, and allowing it to recover as best it can.* This result is consistent with responses to the *allow nature to take its course* options in the 1990 study and as repeated in the General Policy section of the 1991 study, where treatment of severely damaged areas near developments was consistently strongly favored. *Cut, remove and burn* was the most popular restoration option for Alaska residents in both the 1990 and 1991 studies. In response to a similar set of options, 77% of Kenai Peninsula residents participating in the Alaska State survey favored *cutting and removing the dead trees,* and 67% favored *cutting, burning and revegetating damaged areas along highways,* compared to 29% favoring *leave them as is.*

For areas near homes only 13% of Kenai residents favored the leave as is option. Thus, residents in all three studies generally favored cut and burn options for rehabilitating stands, especially when the trees are removed prior to the burn. Danger of wildfire was not a sufficient reason to preclude burning for most 1991 respondents, 47% disagreed with the policy that burning *should not be allowed because of the danger of starting wildfires* vs 31% who agreed.

Reactions to the herbicide options, like those to insecticide spraying, were widely split with about as many strongly agreeing as strongly disagreeing. In the State survey respondents preferred scraping or the use of mats (an option not offered in either the 1990 or 1991 studies) over chemical treatment (herbicide), whether used with or without fire. Only 23% of 1991 respondents agreed that the side effects of burning *have as bad an effect on the environment as herbicides,* while 44% disagreed. There was, however, a strong split in opinion regarding a complete prohibition against the use of herbicides; 26% of respondents strongly agreed that *herbicides should not be used under any circumstances,* matched by another 26% who strongly disagreed with that prohibition.

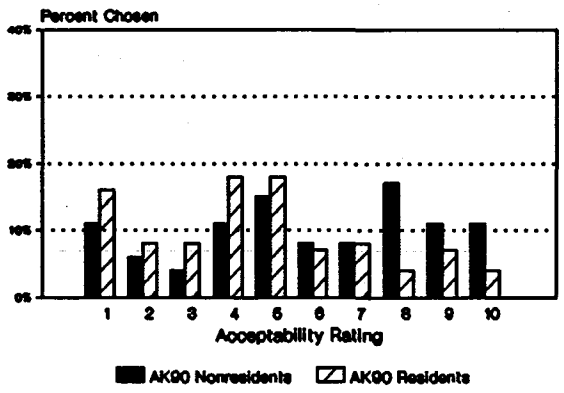
Expectations

This final section of the policy acceptability assessment addressed expectations for the future spread of the bark beetle outbreak. The goal of this section was to determine the extent to which respondents perceived the outbreak as a continuing threat, and whether they believed it might have serious consequences for their own communities. The context for this part of the assessment was set by:

The spruce bark beetle outbreak has now affected over 200,000 acres on the Kenai Peninsula. Biological surveys indicate that the outbreak may be continuing to spread.

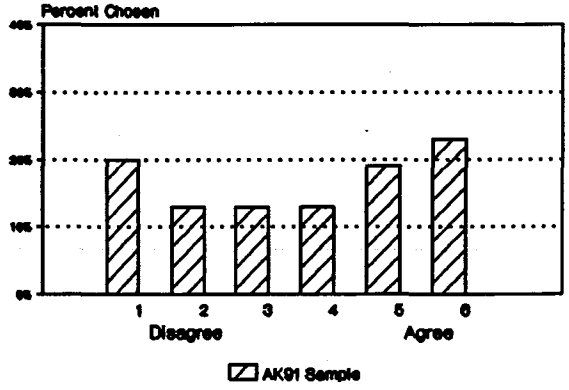
Three statements that followed addressed the likelihood of the outbreak spreading to *other areas on the Kenai Peninsula, to the area where you live* and the expected severity of effects should the outbreak spread, *you would not expect more than half of the spruce trees to be lost.*

Restoration - Cut/Leave/Burn - 1990



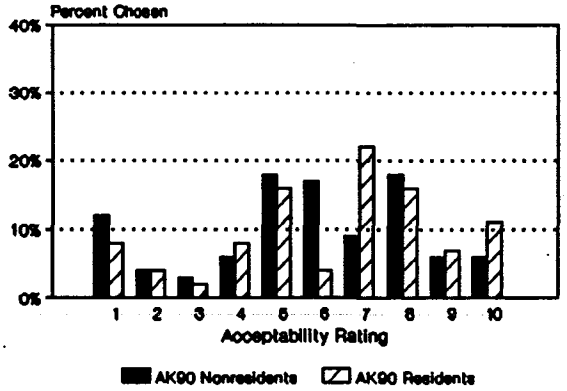
NR n=66 R n=44

Restoration - Cut/Burn - 1991



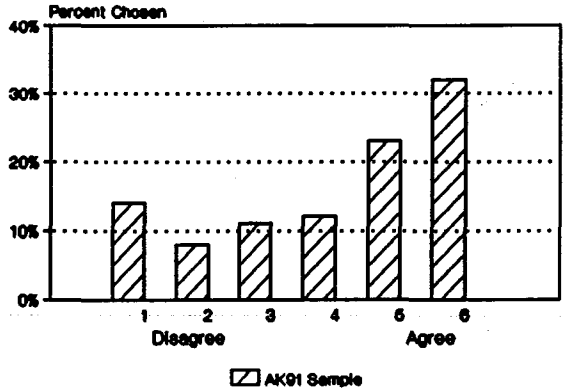
n=79

Restoration - Cut/Remove/Burn - 1990



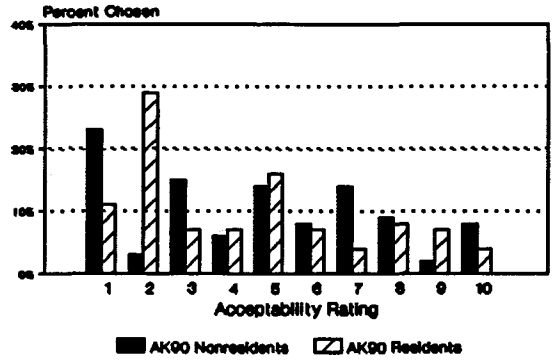
R n=45 NR n=66

Restoration - Cut/Remove/Burn - 1991



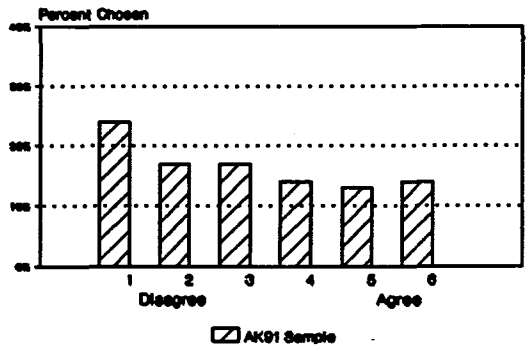
n=73

Restoration - Cut/Scrape - 1990



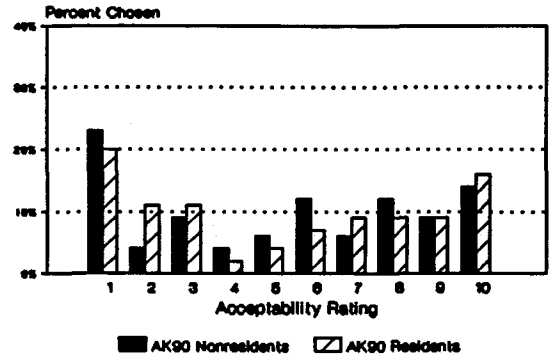
R n=45 NR n=66

Restoration - Cut/Scrape - 1991



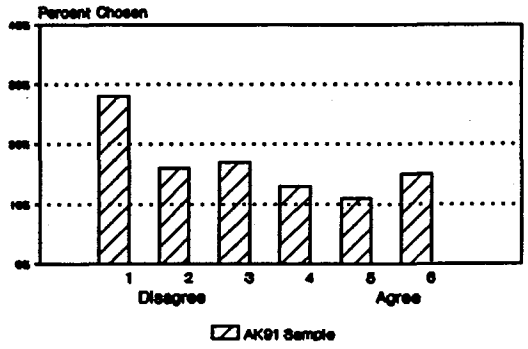
n=66

Restoration - Cut/Herbicide - 1990



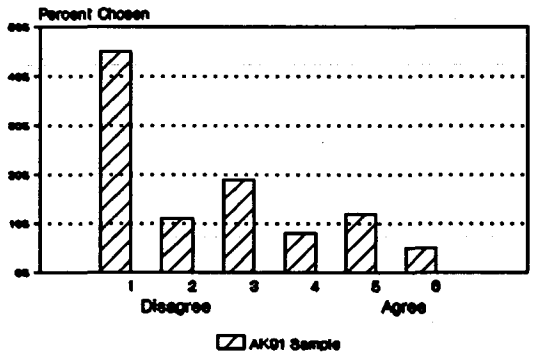
R n=44 NR n=66

Restoration - Cut/Herbicide - 1991



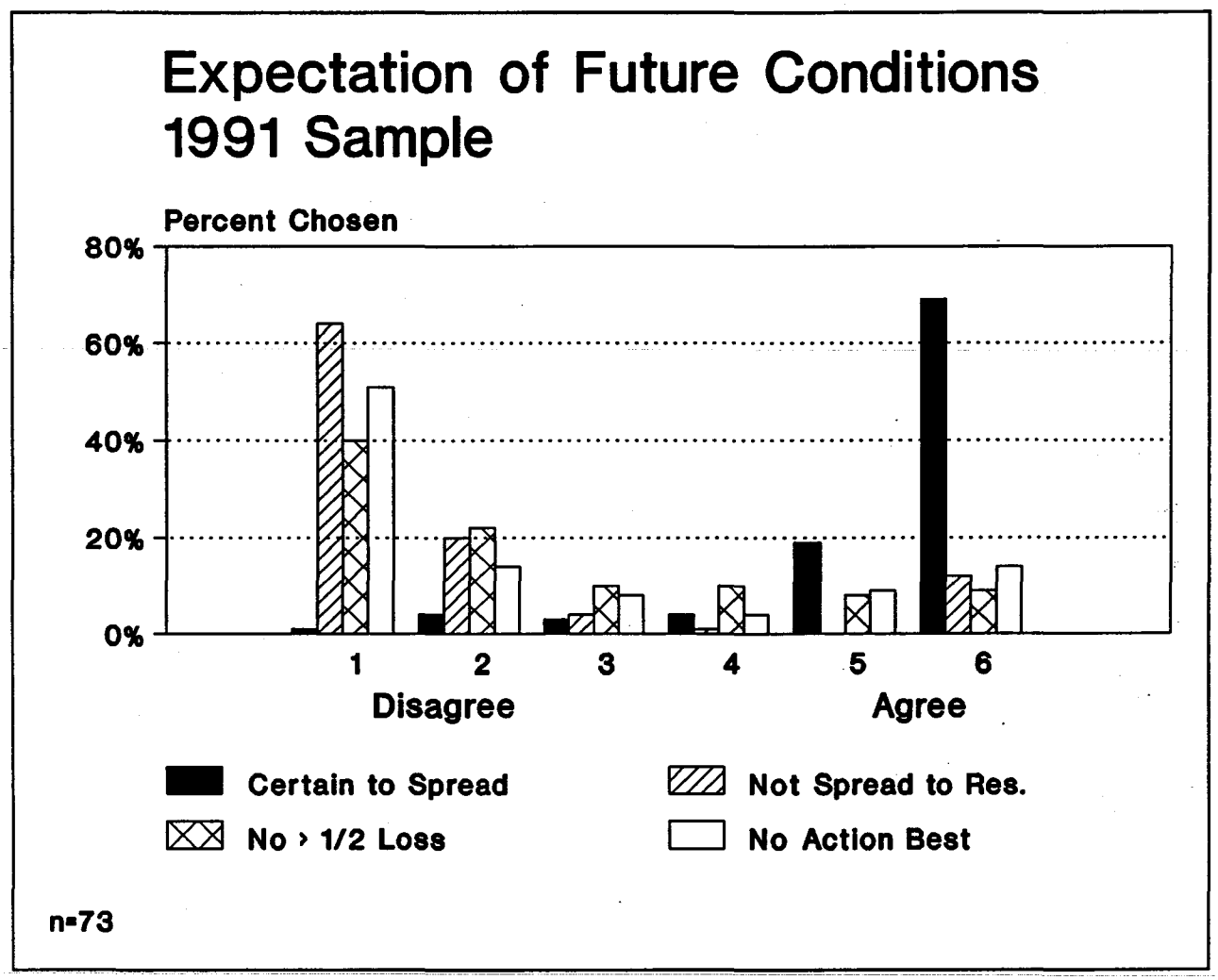
n=76

Restoration - Leave Undisturbed - 1991



n=76

The residents sampled in the 1991 study were quite certain that the outbreak *will continue to spread* (89% agreed), that it *will spread to their own properties* (83%), and that substantial damage will result when it does spread to their area; 62% agreed that *at least half of spruce trees will die* in affected areas.



The final statement in the assessment attempted to reach the "bottom line:" *All things considered, you would rather allow most of the spruce trees in your area to be killed by bark beetles than to have the forest treated by cutting and spraying insecticides.*

Overall, 66% of the residents sampled in 1991 disagreed with the policy indicated by this statement.

Summary

A number of consistent policy preferences emerged across the two studies reported. First, there was agreement that some

management intervention is preferable to "letting nature take its course," especially for areas near developments when damage is severe. The most preferred ***prevention*** treatment was *thinning* (about 50%) stands in threatened areas, with *clear cutting small patches* garnering less support.

The only ***protection*** option offered was spraying approved insecticides, which produced strongly divided responses. The majority of residents in both the 1990 and the 1991 studies were almost equally split between strong agreement and strong disagreement. This split pattern was repeated for the associated items referring to the effectiveness and safety of insecticide use. Visitors in the 1990 study tended to more strongly oppose the use of insecticides.

There was much greater consensus regarding ***restoration*** options. Generally, there was strong agreement across studies and respondent groups that some active rehabilitation effort should be undertaken in areas of severe beetle damage, and the *cut, remove and burn* alternative was consistently preferred over other options. As with insecticide use, the application of herbicides met with responses that were approximately equally split between strong agreement and strong disagreement; the majority of the 1991 respondents were divided equally between strong agreement and strong disagreement with a complete ban on the use of herbicides.

The observed relationships between the observed patterns of support and non-support for alternative forest management policies and the perceptual preferences expressed by the same groups of respondents reveals a potential dilemma. The forest conditions most preferred in the perceptual assessment--where possible, retain green forests dominated by mature spruce, or where damage has already occurred, re-establish green spruce as quickly as possible--are most readily achieved by management policies that were the least acceptable, or that resulted in strongly split opinion, such as the application of insecticides or herbicides. Thus, the future forest conditions most consistently preferred perceptually may be in conflict with the management options most consistently preferred for achieving those conditions. The next section directly addresses the relationships between individual respondent's preferred perceptual *ends*, and their support for the implied management *means*.

PREFERRED ENDS VS ACCEPTABLE MEANS

The conflict between preferred future forest conditions and acceptable management strategies noted above is based on comparisons among average responses over all respondents. Even with this overall pattern of conflict it is possible that individual respondents could hold consistent perceptual and policy preferences; those who strongly prefer green forest conditions might be more tolerant of management practices required to achieve and maintain those conditions, and *vice versa*.

To further investigate this important relationship, and to further articulate the patterns of agreement and disagreement with the management policies assessed in the 1991 study, a **factor analysis** was conducted.[6] This analysis allows the discovery of consistent patterns of responses across the different

policy questions, and provides a better basis for determining the relationships between individual perceptual and policy preferences.

Policy Factors

The analysis revealed several important "factors," defined by consistent patterns in respondents' support (or non-support) for specific sets of management policies. By far the strongest factor (accounting for 37% of the variation in respondents' reactions to the policies offered) was defined by the degree of support (or non-support) for the use of insecticides and herbicides. Respondents scoring high on this ***chemical treatment*** factor tended to support the use of insecticides and herbicides, while those scoring low on the factor tended to be opposed to such treatments. The high end of this factor was associated with strong disagreement (and the low end by strong agreement) with the policies of:

...leaving the (damaged) forest undisturbed; and
...allow most of the spruce trees in your area to be killed by bark beetles (rather) than have the forest treated by cutting and spraying insecticides.

At the same time, the ***chemical treatment*** factor was characterized by stronger agreement (disagreement) with policy statements relating to the use of insecticides for protecting threatened forest areas:

Spraying insecticides is the best way to protect large trees near homes...;
Trees that are sprayed with approved insecticides are essentially 100% safe from bark beetle attack;
Environmentally approved insecticides are perfectly safe...; and
I would be willing to use environmentally approved insecticides...;

while disagreeing (agreeing) with statements that

Insecticides should <u>not</u> be used ... because other insects and animals might be harmed; and
... approved insecticides should not be used because they are potentially dangerous to humans.

With regard to rehabilitation of forest areas already damaged, this factor was defined by stronger agreement (disagreement) with

cutting and removing the dead trees and applying environmentally approved herbicides,

and disagreement (agreement) with

Herbicides should not be used under any circumstances because of possible contamination of the environment.

Following the ***chemical treatment*** factor were four much weaker factors, which achieved minimal statistical criteria for consideration. The second factor (explaining 14% of variance) also involved the degree of support for chemical treatment options, but was primarily defined by the degree to which the continuing bark beetle outbreak was perceived as a ***threat***. Respondents contributing high scores on this factor tended to support chemical treatments, but judged that there was little threat that the bark beetle outbreak would actually continue to spread. The high end of the ***threat*** factor was associated with stronger agreement that:

There is very little chance that the bark beetle outbreak will spread to the area where you

live; and
... if the outbreak does spread to your area, you would not expect more than half of the spruce trees to be lost .

In addition, the ***threat*** factor included agreement with statements indicating that insecticide spraying is *100 % effective* for protecting threatened trees, and *removing trees* (e.g., thinning) is not effective. For rehabilitation *cutting and removing dead trees and applying herbicides* is preferred, while burning is judged to have *as bad an effect on the environment as herbicides*, and burning *should not be allowed because of the danger of starting wildfires*.

The third factor (explaining 13% of variance) was complex, defined by agreement (disagreement) that the outbreak was *certain to spread* coupled with disagreement with "allowing nature to take its course" (except when damage was *less severe* and *far away* from developments). This factor was also associated with preferences for rehabilitating damaged areas by *cut, remove and scrape* treatments and by opposition to burning because of the *danger of starting wildfires*.

The fourth and fifth factors were very weak (explaining 9% and 7% of variance, respectively), but do suggest other patterns of response to the policy options assessed. Factor four was characterized by agreement that the outbreak was *certain to spread*, coupled with support for protecting threatened forest areas by *clear cutting small patches* and for cutting trees on public lands *even if selling the trees will only pay for part of the costs*.

The final factor, which had minimal statistical power, was defined by acceptance that the outbreak will spread to the respondent's area and will do substantial damage (indicated by disagreement with *little chance that the bark beetle outbreak will spread*, and with *not expect more than half of the spruce trees to be lost*), but a willingness to let nature take it's course *near to homes and recreation areas, even when the damage to the forest is more severe*. For areas already severely damaged, the rehabilitation option associated with this factor was *cutting and removing the dead trees and then burning the site with a moderately hot fire*.

Relationships with Perceptual Preferences

To be consistent, respondents whose expressed perceptual preferences indicated a desire to keep threatened spruce forests green, or to have beetle impacted forests restored quickly, should have also supported forest management actions that can effectively achieve those ends (e.g., preventative cutting, insecticide spraying and herbicide use). Alternatively, individuals who disagreed with these forest management approaches should have been more accepting of the visual impacts of bark beetle infestations in forest scenes. To investigate these relationships individual respondent's scores on the management policy factors described above were related to their perceptual preferences as expressed in the four-scene forced choice section of the assessment.

An aggregate measure of perceptual preferences was computed for each respondent as the percentage of choices in which the ***treatment*** scene-set was selected over the ***no-treatment*** set. This measure of preference for treatment-produced forest conditions was related in a multiple linear regression analysis to the five management policy factors described in the preceding section.

Factor Loadings by Policy Item*

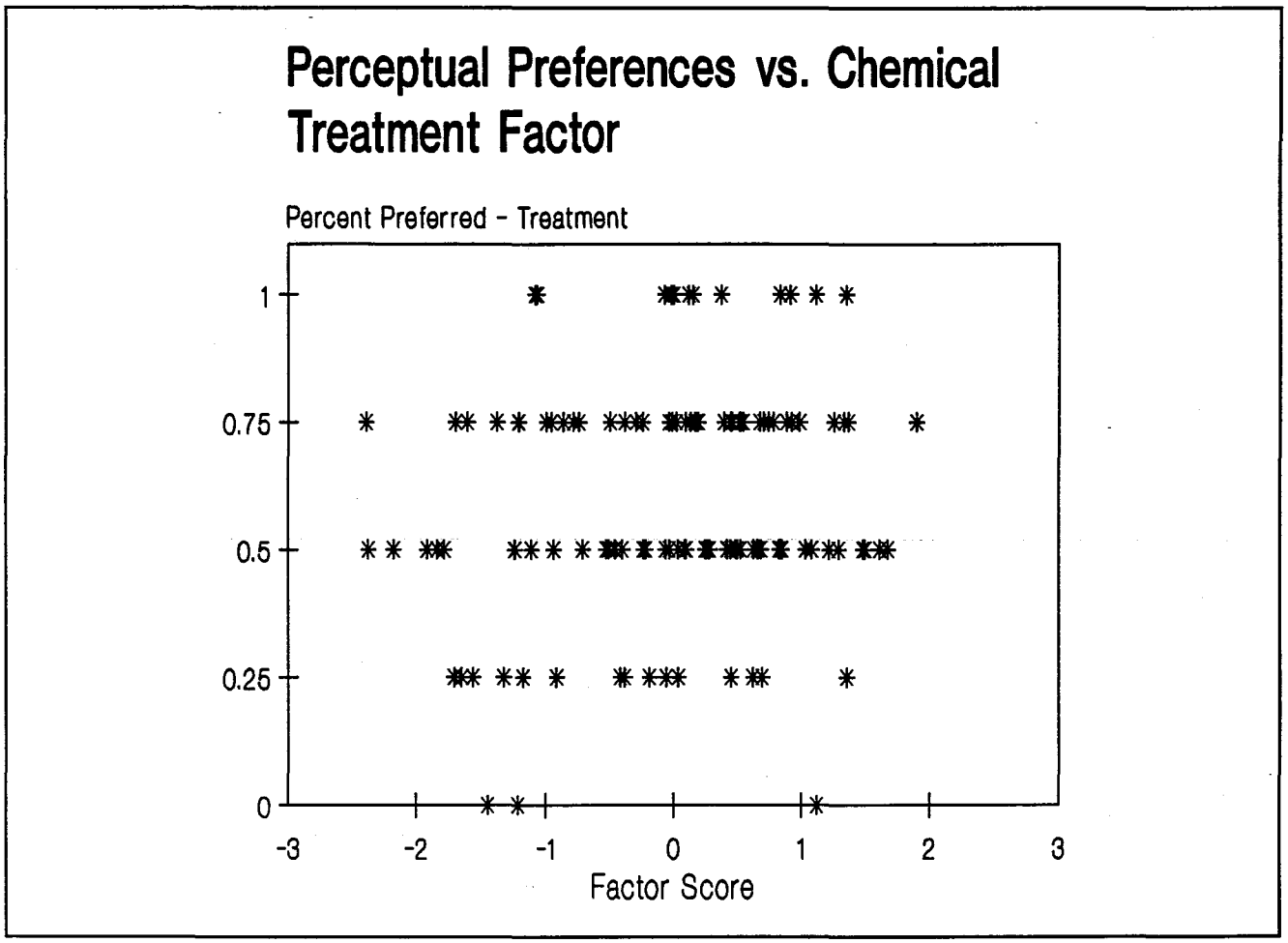
Item #	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
1	.001	-.042	.045	.171	-.166
2	-.134	.024	**-.433**	.252	.070
3	-.142	-.028	**-.403**	.305	.216
4	-.157	.176	**-.452**	.149	**.506**
5	.145	-.098	.331	.279	.023
6	.012	**.402**	-.069	.063	-.104
7	.210	.190	.258	**.386**	-.205
8	-.061	.208	.263	-.069	.293
9	.259	.177	.126	.194	-.086
10	.291	-.178	.084	**.430**	-.037
11	.054	.203	.109	.187	.148
12	**.761**	.135	-.094	-.189	-.071
13	**.558**	**.453**	-.055	.033	.117
14	**.698**	.249	-.183	.090	.058
15	**-.639**	.149	.235	.245	-.039
16	**.794**	.097	-.063	.053	-.026
17	-.259	.051	.114	.044	.128
18	**-.767**	.117	.106	.145	-.075
19	**.418**	.062	.126	.112	.211
20	.336	-.058	.128	.296	**.383**
21	-.036	.244	**.415**	-.078	.053
22	**.504**	**.401**	.085	-.034	.187
23	**-.606**	.174	-.268	.070	.040
24	**-.724**	.015	.198	.074	.221
25	-.395	**.487**	.229	-.262	.125
26	-.285	**.484**	**.396**	-.063	.018
27	.241	-.277	**.434**	**.398**	-.043
28	-.023	**.581**	-.200	.114	-.284
29	-.058	.398	-.246	.213	**-.361**
30	**-.628**	.097	-.228	.227	-.054

* Complete text for Items In attatched Appendix.

The analysis revealed no statistically significant relationships between individual's perceptual preferences and their support (or non-support) for any of the management policy factors, individually or in combination. That is, preferences for the perceptual *ends* were independent of the acceptance of the management *means* most likely to achieve those ends. Further analysis also revealed no consistent differences among the respondent groups sampled (the various Kenai Peninsula resident groups participating in the study) in either perceptual preferences, support for the policy factors or in the relationships between perceptual preferences and patterns of policy support.

Summary

Factor analysis of the agreement and disagreement with the various forest management policies assessed revealed several coherent patterns. The strongest pattern was represented by the ***chemical treatment*** factor. The high end of this factor was defined by higher levels of support for active forest treatments, particularly for the use of insecticides and herbicides, which were accepted as safe and effective methods for prevention, protection, and restoration of the forest. The ***chemical treatment*** factor provided the strongest divisions among the Kenai Peninsula and Anchorage residents who



participated in the 1991 study, but each community represented in the study had effectively equal numbers of individuals at each end of this scale.

The other policy support patterns discovered in the analysis were considerably weaker. A ***threat*** factor was primarily characterized at the high end by the judgement that the bark beetle outbreak would not spread and would not have very serious consequences if it did. Respondents who scored high on the third factor tended to accept the bark beetle outbreak as a continuing threat, but restricted their support of forest rehabilitation actions to mechanical scarification because of a fear that burning would start wildfires.

The final two factors were both defined by acceptance of the bark beetle as a continuing threat, but those scoring high on the first of these factors tended to support logging as a management approach (including clear cutting and selling trees at a loss), while the weaker of these last two factors was associated with the willingness to accept the consequences of the outbreak and to allow nature to take its course. As for the first factor, there were no consistent patterns of differences among the communities sampled in their scores on these factors.

CONCLUSIONS

The spruce beetle outbreak on the Kenai Peninsula was almost universally recognized as a serious problem by residents of the area. *Increased fire danger* and *loss of scenic beauty* were identified as the most important effects of the bark beetle infestation. Most respondents believed that the outbreak will continue to spread and that their own properties will be significantly affected.

For tourists and visitors to the affected areas sight-seeing was by far the most frequent activity, and the quality of natural scenery was consistently reported as the most important factor affecting their enjoyment of their trip. Clearly, the visual impacts of the bark beetle outbreak are of great concern to both residents and visitors to the Kenai Peninsula, and should be a key consideration in any forest management decisions for the area.

Perceptual Preferences

The assessment of the perceived effects of the beetle outbreak on forest scenery, based primarily on computer video simulations, revealed several consistent patterns. First, whether presented as color slides, color prints or as video images, the greater the proportion of beetle killed trees in a forest scene the lower the rated scenic beauty. This pattern obtained for residents and visitors alike. Second, a hypothetical preventative thinning treatment was consistently preferred to a (retrospective) no treatment infestation scenario which allowed virtually all of the spruce to die. Finally, for forest areas where bark beetle impacts were already severe, respondent's preferred the visual conditions produced by rehabilitation strategies that resulted in more rapid regeneration of forest cover.

The consistency of responses from different respondent groups (residents, visitors and two college student samples), and between the different presentation media employed, strongly supports the conclusion that the results of the perceptual assessments provide a valid basis for predicting the perceptions of residents and visitors who view similar forest scenes directly. The visual impacts of the spruce bark beetle outbreak do significantly affect the quality of resident and visitor experience.

Support for Management Alternatives

The acceptability of alternative forest management responses to the bark beetle outbreak were assessed separately by a series of verbal statements. In areas likely to be seen or visited by people, areas near homes and developed recreation areas, the majority of residents in both the 1990 and the 1991 studies preferred some form of treatment over "allowing nature to take its course." The particular treatment options preferred depended upon the stage of the outbreak.

Prevention in threatened areas: The preferred treatment was to thin threatened spruce stands (by approximately 50%). This preference obtained even though respondents understood that large trees should be taken first and that the costs of treatment (which should include replanting trees) might exceed the revenues likely to result from selling the cut trees.

Protection during an outbreak: Opinion was

most divided here, especially with regard to the possible roles of insecticide spraying. At one extreme were individuals who viewed sprays as less than 100% effective, potentially harmful to animals and dangerous to people. Based on these views, they disagreed with use of "environmentally approved insecticides." None-the-less, many of these same respondents indicated that they would use insecticides to protect high valued trees on their own property. At the other extreme was a group of respondents who agreed that sprays are "the best method" for protection. However, many of these respondents did not believe sprays to be "100% effective," and they tended to be divided on whether spraying was "too expensive for most private property owners."

Restoration after an outbreak: The clear message here was **Do Something!** Preferred actions included cut and remove dead trees (even if selling them will recover only part of the costs), then burn the site to aid in the re-establishment of a spruce forest. Danger of wildfire caused by site preparation burning was generally not viewed as a sufficient concern to preclude fire as a treatment option. Scraping the ground was not widely accepted as a regeneration method, though it did appeal to a minority who were concerned that burning treatments might cause wildfires. The use of herbicides, paralleling the results for insecticide spraying, produced wide splits in opinion, and herbicides were generally less preferred than burning.

Ends vs Means

The analysis of individual respondent's perceptual preferences and the management policies they supported revealed no significant relationships. Perceptual preferences and support for management policy options were assessed separately, so the visually presented *ends* were never directly associated or paired with the management *means* which they most likely implied. This opportunity to "have your cake and eat it too" is not unlike the situation created by most of the public participation activities typically associated with forest management planning.

In the "real world," of course, any given set of forest conditions is necessarily associated with a particular, limited set of management options--forest condition ends are generally not separable from their forest management means. In the context of the spruce bark beetle outbreak on the Kenai Peninsula, for example, the combination of maintaining a dense mature spruce forest and adopting a policy of "allowing nature to take its course" is not a realistic option.

In bark beetle threatened areas, cutting some of the spruce trees now (thinning or patch cutting) may be the only cost-effective way to prevent all the trees from being lost later. The use of insecticides and herbicides is clearly controversial and can be relatively expensive. However, chemical treatments are often the only viable means of protecting threatened high-value trees in campgrounds and near residences, or of insuring regeneration of spruce on important sites where forests have been destroyed by bark beetle infestation.

Implications for Management

The assessment studies reported here, along with the results of the Alaska State telephone survey, provide important insights into public perceptions and values regarding Kenai Peninsula forests and forest management policies. Residents are acutely aware of the bark beetle outbreak, and they expect it to

continue to spread. Residents and visitors alike are perceptually sensitive to the visual impacts of the bark beetle outbreak, and they are concerned with an array of scenically-based forest values that may be adversely affected.

The highest level of concern is for severely affected forests near residential and recreation developments. Any forest management strategy that is responsive to public values and concerns must address visual impacts of the spruce bark beetle outbreak. At the same time, many forest management actions themselves have visual impacts (especially vegetation management alternatives) which must be taken into account; it is important that the management "cure" not produce visual effects that are worse than the bark beetle "disease."

There is a general consensus that some active forest management response is needed and desired. However, there is considerably less consensus regarding what that response should be. Respondents were particularly divided on the acceptability of using insecticides to protect threatened forest strands or of using herbicides to help regenerate spruce on stands already heavily damaged.

There was inconsistency between the perceptually preferred future forest conditions and the acceptability of forest management practices most likely required to achieve those conditions. This inconsistency derives in part from the fact that perceptual and management policy preferences were assessed separately. There was also an indication, however, that respondent's knowledge and/or beliefs about the various management options may not be sufficient for them to make meaningful means-ends trade offs. For example, a significant number of respondents did not believe that insecticides can provide complete protection (for a three year period) against bark beetle attach. Also, even though both were described as "environmentally approved," significant numbers of respondents apparently were not convinced that insecticides or herbicides are safe. If chemical treatments are thought to be less effective and less safe than they actually are, it is unlikely that the public could properly assess their relative costs and benefits as responses to the bark beetle outbreak.

Overcoming the means-ends dilemma will require attacks on several fronts. First, a concerted "environmental education" effort directed at the concerned publics would seem to be indicated. This would require that the scientific community, in and outside the Forest Service and forestry professions, reach a consensus on the effectiveness and safety of chemical treatment options for protecting beetle-threatened forest stands and for regenerating stands already impacted. Then, this consensus must be effectively communicated to the public. Second, the public should be presented with meaningful forest condition-management policy options; in effect they must be allowed to choose among future forest conditions packaged together with the management policies required to achieve those conditions.

Future Research Directions

Computer visual simulation technology was demonstrated to be very effective in communicating the important visual impacts of the spruce bark beetle outbreak. Visualizations also provided concrete comparisons with the visual effects of alternative management actions that might be required to protect or rehabilitate affected forest stands. Respondents were willing and,

apparently quite able, to make consistent choices among alternative future forest conditions that involved changes over as much as a 50-year time period.

Responses to the verbally presented management alternatives produced consistent and coherent patterns of response; the ***chemical treatment*** factor provided the strongest basis for distinguishing among respondent's policy choices. However, there were no consistent relationships between the perceptual *ends* that were preferred and support for the management *means* most likely required to achieve the desired forest conditions.

Based on the outcomes of the two studies reported here, additional efforts are indicated in two important areas. First, visual simulations of alternative future forest conditions should be improved by strengthening the links between forest data, both from inventories and as projected by biological models, and the detailed features of the digital video image representations of those data. Data visualization technology is improving very rapidly, and more refined and consistent algorithms for translating quantitative data into concrete visual representations are being developed. Of equal importance to valid visual simulations are efforts to improve the biological bases for more precisely predicting future forest conditions, including details of the spatial and temporal distributions of projected forest changes.

Second, better formats should be developed for presenting visual simulations together with descriptions and other information about the forest management activities that the achievement and maintenance of those conditions imply. The metric conjoint analysis paradigm[7] and mathematical modeling techniques developed within the marketing research and consumer decision analysis fields offer promising approaches in this regard.

FOOTNOTES

[1] State of Alaska, Department of Natural Resources, Division of Forestry (1992) *Forest health management plan for the western Kenai Peninsula and Kalgin Island.* 40 p.

[2] Daniel, T.C., B. Orland, A. Lynch, J. Hetherington and J. La Fontaine (1990) Integration of GIS and video imaging technology for data-driven visual simulations. In J. Greer (Ed.) *Protecting natural resources with remote sensing.* American Society for Photogrammetry and Remote Sensing, Bethesda, MD, 1990.

[3] Kruse, J. and R. Pelz (1991) *Developing a public consensus on the management of spruce bark beetle on the Kenai Peninsula.* Institute of Social and Economic Research, University of Alaska, Anchorage, AK, 36 p.

[4] Orland, B. (1988) Video imaging: a powerful tool for visualization and analysis. *Landscape Architecture*, 78(4), 78-88.

Orland, B. (1991) Digital image processing aids for visual simulation of forest management practices. In T. Daniel and I. Ferguson (Eds.) *Integrating research on hazards in fire-prone forest environments*, US Man and the Biosphere Program, US Department of State, Washington, DC. 73-83.

[5] Daniel, T.C. and R.S. Boster (1976) *Measuring landscape aesthetics: the Scenic Beauty Estimation Method.* USDA Forest Service Research Paper RM 167, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 66 p.

[6] Gorsuch, R.L. (1983) *Factor analysis*, 2nd Edition, Hillsdale, NJ: Lawrence Earlbaum Associates.

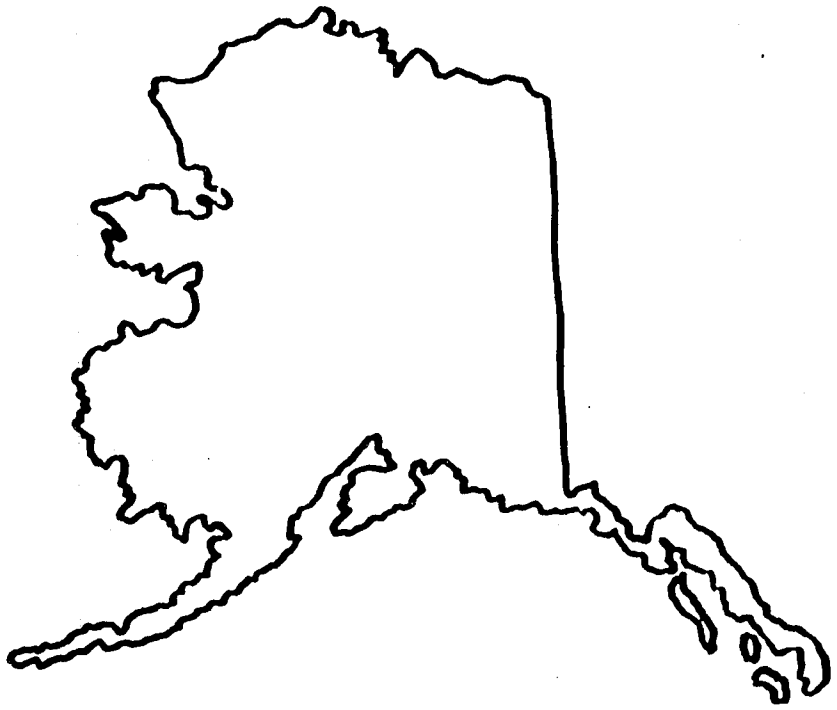
[7] Louviere, J.J. (1988) *Analyzing decision making: metric conjoint analysis.* Sage University Paper series on Quantitative Applications in the Social Sciences, Beverly Hills, CA: Sage Publications. 95 p.

Appendix

Copy of 1991 Assessment Instrument

Environment Perception Assessment

Alaska



ENVIRONMENT PERCEPTION LABORATORY
UNIVERSITY OF ARIZONA

IMAGING SYSTEMS LABORATORY
UNIVERSITY OF ILLINOIS

ENVIRONMENT PERCEPTION ASSESSMENT

The purpose of this study is to investigate public perceptions of the effects of the spruce bark beetle outbreak on the Kenai Peninsula, and to determine what forest management actions are most acceptable to residents of beetle-affected or beetle-threatened areas.

Forests in Alaska are important for many reasons--wildlife, timber, oil and minerals, wilderness and outdoor recreation, and natural scenic beauty to name only a few.

In this study we are interested in the publics' perceptions of the spruce bark beetle outbreak on the Kenai Peninsula. In some places the beetles have already killed most of the trees, and the question is how the affected forests will recover. In areas where the beetle outbreak is now threatening to spread, the question is whether we should attempt to protect the forest and, if so, how.

Responding to the bark beetle outbreak requires the cooperation of a number of federal, state and local government agencies as well as many private land owners. The beetles do not recognize jurisdictions or property boundaries.

It is very important, therefor, that the perceptions and concerns of people who live, work and recreate in the affected areas be considered in decisions about how to respond to the beetle outbreak.

This booklet presents sets of pictures showing how several forest areas could look in the future. The pictures were created with the help of a computer. The conditions shown are based on information about forest conditions and growth patterns, including the effects of bark beetles and forest management actions. You will be asked to judge which of the forest conditions shown you would most prefer. There will also be some questions about the effects of the bark beetle outbreak and about some of the possible ways of dealing with it.

Thank you very much for your help.

FOREST RECOVERY AFTER BEETLE ATTACK

The following sets of pictures show how bark beetle-attacked areas in Kenai Peninsula forests could look in the future. The areas shown have all been affected by the spruce bark beetle outbreak, and now over 90% of the spruce trees are dead.

Pictures are arranged four to a page in this pattern:

5 YR	10 YR
20 YR	50 YR

Each page shows how the scene would be expected to look **five**, **ten**, **twenty** and **fifty years** in the future if certain forest management actions were taken. Each forest area is represented by two pages of scenes, each depicting the expected results of a different forest management approach. Actions might range from simply allowing nature to take its course (no action) to cutting and removing all of the dead trees and planting a new forest. Several of the pages show the effects of fire, either "prescribed" fire used as a management tool, or wildfire.

Some actions result in poorer results in the short term, but better results in the longer term. Other management options may do better in the short term, but not so well in the longer term.

There are fourteen pairs of scene pages. Each pair shows the expected results of two different management actions for the same forest area. We are interested in your judgement of which page of scenes in each pair represents the **best overall scenic quality.**

Please quickly look through all of the pages of scenes, then evaluate each pair of pages one at a time. For each pair, select which page (**A** or **B**) represents the best overall results for the forest area shown.

Record your choice for each pair by circling the appropriate letter (**A** or **B**) on the answer sheet provided.

PROTECTING THREATENED FOREST AREAS

All of the sets of scenes in the previous pages showed views of forest areas that have already been severely affected by spruce bark beetles. The following two pairs of scene sets show possible future conditions for two forest areas that are just beginning to be attacked by beetles.

As in the previous pages, the scenes represent conditions **3, 6, 9** and **12 years** in the future. In the two forest areas shown, most of the spruce trees are currently alive and uninfested by bark beetles. However, both areas are in the path of a spreading beetle outbreak.

Pictures are arranged four to a page in this pattern:

3 YR	6 YR
9 YR	12 YR

The set of four scenes on each page shows how one forest area is expected to look in the future as a result of taking particular management actions now. Possible actions range from allowing the beetle outbreak to take its own course, perhaps only cleaning up dead and fallen trees later, to thinning out some of the threatened trees and spraying some with environmentally approved insecticides.

Please look at the scenes and then select the page in each pair which represents the **best overall visual quality.** As for the previous sets, mark your choices on the answer sheet by circling the letter (**A** or **B**) to indicate which page in each pair provides the best overall visual results.

FOREST MANAGEMENT APPROACHES

On the following pages are 30 statements regarding different aspects of the spruce bark beetle outbreak on the Kenai Peninsula and possible forest management responses. Please read each statement and determine how much you would agree or disagree with it.

Record your answers on the answer sheet provided, by marking the appropriate box from

Strongly Agree to **Strongly Disagree**

The statements are divided into five sets. Each set of statements is preceded by a short introduction.

One response to the spruce bark beetle outbreak is to accept it as a natural process and to just "let nature take its course." In remote areas this may be the only possible response. In some Parks and Wilderness Areas it may be the only alternative allowed by law. Where managers have a choice, the best policy is to let nature take its course, so long as the area is:

1. far away from homes and recreation areas, but only when the damage to the forest is less severe, and new trees are expected to eventually grow back in the area.

2. far away from homes and recreation areas, even when the damage to the forest is more severe, and only grass and brush is expected to grow back in the area.

3. near to homes and recreation areas, but only when the damage to the forest is less severe, and new trees are expected to eventually grow back in the area.

4. near to homes and recreation areas, even when the damage to the forest is more severe, and only grass and brush is expected to grow back in the area.

One method for protecting forest areas that are threatened by the bark beetle outbreak is to remove about half of the trees. This is intended to reduce the number of places for the beetles to breed and to help the remaining trees grow more vigorously so that they are better able to resist beetle attacks.

5. Bark beetles prefer to attack larger more mature spruce trees, so it is best to remove the larger trees first.

6. Removing trees from beetle-threatened areas is generally not effective in protecting the remaining trees.

7. Clear cutting small patches is the best way to remove trees and protect spruce forests.

8. Thinning, by removing a few trees here and there, is the best way to remove trees and protect spruce forests.

9. When trees are removed to protect public forests from beetles, the cut trees should be sold to private companies.

10. Managers should cut trees on public lands to help protect beetle-threatened forests, even if selling the trees will only pay for part of the costs.

11. If trees are to be cut on public lands, all logging roads should be closed and disturbed areas should be replanted.

During a bark beetle outbreak it is possible to protect selected trees by spraying environmentally approved insecticides directly on the bark. Spraying costs about 5 to 10 dollars per tree and lasts for up to three years.

12. Spraying insecticides is the best way to protect large trees near homes and important recreation areas.

13. Trees that are sprayed with approved insecticides are essentially 100% safe from bark beetle attack.

14. Environmentally approved insecticides are perfectly safe for use around homes and recreation areas.

15. Insecticides should <u>not</u> be used to protect trees from bark beetles because other insects and animals may be harmed.

16. I would be willing to use environmentally approved insecticides to protect important trees near my home.

17. Spraying approved insecticides to protect trees from beetles is too expensive for most private property owners.

18. Approved insecticides should not be used because they are potentially dangerous to humans.

After a major beetle outbreak, a primary concern for forest areas that are frequently visited or seen by people is with how to treat the large areas of dead trees. Often more than 90% of the spruce trees are dead. New spruce trees need bare soil and sunlight to get started, and they need protection against competing grasses and brush for the first few years. The best treatment for beetle-affected forest areas is:

19. cutting down the dead trees and then burning the site with a very hot fire to clear the ground and kill competing grass and brush.

20. cutting and removing the dead trees and then burning the site with a moderately hot fire to partially clear the ground and temporarily reduce competing grass and brush.

21. cutting and removing the dead trees and mechanically scraping the ground bare in some areas to temporarily reduce competing grass and brush.

22. cutting and removing the dead trees and applying environmentally approved herbicides to temporarily reduce competing grass and brush.

23. leaving the forest undisturbed, and allowing it to recover as best it can.

24. Herbicides should not be used under any circumstances because of possible contamination of the environment.

25. Burning produces smoke and other by-products that could have as bad an effect on the environment as herbicides.

26. Burning forest sites should not be allowed because of the danger of starting wildfires.

The spruce bark beetle outbreak has now affected over 200,000 acres on the Kenai Peninsula. Biological surveys indicate that the outbreak may be continuing to spread.

27. It is almost certain that the outbreak will spread to other areas on the Kenai Peninsula.

28. There is very little chance that the bark beetle outbreak will spread to the area where you live.

29. Even if the outbreak does spread to your area, you would not expect more than half of the spruce trees to be lost.

30. All things considered, you would rather allow most of the spruce trees in your area to be killed by bark beetles than to have the forest treated by cutting and spraying insecticides.

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 G Street, Suite 402, Anchorage, Alaska 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

January 11, 1994

Brad Phillips
Public Advisory Group - Chair
POB 100034
Anchorage, Alaska 99510-0034

Dear Mr. Phillips:

I am convening a small group of scientists, federal and state agency representatives, and several members of the public to begin discussion of an ecosystem-based management strategy for the Draft Restoration Plan prepared by the Exxon Valdez Oil Spill Trustee Council. Because of your past experience with the Trustee Council's activities, I would like you to be present at this meeting, scheduled to begin at 8:30 a.m., on January 13, 1994, in the Exxon Valdez Restoration Office 4th floor large conference room, 645 G Street, Anchorage. The meeting will reconvene on the 14th at 8:30 a.m. in hopes we will conclude by 3:00 p.m.

This meeting is the result of a decision by the Trustee Council at its November 30, 1993 meeting to incorporate an ecosystem-based management structure into restoration planning. My ultimate goal as you can see from the agenda is to develop management objectives and specific strategies for each key species, restoration process, and service. I am especially interested in your views on how we integrate the management structure with ongoing and proposed scientific activities conducted under the Restoration Plan. We may not be able to complete the comprehensive structure during the two days, but I am confident with your help and support we can build the framework and engage in lively productive dialogue concerning management by objectives for implementation of the Restoration Plan.

Please contact Rebecca Williams at 278-8012 if you will be able to attend this session. I look forward to your participation.

Sincerely,

James R. Ayers

James R. Ayers
Executive Director

Enclosure: Draft agenda

Evaluation - By JG King with delegated vote of RupeAndrews = 2 votes
High = Favorable endorsement
Low = Probably doesn't meet Policy #1 + #9, may be too much cost,

Jim King

DRAFT

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94007	Site Specific Archeological Restoration			High — Don't know whether it's too costly -
		ADNR	$230.4	
		USFS	$130.4	
		DOI-FWS	$12.1	
		DOI-NPS	$112.8	
		Project Total	$485.6	
94015	Archeological Site Stewardship			High — worth a try
		ADNR	$132.4	
		USFS	$33.8	
		DOI-FWS	$25.7	
		DOI-NPS	$25.9	
		Project Total	$217.7	
94020	Black Oystercatcher Interaction with Intertidal			Low — Good study for ecosystem
		DOI-FWS	$148.9	
		Project Total	$148.9	
94039	Common Murre Population Monitoring			Low — Agency responsibility
		DOI-FWS	$227.2	
		Project Total	$227.2	
94040	Reduce Disturbance Near Injured Murre Colonies			Low — Mgt. responsibility
		DOI-FWS	$44.8	
		Project Total	$44.8	
94041	Introduced Predator Removal from Islands			High — Proven technique to benefit sea bird
		DOI-FWS	$146.6	
		Project Total	$146.6	
94043	Cutthroat & Dolly Habitat Restoration in PWS			Low — Agency Mgt. responsibility
		USFS	$182.7	
		Project Total	$182.7	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94064	Harbor Seal Habitat Use and Monitoring			Low
		ADF&G	$270.2	
		Project Total	$270.2	
94066	Harlequin Duck Recovery Monitoring			Low Mgt. Too costly, not broad enough
		ADF&G	$252.5	
		NOAA	$34.4	
		Project Total	$286.9	
94068	Deposit Sand to Promote Clam Recruitment			Low Sand tends to do what it wants
		ADF&G	$36.4	
		Project Total	$36.4	
94070	Restoration of High Intertidal Fucus			Low Will take care of itself before a program can be developed for it
		ADF&G	$285.8	
		Project Total	$285.8	
94081	Recruitment Monitoring of Littleneck Clams			Low
		ADF&G	$206.7	
		Project Total	$206.7	
94083	Monitoring of Oiled & Treated Shorelines			Low mostly done
		NOAA	$616.6	
		Project Total	$616.6	
94086	Herring Bay Experimental & Monitoring Studies			Low
		ADF&G	$729.4	
		Project Total	$729.4	
94090	Mussel Bed Restoration & Monitoring			Medium Low cost/ benefit ratio defer for ecosystem plan
		NOAA	$354.6	
		ADEC	$350.2	
		DOI-NPS	$69.9	
		Project Total	$774.8	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

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Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94092	Killer Whale Recovery Monitoring			Low — whales OK — defer
		NOAA	$163.1	
		Project Total	$163.1	
94102	Murrelet Prey & Foraging Habitat in PWS			Medium — Should be in ecosystem plan
		DOI-FWS	$231.5	
		Project Total	$231.5	
94110	Habitat Protection - Data Acquisition & Support			High — Should include parcels of every size in areas identified for acquisition.
		ADNR	$450.8	
		ADEC	$0.0	
		ADF&G	$128.4	
		USFS	$54.7	
		DOI-FWS	$60.8	
		Project Total	$694.8	
94126	Habitat Protection & Acquisition Fund			High
		ADNR	$317.1	
		ADF&G	$10.4	
		USFS	$496.5	
		DOI-FWS	$253.8	
		Project Total	$1,077.8	
94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS			Low
		ADF&G	$261.6	
		Project Total	$261.6	
94139	Salmon Instream Habitat & Stock Restoration			Low — Mgt. responsibility
		USFS	$181.5	
		ADF&G	$391.1	
		Project Total	$572.6	
94147	Comprehensive Monitoring Program			Low - withdrawn — Defer for ecosystem plan
		NOAA	$112.9	
		Project Total	$112.9	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94159	Marine Bird & Sea Otter Boat Surveys			Low
		DOI-FWS	$286.2	Agency Mgt responsibility
		Project Total	$286.2	
94163	Forage Fish Influence on Injured Species			Low
		NOAA	$455.4	defer for ecosystem plan
		ADF&G	$95.4	
		DOI-FWS	$55.8	
		Project Total	$606.6	
94165	Herring Genetic Stock Identification in PWS			Low
		ADF&G	$62.2	Mgt. needs to be coordinated with ecosystem study.
		Project Total	$62.2	
94166	Herring Spawn Deposition & Reproductive Impairment			Low
		ADF&G	$279.4	
		NOAA	$186.9	
		Project Total	$466.3	
94173	Pigeon Guillemot Recovery Monitoring			Low
		DOI-FWS	$201.1	Monitoring is normal agency responsibility
		Project Total	$201.1	
94184	Coded Wire Tag Recoveries from Pinks in PWS			Low
		ADF&G	$244.4	Mgt.
		Project Total	$244.4	
94185	Coded Wire Tagging of Wild Pinks for Stock ID			Low
		ADF&G	$286.0	Mgt
		Project Total	$286.0	
94187	Otolith Marking - Inseason Stock Separation			Low
		ADF&G	$179.7	Mgt.
		Project Total	$179.7	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94189	Pink Salmon Stock Genetics in PWS			Low
		ADF&G	$171.2	
		Project Total	$171.2	
94191	Oil Related Egg & Alevin Mortalities			Low for '94 will be incorporated in ecosystem approach
		ADF&G	$408.8	
		NOAA	$374.2	
		Project Total	$782.9	
94192	Evaluation of Hatchery Straying on Wild Pinks in PWS			Low Mgt oriented
		ADF&G	$640.5	
		Project Total	$640.5	
94199	Alaska Marine Research Institute			High - But only if research connection is strong + adequate
		ADF&G	TBD****	
		USFS	TBD****	
		DOI-FWS	TBD****	
	****To Be Determined	Project Total	TBD****	
94200	Public Land Access 17(b) Easement ID			High needs doing
		ADNR	$38.1	
		Project Total	$38.1	
94216	Gulf of Alaska Recreation Plan Development			High - needs to be done now
		DOI-NPS	$85.0	
		ADNR	$79.6	
		Project Total	$164.6	
94217	PWS Area Recreation Implementation Plan			High - needed
		USFS	$44.2	
		ADNR	$47.0	
		Project Total	$91.2	
94237	River Otter Recovery Monitoring			Low Mgt. oriented
		ADF&G	$156.7	
		Project Total	$156.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94241	Rockfish Management Plan Data Development			Low
		ADF&G	$233.2	Needs to be done eventually but not in 94
		Project Total	$233.2	
94244	Seal & Otter Co-op Subsistence Harvest Assistance			Low
		ADF&G	$54.5	Mgt. program
		Project Total	$54.5	
94246	Sea Otter Recovery Monitoring			Low
		DOI-FWS	$418.7	Mgt. responsibility
		Project Total	$418.7	
94255	Kenai River Sockeye Salmon Restoration			Low
		ADF&G	$406.1	Mgt. orientation
		Project Total	$406.1	
94258	Sockeye Salmon Overescapement			Low
		ADF&G	$854.9	Mgt. orientation
		Project Total	$854.9	
94259	Coghill Lake Sockeye Salmon Restoration			Low
		ADF&G	$189.8	Mgt. orientation
		USFS	$134.3	
		Project Total	$324.1	
94266	Shoreline Assessment & Oil Removal			High
		ADEC	$860.5	Cost seems high
		ADF&G	$12.1	
		ADNR	$25.3	
		USFS	$12.1	
		DOI-NPS	$51.3	
		NOAA	$12.1	
		Project Total	$973.3	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94272	Chenega Chinook Release Program			High
		ADF&G	$57.4	
		Project Total	$57.4	
94279	Subsistence Food Safety Testing			High
		ADF&G	$233.0	
		NOAA	$146.2	
		Project Total	$379.2	
94280	Spot Shrimp Survey & Juvenile Shrimp Habitat ID			Low Mgt. orientation
		ADF&G	$232.2	
		Project Total	$232.2	
94285	Subtidal Sediment Recovery Monitoring			Low for 187,000 defer until ecosystem planning done
		NOAA 187	$387.3	
		ADEC	$21.4	
		ADF&G	$220.4	
		Project Total	$629.2	
94290	Hydrocarbon Data Analysis & Interpretation			High Needed
		NOAA	$130.2	
		Project Total	$130.2	
94316	Shoreline Trash Cleanup			Low Local responsibility
		ADNR	$35.7	
		USFS	$2.9	
		Project Total	$38.6	
94320	Ecosystem Study Plan			Medium Price seems high Some money should go to endowment
		NOAA	$2,500.0	
		ADF&G	$2,500.0	
		Project Total	$5,000.0	
94345	Salmon Spawning Escapement on the Lower Kenai Pn			Low Mgt. orientation
		ADF&G	$219.2	
		Project Total	$219.2	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:35 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94386	Artifact Repositories - Planning & Design			Low Local responsibility
		ADNR	$223.8	
		USFS	$11.3	
		DOI-NPS	$8.3	
		Project Total	$243.3	
94417	Waste Oil Disposal Facilities			Low Agency responsibility Local responsibility
		ADEC	$232.2	
		Project Total	$232.2	
94419	Leave No Trace Educational Program			Low Mgt. funds
		USFS	$161.9	
		ADNR	$5.8	
		Project Total	$167.7	
94420	Recreation Information Center at Portage			Low Local & private responsibility
		USFS	$100.8	
		Project Total	$100.8	
94421	Common Property Salmon Stock Restoration			Low Should be funded otherwise
		ADF&G	$5,336.8	
		Project Total	$5,336.8	
94422	Restoration Plan NEPA Compliance			
		USFS	$184.0	
		ADF&G	$50.4	
		DOI	$62.8	
		NOAA	$19.9	
		Project Total	$317.0	
94423	Oil Spill Public Information Center			Low
		ADEC	TBD****	
		ADF&G	TBD****	
		Project Total	TBD****	

****To Be Determined

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94504	Genetic Stock ID of Kenai River Sockeye			Low
		ADF&G	$262.2	will be part of ecosystem approach
		Project Total	$262.2	
94505	Information Needs for Habitat Protection + Marbled Murrelet			Low
		USFS	$194.1	Agency responsibility
		ADF&G	$137.5	
		DOI-FWS	$74.5	
		Project Total	$406.0	
94506	Pigeon Guillemot Recovery			High
		DOI-FWS	$13.9	close out
		Project Total	$13.9	
940ED	Executive Director's Office			High
		ADEC	TBD****	
		ADF&G	TBD****	
		ADNR	TBD****	
		USFS	TBD****	
		DOI	TBD****	
		NOAA	TBD****	
	****To Be Determined	Project Total	TBD****	
		TOTAL	$29,182.8	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

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1 - high 2 - med 3 - low 4 - do not fund

John Merrick

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94007	Site Specific Archeological Restoration			
2		ADNR	$230.4	
		USFS	$130.4	
		DOI-FWS	$12.1	
		DOI-NPS	$112.8	
		Project Total	$485.6	
94015	Archeological Site Stewardship			
#2		ADNR	$132.4	
		USFS	$33.8	
		DOI-FWS	$25.7	
		DOI-NPS	$25.9	
		Project Total	$217.7	
94020	Black Oystercatcher Interaction with Intertidal			
1		DOI-FWS	$148.9	
		Project Total	$148.9	
94039	Common Murre Population Monitoring			
1		DOI-FWS	$227.2	
		Project Total	$227.2	
94040	Reduce Disturbance Near Injured Murre Colonies			
#4		DOI-FWS	$44.8	
		Project Total	$44.8	
94041	Introduced Predator Removal from Islands			outside spill area
4		DOI-FWS	$146.6	
		Project Total	$146.6	
94043	Cutthroat & Dolly Habitat Restoration in PWS			Need effort? Combine with 94137!
2		USFS	$182.7	
		Project Total	$182.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments	
94064	Harbor Seal Habitat Use and Monitoring			Funded	(1)
1		ADF&G	$270.2		4
		Project Total	$270.2		
94066	Harlequin Duck Recovery Monitoring			Some Recovery in Western Sound very few in Western Sound trying to identify physeological connection	(2)
2		ADF&G	$252.5		
		NOAA	$34.4		
		Project Total	$286.9		
94068	Deposit Sand to Promote Clam Recruitment			sand redistribution do not fund.	(4)
4		ADF&G	$36.4		
		Project Total	$36.4		
94070	Restoration of High Intertidal Fucus			low end ecosystem restoration endpoint ~ look over 2 yrs	(1)
1		ADF&G	$285.8		
		Project Total	$285.8		
94081	Recruitment Monitoring of Littleneck Clams				
2		ADF&G	$206.7		
		Project Total	$206.7		
94083	Monitoring of Oiled & Treated Shorelines			we should be able to scale this back is this needed yearly	(5)
3		NOAA	$616.6		
		Project Total	$616.6		
94086	Herring Bay Experimental & Monitoring Studies			Too costly	
3		ADF&G	$729.4		
		Project Total	$729.4		
94090	Mussel Bed Restoration & Monitoring				
2		NOAA	$354.6		
		ADEC	$350.2		
		DOI-NPS	$69.9		
		Project Total	$774.8		

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94092	Killer Whale Recovery Monitoring			36 → 23 whales
4		NOAA	$163.1	
		Project Total	$163.1	
94102	Murrelet Prey & Foraging Habitat in PWS			fungs prey / habitat
1		DOI-FWS	$231.5	
		Project Total	$231.5	
94[illegible]	Habitat Protection - Data Acquisition & Support			Habitat Protection is getting out of hand
1		ADNR	$450.8	
3		ADEC	$0.0	
		ADF&G	$128.4	
		USFS	$54.7	
		DOI-FWS	$60.8	
		Project Total	$694.8	
94126	Habitat Protection & Acquisition Fund			A large scale small parcel program is not cost effective
4		ADNR	$317.1	
		ADF&G	$10.4	
		USFS	$496.5	
		DOI-FWS	$253.8	
		Project Total	$1,077.8	
94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS			(2)
2		ADF&G	$261.6	
		Project Total	$261.6	
94139	Salmon Instream Habitat & Stock Restoration			combine with 94043 (2)
2		USFS	$181.5	
		ADF&G	$391.1	
		Project Total	$572.6	
94147	Comprehensive Monitoring Program			NOAA withdraw?
4		NOAA	$112.9	
		Project Total	$112.9	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94159	Marine Bird & Sea Otter Boat Surveys			Is this needed this year?
3		DOI-FWS	$286.2	
		Project Total	$286.2	
94163	Forage Fish Influence on Injured Species			
1		NOAA	$455.4	
		ADF&G	$95.4	
		DOI-FWS	$55.8	
		Project Total	$606.6	
94165	Herring Genetic Stock Identification in PWS			
1		ADF&G	$62.2	
		Project Total	$62.2	
94166	Herring Spawn Deposition & Reproductive Impairment			Funded
1	3	ADF&G	$279.4	
		NOAA	$186.9	
		Project Total	$466.3	
94173	Pigeon Guillemot Recovery Monitoring			
2		DOI-FWS	$201.1	
		Project Total	$201.1	
94184	Coded Wire Tag Recoveries from Pinks in PWS			what does this accomplish?
1		ADF&G	$244.4	
		Project Total	$244.4	
94185	Coded Wire Tagging of Wild Pinks for Stock ID			initial Tagging pay to recover later.
2		ADF&G	$286.0	
		Project Total	$286.0	
94187	Otolith Marking - Inseason Stock Separation			Improves cost effectiveness
1		ADF&G	$179.7	
		Project Total	$179.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94189	Pink Salmon Stock Genetics in PWS			stock segregation
1		ADF&G	$171.2	
		Project Total	$171.2	
94191	Oil Related Egg & Alevin Mortalities			Necessary replicate continuing trend.
4		ADF&G	$408.8	
		NOAA	$374.2	
		Project Total	$782.9	
94192	Evaluation of Hatchery Straying on Wild Pinks in PWS			Related to 94189 over budget?
2		ADF&G	$640.5	
		Project Total	$640.5	
94199	Alaska Marine Research Institute			Only if includes regional facilities 1 yes - if research 4 NO - if only second
		ADF&G	TBD****	
		USFS	TBD****	
		DOI-FWS	TBD****	
	****To Be Determined	Project Total	TBD****	
94200	Public Land Access 17(b) Easement ID			Not time critical
2		ADNR	$38.1	
		Project Total	$38.1	
94216	Gulf of Alaska Recreation Plan Development			Good project could be delayed.
		DOI-NPS	$85.0	
		ADNR	$79.6	
		Project Total	$164.6	
94217	PWS Area Recreation Implementation Plan			30 projects → 6 projects 6) remove [illegible] (266) (316) 1) remove evidence of cleanup 2) education component
1	Funded	USFS	$44.2	
		ADNR	$47.0	
		Project Total	$91.2	
94237	River Otter Recovery Monitoring			Liver levels of prey elevated HC's ??
4		ADF&G	$156.7	
		Project Total	$156.7	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94241	Rockfish Management Plan Data Development			
1		ADF&G	$233.2	
		Project Total	$233.2	
94244	Seal & Otter Co-op Subsistence Harvest Assistance			
2		ADF&G	$54.5	
		Project Total	$54.5	
94246	Sea Otter Recovery Monitoring			Serve chemistry
2		DOI-FWS	$418.7	overbudget
		Project Total	$418.7	
94255	Kenai River Sockeye Salmon Restoration			3rd of 5 years
2		ADF&G	$406.1	
		Project Total	$406.1	
94258	Sockeye Salmon Overescapement			Budget?
2		ADF&G	$854.9	
		Project Total	$854.9	
94259	Coghill Lake Sockeye Salmon Restoration			
3		ADF&G	$189.8	
		USFS	$134.3	
		Project Total	$324.1	
94266	Shoreline Assessment & Oil Removal			Reduced according to E. Piper recommendation
1		ADEC	$860.5	
		ADF&G	$12.1	
		ADNR	$25.3	
		USFS	$12.1	
		DOI-NPS	$51.3	
		NOAA	$12.1	
		Project Total	$973.3	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94272	Chenega Chinook Release Program			start terminal run
1		ADF&G	$57.4	replacement
		Project Total	$57.4	
94279	Subsistence Food Safety Testing			last year
1		ADF&G	$233.0	
		NOAA	$146.2	
		Project Total	$379.2	
94280	Spot Shrimp Survey & Juvenile Shrimp Habitat ID			shrimp not recovering & overfishing?
2		ADF&G	$232.2	
		Project Total	$232.2	
94285	Subtidal Sediment Recovery Monitoring			outside PWS only.
2		NOAA	$387.3	$187 - FY 94
		ADEC	$21.4	
		ADF&G	$220.4	
		Project Total	$629.2	
94290	Hydrocarbon Data Analysis & Interpretation			
1		NOAA	$130.2	
		Project Total	$130.2	
94316	Shoreline Trash Cleanup			Not Time critical
2		ADNR	$35.7	
		USFS	$2.9	
		Project Total	$38.6	
94320	Ecosystem Study Plan			
1		NOAA	$2,500.0	
		ADF&G	$2,500.0	
		Project Total	$5,000.0	
94345	Salmon Spawning Escapement on the Lower Kenai Pn			
3		ADF&G	$219.2	
		Project Total	$219.2	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:35 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94386	Artifact Repositories - Planning & Design			Planning no construction costs
2		ADNR	$223.8	
		USFS	$11.3	
		DOI-NPS	$8.3	
		Project Total	$243.3	
94417	Waste Oil Disposal Facilities			could be delayed. important concept
2		ADEC	$232.2	
		Project Total	$232.2	
94419	Leave No Trace Educational Program			
2		USFS	$161.9	
		ADNR	$5.8	
		Project Total	$167.7	
94420	Recreation Information Center at Portage			
2		USFS	$100.8	
		Project Total	$100.8	
94421	Common Property Salmon Stock Restoration			PWSAC, UFDA, CIAA bail out
1		ADF&G	$5,336.8	
		Project Total	$5,336.8	
94422	Restoration Plan NEPA Compliance			
1		USFS	$184.0	
		ADF&G	$50.4	
		DOI	$62.8	
		NOAA	$19.9	
		Project Total	$317.0	
94423	Oil Spill Public Information Center			less than 93
		ADEC	TBD****	
		ADF&G	TBD****	
		Project Total	TBD****	

****To Be Determined

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Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94504	Genetic Stock ID of Kenai River Sockeye			
2		ADF&G	$262.2	
		Project Total	$262.2	
94505	Information Needs for Habitat Protection			
2		USFS	$194.1	High cost for close out!
		ADF&G	$137.5	
		DOI-FWS	$74.5	How are 505, 505A, 505B and 505C related?
		Project Total	$406.0	
94506	Pigeon Guillemot Recovery			
1		DOI-FWS	$13.9	
		Project Total	$13.9	
940ED	Executive Director's Office			
		ADEC	TBD****	
		ADF&G	TBD****	
		ADNR	TBD****	
		USFS	TBD****	
		DOI	TBD****	
		NOAA	TBD****	
	****To Be Determined	Project Total	TBD****	
	EIS Development	USFS	~300k	
		TOTAL	$29,182.8	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:53 AM

Cloud
McCorkle

1 High
2 Medium
3 Low

DRAFT

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94007	Site Specific Archeological Restoration			Expensive
(3)		ADNR	$230.4	
		USFS	$130.4	
		DOI-FWS	$12.1	
		DOI-NPS	$112.8	
		Project Total	$485.6	Could wait for Comprehensive plan, yes
94015	Archeological Site Stewardship			Now that materials have been financed Agencies should implement out of their own resources, or resources from communities, → No,
(3)		ADNR	$132.4	
		USFS	$33.8	
		DOI-FWS	$25.7	
		DOI-NPS	$25.9	
		Project Total	$217.7	
94020	Black Oystercatcher Interaction with Intertidal			
(2)		DOI-FWS	$148.9	
		Project Total	$148.9	yes
94039	Common Murre Population Monitoring			
(2)		DOI-FWS	$227.2	
		Project Total	$227.2	yes
94040	Reduce Disturbance Near Injured Murre Colonies			
(3)		DOI-FWS	$44.8	
		Project Total	$44.8	yes
94041	Introduced Predator Removal from Islands			
(2)		DOI-FWS	$146.6	
		Project Total	$146.6	yes
94043	Cutthroat & Dolly Habitat Restoration in PWS			Good example of Habitat Restoration on Public lands.
(1)		USFS	$182.7	
		Project Total	$182.7	yes

(3) (3) (2) (3) (2) (1)

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments	Vote	Rank
94064 NR	Harbor Seal Habitat Use and Monitoring	ADF&G Project Total	$270.2 $270.2	Approved TC	No Vote	NR
94066 2	Harlequin Duck Recovery Monitoring	ADF&G ✓ NOAA Project Total	$252.5 $34.4 $286.9	1992 + 93 Breeding recovery noted.	Yes	2
94068 3	Deposit Sand to Promote Clam Recruitment	ADF&G ✓ Project Total	$36.4 $36.4	Restore NEPA ?	yes	3
94070 1	Restoration of High Intertidal Fucus	ADF&G ✓ Project Total	$285.8 $285.8		yes	1
94071 3	Recruitment Monitoring of Littleneck Clams	ADF&G Project Total	$206.7 $206.7		yes	3
94083 3	Monitoring of Oiled & Treated Shorelines	NOAA Project Total	$616.6 $616.6		yes	3
94086 1	Herring Bay Experimental & Monitoring Studies	ADF&G Project Total	$729.4 $729.4		yes	1
94090 1	Mussel Bed Restoration & Monitoring	NOAA ADEC DOI-NPS Project Total	$354.6 $350.2 $69.9 $774.8		yes	1

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94092	Killer Whale Recovery Monitoring			
		NOAA	$163.1	
		Project Total	$163.1	No.
94102	Murrelet Prey & Foraging Habitat in PWS			
		DOI-FWS	$231.5	
		Project Total	$231.5	Yes
94110	Habitat Protection - Data Acquisition & Support			
		ADNR	$450.8	- Looks emphasize on public land managmt. for improving habitat on public lands
		ADEC	$0.0	
		ADF&G	$128.4	- Looks identification of public lands for exchange for private lands,
		USFS	$54.7	
		DOI-FWS	$60.8	- TC has ignored PAG input & concerns,
		Project Total	$694.8	No
94126	Habitat Protection & Acquisition Fund			
		ADNR	$317.1	- No other tools have been used to protect critical habitat.
		ADF&G	$10.4	
		USFS	$496.5	- Land exch program by Govmt land managers.
		DOI-FWS	$253.8	
		Project Total	$1,077.8	No.
94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS			
		ADF&G	$261.6	
		Project Total	$261.6	Yes
94139	Salmon Instream Habitat & Stock Restoration			
		USFS	$181.5	
		ADF&G	$391.1	
		Project Total	$572.6	yes
94147	Comprehensive Monitoring Program			
		NOAA	$112.9	
		Project Total	$112.9	

Printed: 1/11/94 8:52 AM

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94159 (2)	Marine Bird & Sea Otter Boat Surveys	DOI-FWS	$286.2	(2) yes
		Project Total	$286.2	
94163 (2)	Forage Fish Influence on Injured Species	NOAA	$455.4	(2) yes
		ADF&G	$95.4	
		DOI-FWS	$55.8	
		Project Total	$606.6	
94165 (1)	Herring Genetic Stock Identification in PWS	ADF&G	$62.2	(1) yes
		Project Total	$62.2	
94166	Herring Spawn Deposition & Reproductive Impairment	ADF&G	$279.4	Approved by TC
		NOAA	$186.9	
		Project Total	$466.3	
94173 (3)	Pigeon Guillemot Recovery Monitoring	DOI-FWS	$201.1	(3) yes
		Project Total	$201.1	
94184 (1)	Coded Wire Tag Recoveries from Pinks in PWS	ADF&G	$244.4	(1) yes
		Project Total	$244.4	
94185 (3)	Coded Wire Tagging of Wild Pinks for Stock ID	ADF&G	$286.0	(3) yes
		Project Total	$286.0	
94187 (1)	Otolith Marking - Inseason Stock Separation	ADF&G	$179.7	(1) yes
		Project Total	$179.7	

Printed: 1/11/94 8:34 AM

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94189 (2)	Pink Salmon Stock Genetics in PWS			(2)
		ADF&G	$171.2	
		Project Total	$171.2	yes
94191 (1)	Oil Related Egg & Alevin Mortalities			(1)
		ADF&G	$408.8	
		NOAA	$374.2	
		Project Total	$782.9	Yes
94192 (2)	Evaluation of Hatchery Straying on Wild Pinks in PWS			(2)
		ADF&G	$640.5	
		Project Total	$640.5	yes
94199 (0)	Alaska Marine Research Institute			IN FAVOR of Concept, but abstained, (0)
		ADF&G	TBD****	
		USFS	TBD****	
		DOI-FWS	TBD****	
****To Be Determined		Project Total	TBD****	
94200 (2)	Public Land Access 17(b) Easement ID			(2)
		ADNR	$38.1	
		Project Total	$38.1	yes
94216 (0)	Gulf of Alaska Recreation Plan Development			(0)
		DOI-NPS	$85.0	
		ADNR	$79.6	
		Project Total	$164.6	No.
94217 (2)	PWS Area Recreation Implementation Plan			(2)
		USFS	$44.2	
		ADNR	$47.0	
		Project Total	$91.2	TC Approved TC
94237 (3)	River Otter Recovery Monitoring			(3)
		ADF&G	$156.7	
		Project Total	$156.7	yes

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94241 (3)	Rockfish Management Plan Data Development	ADF&G	$233.2	(3)
		Project Total	$233.2	Yes
94244	Seal & Otter Co-op Subsistence Harvest Assistance	ADF&G	$54.5	Why does it cost $54.5 to advise hunters? (3)
		Project Total	$54.5	No
94246 (3)	Sea Otter Recovery Monitoring	DOI-FWS	$418.7	(3)
		Project Total	$418.7	yes
94255 (1)	Kenai River Sockeye Salmon Restoration p 286	ADF&G	$406.1	(1)
		Project Total	$406.1	yes
94258 (1)	Sockeye Salmon Overescapement p 294	ADF&G	$854.9	(1)
		Project Total	$854.9	yes
94259 (2)	Coghill Lake Sockeye Salmon Restoration p 304	ADF&G	$189.8	(2)
		USFS	$134.3	
		Project Total	$324.1	yes
94266 (1)	Shoreline Assessment & Oil Removal	ADEC	$860.5	(1)
		ADF&G	$12.1	
		ADNR	$25.3	
		USFS	$12.1	
		DOI-NPS	$51.3	
		NOAA	$12.1	Less money
		Project Total	$973.3	yes

Printed: 1/11/94 8:28 AM

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94272 (2)	Chenega Chinook Release Program			(2)
		ADF&G	$57.4	
		Project Total	$57.4	Replacement for 1-A Subsistence Research yes
94279 (2)	Subsistence Food Safety Testing			(2)
		ADF&G	$233.0	
		NOAA	$146.2	
		Project Total	$379.2	yes
94280 (2)	Spot Shrimp Survey & Juvenile Shrimp Habitat ID			(2)
		ADF&G	$232.2	
		Project Total	$232.2	yes
94285 (3)	Subtidal Sediment Recovery Monitoring			(3)
		NOAA	$387.3	
		ADEC	$21.4	
		ADF&G	$220.4	
		Project Total	$629.2	yes
94290 (1)	Hydrocarbon Data Analysis & Interpretation			(1)
		NOAA	$130.2	
		Project Total	$130.2	yes
94316 (2)	Shoreline Trash Cleanup			(2)
		ADNR	$35.7	
		USFS	$2.9	
		Project Total	$38.6	yes
94320 (1)	Ecosystem Study Plan			(1)
		NOAA	$2,500.0	
		ADF&G	$2,500.0	
		Project Total	$5,000.0	yes
94345 (2)	Salmon Spawning Escapement on the Lower Kenai Pn Parks			(2)
		ADF&G	$219.2	
		Project Total	$219.2	yes

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:35 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94386	Artifact Repositories - Planning & Design			Too Vague We already have one in Kodiak. Any more should have participation & financing from existing facilities. Volunteer efforts should be emphasized No
		ADNR	$223.8	
		USFS	$11.3	
		DOI-NPS	$8.3	
		Project Total	$243.3	
94417	Waste Oil Disposal Facilities			1 yes
		ADEC	$232.2	
		Project Total	$232.2	
94419	Leave No Trace Educational Program			"How to Shit in the Woods?" Sole Source Contract w/ NOLS 3 Yes
		USFS	$161.9	
		ADNR	$5.8	
		Project Total	$167.7	
94420	Recreation Information Center at Portage			~~Sole Source~~ Why not w/ Portage Glacier Visitors Center. No
		USFS	$100.8	
		Project Total	$100.8	
94421	Common Property Salmon Stock Restoration			1 yes
		ADF&G	$5,336.8	
		Project Total	$5,336.8	
94422	Restoration Plan NEPA Compliance			No description
		USFS	$184.0	
		ADF&G	$50.4	
		DOI	$62.8	
		NOAA	$19.9	
		Project Total	$317.0	
94423	Oil Spill Public Information Center			0 No
		ADEC	TBD****	
		ADF&G	TBD****	
		Project Total	TBD****	
	****To Be Determined			

Printed: 1/11/94 8:28 AM

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94504	Genetic Stock ID of Kenai River Sockeye			
(1)		ADF&G	$262.2	
		Project Total	$262.2	yes (1)
94505	Information Needs for Habitat Protection			
		USFS	$194.1	
		ADF&G	$137.5	
		DOI-FWS	$74.5	
		Project Total	$406.0	yes (2)
94506	Pigeon Guillemot Recovery			
(2)		DOI-FWS	$13.9	
		Project Total	$13.9	yes (2)
940ED	Executive Director's Office			
		ADEC	TBD****	
		ADF&G	TBD****	
		ADNR	TBD****	
		USFS	TBD****	
		DOI	TBD****	
		NOAA	TBD****	
	****To Be Determined	Project Total	TBD****	
		TOTAL	$29,182.8	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:53 AM

Bob Spies still working on this - won't finish

motion to extend comment period to Jan 21st by PAG members - passed

High
Med
Low

Donna Fischer

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94007 pg 60	Site Specific Archeological Restoration			NO - most should have been done - & should only be at sights where there was mod. than 25 workers - As not all sights were damaged - Tatitlek is not in Chatanea Too much Money - Should be Department function
		ADNR	$230.4	
		USFS	$130.4	
		DOI-FWS	$12.1	
		DOI-NPS	$112.8	
		Project Total	$485.6	
94015 1 6	Archeological Site Stewardship			NO - Should be worked on - But where would money come on the future ? Really is not justified - ½ million a year ?
		ADNR	$132.4	
		USFS	$33.8	
		DOI-FWS	$25.7	
		DOI-NPS	$25.9	
		Project Total	$217.7	
94020	Black Oystercatcher Interaction with Intertidal	yes		Med - in oil spill area only - not out - Rethink cost - data could be important
		DOI-FWS	$148.9	
		Project Total	$148.9	
94039	Common Murre Population Monitoring	yes		Med - Budget to high - padding pockets - So - once all is stabilized we won't even think of buying land - should be department job any way - function
		DOI-FWS	$227.2	
		Project Total	$227.2	
94040	Reduce Disturbance Near Injured Murre Colonies			NO - what has this to do with o.i. spill conditions - aren't we just looking for new projects - should be department function
		DOI-FWS	$44.8	
		Project Total	$44.8	
94041	Introduced Predator Removal from Islands			NO - & costly program - un-related to oil spill area - or spill - related - If they remove foxes - could increase rats -
		DOI-FWS	$146.6	
		Project Total	$146.6	
94043 pg 90	Cutthroat & Dolly Habitat Restoration in PWS	yes		Med - Reduce budget - Habitat without land But is Agency's job - Could combine with 139 - to save cost & Still do a decent job -
		USFS	$182.7	
		Project Total	$182.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94064	Harbor Seal Habitat Use and Monitoring			Low - Reduce Budget - approved
		ADF&G	$270.2	
		Project Total	$270.2	
94066	Harlequin Duck Recovery Monitoring			Low - Reduce budget - But could go with Eco System -
		ADF&G	$252.5	
		NOAA	$34.4	
		Project Total	$286.9	
94068	Deposit Sand to Promote Clam Recruitment			Low nature will take care of this -
		ADF&G	$36.4	
		Project Total	$36.4	
94070	Restoration of High Intertidal Fucus			High - yes - Fits into Eco-System
		ADF&G	$285.8	
		Project Total	$285.8	
94081	Recruitment Monitoring of Littleneck Clams			NO - low grade, a very expensive project & past history has shown this has always been up + down - So don't feel it's justified
		ADF&G	$206.7	
		Project Total	$206.7	
94083	Monitoring of Oiled & Treated Shorelines			NO Low grade - Their budget is always way over stated -
		NOAA	$616.6	
		Project Total	$616.6	
94086	Herring Bay Experimental & Monitoring Studies			Low - over budgeted - NO
		ADF&G	$729.4	
		Project Total	$729.4	
94090	Mussel Bed Restoration & Monitoring			NO - over budget - It seems as if they are lazy - everyone needs to watch their cost - NO one is personnel cost very High $15,000 for each bed - The money shown here is what we're going by - 2 yrs
		NOAA	$354.6	
		ADEC	$350.2	
		DOI-NPS	$69.9	
		Project Total	$774.8	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94092	Killer Whale Recovery Monitoring			No way our Budget - project was suppose to be deferred one year -
pg 146		NOAA	$163.1	
		Project Total	$163.1	
94102	Murrelet Prey & Foraging Habitat in PWS			yes - low - Budget
pg 151		DOI-FWS	$231.5	
		Project Total	$231.5	
94	Habitat Protection - Data Acquisition & Support			No Budget + Both projects should come under 1 budget - + people are not happy with land acquisitions - 42 % of the respondents were outside of Alaska - disturbing trends - who will own the land?
pg 154		ADNR	$450.8	
		ADEC	$0.0	
		ADF&G	$128.4	
		USFS	$54.7	
		DOI-FWS	$60.8	
		Project Total	$694.8	
94126	Habitat Protection & Acquisition Fund			No Budget to high - It's grown beyond what was set out to be done - Not Critical Habitat - Cost for 95 TBD - will not vote for that - I hope Trustees will listen to the APC members - + Depts -
pg 160		ADNR	$317.1	
		ADF&G	$10.4	
		USFS	$496.5	
		DOI-FWS	$253.8	
		Project Total	$1,077.8	
94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS			wont be done next year - yes - low - Budget - been on going
		ADF&G	$261.6	
		Project Total	$261.6	
94139	Salmon Instream Habitat & Stock Restoration			No - med - Reduce budget - regular management
pg 110		USFS	$181.5	
		ADF&G	$391.1	
		Project Total	$572.6	
94147	Comprehensive Monitoring Program			no - they are going
pg 116		NOAA	$112.9	
		Project Total	$112.9	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94159 pg 184	Marine Bird & Sea Otter Boat Surveys			NO - Budget out of Hand Also pre-dates oil spill when in 95 it's 43.3K - ? Should be in Eco-System plan - ?
		DOI-FWS	$286.2	
		Project Total	$286.2	
X 17 190	Forage Fish Influence on Injured Species			no - over budget - Still in design Staged & Asking for this amount - NOAA always goes way over budget -
		NOAA	$455.4	
		ADF&G	$95.4	
		DOI-FWS	$55.8	
		Project Total	$606.6	
94165	Herring Genetic Stock Identification in PWS			yes - high - after last year -
		ADF&G	$62.2	
		Project Total	$62.2	
94166	Herring Spawn Deposition & Reproductive Impairment			Approved
		ADF&G	$279.4	
		NOAA	$186.9	
		Project Total	$466.3	
94173 pg 210	Pigeon Guillemot Recovery Monitoring			yes - Low - Budget out of control
		DOI-FWS	$201.1	
		Project Total	$201.1	
94184	Coded Wire Tag Recoveries from Pinks in PWS			yes - Med - Do costly - But combine 94184 + 94185 Do projects closely related -
		ADF&G	$244.4	
		Project Total	$244.4	
94185	Coded Wire Tagging of Wild Pinks for Stock ID			Combine + make one project - 184 + 185
		ADF&G	$286.0	yes - Low - (If combined & would give it high priority & reduce budget.
		Project Total	$286.0	
94187	Otolith Marking - Inseason Stock Separation Very high on list			yes - high - better way to tag fish -
		ADF&G	$179.7	
		Project Total	$179.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94189	Pink Salmon Stock Genetics in PWS			yes - med - Budget -
		ADF&G	$171.2	
		Project Total	$171.2	
94191	Oil Related Egg & Alevin Mortalities			no - Low grade - bottom of the list - Streams have dried due to ash - Trees - weather drying out rivers - & Way over Budget ! Eco-System
		ADF&G	$408.8	
		NOAA	$374.2	
		Project Total	$782.9	
94	Evaluation of Hatchery Straying on Wild Pinks in PWS			yes - Low grade - over Budget - info is important should be a management project any way -
		ADF&G	$640.5	
		Project Total	$640.5	
94199	Alaska Marine Research Institute			NO - Not in the oil spill area -
		ADF&G	TBD****	
		USFS	TBD****	
		DOI-FWS	TBD****	
	****To Be Determined	Project Total	TBD****	
94200	Public Land Access 17(b) Easement ID			yes - Med - Low Budget -
pg 254		ADNR	$38.1	
		Project Total	$38.1	
94216	Gulf of Alaska Recreation Plan Development			no - No resource damage - & out of spill area - should be done by them any way - Not a pressing need -
		DOI-NPS	$85.0	
		ADNR	$79.6	
		Project Total	$164.6	
94217	PWS Area Recreation Implementation Plan			yes - Low - Budget - high for just this item 95 Budget - Not listed - Already approved
3/ pg 262		USFS	$44.2	
		ADNR	$47.0	
		Project Total	$91.2	
94237	River Otter Recovery Monitoring			no - over budget - Low
		ADF&G	$156.7	
		Project Total	$156.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

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Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94241	Rockfish Management Plan Data Development			NO - Low -
		ADF&G	$233.2	
		Project Total	$233.2	
94214	Seal & Otter Co-op Subsistence Harvest Assistance			NO - ... - More otters & Harbor Seals Now Normal -
		ADF&G	$54.5	
		Project Total	$54.5	
94246 pg 382	Sea Otter Recovery Monitoring			NO - Should be covered under normal management - Budget to high - out of control
		DOI-FWS	$418.7	
		Project Total	$418.7	
94255	Kenai River Sockeye Salmon Restoration			- NO - Not hurt by oil - Sport fishing Commercial hurt this - Budget too high -
		ADF&G	$406.1	
		Project Total	$406.1	
94258	Sockeye Salmon Overescapement			NO - Budget factor
		ADF&G	$854.9	
		Project Total	$854.9	
59	Coghill Lake Sockeye Salmon Restoration			yes - Budget over stated - pre data - spud - low -
		ADF&G	$189.8	
		USFS	$134.3	
		Project Total	$324.1	
94266 pg 310	Shoreline Assessment & Oil Removal			NO almost a million dollar - & statement of Lower COST - + Not sure of COST -
		ADEC	$860.5	
		ADF&G	$12.1	
		ADNR	$25.3	
		USFS	$12.1	
		DOI-NPS	$51.3	
		NOAA	$12.1	
		Project Total	$973.3	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94272	Chenega Chinook Release Program			yes - Med - - cost alright
		ADF&G	$57.4	
		Project Total	$57.4	
94279	Subsistence Food Safety Testing			yes - Budget over stated - suppose to be last year of Study -
		ADF&G	$233.0	
		NOAA	$146.2	
		Project Total	$379.2	
94285	Spot Shrimp Survey & Juvenile Shrimp Habitat ID			yes - High - But info - for eco-system important -
		ADF&G	$232.2	
		Project Total	$232.2	
94285 330	Subtidal Sediment Recovery Monitoring			no - Budget - This is out of PWS - & not in the spill area - a 6 year project no - Should fall in as part of duties -
		NOAA	$387.3	
		ADEC	$21.4	
		ADF&G	$220.4	
		Project Total	$629.2	
94290 pg 334	Hydrocarbon Data Analysis & Interpretation			yes - Med - Budget for next year needs to be reduced
		NOAA	$130.2	
		Project Total	$130.2	
94316 pg 3:	Shoreline Trash Cleanup			yes - low - Budget is low here - Lots of people do go out & do this - But - They do charge alot for taking them out - double dipping
		ADNR	$35.7	
		USFS	$2.9	
		Project Total	$38.6	
94320 348	Ecosystem Study Plan			yes - the Amended Version - But watch Budget -
		NOAA	$2,500.0	
		ADF&G	$2,500.0	
		Project Total	$5,000.0	
94345	Salmon Spawning Escapement on the Lower Kenai Pn			no - Budget out of question -
		ADF&G	$219.2	
		Project Total	$219.2	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94386 pg 350	Artifact Repositories - Planning & Design			yes - Low - Should look at giving museums - that are in full operation - this opportunity Budget is over stated - How will it be financed Not well thought out or worked on in a proper manner
		ADNR	$223.8	
		USFS	$11.3	
		DOI-NPS	$8.3	
		Project Total	$243.3	
7 pg 354	Waste Oil Disposal Facilities			yes - think it's needed High
		ADEC	$232.2	
		Project Total	$232.2	
4/ 94419 pg 358	Leave No Trace Educational Program			yes - very low - Shorten to 1 year -
		USFS	$161.9	
		ADNR	$5.8	
		Project Total	$167.7	
5/ 94420 pg 364	Recreation Information Center at Portage			no - out side of Spill area - & should be department function - Forest Service has a visit center near by -
		USFS	$100.8	
		Project Total	$100.8	
94421	Common Property Salmon Stock Restoration			yes - High - many problems in sound - Critical to Sound - Common property -
		ADF&G	$5,336.8	
		Project Total	$5,336.8	
6/ 94422	Restoration Plan NEPA Compliance			no Budget to high not enough information Sole Source Contract
		USFS	$184.0	
		ADF&G	$50.4	
		DOI	$62.8	
		NOAA	$19.9	
		Project Total	$317.0	
94423	Oil Spill Public Information Center			yes
		ADEC	TBD****	
		ADF&G	TBD****	
		Project Total	TBD****	

****To Be Determined

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

DRAFT

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94504	Genetic Stock ID of Kenai River Sockeye			NO - Budget - management problem
		ADF&G	$262.2	
		Project Total	$262.2	
94505	Information Needs for Habitat Protection			yes - low - budget is way to high & really questions what is being done here - Could be Combene with 94422 + 910 + 126 - personnel funding is out of line - do not come out right —
		USFS	$194.1	
		ADF&G	$137.5	
		DOI-FWS	$74.5	
		Project Total	$406.0	
94506	Pigeon Guillemot Recovery			yes - since close out -
		DOI-FWS	$13.9	
		Project Total	$13.9	
940ED	Executive Director's Office			
		ADEC	TBD****	
		ADF&G	TBD****	
		ADNR	TBD****	
		USFS	TBD****	
		DOI	TBD****	
		NOAA	TBD****	
	****To Be Determined	Project Total	TBD****	
		TOTAL	$29,182.8	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

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Added Resolutic

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: Encourage staff to examine budgets of 94 projects and make them as cost-efficient as possible

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓ proxy			
moved Pamela Brodie	✓			
James Cloud	✓ proxy			
James Diehl	✓			
Richard Eliason				✓
Donna Fischer				✓
John French	✓			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓ proxy			
seconded Gerald McCune	✓			
John McMullen	✓			
Brad Phillips				✓
John Sturgeon	✓			
Charles Totemoff	✓			
Llewellyn W. Williams Jr.	✓			

Unanimous

Added Project

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: Include endowment concept in 1994 work plan and fund at $30 million

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓ proxy			
Pamela Brodie		✓		
James Cloud	✓ proxy			
James Diehl		✓		
Richard Eliason				✓
Donna Fischer				✓
John French	✓			
Paul V. Gavora				✓
seconded James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓ proxy			
Gerald McCune		✓		
John McMullen		✓		
Brad Phillips				✓
John Sturgeon	✓			
Charles Totemoff		✓		
moved Llewellyn W. Williams Jr.	✓			

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FY 94 Projects Reviewed

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94007	Site Specific Archeological Restoration ✓	ADNR	$230.4	
		USFS	$130.4	
		DOI-FWS	$12.1	
		DOI-NPS	$112.8	
		Project Total	$485.6	
94015	Archeological Site Stewardship ✓	ADNR	$132.4	
		USFS	$33.8	
		DOI-FWS	$25.7	
		DOI-NPS	$25.9	
		Project Total	$217.7	
94020	Black Oystercatcher Interaction with Intertidal ✓	DOI-FWS	$148.9	
		Project Total	$148.9	
94039	Common Murre Population Monitoring ✓	DOI-FWS	$227.2	
		Project Total	$227.2	
94040	Reduce Disturbance Near Injured Murre Colonies ✓	DOI-FWS	$44.8	
		Project Total	$44.8	
94041	Introduced Predator Removal from Islands ✓	DOI-FWS	$146.6	
		Project Total	$146.6	
94043	Cutthroat & Dolly Habitat Restoration in PWS ✓	USFS	$182.7	
		Project Total	$182.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94064	Harbor Seal Habitat Use and Monitoring Already approved	ADF&G Project Total	$270.2 $270.2	Already approved by TC
94066	Harlequin Duck Recovery Monitoring ✓	ADF&G NOAA Project Total	$252.5 $34.4 $286.9	Need to look at other bird species as well Need to look at PWS deer population too
94068	Deposit Sand to Promote Clam Recruitment ✓	ADF&G Project Total	$36.4 $36.4	
94070	Restoration of High Intertidal Fucus ✓	ADF&G Project Total	$285.8 $285.8	
94081	Recruitment Monitoring of Littleneck Clams ✓	ADF&G Project Total	$206.7 $206.7	
94083	Monitoring of Oiled & Treated Shorelines ✓	NOAA Project Total	$616.6 $616.6	
94086	Herring Bay Experimental & Monitoring Studies ✓	ADF&G Project Total	$729.4 $729.4	
94090	Mussel Bed Restoration & Monitoring ✓	NOAA ADEC DOI-NPS Project Total	$354.6 $350.2 $69.9 $774.8	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94092	Killer Whale Recovery Monitoring			use current private researchers in-state
✓		NOAA	$163.1	
		Project Total	$163.1	
94102	Murrelet Prey & Foraging Habitat in PWS			
✓		DOI-FWS	$231.5	
		Project Total	$231.5	
94110	Habitat Protection - Data Acquisition & Support			
✓		ADNR	$450.8	
		ADEC	$0.0	
		ADF&G	$128.4	
		USFS	$54.7	
		DOI-FWS	$60.8	
		Project Total	$694.8	
94126	Habitat Protection & Acquisition Fund			
✓		ADNR	$317.1	
		ADF&G	$10.4	
		USFS	$496.5	
		DOI-FWS	$253.8	
		Project Total	$1,077.8	
94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS			
✓		ADF&G	$261.6	
		Project Total	$261.6	
94139	Salmon Instream Habitat & Stock Restoration			
✓		USFS	$181.5	
		ADF&G	$391.1	
		Project Total	$572.6	
94147	Comprehensive Monitoring Program			withdrawn
✓		NOAA	$112.9	
		Project Total	$112.9	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94159	Marine Bird & Sea Otter Boat Surveys			
	✓ winter survey already approved	DOI-FWS	$286.2	
		Project Total	$286.2	
941[illegible]3	Forage Fish Influence on Injured Species			
	✓	NOAA	$455.4	
		ADF&G	$95.4	
		DOI-FWS	$55.8	
		Project Total	$606.6	
94165	Herring Genetic Stock Identification in PWS			
	✓	ADF&G	$62.2	
		Project Total	$62.2	
941[illegible]6	Herring Spawn Deposition & Reproductive Impairment			
	Already Approved ✓	ADF&G	$279.4	Already approved by TC
		NOAA	$186.9	
		Project Total	$466.3	
94173	Pigeon Guillemot Recovery Monitoring			
	✓	DOI-FWS	$201.1	
		Project Total	$201.1	
94184	Coded Wire Tag Recoveries from Pinks in PWS			
	✓	ADF&G	$244.4	
		Project Total	$244.4	
94185	Coded Wire Tagging of Wild Pinks for Stock ID			
	✓	ADF&G	$286.0	
		Project Total	$286.0	
94187	Otolith Marking - Inseason Stock Separation			
	✓	ADF&G	$179.7	
		Project Total	$179.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

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Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94189	Pink Salmon Stock Genetics in PWS			
	✓	ADF&G	$171.2	
		Project Total	$171.2	
94191	Oil Related Egg & Alevin Mortalities			
	✓	ADF&G	$408.8	
		NOAA	$374.2	
		Project Total	$782.9	
94192	Evaluation of Hatchery Straying on Wild Pinks in PWS			
	✓	ADF&G	$640.5	
		Project Total	$640.5	
94199	Alaska Marine Research Institute			
	✓	ADF&G	TBD****	
		USFS	TBD****	
		DOI-FWS	TBD****	
	****To Be Determined	Project Total	TBD****	
94200	Public Land Access 17(b) Easement ID			
	✓	ADNR	$38.1	
		Project Total	$38.1	
94216	Gulf of Alaska Recreation Plan Development			
	✓	DOI-NPS	$85.0	
		ADNR	$79.6	
		Project Total	$164.6	
94217	PWS Area Recreation Implementation Plan			Already approved by TC
	✓ working approval	USFS	$44.2	
		ADNR	$47.0	
		Project Total	$91.2	
94237	River Otter Recovery Monitoring			
	✓	ADF&G	$156.7	
		Project Total	$156.7	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94241	Rockfish Management Plan Data Development			
	✓	ADF&G	$233.2	
		Project Total	$233.2	
94244	Seal & Otter Co-op Subsistence Harvest Assistance			
	✓	ADF&G	$54.5	
		Project Total	$54.5	
94246	Sea Otter Recovery Monitoring			
	✓	DOI-FWS	$418.7	
		Project Total	$418.7	
94255	Kenai River Sockeye Salmon Restoration			
	✓	ADF&G	$406.1	
		Project Total	$406.1	
94258	Sockeye Salmon Overescapement			
	✓	ADF&G	$854.9	
		Project Total	$854.9	
94259	Coghill Lake Sockeye Salmon Restoration			
	✓	ADF&G	$189.8	
		USFS	$134.3	
		Project Total	$324.1	
94266	Shoreline Assessment & Oil Removal			
	✓	ADEC	$860.5	
		ADF&G	$12.1	
		ADNR	$25.3	
		USFS	$12.1	
		DOI-NPS	$51.3	
		NOAA	$12.1	
		Project Total	$973.3	costs will drop due to latest survey results

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94272	Chenega Chinook Release Program			
	✓	ADF&G	$57.4	
		Project Total	$57.4	
94279	Subsistence Food Safety Testing			
	✓	ADF&G	$233.0	
		NOAA	$146.2	
		Project Total	$379.2	
94280	Spot Shrimp Survey & Juvenile Shrimp Habitat ID			
	✓	ADF&G	$232.2	
		Project Total	$232.2	
94285	Subtidal Sediment Recovery Monitoring			
	✓	NOAA	$387.3	
		ADEC	$21.4	
		ADF&G	$220.4	
		Project Total	$629.2	187 for 94 rest is close-out (already approved)
94290	Hydrocarbon Data Analysis & Interpretation			
	✓	NOAA	$130.2	
		Project Total	$130.2	
94316	Shoreline Trash Cleanup			
	✓	ADNR	$35.7	
		USFS	$2.9	
		Project Total	$38.6	
94320	Ecosystem Study Plan			
	✓	NOAA	$2,500.0	
		ADF&G	$2,500.0	
		Project Total	$5,000.0	
94345	Salmon Spawning Escapement on the Lower Kenai Pn			
	✓	ADF&G	$219.2	
		Project Total	$219.2	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:35 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94386	Artifact Repositories - Planning & Design			
	✓	ADNR	$223.8	
		USFS	$11.3	
		DOI-NPS	$8.3	
		Project Total	$243.3	
94417	Waste Oil Disposal Facilities			
	✓	ADEC	$232.2	
		Project Total	$232.2	
94419	Leave No Trace Educational Program			
	✓	USFS	$161.9	
		ADNR	$5.8	
		Project Total	$167.7	
94420	Recreation Information Center at Portage			
	✓	USFS	$100.8	
		Project Total	$100.8	
94421	Common Property Salmon Stock Restoration			
	✓	ADF&G	$5,336.8	
		Project Total	$5,336.8	
94422	Restoration Plan NEPA Compliance			
	✓	USFS	$184.0	
		ADF&G	$50.4	
		DOI	$62.8	
		NOAA	$19.9	
		Project Total	$317.0	
94423	Oil Spill Public Information Center			
	✓	ADEC	TBD****	
		ADF&G	TBD****	
		Project Total	TBD****	
	****To Be Determined			Was in Exec. Dir. budget

Printed: 1/11/94 8:28 AM

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94504	Genetic Stock ID of Kenai River Sockeye			
	✓	ADF&G	$262.2	
		Project Total	$262.2	
94505	Information Needs for Habitat Protection			Numbers don't add up.
	✓	USFS	$194.1	
		ADF&G	$137.5	
		DOI-FWS	$74.5	
		Project Total	$406.0	
94506	Pigeon Guillemot Recovery			
	✓	DOI-FWS	$13.9	
		Project Total	$13.9	
940ED	Executive Director's Office			
	✓	ADEC	TBD****	
		ADF&G	TBD****	
		ADNR	TBD****	
		USFS	TBD****	
		DOI	TBD****	
		NOAA	TBD****	
	****To Be Determined	Project Total	TBD****	
		TOTAL	$29,182.8	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:53 AM

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

1-11-94

Date: 1-12-94 Attendance

Issue:

Name	~~YES~~	~~NO~~	~~ABSTAIN~~	ABSENT
	Here Tues	Absent	Here Wed	Absent
Rupert Andrews Jim King proxy	with King proxy	X	King proxy	X
Pamela Brodie	X		X	
James Cloud	X		X	
James Diehl	X		X	
Richard Eliason		X		X
Donna Fischer	X		X	
John French	X		X	
~~Paul V. Gavora~~ Don McCumby		X		X
James King	X		X	
Richard Knecht		X		X
Vern C. McCorkle Jim Cloud proxy	with Cloud proxy	proxy	Cloud proxy	
Gerald McCune → Mary McBurney	X		X	
John McMullen	X		X	
Brad Phillips	X			~~X~~ X
John Sturgeon → Kim Benton	X		X	
Charles Totemoff	X		X	
Llewellyn W. Williams Jr.	X		X	
Sharon Gagnon				

12, 14 w/proxies

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94007

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	L			
James Cloud	L			
James Diehl	m			
Richard Eliason				L
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	H			
Richard Knecht				L
Vern C. McCorkle	L			
Gerald McCune	M			
John McMullen	L			
Brad Phillips				L
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94015

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie		✓		
James Cloud		✓		
James Diehl	L			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94020

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	H			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94039

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	H			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	L			
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.			✓	

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94040

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	✓			
James Diehl	✓			
Richard Eliason				✓
Donna Fischer		✓		
John French		✓		
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓			
Gerald McCune		✓		
John McMullen	✓			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.		✓		

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94041

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	H			
James Cloud	M			
James Diehl	H			
Richard Eliason				L
Donna Fischer		✓		
John French		✓		
Paul V. Gavora				L
James King	H			
Richard Knecht				L
Vern C. McCorkle	M			
Gerald McCune	L			
John McMullen	H			
Brad Phillips				L
John Sturgeon				L
Charles Totemoff				L
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94043

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	H			
James Diehl	M			
Richard Eliason				L
Donna Fischer	M			
John French	M			
Paul V. Gavora				L
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	L			
John McMullen	M			
Brad Phillips				L
John Sturgeon				✓
Charles Totemoff	H			
Llewellyn W. Williams Jr.	M			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94066

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	L			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94068

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	✓			
James Diehl		✓		
Richard Eliason				✓
Donna Fischer	✓			
John French		✓		
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓			
Gerald McCune	✓			
John McMullen	✓			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94070

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	✓			
James Diehl	✓			
Richard Eliason				✓
Donna Fischer	✓			
John French	✓			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓			
Gerald McCune	✓			
John McMullen	✓			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94081

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	L			
James Cloud	L			
James Diehl	M			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	L			
Gerald McCune	L			
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94083

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	✓			
James Diehl		✓		
Richard Eliason				✓
Donna Fischer		✓		
John French	✓			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓			
Gerald McCune	✓			
John McMullen		✓		
Brad Phillips				✓
John Sturgeon		✓		
Charles Totemoff	M			
Llewellyn W. Williams Jr.		✓		

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94086

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	H			
James Diehl		✓		
Richard Eliason				✓
Donna Fischer		✓		
John French	L			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	L			
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94090

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	M			
Pamela Brodie		✓		
James Cloud	H			
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	M			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon	H			
Charles Totemoff	H			
Llewellyn W. Williams Jr.	M			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94092

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud		✓		
James Diehl		✓		
Richard Eliason				✓
Donna Fischer		✓		
John French		✓		
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune		✓		
John McMullen		✓		
Brad Phillips				✓
John Sturgeon		✓		
Charles Totemoff		✓		
Llewellyn W. Williams Jr.		✓		

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94102

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	M			
Pamela Brodie	L			
James Cloud	M			
James Diehl	M			
Richard Eliason				L
Donna Fischer	L			
John French	M			
Paul V. Gavora				L
James King	M			
Richard Knecht				L
Vern C. McCorkle	M			
Gerald McCune	L			
John McMullen	M			
Brad Phillips				L
John Sturgeon				L
Charles Totemoff				L
Llewellyn W. Williams Jr.	M			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94110

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	H			
James Cloud		✓		
James Diehl	H			
Richard Eliason				✓
Donna Fischer		✓		
John French	L			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune	M			
John McMullen	L			
Brad Phillips				✓
John Sturgeon		✓		✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.		✓	✓	

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94126

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	H			
James Cloud		✓		
James Diehl	H			
Richard Eliason				✓
Donna Fischer		✓		
John French		✓		
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune	M			
John McMullen	L			
Brad Phillips				✓
John Sturgeon			✓	[redacted]
Charles Totemoff				✓
Llewellyn W. Williams Jr.		✓	[redacted]	

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94137

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	H			
James Diehl	M			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94 139

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	L			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Withdrawn

Date: 1-12-94

Issue: 94147

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews				
Pamela Brodie				
James Cloud				
James Diehl				
Richard Eliason				✓
Donna Fischer				
John French				
Paul V. Gavora				✓
James King				
Richard Knecht				✓
Vern C. McCorkle				
Gerald McCune				
John McMullen				
Brad Phillips				✓
John Sturgeon				
Charles Totemoff				
Llewellyn W. Williams Jr.				

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94159

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	L			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	L			
John McMullen		✓		
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.	L			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94163

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	M			
James Cloud	M			
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	H			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	M			
John McMullen	H			
Brad Phillips				✓
John Sturgeon	M			
Charles Totemoff	H			
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94165

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	M			
James Cloud	H			
James Diehl	M			
Richard Eliason				✓
Donna Fischer	H			
John French	H			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94173

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	L			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	L			
Gerald McCune	L			
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.	M			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: ~~94173~~ 94184

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	M			
James Cloud	H			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	H			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94185

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	M			
James Cloud	L			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	L			
Gerald McCune	H			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94187

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	M			
James Cloud	H			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	H			
John French	H			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94189

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	H			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	H			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94191

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie	✓			
James Cloud	✓			
James Diehl	✓			
Richard Eliason				✓
Donna Fischer		✓		
John French	✓			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓			
Gerald McCune	✓			
John McMullen	✓			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94192

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94199

Defer, need more info

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews				
Pamela Brodie		✓		
James Cloud				
James Diehl				
Richard Eliason				✓
Donna Fischer		✓		
John French				
Paul V. Gavora				✓
James King				
Richard Knecht				✓
Vern C. McCorkle				
Gerald McCune		✓		
John McMullen	✓			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94200

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	H			
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	M			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon	H			[redacted]
Charles Totemoff	H			[redacted]
Llewellyn W. Williams Jr.	M			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94216

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	L			
James Cloud		✓		
James Diehl	H			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94237

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	L			
James Diehl	H			
Richard Eliason				✓
Donna Fischer		✓		
John French		✓		
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	L			
Gerald McCune			✓	
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94241

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	✓			
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	✓			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	✓			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94244

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud		✓		
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune	M			
John McMullen		✓		
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94246

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	L			
James Diehl	H			
Richard Eliason				L
Donna Fischer		✓		
John French	M			
Paul V. Gavora				L
James King	L			
Richard Knecht				✓
Vern C. McCorkle	L			
Gerald McCune	L			
John McMullen	M			
Brad Phillips				L
John Sturgeon				L
Charles Totemoff				✓
Llewellyn W. Williams Jr.	M			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: ~~[illegible]~~ 94255

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	H			
James Cloud	H			
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94258

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	L			
James Cloud	H			
James Diehl	H			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	M			
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94259

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	L			
Richard Eliason				✓
Donna Fischer	L			
John French	L			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	H			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94266

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie		✓		
James Cloud	H			
James Diehl	L			
Richard Eliason				✓
Donna Fischer		✓		
John French	H			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon	H			
Charles Totemoff	H			
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94272

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	M			
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	H			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	H			
John McMullen			✓	
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94279

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	L			
John French	H			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	H			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94 280

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	H			
John French	M			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	✓			
John McMullen	M			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94285 $187. for FY94 work only

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	L			
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	L			
Gerald McCune	L			
John McMullen	M			
Brad Phillips				✓
John Sturgeon		✓		
Charles Totemoff	M			
Llewellyn W. Williams Jr.	M-H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94290

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie		✓		
James Cloud	H			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	M			
John French	H			
Paul V. Gavora				✓
James King	H			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune			✓	
John McMullen	H			
Brad Phillips				✓
John Sturgeon	H			
Charles Totemoff	H			
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94316

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon	M			✓
Charles Totemoff	M			✓
Llewellyn W. Williams Jr.		✓		

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94320 (amended)

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	M			
Pamela Brodie	H			
James Cloud	H			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	✓			
John French	H			
Paul V. Gavora				✓
James King	M			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94345

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud	M			
James Diehl	H			
Richard Eliason				✓
Donna Fischer		✓		
John French	L			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	M			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94386

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	L			
James Cloud		✓		
James Diehl	L			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune	L			
John McMullen	M			
Brad Phillips				✓
John Sturgeon			✓	✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94417

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	✓			
Pamela Brodie		✓		
James Cloud	H			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	H			
John French	M			
Paul V. Gavora				✓
James King	✓			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen	M			
Brad Phillips				✓
John Sturgeon	H			
Charles Totemoff	H			
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94419

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	L			
James Cloud	L			
James Diehl	H			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	L			
Gerald McCune	L			
John McMullen	L			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff	M			✓
Llewellyn W. Williams Jr.	L			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94420

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie		✓		
James Cloud		✓		
James Diehl	M			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle		✓		
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon			✓	[illegible]
Charles Totemoff	H			
Llewellyn W. Williams Jr.	L			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94421

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	M			
James Cloud	H			
James Diehl	M			
Richard Eliason				✓
Donna Fischer	H			
John French	H			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	H			
John McMullen			✓	
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94 Defer

Issue: 94422 (EIS - no project description)

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews				
Pamela Brodie				
James Cloud				
James Diehl				
Richard Eliason				✓
Donna Fischer				
John French				
Paul V. Gavora				✓
James King				
Richard Knecht				✓
Vern C. McCorkle				
Gerald McCune				
John McMullen				
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				
Llewellyn W. Williams Jr.				

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94504

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	H			
James Cloud	H			
James Diehl	H			
Richard Eliason				✓
Donna Fischer		✓		
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	H			
Gerald McCune	M			
John McMullen	H			
Brad Phillips				✓
John Sturgeon				✓
Charles Totemoff				✓
Llewellyn W. Williams Jr.				✓

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94505

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	L			
Pamela Brodie	M			
James Cloud	M			
James Diehl	M			
Richard Eliason				✓
Donna Fischer	L			
John French	M			
Paul V. Gavora				✓
James King	L			
Richard Knecht				✓
Vern C. McCorkle	M			
Gerald McCune	M			
John McMullen	M			
Brad Phillips				✓
John Sturgeon	L			[redacted]
Charles Totemoff	M			
Llewellyn W. Williams Jr.	M			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94/506

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews	H			
Pamela Brodie	H			
James Cloud	M			
James Diehl	H			
Richard Eliason				L
Donna Fischer	H			
John French	H			
Paul V. Gavora				L
James King	H			
Richard Knecht				L
Vern C. McCorkle	M			
Gerald McCune	H			
John McMullen	H			
Brad Phillips				L
John Sturgeon				L
Charles Totemoff				L
Llewellyn W. Williams Jr.	H			

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Not considered

Date: 1-12-94

Issue: 94423

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews				
Pamela Brodie				
James Cloud				
James Diehl				
Richard Eliason				✓
Donna Fischer				
John French				
Paul V. Gavora				✓
James King				
Richard Knecht				✓
Vern C. McCorkle				
Gerald McCune				
John McMullen				
Brad Phillips				✓
John Sturgeon				
Charles Totemoff				
Llewellyn W. Williams Jr.				

Exxon Valdez Oil Spill

Public Advisory Group
Voting Record

Date: 1-12-94

Issue: 94 OED

Not Considered

Name	YES	NO	ABSTAIN	ABSENT
Rupert Andrews				
Pamela Brodie				
James Cloud				
James Diehl				
Richard Eliason				✓
Donna Fischer				
John French				
Paul V. Gavora				✓
James King				
Richard Knecht				✓
Vern C. McCorkle				
Gerald McCune				
John McMullen				
Brad Phillips				✓
John Sturgeon				
Charles Totemoff				
Llewellyn W. Williams Jr.				

Institute of Social and Economic Research — University of Alaska Anchorage

Research Summary

R.S. No. 51 — October 1991

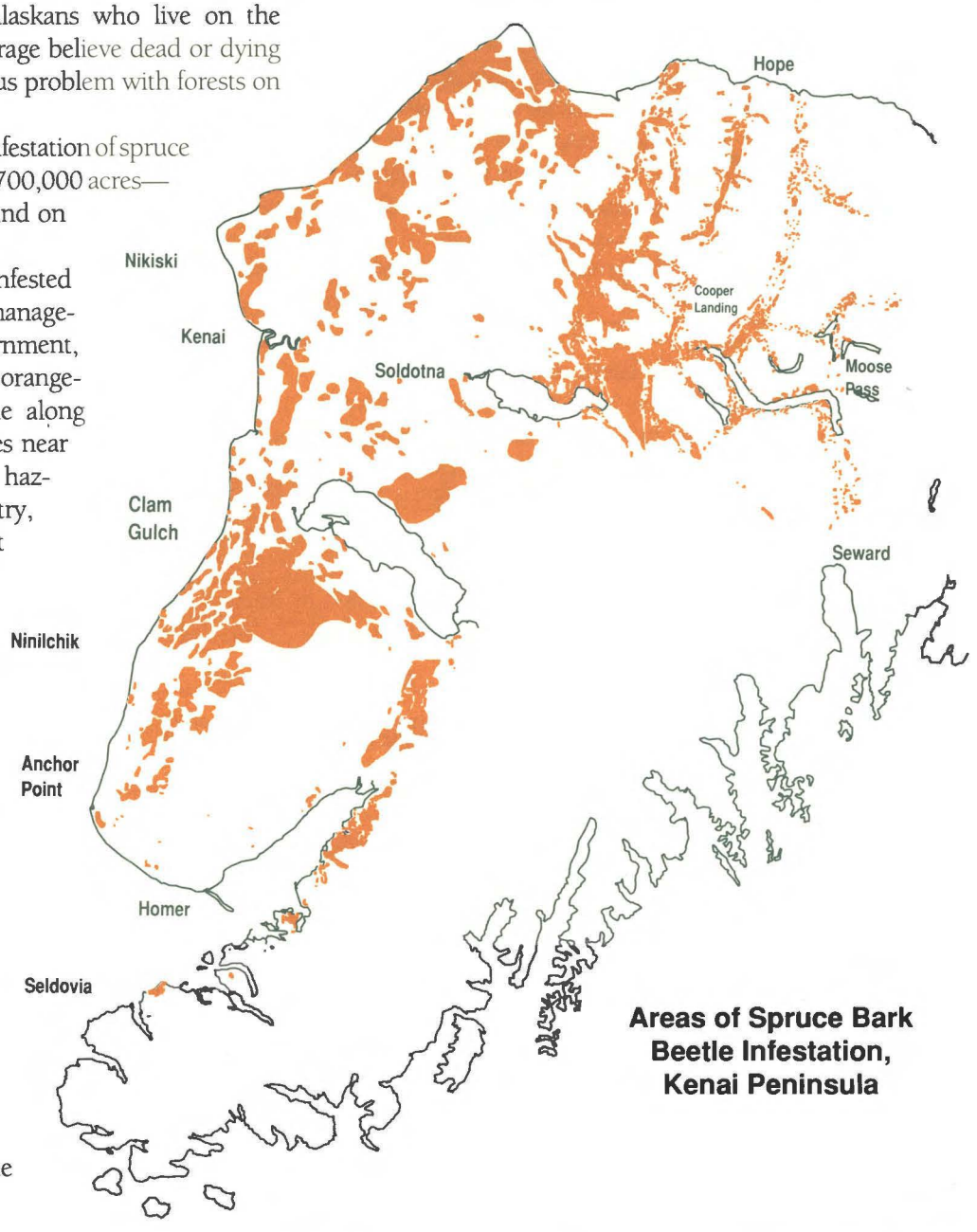
Managing Beetle-Killed Spruce on the Kenai Peninsula

Nearly 90 percent of Alaskans who live on the Kenai Peninsula and in Anchorage believe dead or dying spruce trees are the most serious problem with forests on the Kenai Peninsula.

Since 1970, a spreading infestation of spruce bark beetles has killed trees on 700,000 acres—about 35 percent of forested land on the peninsula.

What to do about the infested trees has become a prominent management issue for the state government, partly because areas of dead, orange-brown spruce are very visible along peninsula highways. Dead trees near communities can also be a fire hazard. The state Division of Forestry, which is part of the Department of Natural Resources, asked ISER to find out how residents of southcentral Alaska want the state to manage areas affected by the spruce bark beetles. The division manages about eight percent of forested land on the Kenai Peninsula.

In March and April 1991 ISER conducted a telephone survey of 400 peninsula households and 100 Anchorage households. ISER also created maps documenting the location and extent of the beetle infestation, using data collected by the U.S. Forest Service over the past 20 years.



Areas of Spruce Bark Beetle Infestation, Kenai Peninsula

This Research Summary is based on ***Developing A Public Consensus on the Management of Spruce Bark Beetles on the Kenai Peninsula,*** *by Jack Kruse and Robert Pelz. The report is available from ISER at a cost of $5.00. This publication is on recycled paper.*

Below we summarize the report findings. We surveyed three groups of southcentral residents: (1) affected homeowners (Kenai Peninsula residents who reported dead or dying spruce on their own or adjoining properties); (2) other Kenai Peninsula households; and (3) Anchorage households.

We asked southcentral residents whether the state should remove or leave beetle-killed trees; whether it should protect healthy trees near infested ones; and whether and how the state should speed re-forestation in affected areas. Affected areas are near homes, along highways, in campgrounds, and in backcountry.

Bear in mind that the state owns just a part of the beetle-infested lands. Areas of the Chugach National Forest and the Kenai National Wildlife Refuge are also affected, as well as borough and private lands. So whatever the state decides to do about the infestation on its own lands, federal, borough, and private landowners will make their own decisions about large areas of the peninsula.

How Big is the Problem?

Press coverage of the beetle infestation, and the growing swaths of dead trees, have made Alaskans very aware of the spruce beetle infestation. More than half of Anchorage residents and three-quarters of Kenai Peninsula residents have read about the beetle infestation, and half of all southcentral residents say they have seen dead trees along peninsula highways.

What are the problems created when beetles kill spruce trees? Figure 1 shows percentages of affected peninsula homeowners, other peninsula residents, and Anchorage residents who cited various kinds of problems created by the spruce bark beetle. Southcentral residents think the chief problems resulting from beetle-killed spruce are (1) less attractive views, (2) fire threat, and (3) loss of privacy. Other problems cited include large areas affected, loss of timber, and declining property values.

In researching the problem ISER found:

- Of the total 700,000 acres affected by beetles since 1970, 150,000 acres were infested within the past five years. Some areas that were first infested between 1970 and 1975 were re-infested between 1985 and 1990.
- The estimated value of buildings on or adjacent to properties with beetle-killed spruce is $686 million. That does not mean all these buildings are at risk in the event of fires, or that all these property owners have lost privacy. The figure simply establishes that a substantial number of homes and other buildings are in areas affected by the spruce bark beetle.
- About 33,000 acres infested by beetles are in the most populated areas of the peninsula, including the communities of Cooper Landing, Nikiski, Kenai, and Soldotna.
- About 5,000 Kenai Peninsula homeowners, or 51 percent of peninsula households, report beetle-killed spruce on their own or adjoining properties.

Dead Trees Near Homes

Figure 2 shows how residents of Anchorage and the Kenai Peninsula want the state to manage beetle-infested trees near homes:

- About three out of four residents of south-central Alaska want the state to cut down and remove dead trees near homes.
- More than half of southcentral residents want the state to plant new trees near homes and either scrape the ground or place mats around the new trees to discourage grasses that can choke seedling trees.
- Fewer than one-quarter of southcentral residents support the use of chemicals near homes to dry or kill grasses that could choke newly planted trees.

Figure 1. Six Most Commonly Cited Problems
(In Percentages of Respondents)

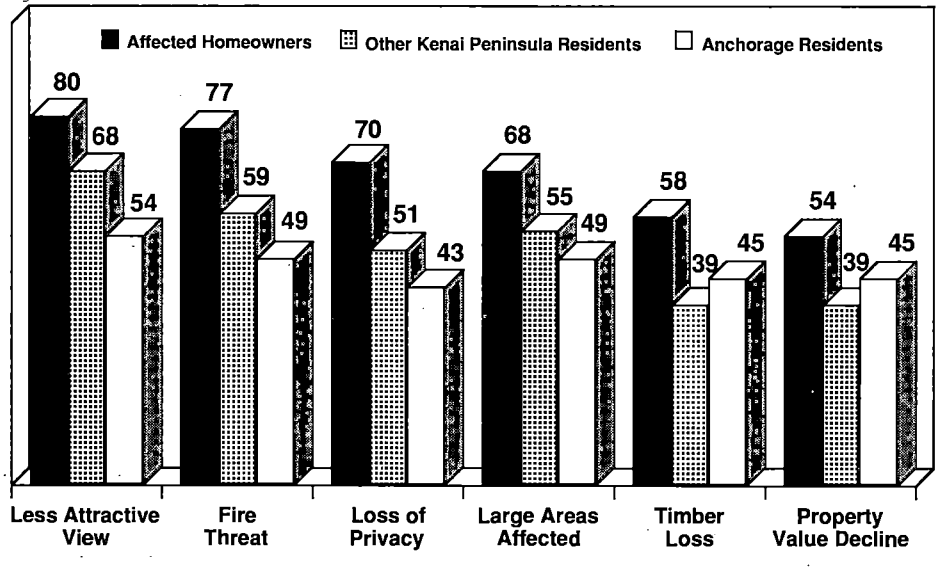


Figure 2. Public Support for Managing Infested Trees Near Homes

(In Percentages of Respondents)

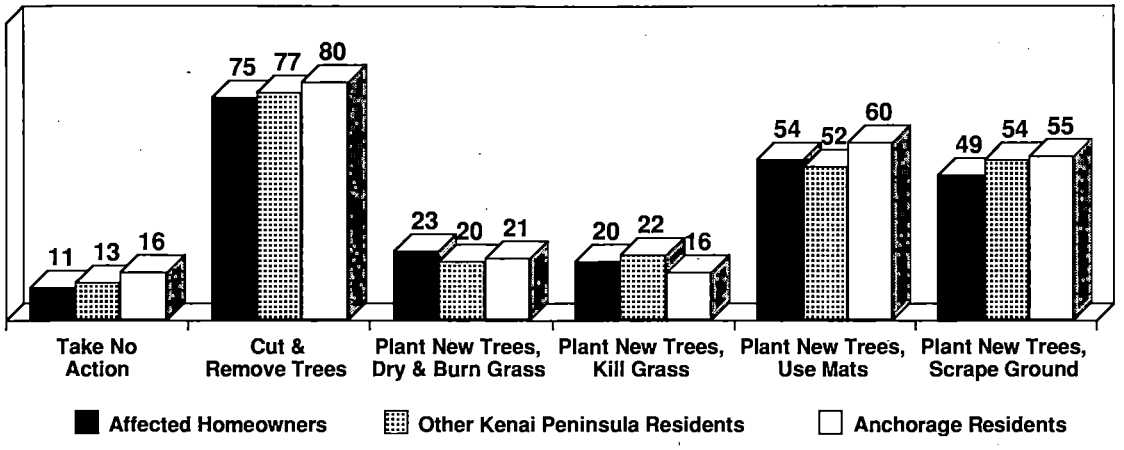


Figure 3. Public Support for Managing Infested Trees Along Highways

(In Percentages of Respondents)

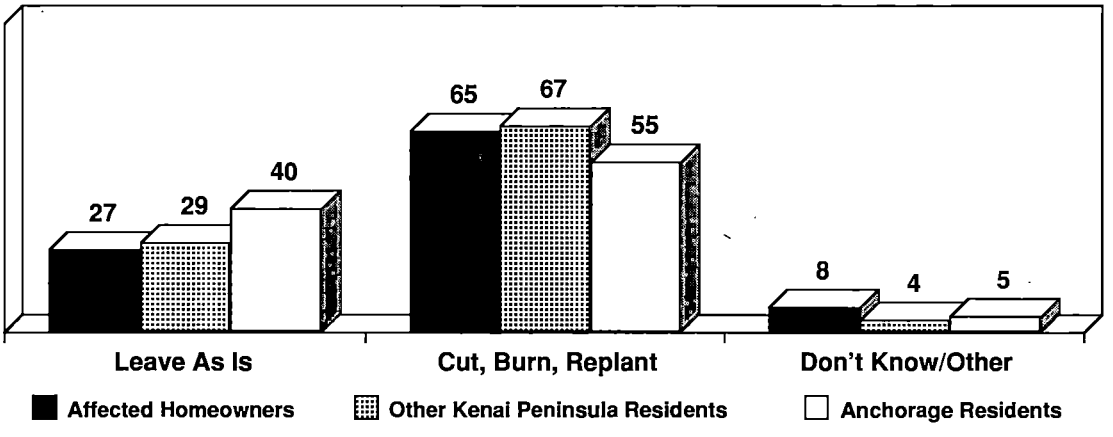
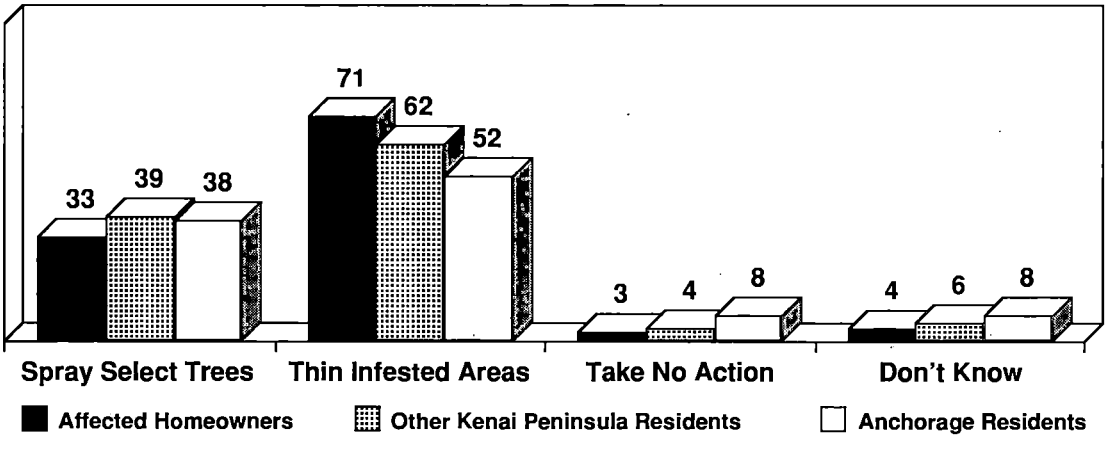


Figure 4. Public Support for Managing Spruce Beetles Near Campgrounds

(In Percentages of Respondents)



Dead Trees Along Highways

Figure 3 shows how southcentral residents want the state to manage beetle-infested trees along highways:

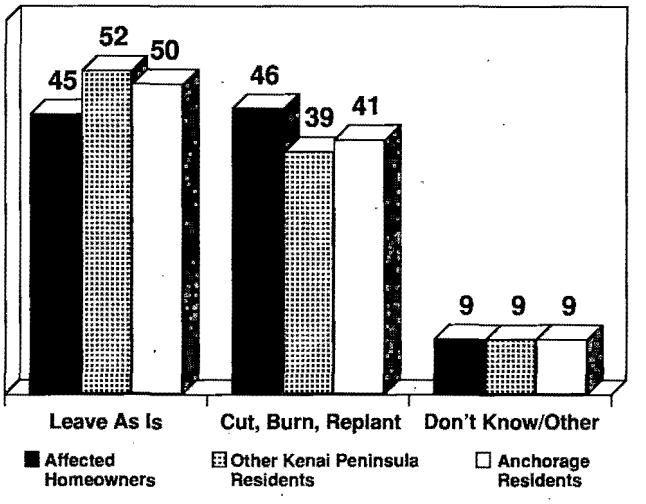
- Two-thirds of peninsula residents and more than half of Anchorage residents want the state to cut and burn beetle-killed trees along the highways and plant new trees.
- A substantial minority of southcentral residents—40 percent in Anchorage and nearly 30 percent on the peninsula—think the state should do nothing about beetle-killed trees along highways.

Dead Trees in Campgrounds and Backcountry

Figures 4 and 5 show how southcentral Alaskans want the state to manage beetle-infested trees in campgrounds and in backcountry:

- Most (71 percent) of peninsula residents whose own properties have been affected by the spruce bark beetle want the state to thin out infested trees in campgrounds. More than half of other southcentral residents also support thinning infested trees in campgrounds.
- Sizable minorities (nearly 40 percent) of Anchorage and Kenai Peninsula residents favor protecting selected trees in campgrounds by spraying them with insecticides.

Figure 5. Public Support for Managing Spruce Beetles in Backcountry
(In Percentages of Respondents)



- Southcentral residents are almost evenly split in their opinions about what the state should do about beetle-killed trees in backcountry: roughly half say the state should do nothing, and almost half want the state to cut and burn dead trees and plant new ones.

Research Summary (No. 51)
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SPRUCE BEETLE FACTS

- The spruce bark beetle is the major killing insect pest of Alaska spruce forests.

- Historically, most spruce beetle outbreaks have been and are occurring throughout southcentral and interior Alaska's Lutz and white spruce forests. From 1920-1990, more than 2 million acres of spruce stands have been infested to varying degrees. Another 1.2 million acres was mapped in 1991, 1992 and 1993.

- More than half of the infestation mapped in 1993, over 300,000 acres, is on the Kenai Peninsula.

- The Kenai Peninsula infestation is the largest recorded in North America over the last decade.

- Net 10-year average annual growth of Kenai Peninsula white spruce stands managed by the United States Forest Service is negative, indicating that mortality exceeds annual growth.

- White, Sitka, and Lutz spruce are commonly attacked by the spruce beetle. Black spruce is rarely attacked.

- White spruce hosts produce more beetles than Lutz spruce which produces more than Sitka spruce.

- Infestations have occurred primarily in older, slower growing spruce. Small diameter, rapidly growing trees are least susceptible to attack, however the Kenai Peninsula infestation has reached a level which ignores some common characteristics.

- Susceptibility to infestations increase when a stand is composed of more than 70 percent spruce over 10" in diameter with a slower than average growth rate.

- Most spruce beetle outbreaks in standing spruce originated in windthrown trees. Large beetle populations emerge from this highly productive breeding material and move into standing trees. Right-of-way clearing debris serve as attractive breeding material for spruce bark beetles.

- The spruce beetle is responsible for over 90% of the total insect-caused mortality on the Kenai Peninsula, up from 57% during the five year period before 1987. 67% of the current insect-caused mortality is on forest lands producing or capable of producing more than 20 cubic feet per acre per year.

- The current infestation on the Kenai Peninsula is epidemic. Halting the infestation soon is unlikely, but concerted efforts can significantly slow natural cycling of insect populations and minimize impacts to high valued areas.

- It appears that the current infestation on the Kenai Peninsula has increased substantially

in recent years and likely will maintain, if not increase, in magnitude.

- Negative impacts of the infestations must be considered: Loss of aesthetic value of the forest; decrease in number and variety of wildlife due to decreased habitat; increased fire hazard; and, loss of timber value.

- Spruce requires a seed source and site disturbance for natural regeneration. Site disturbance is not occurring in many of the infested stands due to fire suppression and minimal management activities. Moreover, entire stands are being destroyed, eliminating seed sources.

- For visitors, natural scenery and wildlife are some of the most important factors affecting the quality of their visit to Alaska. Aesthetic ratings by residents and visitors consistently decline as the proportion of beetle killed trees increase.

- Several tools are available that can help reduce the long term impact of the spruce beetle on Alaska's forest resources and include; use of a risk and hazard rating system; appropriate treatment of down and dead host material; and, silvicultural treatments including stand conversion or improvement.

- There is public support to prevent spruce beetle outbreaks, rehabilitate impacted areas, and reduce impacts where outbreaks are ongoing.

- The more generally accepted treatment to reduce hazard and risk of spruce beetle damage is to maintain a mosaic of tree species and age classes. The most plausible solution is active ecosystem management and appropriate silvicultural techniques to create a future desired mosaic.

- The Alaska Division of Forestry with aid and participation of the United State Forest Service, has a forest health management planning effort well underway to address forest health on the western Kenai Peninsula and Kalgin Island. Site specific prescriptions as well as a landscape perspective are being generated.

14.2.9T

SPRUCE BEETLE IMPACTS, AND CONTROL OPTIONS

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There are a variety of impacts associated with spruce beetle infestations to forest resources, both timber and non-timber. The impacts can be viewed positively or negatively depending upon the forest resources in question. Some of the impacts associated with spruce beetle infestations include, but are not limited to:

(1) **Loss of merchantable value of killed trees:** The value of a spruce as sawtimber is reduced within three years of attack as weather checking and increased sap-rots occur. The value of a beetle killed tree as houselogs, chips, or firewood continues for some time.

(2) **Long term stand conversion:** To optimally regenerate both spruce and birch a site disturbance (i.e. fire, windthrow, flooding, etc) is required which results in a seed bed comprised of bare mineral soil with some organic material mixed in. If there is adequate seed source, such site disturbances provide excellent sites for regeneration. However, what is occurring on many sites in south-central Alaska after spruce beetles have opened up the canopy is that there is a paucity of regeneration coming in as there as been minimal site disturbance. Under such conditions, grass and other competing vegetation can quickly invade the site and prevent future colonization by tree species.

(3) **Impacts to wildlife habitat:** Those wildlife species that are dependent on large diameter spruce stands are negatively impacted. Those species that benefit from early successional stage vegetation will benefit from spruce beetle infestations as stand composition changes.

(4) **Impact to scenic quality:** Recent studies have demonstrated that there is a significant decline in scenic quality of spruce beetle impacted stands and that scenic beauty is an important resource on the Chugach National Forest and other forested areas of the Kenai Peninsula. Along scenic corridors, maintaining or enhancing scenic quality necessitates minimizing impacts from spruce beetle infestations.

(5) **Fire hazard:** There is concern that fire hazard of

spruce beetle impacted stands will increase over time as dead trees fall, dry grass accumulates, thus increasing fuel loading.

(6) **Impact to fisheries:** If salmon spawning streams are bordered by large diameter spruce and if these trees are subsequently killed by spruce beetles, there is concern as to the availability of large woody debris. A continual supply of large woody debris in spawning streams is a necessary component for the integrity of spawning habitat.

There are a variety of techniques that can be used to prevent, mitigate, or reduce impacts associated with spruce beetle infestations. However, before pest management prescriptions can be developed, the resource objective(s) for a particular stand, watershed, landscape, etc. must be determined. The forest manager must evaluate the resource values and economics of objectives. The beetle population level must also bemanagement actions for each stand in light of management considered because population levels will determine the priority of management actions and the type of strategy to be invoked.

The primary strategy should be silvicultural treatments of potentially susceptible stands in order to maintain their health with a moderate growth rate. The first step in this strategy is to hazard/risk rate spruce stands, which will indicate the most susceptible stands. Forest Health Management, in cooperation with Institute of Northern Forestry, has recently developed a PC compatible spruce beetle expert system. One of the functions of this knowlege base system is the hazard and risk rating of spruce stands in south-central Alaska. Hazard is defined as the amount of spruce basal area killed within ten years if you have an outbreak. Risk is defined as the probability of having an outbreak and is dependent on stand structure, spruce beetle breeding material, and spruce beetle population dynamics. The stands can then be treated with harvesting directed at the most susceptible stands. This strategy assumes beetle populatons are not immediately threathening resource values. If they are, suppression measures are more appropriate.

Suppression measures which include silvicultural, physical, and chemical methods are available. Some measures are suitable only for populations in windthrown host material; other methods are better suited for infestations in standing trees. Most suppression methods, however, are short-term responses to beetle populations. **They correct only the immediate situation and are not long lasting.**

Pest management techniques include, but are not limited to:

(1) **Sanitation overstory removal** involves the removal of all infested and susceptible spruce and using harvesting and site preparation techniques that encourage regeneration of a

new, vigorous stand.

(2) **Sanitation partial** cut involves the removal of infested and susceptible spruce to improve the growth and thus the vigor of the residual stand. In essence, this is a thinning from above.

(3) **Trap trees** are large diameter uninfested spruce that are felled in a shady location before beetle flight. Trap trees can absorb up to 10 times the number of spruce beetles that a standing tree will absorb. Spruce beetle preferentially attack downed over standing trees. Once infested, trap trees should be removed from the forest or treated chemically, with fire, or debarked. Trap trees are an effective control when spruce beetle populations are building in standing trees. Ratios of trap trees to infested standing trees range from 1:2 to 1:10.

(4) **Fire** involves piling and burning infested logging residuals and windthrow to destroy spruce beetle brood. Only the bark has to be scorched to destroy the insects.

(5) **Insecticides** such as carbaryl and lindane are registered by the E.P.A. for the prevention of spruce beetle attacks. Formulations of these insecticides are applied to the boles of uninfested high valued trees to kill attacking adult beetles.

(6) **Pheromones** are chemical substances that influence insect behavior. Currently, the use of synthetic attractants and the anti-aggregating pheromone show promise; especially in discouraging spruce beetles from attacking standing trees. However, these compounds are still experimental and have not been registered for use by the E.P.A. They can be used, however, in a small-scale, research context.

As previously mentioned, once resource objectives for a particular stand are defined, Forest Health prescriptions can be developed to minimize spruce beetle impacts to the resources in question. The key to managing the spruce beetle is to reduce tree mortality and associated impacts to acceptable levels which vary with the goals and objectives of the land manager for specific areas. Forest health management presciptions must be developed that consider a wide range of management and land use values. Four major premises are applicable to spruce beetles in Alaska:

1. Spruce beetles **cannot** be eradicated over extensive areas.

2. Management of spruce beetles is viable in those areas that have resources with relatively high values.

3. The optimal strategy for managing the spruce beetle is to

intensively manage the host type; thus preventing outbreaks.

4. Prevention is possible in moderate to highly susceptible stands, or in low susceptible stands which will be in a moderate to high susceptible condition in the near future.

Failure to recognize the above four points will lead to failure for any long range management of spruce beetles.

14.2.95

A STUDY REPORT

of the

DETERIORATING FOREST HEALTH

OF SOUTH-CENTRAL AND INTERIOR ALASKA

Alaska State Society of American Foresters
July, 1993

TABLE OF CONTENTS

1. Background 1-2

2. Discussion 2-3

3. Statement of Findings 3-4

4. Conclusions 5

5. Recommendations 6

6. References 7-8

1. BACKGROUND

The largest spruce bark beetle epidemic in North America is resulting in substantial and expanding impacts to wildlife, fisheries, recreation, and timber resources, as well as loss of critical mature forest ecosystems, in white, Sitka, and Lutz spruce forests of south-central and interior Alaska. Increased spruce beetle activity is also ocurring in the maritime Sitka spruce stands of Prince William Sound and southeast Alaska, although of lesser magnitude than infestations further north. This epidemic constitutes one of the most significant forest health declines currently impacting Alaska forests.

Historical descriptions from miners, fur traders and settlers (Lutz 1960, Johnson 1975) indicate common and extensive fires in these Alaska forest types in the mid-to late 1800's. Fire was a major natural change agent that helped maintain species and age class diversity on the landscape. Stand development following these early fires, and effective fire suppression since the 1950's, has created hundreds of thousands of acres of white, Sitka, and Lutz spruce forest types that are simultaneously becoming mature, decadent and highly susceptible to spruce beetle damage today.

In a 1987 timber inventory, the Kenai Peninsula was estimated to have 364,000 acres of white/Lutz spruce type, of which 220,500 acres was considered commercial timberland, -- that is producing over 20 cubic feet of wood per acre per year (Van Hees and Larson, 1991). This inventory estimated that on the Chugach National Forest portion of the Kenai Peninsula, mortality exceeds annual growth and that 57% of this mortality is estimated to have been caused by the spruce bark beetle. Van Hees (1992) noted dramatic increases in spruce bark beetle populations on the Kenai Peninsula since the 1987 inventory.

Systematic monitoring of insect conditions by the U.S. Forest Service has been in effect since the 1950's. Entomologists monitoring the spruce beetle infestations have been predicting substantial population increases for a number of years (Holsten 1990). Rapid beetle population increases to epidemic levels have become a reality in the last 4 years. Statewide, acreages of active spruce beetle infestation from the U.S. Forest Service annual forest insect and disease aerial surveys (USDA Insect Conditions Reports; 1989, 1990, 1991, 1992) are:

1989 -- 177,000 acres
1990 -- 232,000 acres
1991 -- 375,000 acres
1992 -- 600,000 acres

The current infestation of 600,000 acres is located in three principal geographic locations. These are the Kenai peninsula, the Copper River basin, and the Yukon River basin. This infestation is the largest area of active spruce beetle infestation ever mapped in Alaska and constitutes the largest existing spruce bark beetle infestation in North America.

This epidemic spans a variety of private as well as state and federal land ownerships. Addressing this situation will require coordinated land management actions. Significant ownerships of infested forest types include; the Bureau of Land Management, the U.S. Fish and Wildlife Service, the U.S. National Park Service, the State of Alaska, the U.S. Forest Service, several boroughs, and privately owned forest lands. Some of these ownerships have few or no forest management specialists to address this problem. (ie. The State Division of Forestry currently has less than 2 full time forestry people dedicated to planning and implementing forest health treatments on the Kenai Peninsula.)

Efforts to address this problem to date include:

..During 1991 and 1992, the U.S. Forest Service coordinated a comprehensive forest health protection and restoration effort for the Cooper Landing area of the Kenai Peninsula. The majority of that project has been implemented.

..As part of a State Forest Health Initiative, the State Division of Forestry completed a general Forest Health plan for the Western Kenai Peninsula and Kalgin Island in 1992. Seven project areas were identified in that plan to receive management actions. The first of the seven areas (Falls Creek) is planned for project implementation, but is receiving criticism from the environmental community. Also as part of this initiative, the Division of Forestry has established a citizen working group to consider management actions in the Copper River basin.

..The U.S. Forest Service has begun a planning effort for the Seward Scenic By-Way and Hope portions of the Kenai Peninsula. These actions constitute the extent of coordinated planning and implementation efforts to date in spruce beetle impacted areas.

These actions have thus far resulted in approximately 3,000 of the current 600,000 acres (0.5%) receiving actual ground treatments.

2. DISCUSSION

Concern for maintanence of healthy forest ecosystems has become as national issue in recent years. A national strategic plan has been developed by the U.S. Forest Service to address concerns of forest health (USDA, 1993). The current national forest health monitoring programs by the U.S. Forest Service and the Environmental Protection Agency give strong emphasis to maintaining forest health along with forest biodiversity, all within the context of sound ecosystem management. Many existing silvicultural practices have strong application within this context.

Public perception regarding the spruce bark beetle problem in Alaska has been documented (Daniels 1991, Kruse 1991). Study respondents overwhelmingly were in favor of prevention of spruce beetle outbreaks, mitigation of associated impacts as well as providing management actions that would restore the health of the impacted forests. Surveyed publics expressed a willingness to subsidize reforestation actions if necessary.

The Society of American Foresters has recently published a National Task Force report "Sustaining Long-Term Forest Health and Productivity" (Society of American Foresters, 1993). This report describes the need to address the sustainability of healthy forests by considering social or human forces as well as considering the scientific and economic forces. This Task Force Report includes 26 recommendations on ecologically sound approaches to maintaining or improving forest health. These fall in four broad areas of action:

-Advocate ecosystem management.
-Integrate ecosystem management into educational programs.
-Promote ecosystem management research.
-Coordinate between land owners and the public.

A coordinated effort applying assertive management actions to deal with this Alaskan forest health crisis would be consistent with the recommendations of this report to sustain long-term forest health

and productivity in our ecosystems. Lack of action allowing continuation of increasing forest health decline would be inconsistent with sustained ecosystem productivity and biodiversity.

Not all resource disciplines are actively furthering the ecological significance of these forest alterations. Changes in forested wildlife habitat and/or old-growth habitat has not been raised as an issue in south-central or Interior Alaska. The limited and naturally fragmented landscape patterns of south-central and Interior Alaska make this loss of forest habitat a much more critical issue to sustained ecosystems than loss of habitat in southeast Alaska where the forested landscape is broader and more contiguous. Yet, habitat loss has been raised as a major issue in southeast and virtually not acknowledged in south-central or Interior Alaska.

Lack of fully recognizing the ecological impacts coupled with lack of a viable forest industry to provide cost effective management options has resulted in little direct action to address this declining forest health problem. Meanwhile, hundreds of thousands of acres of Alaska forests are being subject to ever-increasing negative impacts, losing future resource potential, and rapidly losing economic value that could fund positive management actions.

Forest economic development is often billed as the rationale for "logging". While economics should not be the major driver for addressing Alaska forest health problems, clearly, economics should also not be ignored. Implementation of forest management to address forest health can not only assist to pay for the needed forest health treatments, but contribute to other state goals such as rural economic development and economic diversification. Particularly with wood product values rising rapidly, the potential for significant economic returns from implementing forest health treatments, and consequent loss of these values through inaction, should not be ignored. The U.S. imports nearly thirty (30%) percent of its wood fiber, much of which comes from countries with less stringent environmental guidelines than our own (Salwasser, MacCleery, and Snellgrove). Non-use of the large and growing inventory of beetle killed spruce, while supporting the harvest of green trees from foreign sources, may be considered environmentally irresponsible.

The previous lack of viable timber markets in South-central and Interior Alaska have prevented development of a forest industry to utilize industrial wood recovered in silvicultural management activities. Without an industry to provide a reasonably cost effective vehicle to support forest management actions, few silvicultural management actions have been taken to assist ecosystem manipulations. The recent national rise in industrial wood product values has set the stage for ecosystem and silvicultural management that could subsidize assertive forest health enhancements. Markets are rapidly developing for a variety of forest products from Alaskan forest types including house logs, veneer, dimension lumber, and chips. All indications are that market values will increase in the future.

3. STATEMENT OF FINDINGS

Forest health in South-central and Interior Alaska is rapidly deteriorating. However, the greatest forest impact is potential long-term change in forest cover from spruce bark beetle induced tree mortality over extensive portions of the white, Sitka, and Lutz spruce forest types.

Spruce beetle populations have shifted from endemic to epidemic levels in many areas of Alaska. Spruce beetles have and always will be a feature of these ecosystems, however, the notion that this infestation is or should be managed as a totally "natural" event is erroneous. While several environmental factors such as annual weather conditions, host susceptibility, changes in predator and parasite populations, etc., continue to influence beetle population changes, past and future human intervention (such as fire suppression, clearing activities, or simply increased habitation) has re-

moved this situation from a "natural" setting. Even if this event was natural, impacts are ocurring which could be either positive or negative depending on the affected resource and the desired future condition. Consideration of human needs and influences to establish an appropriate desired future condition for these impacted forest types is ecologically appropriate.

Spruce beetle induced mortality is currently occurring on over 600,000 acres in these forest types (USDA, Insect Conditions Report-1993). In many instances this mortality is eliminating all live forest cover (main canopy) in major portions of large drainages. Impacts associated with forest tree canopy losses are occurring to all resources that require a forested landscape (ie. wildlife, fisheries, watersheds, scenic vistas, etc.).

Many of these spruce beetle impacted forest stands will not meet current definitions of "ecologically functional" old-growth (USDA, Ecological Old-Growth Definitions-1992) following beetle infestation. This long-term loss of old-growth habitat will have a significant impact on maintaining current biological diversity in South-central and Interior Alaska.

Natural regeneration of spruce in these impacted stands is spotty at best. Without assertive reforestation actions, long-term forest conversion from spruce to hardwood stands or grass dominated areas could occur on many sites. This conversion will drastically alter current landscape patterns, substantially reducing forested wildlife habitat for the long term. Cover and large organic material input to anadromous streams will be significantly altered over time. From a human ecology standpoint, fire risk and hazard are increasing and causing substantial concern in rural communities as well as in the larger urban forest interface areas such as the Anchorage bowl.

Research on impacts of the bark beetle on the timber resource and control methods exists (Werner and Holsten, 1983; Werner, Hard, Holsten, 1988; Holsten and Werner, 1990; Hard, 1989), but more emphasis is needed in this area. There is currently a lack of research documenting impacts to non-timber resources associated with the spruce bark beetle infestation. Impacts to wildlife and stream side stability are observable, but documentation of these through research studies or long-term monitoring are limited. The emergency nature of this beetle epidemic dictates use of an adaptive management approach based upon known research.

Lack of action and continued forest health decline will result in:

-Increasing loss of wildlife habitat for mature forest species.
-Continued riparian area degradation.
-Substantial long-term conversion from forest to grass or hardwoods (lack of spruce regeneration).
-Increased community fire hazard & associated increased fire suppression costs.
-Degradation od aesthetic quality of forested landscapes.
-Degradation of developed recreation areas and increased trail maintenance costs for removal of hazard and down trees.

Continued focus of habitat loss in southeast Alaska (primarily the Tongass National Forest) with little expressed concern for habitat loss in south-central or interior Alaska is a serious wildlife management oversight. Applying fundamental habitat relations and fragmentation concepts, it is clear that hundreds of thousands of acres of tree mortality (with little natural regeneration) to forested habitat in a naturally fragmented environment (south-central and interior situation) has tremendously more impact than one-thirtieth of those acres being converted to young forest conditions a less fragmented environment (southeast situation). Wildlife species only respond to habitat changes, regardless if those changes are human induced (timber harvesting) or from another change agent (spruce

beetles). Ecologically sound resource management philosophy must be founded upon biological and ecological reasoning rather than development versus non-development opinion. Strong focus needs to be directed to maintaining the biological diversity through sound ecological management (including silvicultural) procedures.

4. CONCLUSIONS

Lack of forest management, non-recognition of the biological/ecological impacts, and lack of expressed professional concern have all contributed to this forest health problem.

Halting the infestation in the near-term is unlikely; however, concerted efforts by all landowners and resource managers can significantly slow the buildup, restore already impacted areas, and minimize future resource impacts from this insect.

Once forests are dead, options for the type and size of ecosystem management are limited. If, however, silvicultural treatments are considered not only for restoration of damaged areas, but also for damage prevention of currently uninfested areas, a variety of silvicultural options are available to meet various resource objectives. Maximum ecosystem values can be maintained using coordinated restoration and assertive silvicultural treatment planning.

Coordinated ecosystem enhancement and restoration planning has the capability to provide:

-Restoring damaged wildlife habitat (forage and cover).
-Restoring damaged riparian area integrity (cover and stream bank stability).
-Providing immediate reforestation.
-Reducing potential fire hazard to communities.
-Preventing additional uncontrolled impacts (reduced mortality).
-Providing rural community development (jobs).

The most generally accepted treatment to reduce hazard and risk of spruce beetle induced resource damage at the landscape scale is to maintain a mosaic of species and age types. Considering public habitation and use of the forests, eliminating fire suppression now and allowing this change agent to create future mosaics through unrestricted burning is not a viable option. Active ecosystem management, applying appropriate silvicultural techniques to create a future desired mosaic is the most plausible solution.

An aggressive forest restoration and forest health maintenance program involving federal, state, local and private forest managers is necessary to fully address the severity and extent of impacts to forest resources and to develop coordinated forest management actions to restore damaged ecosystems and prevent unnecessary additional ecological impacts. This conclusion is consistent with the recommended option of the Kenai Peninsula Borough report (Hall 1992) addressing forest health management needs for the Kenai Peninsula.

5. RECOMMENDATIONS

The Alaska Society of American Foresters recommends and fully supports:

1) Coordinated multi-interest forest health planning at the landscape scale,

2) Research to identify spruce beetle induced impacts to all forest resources,

3) Development of a forest industry as the funding mechanism to subsidize implementing planned forest health actions.

Following the lead of the National SAF Task Force report on Sustaining Long-Term Forest Health and Productivity, it is recommended that the 26 specific recommendations from that Task Force Report be implemented in Alaska using ecologically sound approaches to maintaining or improving forest health. These recommendations will be applied through the following four broad areas of action:

-Advocate ecosystem management,
-Integrate ecosystem management into educational programs,
-Promote ecosystem management research,
-Coordinate between land owners and the public.

The Alaska Society of American Foresters should actively highlight the need for assertive management actions to address declining forest health in south-central and interior Alaska to local, state, and federal officials. This implies implemention of ecologically and silviculturally sound management approaches that will assure maintenance of the health of the forest as well as it's biodiversity.

The Alaska Society recommends that agencies charged with a mandate to manage sustainable forest resources establish adequate organizations with appropriate expertise to develop site specific silvicultural treatments to accomplish those goals.

The Alaska Society recommends that the U.S. Forest Service's Pacific Northwest Research Station prepare a white paper evaluating the significance of the loss of old-growth habitat in south-central Alaska resulting from continued forest health decline.

The Alaska Society recommends using the 1994 National Convention to highlight the National significance of this extensive forest health problem and promote understanding and support for assertive ecological management applications within the American Forestry profession.

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14.2.9 R

Exxon Valdez Oil Spill Trustee Council
Restoration Office
645 "G" Street, Anchorage, AK 99501
Phone: (907) 278-8012 Fax: (907) 276-7178

TO: Charles E. Cole, Attorney General, State of Alaska
John A. Sandor, Commissioner, ADEC
Carl L. Rosier, Commissioner, ADF&G
George T. Frampton Jr, Assistant Secretary for Fish, Wildlife and Parks (DOI)
Mike Barton, Regional Forester, FS
Steven Pennoyer, Regional Director, NMFS

FROM: Bob Loeffler, State Co-Chairman
Sanford P. Rabinowitch, Federal Co-Chairman

SUBJECT: PAG Recommendations for the Draft Restoration Plan

DATE: November, 24 1993

On November 22nd, the Public Advisory Group reviewed the Draft Restoration Plan and recommended a number of changes. We recommend that the Trustee Council make all but one of the PAG changes. In addition, we recommend modifications or editorial changes in three other PAG proposals. The PAG's detailed recommendations, our analysis, and our recommendations follow. Included for each recommendation is the page number from the November 17th draft and the paragraph surrounding the proposed change.

Page 9, Paragraph concerning Habitat Acquisition and Protection. The PAG recommends the additions and deletions shown below:

> *Habitat Acquisition and Protection* may include the purchase of private land or interest in land such as conservation easements, mineral rights, or timber rights. On existing public land within the spill area, it may include recommendations for changing agency management practices. Protecting and acquiring land ~~will~~ may minimize further injury to resources and services, and ~~will~~ may allow recovery to continue unimpeded.
>
> **Our Recommendation: make the proposed change.**

Pages 11 and 13, Policy #3. PAG recommends:

> ~~Most~~ Primarily restoration activities will occur within the spill area. ~~However, Only~~ limited restoration activities outside the spill area, but within Alaska, may be considered under the following conditions:
>
> - when the most effective restoration actions for an injured migratory population are in a part of its range outside the spill area, or
> - when the information acquired from research and monitoring activities outside the spill area will be ~~important~~ significant for restoration or understanding injuries within the spill area.

Our Recommendation: use the proposal with the following editorial change. Change the first two sentences to read as follows: "Restoration activities will occur primarily within the spill area. ~~Only~~ Limited restoration activities outside the spill area, but within Alaska..." In addition, make the change in the second bullet. We believe this change captures the intent of the PAG recommendation which is to ensure that the policy clearly indicates that restoration activities outside the spill area are limited.

Pages 11 and 15, Policy #7. PAG recommends the policy be changed as follows:

Restoration projects will be subject to open, independent, uncompensated scientific review before Trustee Council approval.

Recommendation: use "open" but not "uncompensated." Some PAG members felt that compensated peer reviewers were biased because they were paid. However, the volume large of material and the short review times for scientific review may require compensation. Therefore, the Trustee Council should not guarantee uncompensated review. However, an open scientific review process is necessary for the public to understand the reasons that their projects are being rejected or changed.

Pages 11 and 13, Policy #8. The PAG recommends changing policy #8 to read: "Meaningful public participation in, and review of, restoration decisions will be actively solicited.

Recommendation: reject the proposal. While we agree with the importance of public participation, the proposed wording implies that some public body will review Trustee Council decisions and change them as necessary. Original language provides intent consistent with the need for public participation.

Page 12, Policy #1. PAG recommends changing the explanatory paragraph about monitoring and research.

Monitoring and Research activities include an ecosystem monitoring and research program. The ~~ecological~~ ecosystem monitoring and research program will provide an understanding of ~~problems with food sources, habitat requirements, and other ecosystem relationships of an injured resource or service to permit more effective restoration and management.~~ the physical and biological interactions that affect an injured resource or service. This understanding will facilitate restoration or management.

Recommendation: make the change.

Page 16, Policy #9. PAG recommends no change to the policy, but recommended deleting the last two lines in the explanation paragraph. It would read:

Many public comments have expressed concern that restoration funds will support activities that government agencies would do anyway. This policy addresses that concern. It also affirms the practice that has been in effect since the beginning of the restoration process. To determine whether work is normally conducted by agencies, the Trustee Council will consider agency authorities and the historic level of agency activities. ~~An agency may be funded to accomplish a restoration task if the work is beyond that usually conducted by that agency. For example, a task may be beyond the usual level of agency activities because~~

~~it is not within the agency's legislative authorities, or~~ ~~use historic budget levels have not allowed the agency to accomplish it.~~

Our Recommendation: make the change.

Pages 20 & 21, Habitat Protection and Acquisition. The PAG recommends changes to four paragraphs

¶2: Resource development such as harvesting timber or building subdivisions may ~~harm~~ alter habitat that supports resources or services. Protecting and acquiring land ~~will~~ may minimize further injury to resources and services already injured by the spill, and to allow recovery to continue with the least interference. For example, the recovery of harlequin ducks might be helped by protecting nesting habitat from future changes that may hamper recovery.

¶7: Habitat protection and acquisition is a means of restoring not only injured resources, but also the services (human use) dependent on those resources. Subsistence, recreation, and tourism, benefit from the protection of important fish and wildlife habitats, scenic areas such as those viewed from important recreation or tourist routes, or important subsistence harvest areas. For example, protecting salmon spawning streams ~~will~~ benefits not only the salmon, but also commercial, subsistence and recreational fishermen.

¶8: Habitat protection on existing public land and water may include recommendations for changing agency management practices. The purpose, in appropriate situations, is to increase the level of protection for recovering resources and services above that provided by existing management practices. The Trustee Council may conduct studies within the spill area to determine if changes to public land and water management would help restore injured resources and services. If appropriate, changes will be recommended to state and federal management agencies. Recommendations for special designations, such as parks, critical habitats, or recreation areas, may be made to the Alaska legislature or the U.S. Congress.

p21 Add a new policy that reads: "Subsistence use should not be displaced through acquisition or protection of land or changing management practices."

Recommendation: make the four changes.

Page 25, 1st ¶, Public Information and Administration. PAG recommends adding the following to the last sentence in the paragraph:

Funding is required to prepare work plans, negotiate for habitat purchases, involve the public, and operate the restoration program. These are necessary administrative expenses that are not attributable to a particular project. The Public Information and Administration category includes these and other day-to-day public information functions such as responding to public inquiries or seeking local opinion and advice.

Recommendation: make the change.

Page 28, Recovering Resources. The PAG recommends changing the third full paragraph as follows.

> However, if a resource is not expected to recover fully on its own or if waiting for natural recovery will cause long-term harm to a community or service, alternate means of restoration would be ~~considered.~~ undertaken.
>
> **Recommendation:** make the change with the following modification, "...community or service, appropriate alternative restoration measures would be undertaken." Sometimes, there is no useful, cost-effective, restoration action. The word appropriate is consistent with the PAG recommendation, but allows for this situation.

Appendix C, Page C-1. Add the following paragraph to the end of the appendix.

> State and federal governments will purchase lands on the basis of a willing seller and willing buyer. The above list of areas were recommended by the public. Some of the areas listed may not be available for purchase or protection.
>
> **Recommendation: make the change.**

APPLIED marine SCIENCES

July 12, 1993

To: Trustee Council
From: Robert B. Spies, Chief Scientist
Re: Recommendations for the 1994 Work Plan

At your last meeting you requested that I comment on the projects for the 1994 work plan. I had hoped to have submitted a list to you at the same time that the Restoration Team submitted their list. However, the urgency of final report and work plan reviews for 1993 have delayed my consideration of 1994 projects. It appears impractical at this stage to do more than comment on the list of proposed projects submitted by the Restoration Team.

In order to provide a sensible evaluation of the projects, I have devised a priority scheme similar to that of the Restoration Team with low, medium, and high priorities. However, I have added a few additional categories as follows:

A. Top Priority:

1. Highly recommended.

2. Important, but we can skip a year.

3. Important, but more information is needed before a recommendation can be made. In many cases, the most recent field data should be evaluated before assigning a priority.

B. Medium priority.

C. Low priority.

D. No opinion. Generally the decisions on these are non-technical and more a matter of policy.

E. Special case. Suites of studies on important resources that require an extensive planning effort relative to projects funded from other sources.

3155 Lab Position Court, Suite 8 Livermore, CA 94550 510.373.7162 FAX 510.373.7039

As in the past I have tried to take into account the degree of resource injury and recovery, the importance of the proposed project to the resource, the timeliness of the proposed activity, the need for judicious conservation of the funds, etc. Since the results of many of the 1993 projects are unavailable, I consider many of my recommendations preliminary. As these results become available, I may modify my recommendations regarding the 1994 workplan.

We are fortunate that nature's recuperative powers are such that skipping projects this year will not have a negative effect on recovery of most resources, although opportunities for enhancement could be missed. This provides you the opportunity to fund a relatively large project, stay within a desired level of spending, and at the same time be assured that most resources will continue to recover. In this connection I would like to mention a relatively expensive project, the Alaska Sea Life Center, that is attractive for a variety of reasons:

1. It will benefit marine resources injured by the spill.

2. It will promote interest in and knowledge about the marine and coastal resources effected by the spill.

3. It will encourage tourism and therefore compensates Alaska for the damage to tourism from the spill.

4. It will be a lasting benefit from the spill restoration funds and will continue to benefit the area long after the Trustee Council has expended the last restoration dollar on other resource projects.

For these reasons the Alaska Sea Life Center has my highest recommendation. The remainder of my recommendations are summarized in the attached table. The project numbers in this list correspond to those in the June 29th memo from the Restoration Team. I would be pleased to elaborate on my reasons for placing any of the following projects in their respective categories, and I will gladly undertake any further review of projects for the 1994 work plan that you request.

Recommendations for the 1994 Workplan

(Project Numbers are from the Restoration Team Memo of June 29, 1993)

Top Priority

Recommended for 1994		Conduct in 1995 or 1996		More Information Needed	
Resource	Proj. #	Resource	Proj. #	Resource	Proj. #
Archeology	7	Common Murre	39	Intertidal: mussel beds	85
Hydrocarbon data	290	Common Murre	41	Shoreline assessment	266
AK Mar Rsrch Inst	199	Common Murre	40	Harbor Seals	64
Intertidal	68	Harlequin Duck	66	Intertidal: Littlenecks	81
Marbled murrelets	102	Intertidal: Herring B.	86	Mussel bed restoration	90
Habitat protection	110	Killer whales	92	Shoreline oil removal	266
Habitat protection	126	Boat surveys	159	Black oyster catchers	20
Monitoring Program	147	Herring spawn depo.	166	Pigeon Guillemots	173
		Subtidal commun.	285	Sea otter biology	246
		Intertidal	77	Sea otter telemetry	247

Medium Priority		Low Priority		Special Case, needs planning	
Resource	Proj. #	Resource	Proj. #	Resource	Proj. #
Cutthroat/D. V.	43	Fucus restoration	70	Commercial Fish	345
River otters	237	Coghill lake	259	Commercial Fish	139
Rockfish management	241	Hatchery debt	377	Forage fish study	163
Salmon Stock Rest	421	Commercial fish	137	Pink salmon	184
Bald eagle	18	Cutthroat/D.V.	44	Pink salmon	185
Bald eagle	19	River otter manag.	240	Pink salmon	192
Intertidal	83	Rockfish	242	Pink salmon	198
Multiple resources	155	Sea otter	245	Pink salmon	191
Multiple resources	154	Spot shrimp	280	Pink salmon	187
				Pink salmon	195

No Opinion

Resource	Proj. #	Resource	Proj. #	Resource	Proj. #
Artifact Respository	286	G of A recreation plan	216	Multiple resources	320
Archeology	15	Subsistence	244	Multiple resources	320
Waste oil disp	417	Subsistence	279	Multiple resources	320
Garbage clean up	316	Subsistence	272	Multiple resources	320
Green Island cabin	209	Subsistence	273	Multiple resources	320
PWS recreation plan	217	Subsistence	277	Subsistence	275
Land easements	200	General	54	General	59

14.2.9 P

FISHERY INDUSTRIAL TECHNOLOGY CENTER

KODIAK, ALASKA

The Fishery Industrial Technology Center (FITC) was established in 1981 to provide research, training and technology development for the harvesting, processing and conservation of the fishery resources of Alaska. In addition the Center was to encourage joint projects between industry and government in order to use industrial experience and government programs to enhance the productivity of the industry (AS 16.52.020). In development of its programs the Center consults with the Alaska Departments of Fish and Game (ADFG), Commerce and Economic Development (ADCED), Natural Resources (ADNR), Education, and Labor, the Alaska Fisheries Development Foundation (AFDF), the Alaska Seafood Marketing Institute, the North Pacific Management Council, and the USDC-National Marine Fisheries Service (AS 16.52.060).

The benefits of co-location with other state and federal fisheries agencies were recognized from the very beginning of the FITC planning process and were incorporated into the FITC Master Plan. From 1985-1990 FITC research personnel were co-located with National Marine Fisheries Service (NMFS) Resource Assessment and Conservation Engineering (RACE) , and Utilization Research (UR) Divisions on the U.S. Coast Guard base in Kodiak. After Phase I (the Owen Building) of FITC was opened in 1991, the NMFS-UR division relocated also to continue its close cooperative relationship with FITC.

In 1985 the University of Alaska Board of Regents approved the Programmatic Master Plan for FITC which identified 15,000 sq ft of immediate needs and an additional 16,000 sq ft second phase. In the same year UofA and the City of Kodiak sign a land use agreement which transfers a site of up to 24 acres to the university for FITC. In the years following, several rounds of communications between the University of Alaska (UofA) and NMFS have reinforced the commitment to co-location of all NMFS personnel in Kodiak with UofA.

In 1987 UofA restructured, combining FITC with other units to form the School of Fisheries and Ocean Sciences (SFOS). In 1988 NMFS developed preliminary building specifications for Phase II of the Near Island center. In 1991 the U.S. Congress passed an authorization for annual lease payments of up to one million dollars per year for up to twenty years for NMFS facilities on Near Island. The next year Congress appropriated $100,000 to NMFS for a requirements study for the Near Island facility. This requirements study began in October, 1993 with NMFS, National Weather Service (NWS), National Park Service-Katmai (NPS), U.S. Fish and Wildlife Service-Kodiak National Wildlife Refuge (USFWS), ADFG, UAF-Cooperative Extension Service (CES), UAF-SFOS-Marine Advisory Program (MAP), and FITC as full partners. This requirements study will be complete in March, 1994.

In 1989 when the Exxon Valdez spilled its cargo of crude oil it rapidly became apparent that Alaska did not have the research or testing infrastructure necessary to assess or mitigate the damage from the oil in the coastal ecosystems. Local testing was not available for commercial or subsistence foods. Information and research facilities necessary to assess damage or develop restoration strategies were not present within the oil affected region. The planning for the next phase of FITC clearly provided an opportunity to correct these deficiencies and assist the restoration process.

In 1993 the Alaska State Legislature appropriated three million dollars from the Exxon Valdez Oil Spill (EVOS) criminal settlement to UofA for planning, design and expansion of FITC (Phase II). Congress also appropriated $500,000 for the planning and design of the facilities. These funds were directed to the university. It has been estimated that this phase will require approximately 50,000 sq ft of new space and cost twenty million dollars.

It has been estimated that one third (33%) of the expanded facilities will be directed toward resources and services injured by EVOS, supporting activities consistent with the consent decree. For that reason an additional $3.5 million has been requested from the EVOS civil settlement to assist the restoration, enhancement and replacement of fishery resources and the bird and mammal resources dependent upon them. This would bring the funds in hand to the following fractions of the final cost: Federal; 3%, EVOS-Criminal (includes mitigation); 15%, and EVOS-Civil; 17.5%. The remaining funds will be raised with revenue bonds to be paid off with lease payments from tenet organizations. The operating and maintenance costs will be paid for by the lease payments, research grants and contracts.

The expanded FITC will house approximately 70 state, federal, university, and visiting scientists and technology transfer personnel, and another 30-50 support personnel. This number will be fairly evenly split between state, federal and university personnel. Estimates are as follows: USDC/NOAA (NWS; 3, NMFS-Enforcement; 6, NMFS-Resource Assessment and Conservation Engineering (RACE);22, NMFS-REFM; 2, NMFS-Resource Access Management (RAM);1, NMFS-National Marine Mammals Laboratory (NMML); 0, NMFS-UR; 3), USDI (NPS;2, FWS;2, National Biological Survey-Fish and Wildlife Research Center; 3), ADFG (35), UAF(CES; 3, FITC; 25, MAP; 5).

Primary NMFS functions are resource assessment, management and enforcement for fisheries in the 200 mile fishery conservation zone. They are also responsible for research, management and enforcement under the Marine Mammal Protection Act. NMFS-UR has responsibilities for research and technology development in the utilization of fishery resources. NWS is responsible for weather forecasting, while annual and interannual climatic conditions drive many of the oceanographic and fishery cycles.

ADFG responsibilities are resource assessment, management and enforcement for state managed fishery resources. This is primarily salmon and crab assessment and management, and subsistence use. ADFG also assesses and manages game resources in Kodiak and the Alaska Peninsula. The subsistence division has had the central responsibility for assessing safety of subsistence foods potentially contaminated by EVOS and communicating the results to subsistence users.

NPS and USFWS are the stewards of national park, monument and wildlife refuge resources. They are responsible for research on and conservation of the entire ecosystems contained within those lands and waters.

In 1987 when FITC became part of SFOS, the facilities in Kodiak became an integral part of the whole school. Thus the expanded facilities will enhance the capabilities of the entire UofA activities in fisheries and ocean sciences, especially those traditionally vested with FITC. As listed in AS 16.52.020 these are: 1) providing training opportunities to citizens of the state on the most efficient and appropriate technologies for the harvesting, processing and conservation of the fishery resources of the state; 2) providing information and technical assistance on the adaptation of existing and new technologies to the users of the fishery resources of the state; 3) providing research and development activities to adapt existing technologies to enhance the economic viability of the industry; 4) providing research and development activities to create new technologies that will enhance the effectiveness of the industry, and provide economic benefits to state citizens; and 5) encourage joint projects between industry and government in order to use industrial experience and government programs to enhance the productivity of the industry.

The FITC's Owen Building which opened in 1991 is focuses on seafood processing technology. This first phase left several program areas to be more fully addressed. The next phase, the multi-agency expansion will provide for these needs. This expansion will create a world class fisheries research

and technology center. It will be an Alaskan "Woods Hole" focusing on the conservation and utilization of the rich marine resources in the waters of the Gulf of Alaska and the Bering Sea. More so than any other location in Alaska, Kodiak provides the ideal location to study Alaska's marine resources. Kodiak and Dutch Harbor are the third and first largest fishing ports in the nation. The Kodiak area has major populations and rookeries of harbor seals, sea otters and Stellar sea lions. The Kodiak area suffered the highest levels of seabird kills during the EVOS. Finally, Kodiak sits at the cross-roads of oil spills coming from either Cook Inlet or Prince William Sound.

The fisheries center built on Near Island in Kodiak will include modern research and technology development facilities including a running seawater system, instructional and training facilities, and public interpretive areas. The research facilities will include seawater tanks large enough to study the behavior of adult fish and crabs. This will facilitate the separation of commercial species including salmon, halibut, cod, and pollock. It will also provide new windows into the physiology and stress/response behavior of these species. There will be biochemistry and aquatic toxicology laboratories to monitor natural changes in marine resources and dose/response effects due to toxic exposures. There will be facilities to assure the safety of food products and to study food pathogens, biological and chemical toxins within carefully controlled environments. Taken in concert these facilities will provide in-depth knowledge of the marine resources and the ecosystem interactions necessary to keep the targeted populations healthy.

There will be facilities to necropsy marine mammals and a small rehabilitation center since many injured marine mammals originate near Kodiak, and rehabilitation at the Near Island center will avoid much of the trauma of a flight to Halibut Cove or Seward. A regional approach is clearly best for improving marine mammal rehabilitation.

Training facilities will include a major fisheries library formed by a consortium of agencies, a 200 seat auditorium, two fifty seat classrooms, several conference rooms, and an instructional laboratory. Activities will include both formal university (and possibly high school) instruction in fisheries technology and food science, and a wide variety of training classes ranging from fish identification for Coast Guard boarding teams and observers, to quality control and quality assurance courses for industry personnel, to marine safety classes.

The interpretive areas will focus on public education. MAP, CES, NPS and USFWS are all expected to contribute to the interpretive resources of the center. Each of these groups has a different tradition in the emphasis for interpretative areas, so taken as a whole the center should prove a highly educational place for members of the industry, the general public or K-12 students to visit.

The center will also provide limited housing and flexible office space to encourage use of the facilities by a wide variety visiting scientists, technologists, and students.

This facility has been planned over the last eight years to become Alaska's "Woods Hole". These facilities are necessary for the effective conservation and optimal utilization for economic development of Alaska's marine resources. These facilities are also central to the restoration, replacement and enhancement of several species and services injured by EVOS. These facilities do not duplicate what has been planned in Seward. They emphasize fishery resources while the Seward facilities emphasize oceanography and marine mammals. It would be very difficult and foolhardy to try and duplicate the fishery facilities in Seward. The only logical approach is to include the remaining funding for the Kodiak facilities in a comprehensive plan to develop the research infrastructure necessary to accomplish the EVOS restoration plan. This is the most cost effective way to develop the infrastructure to restore fishery resources and fish dependent services. It also builds the facilities closest to where the resources are.

14.2.9 O

pws fisheries ecosystem research planning group

c/o PWSSC, P.O. Box 705, Cordova, Alaska
99574, (907) 424-5800, 424-5820 facsimile

January 10, 1994

EVOS PROJECT DESCRIPTION 94320 -- BACKGROUND & DEVELOPMENT

In September of last year, the EVOS Trustee Council approved funding for a fisheries research planning process for Prince William Sound (PWS) that was initiated by a coalition of user groups, managers and scientists in the region. This coalition came together as a result of the 1993 herring run failure in PWS, the aberrant 1991, 1992, and 1993 pink salmon returns to PWS, and the worsening distress of the region's fishermen and subsistence users and their communities.

The coalition **Prince William Sound Fisheries Ecosystem Planning Group (PWSFERPG)** formally adopted the objective, "to develop, advocate and communicate the most effective ecosystem research plan for PWS". Coalition members include: Cordova District Fishermen United (CDFU), Cordova Aquatic Corporation (CAMA), Prince William Sound Science Center (PWSSC), Prince William Sound Aquaculture Corporation (PWSAC), University of Alaska Fairbanks, The Eyak Corporation, Prince William Sound Conservation Alliance, and local staff from the Alaska Department of Fish and Game. The planning process has also been endorsed by the City of Cordova and the Prince William Sound Communities to Organize the Sound (PWSCORS), a regional group representing the communities of Cordova, Valdez, Chenega, Tatitlek and Whittier.

The planning group, through it's Science Committee, produced a draft research plan ***Sound Ecosystem Assessment - SEA,*** which describes scientific studies aimed at understanding the natural and anthropogenic (man-caused) factors responsible for changes in the PWS and North Gulf of Alaska marine ecosystem. One of the major goals of the plan is to establish dependable methods of predicting population fluctuations in important marine species in that ecosystem; pink salmon and Pacific herring were chosen as target species for the intial plan because of their ecological and economic importance to the region.

In December, the Trustee Council sponsored an ecosystem research planning workshop in Cordova to obtain peer review of the SEA draft plan, to begin the design a multi-disciplinary study of the PWS ecosystem, and to identify other key processes and species that should be included in a comprehensive research plan for the entire spill impacted area. The SEA plan was endorsed by an international panel of scientists and researchers as as a innovative, reasonable and scientifically testable approach for studying the marine ecosystem of PWS. As well, integration of the SEA plan with other key processes and other marine birds and mammals would further development of a sound bases for ecosystem-based management of research and restoration within the entire spill impacted area.

Since August of last year, the amount and quality of ecosystem based research planning which has taken place within the EVOS Trustee process has been extensive. The development of the SEA research plan by a regionally based coalition has established a credible, scientifically based research focus which unites resourse management and user concerns, and builds upon and enhances NRDA and other ongoing research and restoration priorities in the spill impacted area. Project Description 94320 outlines a series of interdiciplinary projects which reflect the integrated nature of the research outlined in SEA. Implementation of these key projects in the 1994 field season is justified, necessary and is broadly supported both within and outside of the Prince William Sound region. Continuing the integrative planning of other marine procesess and key species into the SEA plan is another major activity called for in the project description which also should be supported this fiscal year.

For further information contact:

Co-chairpersons of PWSFERPG:
Torie Baker, Cordova, (907) 424-3447
Dan Hull, Anchorage (907) 243-1679

Chair of PWSFERPG Scientific Committee
Dr. R. Ted Cooney, Cordova (907) 424-5800

14.2.9 N

Motion for the Jan. 11,1994 EVOSPAG Meeting

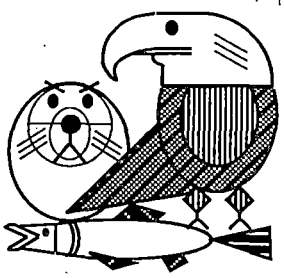
The Killer Whale Project as set forth in the 1994 Draft Work Plan is a duplication of an ongoing project carried forward since 1984 by the North Gulf Oceanic Society, (NGOS) an Alaskan non-profit based in Homer. Currently NGOS is operating under N.O.A.A. SCIENTIFIC RESEARCH PERMIT NO. 840 TO TAKE MARINE MAMMALS. Subject to annual renewal, this permit has an "Expiration Date of October 31,1998".

The permit in the abstract section states, "The purpose of the research are to continue: annual census by photo-identification of individual killer whales (Orcinus orca); detailed determinations of pod structure and the development of vital rates for pods/population; and assessment of recovery of AB pod following the Exxon Valdez oil spill.". In addition the 1994 study proposed by the NGOS will use state of the art techniques to gather genetic and toxicological data from the orcas in the AB and AT1 pods.

To avoid duplication and/or replacement of this ongoing monitoring activity the Public Advisory Group recommends that Project 94092 in the Draft 1994 Work Plan not go forward.

14.2.9m

Exxon Va ez Oil Spill Trustee Cc ncil
Restoration Office
645 G Street, Suite 402, Anchorage, Alaska 99501
Phone: (907) 278-8012 Fax: (907) 276-7178



Mission Statement of the Exxon Valdez Oil Spill Trustee Council

The mission of the Trustee Council and all participants in council efforts is to efficiently restore the environment injured by the Exxon Valdez oil spill to a healthy, productive world renowned ecosystem, while taking into account the importance of quality of life and the need for viable opportunities to establish and sustain a reasonable standard of living.

The restoration will be accomplished through the development and implementation of a comprehensive interdisciplinary recovery and rehabilitation program that includes:

- Natural Recovery
- Monitoring and Research
- Resource and Service Restoration
- Habitat Acquisition and Protection
- Resource and Service Enhancement
- Replacement
- Meaningful Public Participation
- Project Evaluation
- Fiscal Accountability
- Efficient Administration

Adopted by the Trustee Council at their November 30, 1993 meeting.

14.2.9 L

Brad! FYI

LEW M. WILLIAMS, JR.
755 Grant Street
Ketchikan, Alaska 99901

Jan. 3, 1994

Exxon Valdez Oil Spill Trustee Council
645 "G" Street
Anchorage, Alaska 99501

Dear Friends:

I have read the draft 1994 oil spill restoration plan and three things concern me:

1. I see nothing about putting a portion of the restoration funds into an endowment or some type of program similar to the state's Permanent Fund where the earnings from the endowment can pay for spill research well after the last payment is made by Exxon. I think common sense dictates that a portion of the money be set aside for the future. The money to do that is there because it is not possible to reasonably spend what is available each year, judging by the '94 and previous work plans.

2. I see a program to acquire land but I see no efforts to make land trades to make the recovery funds go further and keep as many acres of the state as possible in private hands. Between the federal and state governments, too much of the state is government-owned. That is bad for a state which will need private development in future years to offset lost oil revenue. It adversely affects the economy of the spill area, as well as the rest of the state.

3. I note from other sources that some of the timber acreage the trustees are buying to protect habitat includes timber infested by the spruce bark beetle. That pest can adversely affects the quality of habitat and adversely affects restoration of species, for which

restoration funds are targeted. It appears that a accurate study of the amount of beetle impact is warranted. A program to curb beetle infestation is necessary. And an intensive reforestation program is mandated. That means some type of tree nursery in the spill area with follow-up planting and thinning programs. That's ideal for small villages in the spill area. Some attention should be given to that. Reforestation is a long range project which means the Trusttes Council needs long range funds, another argument for some type of endowment program as mentioned in item 1, above.

Sincerely yours,

Lew M. Williams, Jr.
public member
Exxon Valdez Trustee Council Public Advisory Group

14.2.9 K

EXXON VALDEZ OIL SPILL PROJECT DESCRIPTION

Title: Common Property Salmon Stock Restoration

Project Number: 94421

Lead Agency: Alaska Department of Fish and Game

Cooperating Entities: Prince William Sound Aquaculture Corporation (PWSAC)
Valdez Fisheries Development Association (VFDA)
Cook Inlet Aquaculture Association (CIAA)

Cost of Project, FY94: $ 5,336,800

Project Startup Date: February 1, 1994 **Duration:** Eight months

Geographic Area: Prince William Sound and Lower Cook Inlet, North Gulf of Alaska

INTRODUCTION

As the oil from the *Exxon Valdez* spread southwest through Prince William Sound, out into the Gulf of Alaska, and past the Kenai Peninsula, the region's hatcheries were in the process of releasing millions of pink salmon fry. Unfortunately, many of the fry immediately faced an oil contaminated water column after being released. Concurrently, the wild fry were leaving streams and faced the same contaminated waters. The initial spill killed millions of salmon fry from both wild and hatchery stocks. Besides the acute impact of the oil on the fry, the oil appears to also have had a chronic impact as evidenced by reduced egg and fry survival and perplexing run failures of both pink salmon and Pacific herring within the spill area.

While the hatcheries themselves escaped any direct impact from the spilled oil, often due to the prompt action of fishermen, they are now suffering from the recent poor returns of pink salmon. The hatcheries operate on funds from a cost recovery program of catching some of the returning hatchery fish to sell and cover costs. As detailed below, the last three years have brought disappointing returns of pink salmon to the hatcheries, which, combined with sagging prices, have presented the hatcheries with problems in meeting their cost recovery requirements. In anticipation of higher returns, the hatcheries have been resourceful and used their contingency and capital improvement reserves over the past three years to cover costs, however, those funds were nearly exhausted after the catastrophic run failure in 1993. At this point the hatcheries require an outside infusion of capital to be able to release fry in the spring of 1994, and are therefore requesting a one time allocation of funds to cover operations through the 1994 spring fry releases. Before approaching the Trustee Council, the aquaculture associations failed in their extensive efforts to secure emergency funds from other sources.

In short, this project will prevent the loss of 1994 brood stocks that would be expected to return as adults in 1996. Loss of this brood stock would most likely mean a 75-80% reduction in the pink salmon return to Prince William Sound and Lower Cook Inlet. The salmon stocks of Prince William Sound and Lower Cook Inlet have reached a point where self-sustaining hatcheries require sustainable pink salmon returns, with the converse also being true. Thus, a missing link in the cycle would have tremendous implications, and a guaranteed loss of production, coupled with the apparent poor health of the ecosystem, would make the 1996 return extremely weak, possibly ending the fishery altogether. The viability of the resource and the hatcheries is inextricably linked, therefore this project aims to restore and replace the common property fishery to prespill level through ensuring sustained hatchery operations.

Alaska's salmon, including those produced in wild streams, state hatcheries and private non-

profit hatcheries, are considered the common property of all Alaska residents. Common property salmon fisheries supported by fish produced from all of these sources were injured by the *Exxon Valdez* oil spill (EVOS). In recent years, the collapse of common property fisheries in Prince William Sound and Lower Cook Inlet have created a particular hardship on commercial fishermen. In particular, the pink salmon produced by Prince William Sound and Lower Cook Inlet streams and hatcheries held a major role in sustaining the ecosystems of these areas by their contribution to the food web. Other species of salmon produced here have also contributed, but to a lesser degree. By incubating, rearing and releasing salmon eggs, fry and smolt at hatcheries, this project, consistent with the mandated restoration objectives, would help restore and replace the resource while assisting the commercial fisheries and impacted predator species in the spill area.

In 1971, the Division of Fisheries Rehabilitation, Enhancement and Development (FRED Division) of the Alaska Department of Fish and Game (ADF&G) was created by the Alaska State Legislature. The legislature directed the division "through rehabilitation, enhancement, and development programs to do all things necessary to insure perpetual and increasing production and use of food resources of Alaska waters," or to promote and maintain the common property fisheries.

In 1973, the United Fisherman's Association (UFA) was formed, organizing commercial fishermen at the state level for the first time. Fishermen's groups such as UFA were a driving force behind Alaska's salmon hatchery programs. This group, along with others, believed it would take artificial propagation as well as some restrictive regulations to bring the commercial harvest level back up from an annual harvest level of 23 million fish between 1973 and 1975.

In 1973, the legislature implemented limited entry in the commercial salmon fishery with the long term goal of increasing economic returns to commercial fishermen. With the limited entry program in place, legislators felt more confident about expanding the hatchery program because the economic benefits of a rehabilitated fishery resource would not be dissipated among an ever-increasing number of fishermen. At this time, legislators also began to accept that nongovernmental hatcheries had much to offer from the perspective of public finance issues: the operation of private hatcheries could be funded from the harvest of returning fish and from tax assessments on the fishermen who had access to the hatchery production, thus shifting the cost of the facilities from the shoulders of the general public to the people who derived benefits directly form them. Thus, fisheries organizations and other Private Non-Profit (PNP) groups were encouraged to build and operate PNP hatchery facilities. The 1974 Alaska State Legislature authorized the Commissioner of ADF&G to issue permits to PNP corporations for the construction and operation of salmon hatcheries.

As the PNP hatchery program developed and hatchery technology progressed, it became evident that the cost of developing viable salmon hatcheries was far greater than was initially expected. In 1974 funds became available through the Renewable Resources Development Fund that was established that year. Additional state loans for construction of PNP hatcheries became available in 1975 when the commercial fisheries loan program was expanded to include hatcheries. The following year, a separate fisheries enhancement loan program was established.

Another positive step toward the long range goal of increasing the commercial salmon harvest occurred in 1974 with the passage of the Magnuson Act. This created a 200 mile limit along Alaska's coastline where foreign registered boats could not fish.

In 1976, Alaska legislation was passed creating Regional Aquaculture Associations that were responsible for the regional planning and coordination of salmon enhancement activities. The legislature felt that comprehensive planning on the regional level; primarily, careful hatchery site selection, would help mitigate potential problems such as intermingling of hatchery and wild stocks.

All of this legislation and funding set the stage for the development of the public and private hatchery programs that developed during the 70's and 80's.

The hatchery program in Alaska went from five operating facilities in 1971 to thirty-eight in 1990. In the early stages of this development, the majority of the hatcheries were built and operated by the State of Alaska. For example of the twenty-six facilities in 1980 eighteen were publicly funded and operated and eight were privately funded and operated. By 1985 the number had increased to thirty-six (twenty public and sixteen private). It was a cooperative effort to build and maintain the common property salmon stocks of Alaska.

PROJECT DESCRIPTION

A. Resources and/or Associated Services

The primary goal of the proposed project is to restore the health by maintaining operations of seven hatcheries in Prince William Sound and Lower Cook Inlet, in order to promote recovery of the common property pink salmon stocks to their pre-spill levels. The direct beneficiaries are the commercial, recreational and subsistence fishermen, as well as local populations of fish, birds and mammals dependent on salmon. Achievement of this goal is explained in the following three plans. Four of these seven hatcheries are owned by the State of Alaska which currently makes bond payments on three of them. At the time of the *Exxon Valdez* oil spill, three of the four state hatcheries were operated by the State of Alaska using General Fund monies. Because of the cooperative relationship between private non-profit hatcheries and the state in producing common property fisheries (as described in the introduction), operation of these facilities, which remain in the ownership of the State, was given to the private non-profit (PNP) aquaculture facilities with the proviso that operation costs could be recovered by the harvest of salmon for this purpose only in special harvest areas. This is same procedure used by the PNP's to recover operating costs for the facilities they own as well as operate. In 1993, sales from returns of adult salmon to these special harvest areas were insufficient to meet operating costs. Because of poor returns in previous years, reserve accounts have been depleted to the extent that the PNP's could not make up this shortfall from reserves. For Prince William Sound Aquaculture Corporation and Cook Inlet Aquaculture Association, accepting the responsibility for operating state facilities has increased the budget shortfalls for their entire organizations.

The monies being requested from the Trustee Council are for operating expenses only. None of these monies will be used to retire loans or to make interest payments on loans. Further, none of these monies will be used to replenish contingency reserve accounts. The monies being requested from the Trustee Council are only for operating budget shortfalls, not the entire operating budget where the aquaculture associations have some operating monies. Any monies recovered by the associations through litigation against Exxon, Alyeska, or subsidiaries thereof as regards to the *Exxon Valdez* oil spill will be used to repay these project costs to the Trustee Council.

PLAN I - PRINCE WILLIAM SOUND AQUACULTURE ASSOCIATION

INTRODUCTION

This plan advocates maintaining the existing salmon enhancement and restoration system operated in the Prince William Sound bioregion by the Prince William Sound Aquaculture Corporation. The aquaculture corporation was created under the Private Nonprofit Hatchery Act (AS Title 16.10.8) to "rehabilitate the state's depleted and depressed salmon fishery." For 18 years, this restoration/enhancement system has sustained and augmented the salmon resources in the Sound. Pre-spill, healthy natural and hatchery stocks of all five species of Pacific salmon supported a strong commercial fishing industry of 800 permit holders and 20 processing plants, and the economies of six Sound communities. In addition, the salmon resources fostered a growing sport fishing industry, and provided the basis for the subsistence lifestyles of the region. At various life stages, salmon are a food source for birds, marine mammals and other fishes in the PWS and North Gulf of Alaska ecosystem. During the ten years prior to 1989, the average annual return of all salmon to the PWS management region was 22 million fish.

Total natural and hatchery salmon returns have dwindled to 10.5 million in 1992 and 7.0 million in 1993, in response to ecosystem changes that require further investigation. The Draft Restoration Plan lists pink salmon and herring in PWS as "non-recovering." The damaged salmon resources and the lost services provided by those resources have heavily impacted all user groups. Revenues to the aquaculture corporation, primarily dependent on sales of returning fish, have fallen far short of what is necessary to maintain its restoration and enhancement efforts. While the extent of short- and long-term damage to the Prince William Sound ecosystem is still being assessed, it is more important than ever to the people of the Sound that the salmon enhancement programs be maintained to both restore and replace these lost resources and services.

Prince William Sound Aquaculture Corporation (PWSAC) was founded by the fishermen, processors and communities of Prince William Sound in 1974, following several years of low salmon returns, to restore and enhance the salmon resources of the region. The private, non-profit, regional aquaculture association began with one pink salmon hatchery, and during the subsequent ten years built a second, multi-species hatchery, largely with state aquaculture loans. During the same period, the state of Alaska built and operated three salmon hatcheries in the Prince William Sound area. As state revenues declined, the state shifted the cost and responsibility of its 3 state hatchery operations in PWS to the private sector. This in addition to its capital construction debt have greatly increased PWSAC's financial responsibilities since 1989.

Pre-spill, the combined production of the five hatcheries in the Prince William Sound/Copper River region contributed substantially to the salmon harvest, particularly to the commercial catch. In the commercial fishery prior to 1989, hatcheries produced up to 75% of the pink salmon catch, 25% of the chum and sockeye, and smaller percentages of coho and chinook. Wild returns of pinks ranged from average to record highs. However, in 1991, an aberrant return of adult pink salmon, spawned in the parent year of 1989, came in late and dark, and millions went unsold. In 1992, the wild and hatchery pink salmon return was approximately one-third of the projected size; in 1993, pinks came back at about one-fifth of their expected strength, and wild chum returns were far under projections. The 1993 wild and hatchery sockeye returns to the Sound were less than half the expected strength.

These failed salmon returns to Prince William Sound, coupled with deflated fish prices, resulted in financial disaster for commercial fishermen and for PWSAC in 1991, 1992, and 1993. In an effort to understand the ecosystem of the Sound and determine the causes of the failures, the

fishermen and PWSAC have joined in a bioregional coalition -- Prince William Sound Fisheries Ecosystem Research Planning Group (PWSFERGP) -- encouraged and funded by the Trustee Council. While the scientific questions are being answered, the role of the salmon enhancement programs in research, restoration and replacement of lost services must be maintained. PWSAC is requesting $3.9 million from the EVOS Trustee Council to fund its FY94 revenue shortfall. This request is not intended to set a precedent for operational funding by the Trustee Council.

Endeavoring to maintain operations, PWSAC has cut its budgets for each of the last three years, has committed the remainder of its contingency funds, and is actively pursuing additional funding sources, as well as means of increasing revenue. On PWSAC's behalf, the Department of Commerce has asked that $4 million in aquaculture loan funds be included in the Governor's FY94 supplemental budget request to the Legislature. The chance of success of this request is very unsure, given the present condition of the State's finances. Litigation claims settlements from Alyeska and Exxon could increase revenue, although it is questionable when and by how much. In addition, this year the PWSAC Board of Directors, in an effort to achieve better value for fish sold, authorized a product development and marketing project, supported by the Department of Commerce and the Governor. Additional revenues resulting from any of these efforts would reduce the amount of PWSAC funding sought from the Trustee Council.

PROJECT DESCRIPTION

A. Resources and/or Associated Services

The primary goal of the proposed project is to maintain operations of the hatcheries in Prince William Sound, in order to promote recovery of the populations and distributions of injured salmon resources to their pre-spill levels, and/or replace those resources.

B. Objectives

Specific objectives of this project include the following:

1. Maintain the current salmon restoration and enhancement program in PWS by preventing the closure of all salmon hatcheries and their ability to replace, restore and enhance lost services and resources to pre-spill conditions.

2. Replace, restore, and enhance lost and damaged salmon resources to return salmon productivity within the PWS ecosystem to pre-spill levels and thereby maintain those indigenous mammal, bird and fish species dependant on salmon.

3. Replace, restore and enhance lost and damaged resources and services to pre-spill conditions which support the consumptive and non-consumptive human users of the PWS salmon resource including primary users (subsistence, commercial, sport, etc.) and secondary users and beneficiaries (processors, transportation and PWS communities).

C. Methods

Based on long-term average survival rates, the PWSAC hatchery system expects annual adult salmon production of approximately 21 million pink salmon, 2 million chums, about 1 million sockeye salmon and lesser numbers of coho and chinook salmon. However, production expectations following the spill have been downgraded/reduced, based on recent run failures.

Armin F. Koerning Hatchery (Evans Island) produces pink salmon. The oldest hatchery in the PWS salmon hatchery system, the AFK program has enjoyed more than 15 years of operational success with run declines only experienced following the spill. With an annual operational budget of $800,000, the program is capable of producing approximately 6 million adult pink salmon under normal conditions.

Wally Noerenberg Hatchery (Esther Island) produces pink, chum, coho and chinook salmon. The facility and salmon program is one of the more complex and advanced in North America. The annual operational budget is $1,600,000. The program normally has the capacity to produce approximately 9 million pink salmon, 2 million chum, 40,000 chinook and 200,000 coho salmon. The coho and chinook program provides sport fisheries with releases of young salmon at Cordova, Whittier and Valdez. The hatchery site is also a significant sport fishery.

Main Bay Hatchery (Western PWS) is a State hatchery contracted to PWSAC. It is a sockeye salmon program on the leading edge of sockeye salmon hatchery technology. The program currently has the capacity to produce nearly 1.2 million adult sockeye, including first generation Coghill and Eshamy Lake stocks used in a long-term program to rehabilitate the Coghill and Eshamy lake systems. The annual operating budget is $850,000.

Cannery Creek Hatchery (Unakwik Inlet) is also a State hatchery contracted to PWSAC. This program produces pink salmon and normally has the capacity to produce 6 million adult pink salmon. The operating budget is $750,000.

Gulkana Hatchery (Gulkana River, Copper River Basin) is the third State hatchery contracted to PWSAC. The program is located on the Gulkana River and produces sockeye salmon for harvest within the Copper River system. The program produces approximately 200,000 sockeye annually and contributes to a significant sport, subsistence and personal use fishery on the Copper and Gulkana rivers, along with a commercial harvest on the Copper River delta. This

production has provided replacement of resources degraded within PWS. The annual operating budget is $250,000.

Coghill Smolt Project The release of 800,000 sockeye smolts annually at Coghill River is integral to the restoration program cooperatively funded by USDA Forest Service, ADF&G and PWSAC. PWSAC provides the wild stock smolts, while other agencies provide limnological research, fish enumeration and lake fertilization to rehabilitate the lake productivity (project 94259). The operating budget is $70,000. If the PWSAC operating budget shortfall of $3.9 million is not approved by the Trustee Council, PWSAC requests that this portion be considered and approved separately as it complements project 94259.

General Methods

In methods annually employed at all facilities, brood stock are harvested by contracted seiner at the four PWS hatcheries and held until spawning maturity. Eggs are taken from the females and fertilized at a 1:1 female to male ratio. Incubation and rearing takes place at the hatchery sites. Stocks such as pink and chum salmon which enter the marine environment as fry are released into the spring plankton bloom. Coho, chinook and sockeye salmon are reared for an additional year and released as smolts.

Remote releases of salmon are conducted to rehabilitate wild stocks such as the Eshamy and Coghill programs. Approximately 700,000 Eshamy stock smolts are released annually at Eshamy Lagoon to rehabilitate Eshamy Lake.

Coho and chinook remote release programs are conducted to provide resources and services to salmon resource users at Cordova, Whittier and Valdez. These programs annually cost PWSAC approximately $25,000. In addition, a recent proposal to provide replacement of lost subsistence resources and services in the vicinity of Chenega will likely be fulfilled.

D. Location

Four hatcheries are located in PWS, and one on the upper Copper River system. In addition, remote release sites include Cordova, Whittier, Valdez, Eshamy Lake, and Coghill Lake. New release sites have been investigated at Port Chalmers (Montague Island), Naked Island and Port Wells, for remote releasing salmon to restore fisheries to historic locations which have been closed due to weak wild stock returns.

E. Technical support

The PWSAC salmon program receives technical support from permitting agencies, University of Alaska Fairbanks, and PWS Science Center. ADF&G reviews project applications from numerous biological and management perspectives. The ADF&G pathology lab, genetic lab, and coded wire tag lab are among specific expertise areas overseeing the hatchery salmon program. Cooperative ecosystem component studies are conducted with UAF and PWSAC to better understand environmental conditions affecting salmon and predator-prey relationships. ADEC provides technical support on water quality issues, whereas the Forest Service and DNR provide technical support on terrestrial and tidelands concerns. The Cordova ADF&G staff are in constant communication with PWSAC staff to monitor marine conditions, wild stock productivity, adjust harvesting to match production levels and fishery concerns, and provide technical guidance in hatchery practices.

F. Contracts

PWSAC requires the use of contracted vessels for harvesting brood stock and cost recovery fish, and for support of remote release operations. PWSAC also contracts vessels for hauling, placement and retrieval of barrier seines, buoys and anchors as needed, and barge services for hauling salmon fry/smolts and hatchery supplies. Air charter services are contracted for personnel, supplies and remote field transportation.

SCHEDULES

Incubation, outmigration, rearing, release: Oct 1993 - May 1994
Incubate eggs/embryos; enumerate, tag and outmigrate fry to rearing pens; rear fry; clean and sterilize incubation units; rear smolts; assess marine plankton abundance, release fry and smolts.

Adult returns, brood stock and cost recovery harvest: June 1994 - Sept 1994
Contract harvest vessels; place and secure brood barrier seines; harvest adult fish; spawn fish and incubate eggs/embryos; market sales fish.

In addition to the annual hatchery cycle, administrative cycles include budgeting (October-November); project permitting (December-March); annual hatchery reporting (October-December); annual hatchery planning (December-February); seasonal personnel hiring (January-July); sales fish marketing (ongoing); construction, maintenance and supplies transportation (ongoing).

ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

Permitting is a significant aspect of the PWSAC salmon program. Hatcheries must receive extensive permitting prior to construction which address water use and quality, land use, wild stocks and other concerns. Each salmon project must receive ADF&G review and permitting with scrutiny for genetic and disease histories, wild stock interactions, fishery management implications and common property benefit. Hatchery and remote release sites also require permitting from Department of Army Corp, DNR Lands Division, Forest Service special use or EA permitting if necessary, and ADF&G fry transport permits. Certain projects may require more thorough analysis such as the Main Bay Hatchery EIS.

PERFORMANCE MONITORING

Under mandate of law, the Regional Planning Team (RPT) for PWS is required to produce a comprehensive salmon plan. The RPT is composed of ADF&G staff appointed by the Commissioner and representatives from the regional salmon association. The RPT develops specific salmon rehabilitation and enhancement objectives which receive public review and approval by the ADF&G Commissioner. These objectives set the direction, production limits, and often specific projects for salmon rehabilitation or hatchery enhancement. Hatchery permits are issued which comply with agency regulation and address regional objectives. Rehabilitation and enhancement programs are reviewed by the RPT and recommended to the Commissioner. Annual review of accomplishments by Department personnel and the RPT, and recommendations for program revisions are processes to guide salmon programs and maintain performance within permitting requirements.

BUDGET NARRATIVE

Since the 1991 season, PWSAC has been faced with continual revenue shortfalls due to extreme and unusual variations in the quantity, quality, size and market value of their returning cost recovery fish. From 1991 through June 1993 these shortfalls were covered through the use of a contingency fund established and added to during years of surplus.

PWSAC's FY94 budget includes debt payment of $637,000, administrative costs of $1.2 million, in-house repair and maintenance of $500,000, plus direct operating costs of our enhancement program of $3.9 million. This $3.9 million includes $70,000 in costs associated with the Coghill Lake program, for which a separate funding request has been submitted. It does not include any funds for the Chenega chinook remote release program. In addition, PWSAC has committed to an aggressive market development project with the realization that value-added products will play a large part in returning economic viability to the fishery in PWS. Total projected cost of this project is $1.0 million. Product sales of up to $800,000 have been projected. Because of the developmental nature of this project, we realistically cannot consider these funds "in the bank" until they become fact. **However, receipts from sales will be used to address operating shortfalls in lieu of using Trustee Council monies rather than to create a contingency reserve account or to make principle or interest loan payments.**

Many uncertainties face PWSAC over the next several months. We have spent all revenues from last summer and in November began spending the remainder of our reserve funds. We currently project, that if the marketing project performs fully as budgeted and we have no emergency situations at our remote sites, that we will, at best, have zero funds to carry us past June 30, 1994. Our situation is further complicated by the fact that the major portion of our

annual expenditures occur in the first three months of our fiscal year (July through September) when our fish return and are either spawned or sold. With no funds left to enter the fiscal year beginning July 1, 1994, except those that might be collected from fish sales after the year begins, we will be at great risk in the case of another revenue shortfall.

FY94 PROJECT BUDGET ($K)

Personnel	2,213.0
Travel	83.0
Contractual	445.0
Commodities	1,185.0
	3,926.0

PLAN II - VALDEZ FISHERIES DEVELOPMENT ASSOCIATION

INTRODUCTION

Solomon Gulch Hatchery, located in the Eastern District of Prince William Sound, has been in operation since 1977. This facility has grown from a very modest 10 million egg facility to one of the largest Pink salmon producing hatcheries in the State of Alaska. The 1993 return of Pink salmon, while insufficient to cover the needed revenues for operations in FY94 did provide sufficient spawners to allow us to reach our permitted egg level of 230 million green eggs.

Valdez Fisheries Development Association has experienced revenue shortfalls each of the last three years, requiring us to request assistance from the State of Alaska revolving loan fund during each of those years. A steady decline in the numbers of returning adult Pink and Chum salmon to Port Valdez culminated in 1993 with a return that was 60% below what was projected to return.

While Pink and Chum salmon produced at Solomon Gulch Hatchery contribute significantly to the commercial harvest in the eastern district of Prince William Sound, the Pink salmon returns have also fostered one of the most unique and successful sport fishing programs found anywhere in the State of Alaska. The annual harvest rate of pink salmon by shore-based sport fishermen exceeds 100,000 fish.

Failed salmon returns to the Port Valdez area have resulted in financial disaster for commercial fishermen and charter boat operators and for VFDA in 1991, 1992 and 1993. The need for assistance is paramount in keeping this successful program.

PROJECT DESCRIPTION

A. Resources and/or Associated Services

The primary focus of the proposed project is to maintain operations of the Solomon Gulch Hatchery program to help foster the recovery of the common property fisheries, both commercial and sport, in eastern Prince William Sound. None of this money will be used for debt retirement.

B. Objectives

The objectives of this project are to collect and incubate the permitted egg levels assigned to this facility. Those levels being 230 million Pink salmon eggs; 18 million Chum salmon eggs; 2 million Coho salmon eggs and 200 thousand Chinook smolts.

C. Methods

The accepted methods for fish culture described in the Annual Management Plan for Solomon Gulch Hatchery will be used. These methods conform to those methods approved by the Alaska Department of Fish and Game.

D. Location

Solomon Gulch Hatchery is located in Port Valdez between the Alyeska Marine Terminal and Petro Star Refining and is a successful example of the cooperation between a large industrial complex and a resource producer.

E. Technical Support

The Alaska Department of Fish and Game, Prince William Sound Aquaculture Association and Valdez Fisheries Development Association biologists all provide technical support to this facility.

F. Contracts

Valdez Fisheries requires the use of contracted fishing vessels for harvesting cost recovery fish and for support of our remote release operations.

SCHEDULES

Incubation, outmigration, rearing, release: Oct 1993 - May 1994
Incubate eggs/embryos; enumerate, tag and outmigrate fry to rearing pens; rear fry; clean and sterilize incubation units; rear smolts; assess marine plankton abundance, release fry and smolts.

Adult returns, brood stock and cost recovery harvest: June 1994 - Sept 1994
Contract harvest vessels; place and secure brood barrier seines; harvest adult fish; spawn fish and incubate eggs/embryos; market sales fish.

In addition to the annual hatchery cycle, administrative cycles include budgeting (October-November); project permitting (December-March); annual hatchery reporting (October-December); annual hatchery planning (December-February); seasonal personnel hiring (January-July); sales fish marketing (ongoing); construction, maintenance and supplies transportation (ongoing).

ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

Environmental analysis of the hatchery stocking program is included in ADF&G's Statewide Stocking Plan.

FY94 BUDGET ($K)

The operating expenses for VDFA, not including loan payments, for FY 94 are $2,280,627. Available revenue from all sources is $1,312,106 leaving a projected shortfall of $968,521 which is being requested from the Trustee Council. A more detailed budget is being developed and will be provided to the Trustee Council.

PLAN III - COOK INLET AQUACULTURE ASSOCIATION

INTRODUCTION

Tutka Lagoon Hatchery has been producing pink salmon since the mid 1970's. Originally constructed and operated by ADF&G, operating responsibility (but not facility ownership) was transferred by contract to CIAA in 1991.

Since 1991 CIAA has operated Tutka Lagoon Hatchery under Alaska Law as a private nonprofit hatchery. The operating principle of a private nonprofit hatchery is that numbers of returning fish should be abundant enough to provide both sufficient revenue to carry on hatchery operation and significant contribution to common property fisheries.

Since taking over operation of Tutka Lagoon Hatchery CIAA has experienced adult returns so small that there has been virtually no contribution to the common property fisheries and insufficient revenue to support continued hatchery operation. Pink salmon fry released in 1987 and 1988, the two years immediately prior to the spill, experienced release to return survival rates of 3.7 and 6.1% which resulted in adult returns of 920,000 and 950,000 respectively.

Pink salmon fry released in 1989 experienced a survival rate of 0.8%; only 250,000 fish returned. Fry released in 1990 experienced a 1.1% survival rate; 320,000 fish returned. Fry released in 1991 experienced a 1.6% survival rate; 460,000 adult fish returned. Fry released in 1992 experienced a 2.4% survival rate; 775,000 adult fish returned. The low survival rates of fry released since the spill has caused fish sale revenues to be less than hatchery operation expense. The financial drain has finally exhausted CIAA's financial reserves for Tutka Lagoon Hatchery.

PROJECT DESCRIPTION

A. Resources and/or Associated Services

The goal of this project is to maintain operation of Tutka Lagoon Hatchery in order to help promote recovery of common property pink salmon stocks to pre-spill levels. Recovery of these stocks benefits commercial, recreational and subsistence fishermen as well as local populations of fish, birds and mammals which prey on migrating fry and adults.

B. Objectives

The objectives of this project are to collect and incubate up to 120M pink salmon eggs and release up to 100M Pink salmon fry into the waters of Tutka Bay.

C. Methods

Standard methods will be used to culture pink salmon. Standard methods are described in CIAA's Annual Management Plan for Tutka Lagoon Hatchery as approved by ADF&G.

D. Location

Tutka Lagoon Hatchery is located in lower Cook Inlet, on the southern shore of Kachemak Bay across from Homer.

E. Technical Support

CIAA biologists, the ADF&G fish pathology and genetics laboratories, and the Cook Inlet Seiners Association all provide technical support to CIAA's Tutka Lagoon Hatchery.

F. Contracts

A contract will be issued for logistical and technical support to the Cook Inlet Seiners Association of Homer, Alaska. Local vessel and aircraft charters are also required to support normal operations of the Tutka Hatchery.

SCHEDULES

Incubation, outmigration, rearing, release: Oct 1993 - May 1994
Incubate eggs/embryos; enumerate, tag and outmigrate fry to rearing pens; rear fry; clean and sterilize incubation units; rear smolts; assess marine plankton abundance, release fry and smolts.

Adult returns, brood stock and cost recovery harvest: June 1994 - Sept 1994
Contract harvest vessels; place and secure brood barrier seines; harvest adult fish; spawn fish and incubate eggs/embryos; market sales fish.

In addition to the annual hatchery cycle, administrative cycles include budgeting (October-November); project permitting (December-March); annual hatchery reporting (October-December); annual hatchery planning (December-February); seasonal personnel hiring (January-July); sales fish marketing (ongoing); construction, maintenance and supplies transportation (ongoing).

ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

CIAA operates Tutka Lagoon Hatchery under a contract with ADF&G. CIAA is a qualified Regional Aquaculture Association operating under Alaska's private nonprofit hatchery statutes. CIAA's operation of Tutka Lagoon Hatchery fully complies with Borough, State and Federal law. Environmental analysis of the hatchery stocking program is included in ADF&G's Statewide Stocking Plan.

PERFORMANCE MONITORING

Through auditing CIAA's operating contract and administering the Alaska private nonprofit hatchery program, ADF&G will, in the course of normal business, monitor CIAA's performance as a hatchery operator.

FY94 BUDGET ($K)

None of the following budget would be used for debt retirement because CIAA has no Tutka Lagoon Hatchery debt load.

Personnel	145.3
Travel	11.2
Contractual	43.0
Commodities	215.0
Equipment	0.0
Capital Outlay	0.0
Subtotal	414.5
Less Fish Sale Revenue	- 104.2
Project Total	310.3

FY94 BUDGET ($K), ALL PARTS COMBINED

Operating expenses for all three aquaculture associations have been combined in the budget which follows.

	ADF&G
Personnel	13.4
Travel	0.0
Contractual	5,204.8
Commodities	0.0
Equipment	0.0
Capital Outlay	0.0
Subtotal	$5,218.2
General Administration	118.6

Project Description

Project Total	$5,336.8
NEPA Compliance	0.0

Exxon Valdez Oil Spill Project Description

Title: Sound Ecosystem Assessment (SEA) - An Ecosystem Study for Prince William Sound

Project Number: 94320

Lead Agencies: Alaska Department of Fish & Game
National Oceanic and Atmospheric Administration

Cooperating Entities: Prince William Sound Science Center
US Forest Service
Prince William Sound Aquaculture
University of Alaska Fairbanks

Cost of Project, FY94:

Cost of Project, FY95:

Project Startup Date: February 1994

Duration: Long-term

Geographic Area: Prince William Sound

Introduction

The Sound Ecosystem Assessment program (SEA) is an ecosystem level study that will provide necessary information for the restoration of pink salmon and herring populations in Prince William Sound. It directly addresses the restoration of resources and services injured by the Exxon Valdez oil spill (EVOS). Resources addressed by SEA include pink salmon, herring, and injured species depending upon these fishes. Services addressed include subsistence, commercial fishing, recreation and tourism, and passive use. While SEA is primarily a monitoring and research restoration activity, this program will also provide support for other restoration activities (i.e., informing land and fisheries management to promote a healthy ecosystem, increasing public information about the state of the ecosystem). The SEA program was created by the PWS Fisheries Ecosystem Research Planning Group, comprising the scientists, communities, managers and resource users of the Sound. Plans for SEA were developed with the encouragement and support of the EVOS Trustee Council to provide an understanding of important ecological influences on injured resources and services. The draft SEA plan (with related technical information) was reviewed by independent scientists and agents of the EVOS Trustee Council at an workshop in December 1993, and was endorsed as innovative, reasonable, and scientifically testable.

Ecosystem approach

There is a general need to understand and separate anthropogenic and natural effects on the variability of the Prince William Sound ecosystem. In recent years, poor runs of both pink salmon and herring, and the decline in seabirds and some marine mammals, are forceful reasons to initiate long-term ecological studies. The probability of future oil-related impacts is an additional compelling reason for integrated, long-term research that will enable assessment of man-induced and natural variability. The SEA program focuses on pink salmon and herring as important components of the marine ecosystem. In the words of Dr. Ken Sherman (NOAA), *"Changes in the abundance levels of . . . fish, mollusks, and crustaceans through human intervention in fishing or from natural environmental perturbations can alter the structure and dynamics of large marine ecosystems, generating cascading effects up the food chain to predators, including cetaceans, pinnipeds, and sea birds, and down the food chain to the plankton."*[1] The SEA program proposes to look at the entire community of species that interact closely with pink salmon and herring in Prince William Sound. Accordingly, SEA encompasses the interactions of climate and ocean currents, their effects on plankton and fishes, and the distribution and diet of apex predators on fishes. Results will be fundamental to related projects that examine propagating effects through the food chain to marine mammals and birds, and to projects that examine the roles of ecotoxicology, disease, and genetics in limiting the survival of these fishes.

Injured resources and services

The history of communities within Prince William Sound is closely linked with the use of marine resources. In particular, pink salmon and herring have historically supported the largest commercial fisheries in the region. These species are critically important to subsistence and recreational users of fishery resources in the Sound. They also provide a food source for many species of fish, birds, and mammals. According to the EVOS Draft '94 Work Plan, pink salmon and herring currently show no sign of recovery nearly five years after the oil spill. In August 1993, members of the Prince William Sound fishing community blockaded the Alyeska Pipeline Terminal in Port Valdez, and drew state and national attention to the plight of these resources. The public will not regard Alaskan waters as pristine as long as fish stocks in Prince William Sound remain depressed and the region continues to be the focus of national attention and concern.

Restoration activities

SEA is a research program designed to understand the natural and anthropogenic factors that constrain the abundance levels of pink salmon and Pacific herring in the Sound. The SEA program includes developing predictive ecosystem models for oceanographic conditions and animal populations (i.e., zooplankton, fishes). This increased understanding and formal

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[1]Sherman, K. 1991. The large marine ecosystem concept: research and management strategy for living marine resources. *Ecological Applications* (4):349-360.

modeling will allow better design of restoration activities, and will improve prediction and monitoring of the effects of restoration on injured resources and services.

Scientific review
This proposal seeks funding to implement the SEA program, beginning in 1994 and continuing for a minimum of 8-10 years or until sufficient information is available to restore the injured resources. Among other things, the December 1993 workshop findings emphasized that the time frame for SEA must be long enough to encompass cycles of climatic variation (on time scales of five to twenty years) and recovery from oil impacts. Additionally, the life cycles of many resources damaged by EVOS can be 5 or more years, and the effects of EVOS on these populations (particularly genetic and ecotoxicological) can only be understood over several life spans of these species. SEA therefore requires a time sequence encompassing as much natural variation as possible. Low fisheries returns in 1991-1993 suggest that Prince William Sound may be at one extreme of variation right now. For these reasons, we request support to begin data collection in 1994 and to develop SEA as a long-term research program.

PROJECT DESCRIPTION

A. Resources and/or Associated Services

SEA will provide ecosystem level information (now missing) about injured pink salmon and herring populations in Prince William Sound. This information will assist the EVOS Trustee Council in restoring these resources and associated services to pre-spill conditions. Commercial, subsistence and sport users in Cordova, Valdez, Whittier, Tatitlek, Chenega, Anchorage and other communities inside and outside Alaska depend on these resources and associated services. The depressed condition of these resources continues to affect the social and economic health of the resource users and communities in the Sound. National attention to the plight of these fishes continues to prevent passive use of these resources from returning to pre-spill conditions.

Although designed around the biology of these fisheries resources, the ecosystem approach to research will result in information relevant to the restoration of other injured resources throughout the oil spill affected area. SEA will provide a better understanding of processes regulating the size of the pink salmon and herring spawning populations available to apex predators such as birds, marine and terrestrial mammals, and humans. Further planning for work to be implemented beginning in 1995 will focus on expanding SEA to address the roles of sea birds, marine mammals, the intertidal community, the benthos, and ecotoxicological factors in the marine system, and on building connections to ongoing projects already working in these areas. The results of this study of ecosystem dynamics in Prince William Sound

should also be transferable to other parts of the spill affected area, especially for sea birds and mammals.

B. Objectives

The goal of SEA is to develop an ecosystem level understanding of natural and man-caused factors influencing the production of pink salmon and herring in Prince William Sound. SEA is developing formal ecosystem models, designed to more accurately forecast production, predict population responses to ecosystem disturbance (natural and anthropogenic), and design and conduct restoration efforts for resources damaged by EVOS. New information emerging from SEA will establish a comprehensive data base for the fisheries of Prince William Sound serving the needs of the region for more informed management, enhancement, and mandated restoration activities. As a multidisciplinary, integrated study, SEA will achieve the following objectives:

1. Describe the oceanographic and meteorological mechanisms (currents, wind-driven upwelling, mixing, nutrients) that interact to establish levels of food for juvenile pink salmon, herring, and other species with similar feeding behavior (planktivores) in Prince William Sound each year;

2. Determine how prey/predator relationships affecting the survival of juvenile pink salmon, herring, and other fish with similar predators are modified by both seasonal and year-to-year changes in upper-layer plankton stocks;

3. Determine how physical processes affect the natal habitats (egg and larva incubation sites) for pink salmon and herring and contribute to losses of eggs, embryos and alevins;

4. Describe the ecological factors responsible for juvenile herring biological condition and overwinter survival in Prince William Sound;

5. In collaboration with agents of the EVOS Trustee Council, integrate the SEA research program with research encompassing 1) sea birds and mammals, 2) intertidal communities and processes, 3) benthic processes, and 4) ecotoxicological pathways;

6. Develop a comprehensive numerical simulation (model) including plankton, fishes, and apex predators (including sea birds and mammals) in Prince William Sound as the principal tool for directing SEA, for data integration and resource prediction, and for "what-if" modeling of management and restoration scenarios;

7. Plan and realize a multidisciplinary, long-term, ecosystem research program in Prince William Sound involving area residents, resource users, aquaculture corporations,

educators and students, and industries in cooperation with area scientists and managers;

8. Establish a regional and historical data base to assist the EVOS Trustee Council, the agencies, and area resource users to more efficiently manage, enhance, and restore a healthy ecosystem in Prince William Sound.

C. Methods

Much of SEA will be undertaken as a multi-disciplinary study that will rely on: 1) formal model development to assist in project design, interpretation, prediction, sensitivity and risk analysis, monitoring and restoration, 2) vessel and sea-side facilities in Prince William Sound for data collection and logistical support and, 3) remote sensing. SEA will rely heavily on private vessels (e.g., fishing, ecotourism, industry) outfitted with scientific equipment, and will require some use of agency and university scientific vessels. Salmon hatcheries in the region will provide SEA with spring and summer plankton data and year-round measurements of local weather and ocean conditions. These facilities will be supplemented by satellite-linked buoys, oceanographic moorings, and aircraft and satellite measurements.

SEA hypothesizes that the recruitment success of pink salmon and herring populations in Prince William Sound is related to losses due to physical processes and to predation during early life stages (embryo to late juvenile) that occur within the Sound. This hypothesis provides a means to focus the field efforts on those parts of the ecosystem that support these critical life stages. The freshwater, intertidal and shallow sub-tidal spawning habitats for both species forms a natural subdivision for embryo and alevin studies. In the drifting (herring) and free-swimming (pink salmon) environments, the different developmental stages and the habitats they exploit will define the regions of study. The resulting ecological pathways will establish the important links to food and predators and determine the structuring of direct and remote field sampling, and of model development.

Previous studies of Prince William Sound indicate that the important early portions of the marine production cycle are tightly compressed in time around the months of April and May. During this period, massive upper-layer stocks of large zooplankton arise from the deeper water to graze on a short-lived diatom bloom. Herring spawning and the wild and hatchery-reared pink salmon out-migration occurs at this time as well. SEA hypothesizes that the success or failure of a pink salmon (and to some extent) a herring brood year depends on ecosystem level interactions at this time. These interactions include oceanographic and meteorological influences, prey/predator relationships, physical effects, and mortality associated with toxic pollutants and diseases. SEA includes a formal model of this hypothesis that we are using to design sampling programs and to predict brood year success for these fishes.

Oceanographic and meteorological effects on plankton dynamics, and fish distribution
Standard oceanographic methods will be employed to describe changes in upper layer and deep ocean circulation in the Sound and the bordering shelf of the Gulf of Alaska. Acoustic doppler current profilers (ADCP) will be used to assess large scale intrusions and losses of water between the Sound and the bordering shelf waters of the Gulf of Alaska, especially in relation to the abundance of important food resources for animals in the Sound. Closely spaced hydrographic measurements will be used in conjunction with ADCP data to discern the distribution and characteristics of oceanographic structures (e.g. eddies, fronts, mixed layers, thermoclines) in the central Sound and in the nearshore region. These measurements will be designed to relate the distribution and abundance of pink salmon and herring, their predators and their prey to environmental conditions (including natural and anthropogenic disturbances). Variability of animal distribution and abundance in relation to physical oceanographic structures and climatic forcing will be examined over a broad range of time scales ranging from hours to years. Ocean temperature and salinity will be measured using conductivity temperature-depth (CTD) equipment and nutrient distributions will be sampled with Niskin bottles. Differences in (oceanic) shelf derived waters and those of the Alaska Coastal Current will be discerned using chemical tracers and differing zooplankton assemblages. Broad-scale upper layer measurements (i.e. temperature, phytoplankton distributions, and ocean color) will be augmented by satellite and aircraft mounted remote sensors. Moored buoys will be used to continuously monitor atmospheric and oceanic conditions, plankton density, and to provide sea-truthing for remotely measured quantities. Meteorological and hydrological data will be used with formal predictive models to assess the importance of wind and buoyancy forcing on oceanographic properties and animal distributions in PWS.

Plankton productivity and the timing of phyto- and zooplankton blooms will be determined using standard oceanographic methods. Zooplankton abundance will be measured quantitatively by water bottles, nets, ADCP backscatter, high-frequency acoustics, and optical plankton counting. Acoustic techniques and optical plankton counting will also be used to describe meso and micro-scale distributions of zooplankton along the ecological pathways of pink salmon and herring.

Prey/predator relationships
Pink salmon and herring predators will be identified from collections made with large trawls and seines along the migratory pathways for both species. Potential predators (1+ and older juvenile and adult fishes) will be identified, measured and their stomach contents examined at times and places where overlap with fry and larval/post-larval herring populations occurs. Attention will be paid to dawn and dusk feeding times for larger fishes in the near-surface waters. The location, behavior and extent of predator populations will be measured acoustically. Experimental releases of hatchery juveniles will provide a powerful test of the influence of ocean-entry timing and of fry size at ocean entry on losses to predators. Initial work will focus on predation by fish, although some research on birds is included here and

further projects examining predation by birds and mammals are being planned for the future. Initially, the importance of predation by marine birds and mammals on early life stages by will be assessed through simultaneous observations from sampling platforms, and additional aerial and boat surveys (focused initially on the rocky intertidal). Additional assessment of predation by birds and mammals will be done through integration with marine bird and mammal studies conducted by other investigators.

Physical processes in natal habitats

Studies of the natal habitats of pink salmon and herring will be undertaken to determine how the different watershed characteristics of the region influence losses to scouring, low oxygen, wave energy, desiccation, and freezing. Prediction and estimates of survival in natal habitats, the timing of ocean entry, and its relationship to zooplankton blooms are also important components of an ecosystem model. Spawning habitats (streams, beaches, kelp beds) will be typed by physical, biological and microclimatic properties, and predictive models will be developed to related natural and man-made environmental variations to survival within habitat types. Typing and modeling of spawning habitat for these species will be predicated upon existing but incomplete data bases and models created by USFS and ADF&G. The USFS, in conjunction with ADF&G and the PWSSC will expand the streams spawning habitat data set (particularly in the intertidal) using a combination of aerial photo interpretation and foot survey techniques. Habitat typing for herring spawning habitat must be developed but much of the data is already collected under existing ADF&G studies and under other EVOS-related studies. Predation on herring spawn will also be investigated as a function of spawing habitat type and predator behavior. Meteorological and hydrographic data will be measured over a broader scale using on-site and remote sensors, and used in SEA modeling projects to predict survival and the timing of ocean entry. Actual survival and ocean entry will be estimated using techniques similar to those of existing ADF&G programs and EVOS Trustee Council damage assessment projects.

Herring condition and overwinter survival

The roles of food availability and winter severity in regulating the overwinter survival of juvenile herring will be examined. Herring condition will be assessed from samples obtained during hydroacoustic and trawl surveys. Ocean temperature will be obtained as described above. Laboratory studies of metabolic rates and behavior will be used with models to examine the relationship between herring condition, starvation, and losses to predation.

Simulation model

Simulation modeling of pink salmon and herring populations in Prince William Sound will include assessments of ocean state, plankton dynamics, predators, competitors, and prey, and mortality associated with physical and toxicological features of the system that vary in time and space. These models will be capable of both nowcasting and forecasting, as well as sensitivity and risk analyses. As a research tool, the model will be used to drive appropriate sampling protocols to resolve biological and physical interactions on levels consistent with the

development and behavior of juvenile pink salmon and herring along their migratory pathways.

Program development and relationship to other programs
The initial plan for SEA focusses on the fisheries resources in Prince William Sound. Additional planning or the inclusion of research on other important resources will require more interaction with agency- and EVOS Trustee Council-sponsored scientist and managers. Increased collaborative planning and data sharing will result in more efficient use of scientific knowledge to understand and restore the ecosystem. The December 1993 workshop identified four areas where further information would be valuable in understanding, managing and restoring the ecosystem: 1) sea birds and mammals, 2) intertidal communities and processes, 3) benthic processes, and 4) ecotoxicological pathways. Pilot plans for reasearch addressing compenents of the birds, mammal, and intertidal communities, and the ecotoxicollogy in these communities, are being coordinated between SEA and researchers active in these areas, and are included in this project proposal, as mentioned above.

Initial planning resulting in SEA has met with praise. However, the expansion of SEA in response to the findings of the December 1993 workshop and the establishment of a large-scale, long-term ecosystem research program will require additional planning, organization and communication efforts. In order to be successful, SEA planners will need to continue program development in 1994-1995 and beyond. On-going field work should serve as a pilot program for SEA. Planning needs to continue through an organized series of meetings between agency, independent, and academic scientists, resource users, managers, industry, and local communities, together with continued integrative workshops. As SEA is integrated with research in the above areas, ecosystem models will be developed to include additional components of the system.

Regional database
A data base and archival/retrieval system will be developed so that the results of SEA are accessible to the agencies responsible for restoration in Prince William Sound, as a tool for improving resource forecasting, management and enhancement, and as an educational resource for use within the spill-impacted area. A necessary component of this database will be interaction with or creation of a database of historical information (pre- and post-spill) already available on the ecosystem, with particular attention to EVOS-related research. Geographic visualizations and analyses, data listings, reports, and other services will be available as part of the SEA data base and management system. Predictive and "what-if" scenario modeling tools, computer, communication, and library facilities will be available to assist in conducting SEA programs and to aid in restoration design and implementation as well as in resource management.

Equipment and implementation
Equipment costs reflect the start-up expenses for a long-term research program, and will therefore be relatively high during the first years of the program. The overall annual expenditures will be significantly reduced as the costs of the equipment will be amortized over the duration of the program. We propose a phased initial implementation with a focussed study area in 1994 in western Prince William Sound, followed by expansion in 1995-96 to encompass the entire Sound. The western region is chosen because it is the area most heavily impacted by oil and most heavily used by many migratory species (notable pink salmon), it contains the deep-water reservoir of macrozooplankton central to SEA hypotheses, and includes substantial hatchery activity as well as a representative subset of habitats.

D. Location

This project will be conducted within the EVOS-impacted area in Prince William Sound and the waters immediately adjacent to this region. Prince William Sound is an ideal location for such a long-term ecosystem study. The Sound is a semi-enclosed basin, of tractable size, and suitable for sampling and monitoring with small vessels. Because of fundamental similarities in the structure of northern pelagic ecosystems and in the nature of unexplained declines in seabirds and marine mammals in the north Pacific, an ecosystem study for Prince William Sound could serve as a model for understanding the ecosystem dynamics of the entire region.

E. Technical Support

SEA will provide information and models useful to monitoring programs, studies and restoration activities currently planned or underway for Prince William Sound and the spill impacted area, as well as for national efforts such as the National Biological Survey. Data will be archived in accordance with standardized procedures set up for handling EVOS-related databases. SEA will utilize local boat fleets for much of the needed marine transport. Some use of agency and university scientific vessels is expected. Zooplankton and ichthyoplankton samples may be processed on board vessels, at the ADF&G Limnology Laboratory in Soldotna, or at other facilities as needed.

F. Contracts

The Prince William Sound Science Center, the Prince William Sound Aquaculture Corporation, the University of Alaska Fairbanks, the US Forest Service, and the private sector fishermen in Prince William Sound will be contracted to assist with the oceanography, meteorology, plankton dynamics, remote sensing, modeling and predator surveys.

SCHEDULES

SEA is a long-term project to be implemented in three phases: 1) an initial 1-2 year phase of model development, planning, and field surveys; 2) an intensive 4-5 year phase of field and laboratory studies focussed on production and trophic interactions, and model testing and improvement; and 3) an extended phase of less intensive sampling, monitoring and model validation, and perhaps involving adaptive management manipulations of stocking and harvest practices. Studies should begin in 1994. Generally, the annual schedule will include activities listed in Table 1.

Table 1: Annual schedule of SEA activities

January-February	Stage for the field season
March-July	Full-scale field studies focused around the marine production cycle
August-December	Sample processing, data assessment
November	Macrozooplankton overwintering survey
December-February	Herring overwintering studies
December-February	Annual report preparation

EXISTING AGENCY PROGRAMS

Related Studies in the EVOS 1994 Draft Workplan

The projects incorporated in SEA will benefit from interaction with ongoing EVOS Trustee sponsored projects, most notably those listed here. We expect that many of these project could be profitably informed by the results of the SEA program as well.

94163 Forage fish influence on injured species.
94165 Herring genetic stock identification, PWS
94166 Herring spawn deposition, reproduction
94184 Coded wire tag recoveries of pink salmon
94185 Coded wire tagging of wild pink salmon
94187 Otolith marking of pink salmon
94189 Pink salmon stock genetics
94192 Evaluation of hatchery straying
94083 Monitoring of oiled and treated shorelines
94086 Herring Bay experimental and monitoring studies
94070 Restoration of high intertidal fucus
94064 Harbor seal habitat use and monitoring

ENVIRONMENTAL COMPLIANCE/PERMIT/COORDINATION STATUS

PERFORMANCE MONITORING

BUDGET

ADF&G

Salaries and Benefits	$531.6K
Services	$700k
Vessel charters	
Trawlers ($550K)	
R/V Alpha Helix ($50K)	
Laboratory services (ADF&G Limnology lab, $100K)	
Supplies	$38K
Equipment	$266K
Travel	$8K
Total direct costs, ADF&G	**$1,543.6K**
Indirect costs	$123.5K
Total costs, ADF&G, FY 1994	**$1,667.1K**

SUBCONTRACTS

PWS Science Center	$2427.3K
University of Alaska Fairbanks	$800K
United States Forest Service	$120K
Copper River Delta Institute, Pacific NW Research Station ($90K)	
Chugach National Forest ($30K)	
National Biological Survey	$125K
Future planning efforts	$100K
PWS Aquaculture Corporation	$50K
Total subcontracts	**$3622.3K**

TOTAL COSTS, FY94 ..... **$5,289.4K**

14.2.9 I

Meeting Announcement

DRAFT

A. **MEETING:** Exxon Valdez Oil Spill Public Advisory Group (PAG)

B. **DATE/TIME:** Tuesday/Wednesday January 11/12, 1994 @ 9:30 A.M.

C. **LOCATION:** First floor conference room
645 G Street, Anchorage, Alaska

D. **PURPOSE:**

1. Review and make recommendations on the draft 1994 Work Plan.
2. Obtain status reports on restoration activities.

E. **AGENDA**

Tuesday

9:30 am	Call to order/roll call/ Approval of agenda	Brad Phillips, Chair
9:35	Approval of summary of November 23, 1993 meeting	Brad Phillips, Chair
9:40	Executive Director's Report	Jim Ayers, Executive Director
	--Report on Trustee Council	
	--Implementation of the Draft Restoration Plan:	
	--Environmental Impact Statement --Ecosystem-based Management --Habitat Protection	
	--Status Report	
11:00	Comments on draft 1994 Work Plan	Bob Spies, Chief Scientist
11:30	Public Comments	
12:15 pm	Lunch	
1:15	Recommendations on the draft 1994 Work Plan	Brad Phillips, Chair
5:00	Recess	

Wednesday

8:30 am	Continue recommendations on the draft 1994 Work Plan	Brad Phillips, Chair
11:30	Schedule next meeting	Brad Phillips, Chair
11:35	PAG member comments	

(SOURCE: DRAFT BUDGET, DRAFT 94 WORK PLAN)

TABLE 5

1994 PROJECTS LISTED BY RESOURCE CATEGORY

RESTORATION STATUS				Restoration Category*			
Resources and Services	Project Number	Project Title	Location***	G	M	H	Requested FFY 94**
RESOURCES RECOVERING							
Bald Eagles		No specific projects for Bald Eagles					
Black Oystercatcher	94020	Black Oystercatcher Interaction with Intertidal	PWS		M		$148.9
See also:	*94041*	*Introduced Predator Removal from Islands (Multi-Resource Project)*					
	94159	*Marine Bird & Sea Otter Boat Surveys (Multi-Resource Project)*					
Killer Whales	94092	Killer Whale Recovery Monitoring	PWS		M		$163.1
Sockeye Salmon (Red Lk) See also:	*94258*	*Sockeye Salmon Overescapement (Resources Not Recovering - Sockeye)*					
RESOURCES NOT RECOVERING							
Common Murres	94039	Common Murre Population Monitoring	Kodiak		M		$227.2
	94040	Reduce Disturbance Near Injured Murre Colonies	Kod, Ken, AkP	G			$44.8
See also:	*94041*	*Introduced Predator Removal from Islands (Multi-Resource Project)*					
	94159	*Marine Bird & Sea Otter Boat Surveys (Multi-Resource Project)*					
	94163	*Forage Fish Influence on Injured Species (Multi-Resource Project)*					
Harbor Seals	94064	Harbor Seal Habitat Use and Monitoring	PWS		M		$270.2
	94244	Seal & Otter Co-op Subsistence Harvest Assistance	PWS, Kenai	G			$54.5
See also:	*94163*	*Forage Fish Influence on Injured Species (Multi-Resource Project)*					
Harlequin Ducks	94066	Harlequin Duck Recovery Monitoring	PWS		M		$286.9
See also:	*94159*	*Marine Bird & Sea Otter Boat Surveys (Multi-Resource Project)*					
Intertidal Ecosystem	94070	Restoration of High Intertidal Fucus	PWS	G			$285.8
	94083	Monitoring of Oiled & Treated Shorelines	PWS		M		$616.6
	94086	Herring Bay Experimental & Monitoring Studies	PWS		M		$729.4
	94090	Mussel Bed Restoration & Monitoring	PWS, AkP	G			$774.8

Dollar Amounts are shown in thousands of dollars.

*G = General Restoration, M = Monitoring and Research, H = Habitat Protection

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

***PWS = Prince William Sound, Ken = Kenai, Kod = Kodiak, AkP = Alaska Peninsula

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TABLE 5

RESTORATION STATUS		1994 PROJECTS LISTED BY RESOURCE CATEGORY		Restoration Category*			
Resources and Services	Project Number	Project Title	Location***	G	M	H	Requested FFY 94**
RESOURCES NOT RECOVERING (Continued)							
Marbled Murrelets	94102	Murrelet Prey & Foraging Habitat in PWS	PWS		M		$231.5
See also:	*94159*	*Marine Bird & Sea Otter Boat Surveys (Multi-Resource Project)*					
	94163	*Forage Fish Influence on Injured Species (Multi-Resource Project)*					
Pacific Herring	94165	Herring Genetic Stock Identification in PWS	PWS		M		$62.2
	94166	Herring Spawn Deposition & Reproductive Impairment	PWS	G			$466.3
See also:	*94163*	*Forage Fish Influence on Injured Species (Multi-Resource Project)*					
Pigeon Guillemots	94173	Pigeon Guillemot Recovery Monitoring	PWS		M		$201.1
	94506	Pigeon Guillemot Recovery	PWS		M		$13.9
See also:	*94041*	*Introduced Predator Removal from Islands (Multi-Resource Project)*					
	94159	*Marine Bird & Sea Otter Boat Surveys (Multi-Resource Project)*					
	94163	*Forage Fish Influence on Injured Species (Multi-Resource Project)*					
Pink Salmon	94184	Coded Wire Tag Recoveries from Pinks in PWS	PWS	G			$244.4
	94185	Coded Wire Tagging of Wild Pinks for Stock ID	PWS	G			$286.0
	94187	Otolith Marking - Inseason Stock Separation	PWS	G			$179.7
	94189	Pink Salmon Stock Genetics in PWS	PWS		M		$171.2
	94191	Oil Related Egg & Alevin Mortalities	PWS		M		$782.9
	94192	Evaluation of Hatchery Straying on Wild Pinks in PWS	PWS	G			$640.5
See also:	*94163*	*Forage Fish Influence on Injured Species (Multi-Resource Project)*					
Sea Otters	94246	Sea Otter Recovery Monitoring	PWS		M		$41
See also:	*94159*	*Marine Bird & Sea Otter Boat Surveys (Multi-Resource Project)*					
	94244	*Seal & Otter Co-op Subsistence Harvest Assistance (Resources Not Recovering - Harbor Seals)*					
Sockeye Salmon (Kenai River)	94255	Kenai River Sockeye Salmon Restoration	Kenai	G			$406.1
	94258	Sockeye Salmon Overescapement	Kenai, Kodiak		M		$854.9
	94504	Genetic Stock ID of Kenai River Sockeye	Kenai	G			$262.2
Subtidal Ecosystem	94285	Subtidal Sediment Recovery Monitoring	Ken, Kod, AkP		M		$629.2

Dollar Amounts are shown in thousands of dollars.

*G = General Restoration, M = Monitoring and Research, H = Habitat Protection

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

***PWS = Prince William Sound, Ken = Kenai, Kod = Kodiak, AkP = Alaska Peninsula

TABLE 5

RESTORATION STATUS — 1994 PROJECTS LISTED BY RESOURCE CATEGORY

Resources and Services	Project Number	Project Title	Location***	Restoration Category* G	M	H	Requested FFY 94**
RESOURCE RECOVERY UNKNOWN							
Clams	94081	Recruitment Monitoring of Littleneck Clams	PWS		M		$206.7
See also:	*94068*	*Deposit Sand to Promote Clam Recruitment (Services - Subsistence)*					
Cutthroat Trout							
See also:	*94043*	*Cutthroat & Dolly Habitat Restoration in PWS (Services - Recreation & Tourism)*					
Dolly Varden Trout							
See also:	*94043*	*Cutthroat & Dolly Habitat Restoration in PWS (Services - Recreation & Tourism)*					
River Otter	94237	River Otter Recovery Monitoring	PWS		M		$156.7
Rockfish	94241	Rockfish Management Plan Data Development	PWS, Kenai		M		$233.2
OTHER RESOURCES							
Archeological Resources	94007	Site Specific Archeological Restoration	Spill area	G			$485.6
	94015	Archeological Site Stewardship	Spill area	G			$217.7
	94386	Artifact Repositories - Planning & Design	Spill area	G			$24[illegible]
SERVICES							
Subsistence	94068	Deposit Sand to Promote Clam Recruitment	PWS	G			$36.4
	94272	Chenega Chinook Release Program	PWS	G			$57.4
	94279	Subsistence Food Safety Testing	PWS, Ken, Kod	G			$379.2
See also:	*94090*	*Mussel Bed Restoration & Monitoring (Resources not Recovering - Intertidal Organisms)*					
	94266	*Shoreline Assessment & Oil Removal (Multi-Resource Project)*					

Dollar Amounts are shown in thousands of dollars.

*G = General Restoration, M = Monitoring and Research, H = Habitat Protection

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

***PWS = Prince William Sound, Ken = Kenai, Kod = Kodiak, AkP = Alaska Peninsula

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TABLE 5

RESTORATION STATUS — 1994 PROJECTS LISTED BY RESOURCE CATEGORY

Resources and Services	Project Number	Project Title	Location***	Restoration Category* G	M	H	Requested FFY 94**
SERVICES (Continued)							
Commercial Fishing	94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS	PWS	G			$261.6
	94139	Salmon Instream Habitat & Stock Restoration	PWS, Ken, Kod	G			$572.6
	94259	Coghill Lake Sockeye Salmon Restoration	PWS	G			$324.1
	94280	Spot Shrimp Survey & Juvenile Shrimp Habitat ID	PWS		M		$232.2
	94345	Salmon Spawning Escapement on the Lower Kenai Pn	Kenai	G			$219.2
	94421	Common Property Salmon Stock Restoration	PWS, Ken	G			$5,336.8
Recreation and Tourism	94043	Cutthroat & Dolly Habitat Restoration in PWS	PWS	G			$1[illegible]
	94200	Public Land Access 17(b) Easement ID	PWS, Ken, Kod			H	$38.1
	94216	Gulf of Alaska Recreation Plan Development	Kod, Ken, AkP	G			$164.6
	94217	PWS Area Recreation Implementation Plan	PWS	G			$91.2
	94316	Shoreline Trash Cleanup	PWS	G			$38.6
	94419	Leave No Trace Educational Program	PWS	G			$167.7
	94420	Recreation Information Center at Portage	PWS, Ken	G			$100.8
See also:	*94266*	*Shoreline Assessment & Oil Removal (Multi-Resource Project)*					
Passive Use		No specific projects for Passive Use					

Dollar Amounts are shown in thousands of dollars.

*G = General Restoration, M = Monitoring and Research, H = Habitat Protection

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

***PWS = Prince William Sound, Ken = Kenai, Kod = Kodiak, AkP = Alaska Peninsula

TABLE 5

1994 PROJECTS LISTED BY RESOURCE CATEGORY

RESTORATION STATUS				Restoration Category*			
Resources and Services	Project Number	Project Title	Location***	G	M	H	Requested FFY 94**
MULTI-RESOURCE PROJECTS							
	94041	Introduced Predator Removal from Islands	AK Pen	G			$146.6
	94110	Habitat Protection - Data Acquisition & Support	Spill area			H	$678.6
	94126	Habitat Protection & Acquisition Fund	Spill area			H	$1,032.1
	94147	Comprehensive Monitoring Program	Spill area		M		$1
	94159	Marine Bird & Sea Otter Boat Surveys	PWS		M		$
	94163	Forage Fish Influence on Injured Species	PWS		M		$606.6
	94199	Alaska Marine Research Institute	Spill area		M		TBD****
	94266	Shoreline Assessment & Oil Removal	PWS, Kenai	G			$973.3
	94290	Hydrocarbon Data Analysis & Interpretation	Spill area		M		$130.2
	94320	Ecosystem Study Plan	PWS		M		$5,000.0
	94417	Waste Oil Disposal Facilities	Spill area	G			$232.2
	94505	Information Needs for Habitat Protection	Spill area			H	$406.0
PUBLIC INFORMATION AND ADMINISTRATION							
	940ED	Executive Director's Office	Spill area				$2,340.6
	940FC	Finance Committee	Spill area				$165.1
	94PAG	Public Advisory Group	Spill area				$181.9
	940RT	Restoration Team Support	Spill area				$2,8
The Trustee Council is developing a new management structure. As a part of that development, they have directed that the Public Information and Administration budget be reduced by a minimum of 15% from the amount shown in this table.							
		Total					$34,339.4

****TBD = To Be Determined

Dollar Amounts are shown in thousands of dollars.

*G = General Restoration, M = Monitoring and Research, H = Habitat Protection

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

***PWS = Prince William Sound, Ken = Kenai, Kod = Kodiak, AkP = Alaska Peninsula

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(SOURCE: DRAFT BUDGET, DRAFT 94 WORK PLAN)

TABLE 3
1994 PROJECTS LISTED BY AGENCY

Agency	Cooperating Agency(s)	Project Number	Project Title	NEPA Cost*	Reprt/Intrm 1-Oct-93 - 31-Jan-94	Remaining 1-Feb-94 - 30-Sep-94	R/I + R Total FFY 94**
ADEC	NOAA/DOI-NPS	94090	Mussel Bed Restoration & Monitoring	$5.0	$0.0	$350.2	$350.2
	ADNR/ADF&G/ USFS/DOI-FWS/ DOI-NPS	94110	Habitat Protection - Data Acquisition & Support	$0.0	$6.4	$6.4	$12.8
	ADF&G/ADNR/ USFS/DOI-NPS/ NOAA	94266	Shoreline Assessment & Oil Removal	$5.0	$33.1	$827.5	$860.5
	ADF&G/NOAA	94285	Subtidal Sediment Recovery Monitoring	$0.0	$21.4	$0.0	$21.4
		94417	Waste Oil Disposal Facilities	$0.0	$0.0	$232.2	$232.2
	ADNR/USFS/DOI	940ED	Executive Director's Office	$0.0	$419.1	$242.6	$661.7
	ADF&G/ADNR/ USFS/DOI/NOAA	940FC	Finance Committee	$0.0	$8.5	$18.6	$27.1
	USFS/DOI	94PAG	Public Advisory Group	$0.0	$10.7	$19.3	$30.0
	ADF&G/ADNR/ USFS/DOI/NOAA	940RT	Restoration Team Support	$0.0	$264.6	$371.3	$635.9
			ADEC Total	**$10.0**	**$763.7**	**$2,068.1**	**$2,831.8**
ADF&G		94064	Harbor Seal Habitat Use and Monitoring	$0.0	$116.9	$153.3	$270.2
	NOAA	94066	Harlequin Duck Recovery Monitoring	$0.0	$104.9	$147.5	$252.5
		94068	Deposit Sand to Promote Clam Recruitment	$2.0	$0.0	$36.4	$36.4
		94070	Restoration of High Intertidal Fucus	$5.0	$0.0	$285.8	$285.8
		94081	Recruitment Monitoring of Littleneck Clams	$0.0	$0.0	$206.7	$206.7
		94086	Herring Bay Experimental & Monitoring Studies	$0.0	$198.0	$531.4	$729.4
	ADEC/ADNR/ USFS/DOI-FWS/	94110	Habitat Protection - Data Acquisition & Support	$0.0	$71.5	$48.8	$120.3
		94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS	$0.0	$46.7	$214.9	$261.6
	USFS	94139	Salmon Instream Habitat & Stock Restoration	$3.0	$0.0	$391.1	$391.1
	DOI-FWS/NOAA	94163	Forage Fish Influence on Injured Species	$0.0	$0.0	$95.4	$95.4

07/14/93

Dollar Amounts are shown in thousands of dollars.
*NEPA costs are for FFY 94. These amounts are not included in the Total.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

TABLE 3
1994 PROJECTS LISTED BY AGENCY

Agency	Cooperating Agency(s)	Project Number	Project Title	NEPA Cost*	Reprt/Intrm 1-Oct-93 - 31-Jan-94	Remaining 1-Feb-94 - 30-Sep-94	R/I + R Total FFY 94**
ADF&G (cont.)		94165	Herring Genetic Stock Identification in PWS	$0.0	$0.0	$62.2	$62.2
	NOAA	94166	Herring Spawn Deposition & Reproductive Impairment	$0.0	$37.1	$242.2	$279.4
		94184	Coded Wire Tag Recoveries from Pinks in PWS	$0.0	$47.8	$196.6	$244.4
		94185	Coded Wire Tagging of Wild Pinks for Stock ID	$0.0	$40.8	$245.2	$286.0
		94187	Otolith Marking - Inseason Stock Separation	$0.0	$0.0	$179.7	$179.7
		94189	Pink Salmon Stock Genetics in PWS	$0.0	$0.0	$171.2	$171.2
	NOAA	94191	Oil Related Egg & Alevin Mortalities	$0.0	$206.2	$202.6	$408.8
		94192	Evaluation of Hatchery-Straying on Wild Pinks in PWS	$0.0	$0.0	$640.5	$640.5
	DOI-FWS/NOAA	94199	Alaska Marine Research Institute	TBD****	$0.0	TBD****	TBD****
		94237	River Otter Recovery Monitoring	$0.0	$0.0	$156.7	$156.7
		94241	Rockfish Management Plan Data Development	$0.0	$0.0	$233.2	$233.2
		94244	Seal & Otter Co-op Subsistence Harvest Assistance	$0.0	$0.0	$54.5	$54.5
		94255	Kenai River Sockeye Salmon Restoration	$5.0	$121.0	$285.1	$406.1
		94258	Sockeye Salmon Overescapement	$0.0	$379.0	$475.9	$854.9
	USFS	94259	Coghill Lake Sockeye Salmon Restoration	$0.0	$76.6	$113.2	$189.8
	ADEC/ADNR/ USFS/DOI/NOAA	94266	Shoreline Assessment & Oil Removal	$0.0	$0.0	$12.1	$12.1
		94272	Chenega Chinook Release Program	$0.0	$0.0	$57.4	$57.4
	NOAA	94279	Subsistence Food Safety Testing	$0.0	$56.9	$176.1	$233.0
		94280	Spot Shrimp Survey & Juvenile Shrimp Habitat ID	$0.0	$0.0	$232.2	$232.2
	ADEC/NOAA	94285	Subtidal Sediment Recovery Monitoring	$0.0	$220.4	$0.0	$220.4
	NOAA	94320	Ecosystem Study Plan	$0.0	$75.0	$2,425.0	$2,500.0
		94345	Salmon Spawning Escapement on the Lower Kenai Pn	$0.0	$0.0	$219.2	$219.2
		94421	Common Property Salmon Stock Restoration	$0.0	$0.0	$5,336.8	$5,336.8
		94504	Genetic Stock ID of Kenai River Sockeye	$0.0	$262.2	$0.0	$262.2
	USFS/DOI-FWS	94505	Information Needs for Habitat Protection	$0.0	$137.5	$0.0	$137.5
	ADEC/ADNR/ USFS/DOI/NOAA	940FC	Finance Committee	$0.0	$6.5	$14.1	$20.6
	ADEC/ADNR/ USFS/DOI/NOAA	940RT	Restoration Team Support	$0.0	$177.2	$288.2	$465.4
			ADF&G Total	$15.0	$2,382.3	$14,131.2	$16,513.5

07/14/93

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

****TBD = To Be Determined

TABLE 3
1994 PROJECTS LISTED BY AGENCY

Agency	Cooperating Agency(s)	Project Number	Project Title	NEPA Cost*	Reprt/Intrm 1-Oct-93 - 31-Jan-94	Remaining 1-Feb-94 - 30-Sep-94	R/I + R Total FFY 94**
ADNR	USFS/DOI-FWS/ DOI-NPS	94007	Site Specific Archeological Restoration	$0.0	$50.8	$179.7	$230.4
	USFS/DOI-FWS/ DOI-NPS	94015	Archeological Site Stewardship	$0.0	$0.0	$132.4	$132.4
	ADEC/ADF&G/ USFS/DOI-FWS/ DOI-NPS	94110	Habitat Protection - Data Acquisition & Support	$0.0	$176.6	$300.1	$476.6
	USFS/DOI-FWS/ DOI-NPS	94126	Habitat Protection & Acquisition Fund	$0.0	$99.6	$199.3	$298.9
		94200	Public Land Access 17(b) Easement ID	$0.0	$0.0	$38.1	$38.1
	DOI-NPS	94216	Gulf of Alaska Recreation Plan Development	$0.0	$0.0	$79.6	$79.6
	USFS	94217	PWS Area Recreation Implementation Plan	$0.0	$47.0	$0.0	$47.0
	ADEC/ADF&G/ USFS/DOI-NPS/ NOAA	94266	Shoreline Assessment & Oil Removal	$0.0	$0.0	$25.3	$25.3
		94316	Shoreline Trash Cleanup	$0.0	$0.0	$38.6	$38.6
	USFS/DOI-NPS	94386	Artifact Repositories - Planning & Design	$0.0	$0.0	$223.8	$223.8
	USFS	94419	Leave No Trace Educational Program	$0.0	$0.0	$5.8	$5.8
	ADEC/USFS/DOI	940ED	Executive Director's Office	$0.0	$629.1	$8.5	$637.6
	ADEC/ADF&G/ USFS/DOI/NOAA	940FC	Finance Committee	$0.0	$10.3	$21.8	$32.1
	ADEC/ADF&G/ USFS/DOI/NOAA	940RT	Restoration Team Support	$0.0	$184.8	$293.4	$478.2
			ADNR Total	$0.0	$1,198.0	$1,546.2	$2,744.3

07/14/93

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

TABLE 3
1994 PROJECTS LISTED BY AGENCY

Agency	Cooperating Agency(s)	Project Number	Project Title	NEPA Cost*	Reprt/Intrm 1-Oct-93 - 31-Jan-94	Remaining 1-Feb-94 - 30-Sep-94	R/I + R Total FFY 94**
USFS	ADNR/DOI-FWS/ DOI-NPS	94007	Site Specific Archeological Restoration	$13.9	$26.5	$103.9	$130.4
	ADNR/DOI-FWS/ DOI-NPS	94015	Archeological Site Stewardship	$0.0	$0.0	$33.8	$33.8
		94043	Cutthroat & Dolly Habitat Restoration in PWS	$3.5	$0.0	$182.7	$182.7
	ADEC/ADF&G/ ADNR/DOI-FWS/ DOI-NPS	94110	Habitat Protection - Data Acquisition & Support	$0.0	$10.6	$14.5	$25.2
	ADNR/DOI-FWS/ DOI-NPS	94126	Habitat Protection & Acquisition Fund	$0.0	$103.7	$384.3	$488.0
	ADF&G	94139	Salmon Instream Habitat & Stock Restoration	$3.0	$0.0	$181.5	$181.5
	ADNR	94217	PWS Area Recreation Implementation Plan	$0.0	$44.2	$0.0	$44.2
	ADF&G	94259	Coghill Lake Sockeye Salmon Restoration	$0.0	$0.0	$134.3	$134.3
	ADEC/ADF&G/ ADNR/DOI-NPS/ NOAA	94266	Shoreline Assessment & Oil Removal	$0.0	$0.0	$12.1	$12.1
	ADNR/DOI-NPS	94386	Artifact Repositories - Planning & Design	$0.0	$0.0	$11.3	$11.3
	ADNR	94419	Leave No Trace Educational Program	$0.0	$0.0	$161.9	$161.9
		94420	Recreation Information Center at Portage	$0.0	$0.0	$100.8	$100.8
	ADF&G/DOI-FWS	94505	Information Needs for Habitat Protection	$0.0	$194.1	$0.0	$194.1
	ADEC/ADNR/DOI	940ED	Executive Director's Office	$0.0	$932.3	$109.0	$1,041.3
	ADEC/ADF&G/ ADNR/DOI/NOAA	940FC	Finance Committee	$0.0	$11.2	$25.8	$36.9
	ADEC/DOI	94PAG	Public Advisory Group	$0.0	$21.4	$6.9	$28.4
	ADEC/ADF&G/ ADNR/DOI/NOAA	940RT	Restoration Team Support	$0.0	$209.8	$405.8	$615.6
			USFS Total	$20.4	$1,553.7	$1,868.6	$3,422.4

07/14/94

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

TABLE 3
1994 PROJECTS LISTED BY AGENCY

Agency	Cooperating Agency(s)	Project Number	Project Title	NEPA Cost*	Reprt/Intrm 1-Oct-93 - 31-Jan-94	Remaining 1-Feb-94 - 30-Sep-94	R/I + R Total FFY 94**
DOI-FWS	ADNR/USFS/ DOI-NPS	94007	Site Specific Archeological Restoration	$0.0	$12.1	$0.0	$12.1
	ADNR/USFS/ DOI-NPS	94015	Archeological Site Stewardship	$0.0	$0.0	$25.7	$25.7
		94020	Black Oystercatcher Interaction with Intertidal	$0.0	$17.3	$131.6	$148.9
		94039	Common Murre Population Monitoring	$0.0	$26.9	$200.2	$227.2
		94040	Reduce Disturbance Near Injured Murre Colonies	$0.0	$0.0	$44.8	$44.8
		94041	Introduced Predator Removal from Islands	$0.0	$0.0	$146.6	$146.6
		94102	Murrelet Prey & Foraging Habitat in PWS	$0.0	$0.0	$231.5	$231.5
	ADEC/ADF&G/ ADNR/USFS/ DOI-NPS	94110	Habitat Protection - Data Acquisition & Support	$0.0	$8.5	$35.1	$43.6
	ADNR/USFS/ DOI-NPS	94126	Habitat Protection & Acquisition Fund	$0.0	$81.6	$163.6	$245.2
		94159	Marine Bird & Sea Otter Boat Surveys	$0.0	$146.2	$140.0	$286.2
	ADF&G/NOAA	94163	Forage Fish Influence on Injured Species	$0.0	$0.0	$55.8	$55.8
		94173	Pigeon Guillemot Recovery Monitoring	$0.0	$0.0	$201.1	$201.1
	ADF&G/NOAA	94199	Alaska Marine Research Institute	TBD****	$0.0	TBD****	TBD****
	DOI-NPS	94246	Sea Otter Recovery Monitoring	$0.0	$207.4	$211.3	$418.7
	ADF&G/USFS	94505	Information Needs for Habitat Protection	$0.0	$74.5	$0.0	$74.5
		94506	Pigeon Guillemot Recovery	$0.0	$13.9	$0.0	$13.9
			DOI-FWS Subtotal	$0.0	$588.3	$1,587.3	$2,175.5
DOI-NPS	ADNR/USFS/ DOI-FWS	94007	Site Specific Archeological Restoration	$0.0	$91.5	$21.3	$112.8
	ADNR/USFS/ DOI-FWS	94015	Archeological Site Stewardship	$0.0	$0.0	$25.9	$25.9
	ADEC/NOAA	94090	Mussel Bed Restoration & Monitoring	$0.0	$19.5	$50.4	$69.9

07/14/93

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

****TBD = To Be Determined

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TABLE 3
1994 PROJECTS LISTED BY AGENCY

Agency	Cooperating Agency(s)	Project Number	Project Title	NEPA Cost*	Reprt/Intrm 1-Oct-93 - 31-Jan-94	Remaining 1-Feb-94 - 30-Sep-94	R/I + R Total FFY 94**
DOI-NPS (cont.)	ADEC/ADF&G/ ADNR/USFS/ DOI-FWS	94110	Habitat Protection - Data Acquisition & Support	$0.0	$0.0	$0.0	$0.0
	ADNR/USFS/ DOI-FWS	94126	Habitat Protection & Acquisition Fund	$0.0	$0.0	$0.0	$0.0
	ADNR	94216	Gulf of Alaska Recreation Plan Development	$0.0	$0.0	$85.0	$85.0
	ADEC/ADF&G/ ADNR/USFS/ NOAA	94266	Shoreline Assessment & Oil Removal	$0.0	$0.0	$51.3	$51.3
	ADNR/USFS	94386	Artifact Repositories - Planning & Design	$0.0	$0.0	$8.3	$8.3
			DOI-NPS Subtotal	$0.0	$111.0	$242.2	$353.2
	ADEC/ADNR/ USFS	940ED	Executive Director's Office	$0.0	$0.0	$0.0	$0.0
	ADEC/ADF&G/ ADNR/USFS/ NOAA	940FC	Finance Committee	$0.0	$5.0	$10.7	$15.7
	ADEC/USFS	94PAG	Public Advisory Group	$0.0	$42.2	$81.4	$123.6
	ADEC/ADF&G/ ADNR/USFS/ NOAA	940RT	Restoration Team Support	$0.0	$102.3	$169.7	$272.0
			DOI Subtotal	$0.0	$149.5	$261.8	$411.3
			DOI Total	$0.0	$848.7	$2,091.2	$2,940.0

07/14/94

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

TABLE 3
1994 PROJECTS LISTED BY AGENCY

Agency	Cooperating Agency(s)	Project Number	Project Title	NEPA Cost*	Reprt/Intrm 1-Oct-93 - 31-Jan-94	Remaining 1-Feb-94 - 30-Sep-94	R/I + R Total FFY 94**
NOAA	ADF&G	94066	Harlequin Duck Recovery Monitoring	$0.0	$34.4	$0.0	$34.4
		94083	Monitoring of Oiled & Treated Shorelines	$0.0	$0.0	$616.6	$616.6
	ADEC/DOI-NPS	94090	Mussel Bed Restoration & Monitoring	$0.0	$138.6	$216.1	$354.6
		94092	Killer Whale Recovery Monitoring	$0.0	$33.7	$129.5	$163
		94147	Comprehensive Monitoring Program	$0.0	$0.0	$112.9	$112.9
	ADF&G/DOI-FWS	94163	Forage Fish Influence on Injured Species	$0.0	$0.0	$455.4	$455.4
	ADF&G	94166	Herring Spawn Deposition & Reproductive Impairment	$0.0	$25.9	$161.0	$186.9
	ADF&G	94191	Oil Related Egg & Alevin Mortalities	$0.0	$161.3	$212.9	$374.2
	ADF&G/DOI-FWS	94199	Alaska Marine Research Institute	TBD****	$0.0	TBD****	TBD****
	ADEC/ADF&G/ ADNR/USFS/ DOI-NPS	94266	Shoreline Assessment & Oil Removal	$0.0	$0.0	$12.1	$12.1
	ADF&G	94279	Subsistence Food Safety Testing	$0.0	$54.0	$92.2	$146.2
	ADEC/ADF&G	94285	Subtidal Sediment Recovery Monitoring	$0.0	$209.4	$178.0	$387.3
		94290	Hydrocarbon Data Analysis & Interpretation	$0.0	$74.7	$55.5	$130.2
	ADF&G	94320	Ecosystem Study Plan	$0.0	$25.0	$2,475.0	$2,500.0
	ADEC/ADF&G/ ADNR/USFS/DOI	940FC	Finance Committee	$0.0	$10.2	$22.5	$32.7
	ADEC/ADF&G/ ADNR/USFS/DOI	940RT	Restoration Team Support	$0.0	$144.2	$236.6	$380.
			NOAA Total	$0.0	$911.2	$4,976.2	$5,887.5
			Total	$45.4	$7,657.8	$26,681.6	$34,339.4

07/13/93

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

****TBD = To Be Determined

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Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

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Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94007	Site Specific Archeological Restoration			
		ADNR	$230.4	
		USFS	$130.4	
		DOI-FWS	$12.1	
		DOI-NPS	$112.8	
		Project Total	$485.6	
94015	Archeological Site Stewardship			
		ADNR	$132.4	
		USFS	$33.8	
		DOI-FWS	$25.7	
		DOI-NPS	$25.9	
		Project Total	$217.7	
94020	Black Oystercatcher Interaction with Intertidal			
		DOI-FWS	$148.9	
		Project Total	$148.9	
94039	Common Murre Population Monitoring			
		DOI-FWS	$227.2	
		Project Total	$227.2	
94040	Reduce Disturbance Near Injured Murre Colonies			
		DOI-FWS	$44.8	
		Project Total	$44.8	
94041	Introduced Predator Removal from Islands			
		DOI-FWS	$146.6	
		Project Total	$146.6	
94043	Cutthroat & Dolly Habitat Restoration in PWS			
		USFS	$182.7	
		Project Total	$182.7	

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94064	Harbor Seal Habitat Use and Monitoring			
		ADF&G	$270.2	
		Project Total	$270.2	
94066	Harlequin Duck Recovery Monitoring			
		ADF&G	$252.5	
		NOAA	$34.4	
		Project Total	$286.9	
94068	Deposit Sand to Promote Clam Recruitment			
		ADF&G	$36.4	
		Project Total	$36.4	
94070	Restoration of High Intertidal Fucus			
		ADF&G	$285.8	
		Project Total	$285.8	
94081	Recruitment Monitoring of Littleneck Clams			
		ADF&G	$206.7	
		Project Total	$206.7	
94083	Monitoring of Oiled & Treated Shorelines			
		NOAA	$616.6	
		Project Total	$616.6	
94086	Herring Bay Experimental & Monitoring Studies			
		ADF&G	$729.4	
		Project Total	$729.4	
94090	Mussel Bed Restoration & Monitoring			
		NOAA	$354.6	
		ADEC	$350.2	
		DOI-NPS	$69.9	
		Project Total	$774.8	

Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94092	Killer Whale Recovery Monitoring			
		NOAA	$163.1	
		Project Total	$163.1	
94102	Murrelet Prey & Foraging Habitat in PWS			
		DOI-FWS	$231.5	
		Project Total	$231.5	
94110	Habitat Protection - Data Acquisition & Support			
		ADNR	$450.8	
		ADEC	$0.0	
		ADF&G	$128.4	
		USFS	$54.7	
		DOI-FWS	$60.8	
		Project Total	$694.8	
94126	Habitat Protection & Acquisition Fund			
		ADNR	$317.1	
		ADF&G	$10.4	
		USFS	$496.5	
		DOI-FWS	$253.8	
		Project Total	$1,077.8	
94137	Stock ID of Chum, Sockeye, Chinook & Coho in PWS			
		ADF&G	$261.6	
		Project Total	$261.6	
94139	Salmon Instream Habitat & Stock Restoration			
		USFS	$181.5	
		ADF&G	$391.1	
		Project Total	$572.6	
94147	Comprehensive Monitoring Program			
		NOAA	$112.9	
		Project Total	$112.9	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94159	Marine Bird & Sea Otter Boat Surveys			
		DOI-FWS	$286.2	
		Project Total	$286.2	
94163	Forage Fish Influence on Injured Species			
		NOAA	$455.4	
		ADF&G	$95.4	
		DOI-FWS	$55.8	
		Project Total	$606.6	
94165	Herring Genetic Stock Identification in PWS			
		ADF&G	$62.2	
		Project Total	$62.2	
94166	Herring Spawn Deposition & Reproductive Impairment			
		ADF&G	$279.4	
		NOAA	$186.9	
		Project Total	$466.3	
94173	Pigeon Guillemot Recovery Monitoring			
		DOI-FWS	$201.1	
		Project Total	$201.1	
94184	Coded Wire Tag Recoveries from Pinks in PWS			
		ADF&G	$244.4	
		Project Total	$244.4	
94185	Coded Wire Tagging of Wild Pinks for Stock ID			
		ADF&G	$286.0	
		Project Total	$286.0	
94187	Otolith Marking - Inseason Stock Separation			
		ADF&G	$179.7	
		Project Total	$179.7	

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**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94189	Pink Salmon Stock Genetics in PWS			
		ADF&G	$171.2	
		Project Total	$171.2	
94191	Oil Related Egg & Alevin Mortalities			
		ADF&G	$408.8	
		NOAA	$374.2	
		Project Total	$782.9	
94192	Evaluation of Hatchery Straying on Wild Pinks in PWS			
		ADF&G	$640.5	
		Project Total	$640.5	
94199	Alaska Marine Research Institute			
		ADF&G	TBD****	
		USFS	TBD****	
		DOI-FWS	TBD****	
	****To Be Determined	Project Total	TBD****	
94200	Public Land Access 17(b) Easement ID			
		ADNR	$38.1	
		Project Total	$38.1	
94216	Gulf of Alaska Recreation Plan Development			
		DOI-NPS	$85.0	
		ADNR	$79.6	
		Project Total	$164.6	
94217	PWS Area Recreation Implementation Plan			
		USFS	$44.2	
		ADNR	$47.0	
		Project Total	$91.2	
94237	River Otter Recovery Monitoring			
		ADF&G	$156.7	
		Project Total	$156.7	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:28 AM

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94241	Rockfish Management Plan Data Development			
		ADF&G	$233.2	
		Project Total	$233.2	
94244	Seal & Otter Co-op Subsistence Harvest Assistance			
		ADF&G	$54.5	
		Project Total	$54.5	
94246	Sea Otter Recovery Monitoring			
		DOI-FWS	$418.7	
		Project Total	$418.7	
94255	Kenai River Sockeye Salmon Restoration			
		ADF&G	$406.1	
		Project Total	$406.1	
94258	Sockeye Salmon Overescapement			
		ADF&G	$854.9	
		Project Total	$854.9	
94259	Coghill Lake Sockeye Salmon Restoration			
		ADF&G	$189.8	
		USFS	$134.3	
		Project Total	$324.1	
94266	Shoreline Assessment & Oil Removal			
		ADEC	$860.5	
		ADF&G	$12.1	
		ADNR	$25.3	
		USFS	$12.1	
		DOI-NPS	$51.3	
		NOAA	$12.1	
		Project Total	$973.3	

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Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94272	Chenega Chinook Release Program			
		ADF&G	$57.4	
		Project Total	$57.4	
94279	Subsistence Food Safety Testing			
		ADF&G	$233.0	
		NOAA	$146.2	
		Project Total	$379.2	
94280	Spot Shrimp Survey & Juvenile Shrimp Habitat ID			
		ADF&G	$232.2	
		Project Total	$232.2	
94285	Subtidal Sediment Recovery Monitoring			
		NOAA	$387.3	
		ADEC	$21.4	
		ADF&G	$220.4	
		Project Total	$629.2	
94290	Hydrocarbon Data Analysis & Interpretation			
		NOAA	$130.2	
		Project Total	$130.2	
94316	Shoreline Trash Cleanup			
		ADNR	$35.7	
		USFS	$2.9	
		Project Total	$38.6	
94320	Ecosystem Study Plan			
		NOAA	$2,500.0	
		ADF&G	$2,500.0	
		Project Total	$5,000.0	
94345	Salmon Spawning Escapement on the Lower Kenai Pn			
		ADF&G	$219.2	
		Project Total	$219.2	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

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Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94386	Artifact Repositories - Planning & Design			
		ADNR	$223.8	
		USFS	$11.3	
		DOI-NPS	$8.3	
		Project Total	$243.3	
94417	Waste Oil Disposal Facilities			
		ADEC	$232.2	
		Project Total	$232.2	
94419	Leave No Trace Educational Program			
		USFS	$161.9	
		ADNR	$5.8	
		Project Total	$167.7	
94420	Recreation Information Center at Portage			
		USFS	$100.8	
		Project Total	$100.8	
94421	Common Property Salmon Stock Restoration			
		ADF&G	$5,336.8	
		Project Total	$5,336.8	
94422	Restoration Plan NEPA Compliance			
		USFS	$184.0	
		ADF&G	$50.4	
		DOI	$62.8	
		NOAA	$19.9	
		Project Total	$317.0	
94423	Oil Spill Public Information Center			
		ADEC	TBD****	
		ADF&G	TBD****	
		Project Total	TBD****	
	****To Be Determined			

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Dollar Amounts are shown in thousands of dollars.

**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Public Advisory Group 1994 Work Plan Recommendations
Projects Listed in Numerical Order

DRAFT

Project Number	Project Title	Agency(s)	Requested FFY 94**	PAG Recommendation and Comments
94504	Genetic Stock ID of Kenai River Sockeye			
		ADF&G	$262.2	
		Project Total	$262.2	
94505	Information Needs for Habitat Protection			
		USFS	$194.1	
		ADF&G	$137.5	
		DOI-FWS	$74.5	
		Project Total	$406.0	
94506	Pigeon Guillemot Recovery			
		DOI-FWS	$13.9	
		Project Total	$13.9	
940ED	Executive Director's Office			
		ADEC	TBD****	
		ADF&G	TBD****	
		ADNR	TBD****	
		USFS	TBD****	
		DOI	TBD****	
		NOAA	TBD****	
	****To Be Determined	Project Total	TBD****	
		TOTAL	$29,182.8	

Dollar Amounts are shown in thousands of dollars.
**Federal Fiscal Year 1994 (October 1, 1993 - September 30, 1994)

Printed: 1/11/94 8:53 AM

Exxon Valdez Oil Spill

Public Advisory Group and Alternates

December 1993

Member	Mailing Address	Work Telephone Home Telephone FAX	Principal Interest
Rupert E. Andrews	9416 Long Run Drive Juneau, AK 99801	hm (907) 789-7422	Sport Hunting & Fishing
alternate: None			
Pamela Brodie	Sierra Club 241 E. 5th Ave., Suite 205 Anchorage, AK 99501	wk (907) 276-4048 fx (907) 258-6807	Environmental
alternate: Eric Myers	6710 Potter Heights Anchorage, AK 99516	hm (907) 345-3366	
James L. Cloud	P.O. Box 201014 Anchorage, AK 99520-1014	wk (907) 265-2816 fx (907) 265-2141	Public-at-Large
alternate: will delegate a current PAG member			
James Diehl	Knik Canoers and Kayakers Box 868 Girdwood, AK 99587	wk (907) 783-2708	Recreation Users
alternate: Sarah Cronk	P.O. Box 927, Davos Road Girdwood, AK 99587-0927	hm (907) 783-2835	
Richard I. Eliason	P.O. Box 143 Sitka, AK 99813	wk (907) 747-6276 hm (907) 747-3322 fx (907) 747-5807	Public-at-Large
alternate: will delegate to Jim Cloud or Vern McCorkle			

Exxon Valdez Oil Spill

Public Advisory Group and Alternates

December 1993

Member	Mailing Address	Work Telephone Home Telephone FAX	Principal Interest
Donna Fischer	City of Valdez P.O. Box 395 Valdez, AK 99686	wk (907) 835-4437 fx (907) 835-2992	Local Government
alternate: Dave Beck	P.O. Box 3416 Valdez, AK 99686	wk (907) 835-3789 fx (907) 835-3792	
John French	Fishery Industrial Technology Center University of Alaska Fairbanks 900 Trident Way Kodiak, AK 99615	wk (907) 486-1505 fx (907) 486-1540	Science/Academic
alternate: Brenda Norcross	Institute of Marine Science School of Fisheries and Ocean Sciences 200 O'Neil Building Fairbanks, AK 99775-1090	wk (907) 474-7990 fx (907) 474-7204	
Vacant		wk fx	Public-at-Large
alternate: Donald McCumby	154 View Avenue Fairbanks, AK 99712	hm (907) 457-5617	
James G. King	1700 Branta Road Juneau, AK 99801	hm (907) 789-7540	Conservation
alternate: George Matz	14345 Cody Circle Anchorage, AK 99516	hm (907) 345-3139	

Exxon Valdez Oil Spill

Public Advisory Group and Alternates

December 1993

Member	Mailing Address	Work Telephone Home Telephone FAX	Principal Interest
Richard A. Knecht	Kodiak Area Native Association 402 Center Avenue Kodiak, AK 99615	wk (907) 486-1992 fx (907) 486-2763	Subsistence
alternate: Dolly Reft	3011 Spruce Cape Road Kodiak, AK 99615	hm (907) 486-8564	
Vern C. McCorkle	8811 Arlene Street Anchorage, AK 99502	wk (907) 276-4373 hm (907) 243-3627 fx (907) 279-2900	Public-at-Large
alternate: will delegate to a current PAG member			
Gerald McCune	P.O. Box 372 Cordova, AK 99574	wk (907) 424-3447 fx (907) 424-3430 fx (206) 321-6474	Commercial Fishing
alternate: Mary McBurney	P.O. Box 464 Cordova, AK 99574	wk (907) 424-3447 hm (907) 424-3557 fx (907) 424-3430	
John C. McMullen	Prince William Sound Aquaculture Corp. P.O. Box 1110 Cordova, AK 99574	wk (907) 424-7511 fx (907) 424-7514	Aquaculture
alternate: Dan Warren	821 N Street, #101B Anchorage, AK 99501	wk (907) 274-6066 fx (907) 274-1959	

Exxon Valdez Oil Spill

Public Advisory Group and Alternates

December 1993

Member	Mailing Address	Work Telephone Home Telephone FAX	Principal Interest
E. Bradford Phillips	Phillips Cruises & Tours P.O. Box 100034 Anchorage, AK 99510-0034	wk (907) 276-8023 fx (907) 276-5315	Commercial Tourism
alternate: Bill Elander	1600 A Street, Suite 200 Anchorage, AK 99501-5162	wk (907) 276-4118 fx (907) 278-5559	
John L. Sturgeon	Koncor Forest Products 3501 Denali, Suite 202 Anchorage, AK 99503	wk (907) 562-3335 hm (907) 345-2299 fx (907) 562-0599	Forest Products
alternate: Kimberley Benton	621 West 90th Avenue Anchorage, AK 99515	wk (907) 522-2163 fx (907) 349-9394	
Charles Totemoff	Chenega Corp. 3333 Denali Street, Suite 220-H Anchorage, AK 99503	wk (907) 277-5706 hm (907) 573-5118 fx (907) 279-6862	Native Landowners
alternate: Gail Evanoff	Chenega Corp. P.O. Box 60 Chenega Bay, AK 99574-0060	wk (907) 573-5118 fx (907) 573-5135	
Llewellyn W. Williams Jr.	755 Grant Street Ketchikan, AK 99901	wk (907) 225-3157 fx (907) 225-1096 hm/fx (907) 225-5431	Public-at-Large
alternate: Sharon Gagnon	7001 Tree Top Circle Anchorage, AK 99516	hm (907) 346-2592 fx (907) 346-3625	

Exxon Valdez Oil Spill

Public Advisory Group and Alternates

December 1993

Member	Mailing Address	Work Telephone Home Telephone FAX	Principal Interest
Ex-Officio Members			
Cliff Davidson	112 Millbay Road Kodiak, AK 99615	wk (907) 486-8250 wk (907) 465-2487 fx (907) 561-7060	Alaska State House
Drue Pearce	716 West Fourth Avenue, Suite 510 Anchorage, AK 99501-2133	wk (907) 258-8185 wk (907) 465-4993 fx (907) 258-0226	Alaska State Senate
Designated Federal Officer			
Douglas L. Mutter	1689 C Street, Room 119 Anchorage, AK 99501-5126	wk (907) 271-5011 hm (907) 345-7726 fx (907) 271-4102	Department of the Interior
alternate: Pamela Bergmann	1689 C Street, Room 119 Anchorage, AK 99501-5126	wk (907) 271-5011 fx (907) 271-4102	Department of the Interior

14.2.9 D

Exxon Valdez Oil Spill Public Advisory Group

Actions Approved November 23, 1993

1. The Public Advisory Group requests that the Trustee Council prepare a status report on approved projects and distribute it to the PAG from time to time. For example, what is the status of the Kodiak Archeological Repository project?

2. The Pubic Advisory Group requests information about the Trustee Council's comprehensive habitat evaluation and protection process and information about how many letters of interest went to landowners.

3. The Public Advisory Group requests that the Trustee Council release detailed information justifying past reimbursements, and any future reimbursement requests, of funds to State and Federal agencies. It is noted that at least 20% of the settlement funds went to reimbursements with little explanation as to what these expenses were.

4. The Public Advisory Group requests Trustee Council approve its officers for FY1994. The present officers were re-elected by unanimous vote to fill their positions for the next year: Chairperson: Brad Phillips, Vice-Chairperson: Donna Fischer.

5. The Public Advisory Group requests the Trustee Council consider the PAG recommendations regarding the establishment of an endowment to carry on restoration and related work past the year 2001 (see attached Endowment for Restoration and Monitoring of Injury from the Exxon Valdez Oil Spill).

6. The Public Advisory Group requests that the Trustee Council make the suggested changes to the Draft Restoration Plan and provide the additional information requested (see attached Recommendations for the November 17, 1993 Review Copy Draft Restoration Plan).

7. The Public Advisory Group recommends the Trustee Council use the principles identified in the attached "Statement of Some Principles for Evaluation of EVOS Work Plans and for Their Implementation" in evaluating work plans and that these principles be incorporated into the Restoration Plan.

ENDOWMENT FOR RESTORATION AND MONITORING OF INJURY FROM THE *EXXON VALDEZ* OIL SPILL

I. Purpose

The Endowment is established for the purposes of restoration, enhancement, or replacement of resources injured by the *Exxon Valdez* oil spill, restoration services dependent on those resources, and monitoring of the injured ecosystems to assess the effectiveness of restoration activities. The estimated recovery times for several injured species exceeds the duration of the Exxon payments. In addition, the natural variability in the injured ecosystems is large and poorly documented. Specific activities should include long-term restoration activities and those requiring initiation after 2001, monitoring of both specific restoration activities and ecosystem interactions through food webs and the natural dynamics of Prince William Sound and the Gulf of Alaska. Systematic study of the affected ecosystems is needed to assess the natural variability within the system and the degree the natural cycles are affecting the recovery of the injured resources and the services dependent on them. Activities supported by the endowment will be consistent with the EVOS Restoration Plan.

II. Relationship to Damaged Resources and Services

The environment of the northern Gulf of Alaska and the fish species in it display numerous inter-annual and inter-decadal cycles. A large part of the variation in water temperature can be accounted for by a 18.6 year cycle. The damage, restoration and recovery of damaged resources must be assessed in the context of this changing background. To fully understand the extent of injury and to facilitate recovery it is critical to understand the species in the context of the ecosystem they depend on for survival and recovery.

A. Pink Salmon, Herring and Sockeye Salmon

The pink salmon and herring returns of 1990-1993 are a good example of how poorly fisheries scientists and managers understand the factors controlling the health of these fish populations. Although the initial estimates of recovery times were short (2-3 years), current estimates, among those who believe there were population level effects, are a decade or more. It is highly likely that other factors have played a major role in the catastrophic pink salmon and herring returns to prince William Sound in 1993 besides damage from the oil spill. It will take a rigorous, systematic plan implemented over several years to untangle this ecosystem puzzle.

B. Birds (Black Oystercatchers, Murres, Harlequin Ducks, Marbled Murrelets, and Pigeon Guillemots)

While nesting habitat may be critical to some injured populations, such as marbled murrelets, the availability of quality food sources may be a limiting factor for species feeding at sea or in the intertidal. It is necessary to improve understanding of food webs and ecosystem

dynamics to enhance prospects of recovery. Predicated recovery times are expected to be long, on the order of decades. Therefore, necessary monitoring will extend beyond 2001.

C. Marine Mammals (Harbor Seals, Killer Whales and Sea Otters)

Harbor seals and Stellar sea lions have been experiencing a steady decline since before the oil spill. Numbers of killer whales outside Prince William Sound are not accurately known. Broad ecosystem studies and analysis of food webs are necessary in order to assess the health of these populations and the course of restoration. Although sea otter ecology is better understood, restoration will still be a long process requiring monitoring beyond 2001.

D. Services

1. Commercial, Sports and Subsistence Fishing. Commercial fishing, including fishermen, processors and non-profit aquaculture associations, were all injured by the oil spill. Some injury, such as loss of markets due to unpredictable returns, is impossible to accurately assess. Recovery from other injury should accompany recovery of commercial stocks.

2. Recreations Use and Tourism. Passive use of the oil spill affected area is highly dependent on the overall health of ecosystems. Increased understanding of the interdependence of the species in Prince William Sound and the northern Gulf of Alaska should enhance the recovery of use by all passive users.

III. Establishing the Endowment

The PAG did not reach a consensus on the amount of money that should be placed into an endowment or how money should be placed into an endowment--legal questions are left to government lawyers to sort out. Two specific options are (there could be other ways to accomplish the end goal):

The Endowment would be established over the course of the next eight years by encumbering $30,000,000 per year from the civil settlement for immediate and long- range activities. Seven million dollars would be used in each of the eight years, with the remaining $23,000,000 being placed in a restricted account to form an endowment. After the first eight years, when the Endowment's principal would be approximately $184,000,000 plus earnings, the program would be supported by earnings from the endowment. *[PAG endowment subgroup discussed a limited duration for the endowment. The group felt the duration could be limited to approximately twice the length of major ecosystem cycles (14-19 years). With this limitation to 30-40 years the total funding for the endowment could be reduced.]*

OR

An endowment of $100 million should be established to carry work forward beyond 2001.

IV. Managing the Endowment Fund

A. Investment

The Endowment funds would be held and invested by the University of Alaska Foundation according to the standards followed in investing the Foundation's other restricted funds. The UA Foundation has an excellent tract record in managing investments -- out performing other State investments to a significant degree. Management fees would be limited to the commercially competitive rate.

B. Expenditures

Earnings from the fund would be used exclusively to support the purposes of the Endowment, and in accordance with the Endowment Activities Plan and the Administrative rules of the Endowment.

V. Organization and Process

The PAG did not attempt to develop a detailed organization or set of operating procedures for the endowment. The group did agree that the following general principles are important to the management of the endowment.

A. Management

The process must recognize the role of the EVOS Trustees as required by the consent decree. The process should minimize the establishment of new bureaucracy. The process should include regional marine research groups and local communities affected by the Exxon Valdez Oil Spill empowered to develop regional restoration plans and help evaluate specific research projects.

B. Restoration Planning

The endowment activities should be directed by a rolling restoration plan which is consistent with the overall EVOS Restoration Plan. The restoration program should take an ecosystem approach. The plan should look forward five to ten years and be up-dated every two years to assure the continued focus of restoration and monitoring activities. The plan should also set in perspective how the endowment investments relate to the other activities in the area which affect the recovery and restoration of the natural resources of the EVOS affected region, take into consideration the needs of the local communities, industries, and the broader citizen interests in the region and its ecosystem, and reflect sound resource management and scientific principles.

C. Restoration and Monitoring Project Review

Projects proposing either applied or basic research should be submitted for a two step review process; a review of how well the proposed research targets the priorities of the plan, and a scientific peer review. Scientific peer review should be done by an open peer review process using unpaid reviewers. The concept of a Chief Scientist is unnecessary and should be abandoned.

Exxon Valdez Oil Spill Public Advisory Group

Recommendations for the November 17, 1993
Review Copy Draft Restoration Plan

The following suggested changes were passed unanimously, except where noted otherwise.

1. Page 9, Habitat Acquisition and Protection paragraph, second and third sentence, change to read:

   "On existing public land within the spill area, it may include recommendations for changing agency management practices. Protecting and acquiring land may minimize further injury to resources and services, and may allow recovery to continue unimpeded." **it is important to focus on lands within the spill area and some activities do not always cause further injury.**

2. Page 11, number 3, first two sentences, change to read:

   "Primarily restoration activities will occur within the spill area. Only limited restoration activities outside the spill area, but within Alaska, may be considered under the following conditions:" **vote was 12 to 2 in favor**

   and the second bullet, change to read:

   "when the information acquired from research and monitoring activities outside the spill area will be significant for restoration or understanding injuries within the spill area." **the focus of effort should be within the spill area**

3. Page 11, number 7, change to read:

   "Restoration projects will be subject to open, independent, uncompensated scientific review before Trustee Council approval." **a truly objective review will occur when no money changes hands, as is the case with most scientific peer review activities**

4. Page 11, number 8, change to read:

   "Meaningful public participation in, and review of, restoration decisions will be actively solicited." **more active public involvement in planning and oversight is needed**

5. Page 12, number 1, fourth paragraph, second sentence change to read:

   The ecosystem monitoring and research program will provide an understanding of the physical and biological interactions which affect an injured resource or service to facilitate more effective restoration and management." **more clearly explains the results**

6. Page 15, number 8, title, change to read:

"Meaningful public participation in, and review of, decisions will be actively solicited." **see comment in number 4, above**

7. Page 16, number 9, last two sentences, delete. **do not want to encourage agency budget enhancement nor have them go beyond their legislative authorities**

8. Page 20, second paragraph, first sentence, change to read:

"Resource development such as harvesting timber or building subdivisions may alter habitat that supports resources or services." **vote was 11 to 3 in favor--"harm" is a value judgement and it depends upon the resource**

9. Page 20, second paragraph, second sentence, change to read:

Protecting and acquiring land may minimize further injury to resources and services already injured by the spill, and to allow recovery to continue with the least interference." this is not an absolute, so do not use "will"

10. Page 20, seventh paragraph, last sentence, change to read:

"For example, protecting salmon spawning streams benefits not only salmon, but also commercial, subsistence and recreational fishermen." **do not want to assume there is no protection now**

11. Page 20, eighth paragraph, last sentence, change to read:

"The Trustee Council may conduct studies within the spill areas to determine if changes to public land and water management would help restore injured resources and services." keep focus in the spill area

12. Page 21, add this as a last bullet:

"Subsistence use should not be displaced through acquisitions or protection of lands or changing management practices." **do not want to adversely affect traditional uses by subsistence groups who were also impacted by the spill**

13. Page 25, first paragraph, last sentence, change to read:

"The Public Information and Administration category includes these and other day-to-day public information functions such as responding to public inquiries, and seeking local opinions and advice." want to emphasize the participation of local interests

14. Page 28, Restoration Strategy, second paragraph, last sentence, change to read:

"However, if a resource is not expected to recover fully on its own or if waiting for natural recovery will cause long-term harm to a community or service, alternate means of restoration would be undertaken." **vote was 11 to 2 in favor--want to emphasize the need for action, not just consideration**

15. Page 29, Resources not Recovering, Sockeye salmon (Kenai River), no change required at this time: **request a review by the Trustee Council to determine if the population is not coming back, according to ADF&G estimates--move to "recovering" status**

16. Page B-10, Sitka Black-tailed Deer, no change required at this time: **recommend the Trustee Council scientists re-examine the conditions of this species, local input suggests a decline in the population**

17. Page C-1, add the following footnote:

"State and Federal governments will purchase lands on the basis of a willing seller and willing buyer. The above list of areas were recommended by the public. Some of the areas listed may not be available for purchase or protection." **clarifies what this list contains, that not all of these areas are for sale**

Exxon Valdez Oil Spill Public Advisory Group

Statement of Some Principles
for Evaluation of EVOS Work Plans
and for Their Implementation

The Public Advisory Group recommends the Trustee Council use the following principles in evaluating work plans and that these principles be incorporated into the Restoration Plan.

1. The plan should be designed to minimize administrative costs within individual projects.

2. The plan should seek to maximize coordination of logistical operations among projects to minimize costs.

3. The plan should combine projects with similar restoration objectives.

4. The plan should use external RFPs and external review of final proposals where possible.

5. The plan should use local individuals and Alaskan organizations where cost effective.

Passed November 23, 1993 by unanimous vote

Meeting Summary

A. GROUP: Exxon Valdez Oil Spill Public Advisory Group (PAG)

B. DATE/TIME: November 23, 1993

C. LOCATION: Anchorage, Alaska

D. MEMBERS IN ATTENDANCE:

Name	Principal Interest
Rupert Andrews	Sport Hunting and Fishing
Pamela Brodie	Environmental
Jim Diehl	Recreation Users
Donna Fischer	Local Government
John French	Science/Academic
Sharon Gagnon (for Williams)	Public-at-Large
James King	Conservation
Vern McCorkle	Public-at-Large
Mary McBurney (for McCune)	Commercial Fishing
John McMullen	Aquaculture
Ken Erickson (for Pearce)	Alaska State Senate
Brad Phillips, Chair	Commercial Tourism
Kim Benton (for Sturgeon)	Forest Products
Dolly Reft (for Knecht)	Subsistence
Charles Totemoff	Native Landowners

E. NOT REPRESENTED:

Name	Principal Interest
James Cloud	Public-at-Large
Cliff Davidson (*ex officio*)	Alaska State House
Richard Eliason	Public-at-Large
Don McCumby (alternate)	Public-at-Large

F. OTHER PARTICIPANTS:

Name	Organization
Jim Ayers	Executive Director, EVOS Restoration Team
Michael Castellini	Univ. of Alaska Fairbanks
Willard Dunham	AK SeaLife Center
L.J. Evans	Restoration Team Staff
Dave Gibbons	Restoration Team Interim Administrative Director
Dane Harris	
Willie Hensley	NANA
Bill Hines	National Oceanic & Atmospheric Administration

Dan Hull	Prince William Sound Fisheries Ecosystem Research Planning Group
Karen Klinge	U.S. Forest Service
Karen Kroon	Prince William Sound Tourism Coalition
Bob Loeffler	AK Dept. Envir. Conservation
Jerome Montague	Restoration Team AK Dept. Fish and Game
Joyce Murphy	AK SeaLife Center
Doug Mutter	Designated Federal Officer Dept. of the Interior
Eric Myers	Alaska Center for the Environment
Ken Rice	Restoration Team U.S. Forest Service
Sandy Rabinowitch	National Park Service
Leif Selkregg	Heery International
Darryl Shaefermeyer	AK SeaLife Center
Lewis Stackpole	???
Ray Thompson	U.S. Forest Service

G. SUMMARY:

The meeting was opened at 9:00 a.m. by Chairperson Brad Phillips. The July 15-16, 1993 meeting summary was accepted. Dave Gibbons distributed a summary of the August 6 & 9, 23, September 16-17, and October 27, 1993 Trustee Council meetings (attachments J.7, 8, 9, 10). Gibbons introduced the new permanent Executive Director for the Restoration Office, Jim Ayers.

John French reported on the Endowment Work Group recommendations. The question of legality of an endowment was raised--it was recommended that the PAG not be concerned about legal ambiguities at this time, but that they present their concept to the Trustee Council and request that the Trustee Council obtain legal opinion. The subject was postponed to the afternoon session, when the Work Group proposal was modified and passed (13 for, 2 (Pamela Brodie and Jim Diehl) against) (see attachment J.2).

Charles Totemoff moved (second by Diehl) that the Preliminary Statement of Principles for Evaluation of EVOS Work Plans that was postponed at the July 1993 meeting of the PAG be passed on to the Trustee Council. The Statement was modified and passed unanimously (see attachment J.3).

French moved (second by Mary McBurney) to defer recommendations about projects for the 1994 Work Plan until the PAG had the full 1994 Work Plan before them for discussion (probably in January) (passed unanimously).

Diehl raised a question about the RFP and proposal process used for the killer whale project in 1993. It appeared that changes were made during the process that precluded local Alaskan scientists from participating in the scientific elements of the study. (See also attachment J.6). The issue was tabled until discussion of the 1994 Work Plan projects.

Bob Loeffler and Sandy Rabinowitch presented an overview of the review copy of the Draft Restoration Plan. This interim draft is for informal review and for use in determining 1994 projects. It is anticipated that a draft environmental impact statement will be prepared and a formal public review will occur in 1994. The plan presents general guidelines and policies, not detailed allocations of effort. After questions, answers, and discussion, specific recommendations for change were made (see attachment J.4). Some general comments made during discussion:

--will need to present alternatives and response to public comments during the EIS process

--need more information about how reimbursements were spent

--how can you allow the price of land to exceed fair market value?

--we should limit this plan to those actions approved by the court in the settlement

--this says very little about what will be done, or won't be done--there is no action identified

Darryl Shaèfermeyer, Michael Castellini and Joyce Murphy presented information and answered questions about the proposed Alaska SeaLife Center in Seward (see attachment J.5).

Brodie moved (second by Benton) that the PAG request that the Trustee Council release detailed information justifying past reimbursements, and any future reimbursement requests, of funds to State and Federal agencies (passed unanimously). It was noted that at least 20% of the settlement funds went to reimbursements with little explanation as to what these expenses were.

The meeting was opened for public comment at 4:40 p.m. Testimony was presented by Karen Kroon (see attachment J.11), Dan Hull, and Charles McKee (see attachment J.12).

McCorkle moved (second by McMullen) that there be unanimous consent to retain the current officers (Chair: Brad Phillips, Vice-Chair: Donna Fischer) of the PAG for the next year (passed unanimously).

The PAG members were invited to offer comments on issues and concerns. King moved (second by Fischer) to send a letter of appreciation to Dave Gibbons (passed unanimously). Benton moved (second by Fischer) that a status report on approved projects be prepared and distributed to the PAG from time to time (passed unanimously). For example, what is the status of the Kodiak Archeological Repository project? McCorkle offered appreciation of the efforts of PAG members to review the Review Copy Draft Restoration Plan on such a short time-frame. Fischer offered appreciation to the endowment Work Group for their efforts.

The meeting adjourned at 5:20 p.m. on November 23, 1993.

H. FOLLOW-UP:

1. John French will present a summary of PAG actions at the November 30, 1993 Trustee Council meeting, since the Chairperson will be out of town at that time.

2. Mutter will meet with Ayers to determine when the 1994 Work Plan will be ready for review and will then contact Phillips about when the next PAG meeting should be.

3. Mutter will distribute to the PAG the comprehensive habitat protection process description and information about the number of landowners contacted.

I. NEXT MEETING: To be determined.

J. ATTACHMENTS:

1. Summary of PAG actions taken November 23, 1993
2. Endowment for Restoration and Monitoring
3. Recommended changes to the Review Copy Draft Restoration Plan
4. Statement of Some Principles for Evaluation of EVOS Work Plans and for Their Implementation

Handouts attached for those not present:

5. Alaska SeaLife Center Information
6. Nancy Lethcoe letter on killer whale project
7. Summary of August 6 & 9, 1993 Trustee Council Meeting
8. Summary of August 23, 1993 Trustee Council Meeting

9. Summary of September 16 & 17, 1993 Trustee Council Meeting
10. Summary of October 27, 1993 Trustee Council Meeting
11. Prince William Sound Tourism Coalition letter and recreation project list
12. McKee handouts
13. Example and blank travel itinerary forms for PAG members

K. CERTIFICATION:

_____ _____

PAG Chairperson **Date**

OCT 13 REC'D

DEC 30 1993

RECEIVED

Charles E. McKee 14.2.9C
7800 DeBarr Rd E #63
Anch, Ak 99504

1506 W 43rd #7
Anch, Ak 99504
c/o Bobby Bowman

To: Honorable Senater
Ted Steven's

This is pertaining to Bills S. 422 & H.R. 618 on my copyright TXu 545 416 aimed at reforming the $4 trillion government bond market that finances the national debt and the "authority" that I now have! My assertion is pursuant to common law on page 854 under Sources and Scope §4 Christianity, Commerce again under §1. Nature & grounds of power B. §2. What constitutes commerce. (a) page #658 and on page 2028. Municipal Corpotions, please see §2000. Payment (a) (Col. 1858) under act May 1, 1851 plus Federal Statutes a Verdict Apr. 20. 1871 on Conspiracy to influence; right of action of injured party book 17 page 23-25 please pay close attention SEC. 6. of page 15. The other public records of me and my aparent "retroactive" "harassment" against me is just a percentage of same as you know "U.S. Dis Court case #87-356 c.m. that your office tryed too help me with.

Please assert back to me my authority when amplifying my educational requisition, to all of the U.S. Senate

10-13-1993

Sincerely
Charles E. McKee 12:54 noon
Charles E. McKee 12-30-93 3:30 pm

3AN 4972 civil
State of Ak

14.2.9 B

14.2.9 B

Status Report: 1993 *Exxon Valdez* Oil Spill Restoration Projects

(incorporating comments of the Chief Scientist)

DRAFT

No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Administration			**$4,135.8**	**$1,434.6**			
93AD	Administrative Director's Office		$1,702.2	$425.8	Ongoing.	Not applicable.	None.
93FC	Financial Committee		$105.2	$36.5	Ongoing.	Not applicable.	None.
93RT	Restoration Team Support		$2,328.4	$972.3	Ongoing.	Not applicable.	None.
Archaeological Resources			**$1,760.1**	**$14.3**			
93006	Site Specific Archaeological Restoration	ADNR USFS DOI	$260.1	$14.3	Fieldwork is complete. Report is under preparation and expected to be submitted 1/15/94.	Not available.	
93066	Alutiiq Archeological Repository	ADEC	$1,500.0	$0.0	About to issue grant to Kodiak Area.Native Association for construction of the facility.	Facility expected to open in early 1995.	None.

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14.2.9 B

14.2.9 B

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DRAFT

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Ecosystems			**$1,913.1**	**$1,207.7**			
93036	Oiled Mussel Beds	DOI NOAA	$404.8	$155.7	Report in preparation. Continuation of R103.	Identified 27 mussel beds with total petroleum hydrocarbons greater than 10,000 mg/g wet weight. Minimally intrusive site manipulation was conducted at three heavily oiled mussel beds.	B11, CH1B, R71 and 93033.
93039	Herring Bay Experimental and Monitoring	ADFG	$507.5	$452.1	Draft report due by end of February 1994.	Recovery patterns and rates continued to be monitored and studied experimentally. Recruitment and growth rates of organisms at oiled and unoiled sites were studied relative to currents to test the hypothesis that oil tended to ground on the most productive coastal locations.	B11, CH1A, and R103.
93047	Subtidal Monitoring	ADEC ADFG NOAA	$1,000.8	$599.9	Draft final report on 1989-1991 and 1993 due on 6/30/94.	As a follow-up to previous studies from 1989-1991, the numbers and activity of oil-degrading microorganisms were measured in sediments collected in 1993. Preliminary results suggest some contamination remains in subtidal sediments. However, generally very low numbers and activities were found where visible oil was present (e.g., subsurface sediments, Northwest Bay). These results support the hypothesis that populations of oil-degrading microorganisms are good indicators of the presence of biodegradable (e.g., relatively "fresh") oil in Prince William Sound. 1993 infaunal samples have been processed and analyses are underway. Epifauna appears reduced from previous years. Sea urchins are more abundant. Hemosderosis in fishes from oiled sites.	ST1A, ST1B and 93053.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Fish/Shellfish			**$2,816.5**	**$915.4**			
93002	Sockeye Salmon Overescapement	ADFG	$714.6	$275.8	1993 field data collection completed. Laboratory analysis approximately 50% completed. Final 1993 progress report will be submitted in March 1994.	1993 Kenai smolt demonstrated continued high overwintering mortality with less than 500,000 smolt estimated to migrate, while Tustumena Lake produced approximately 9 million smolt. Red and Akalura lakes demonstrated poor smolt production on Kodiak Island. Fall 1992 Tustumena and Skilak Lake dry fat content support poor nutrition going into winter as probable cause of mortality in Skilak Lake. Adult 1992 returns to the Kenai River were consistent with smolt estimates. However, primary age class of the 1989 brood year will return in 1994 and will determine accuracy of smolt estimates. (Recent improvement in forecasted returns for 1994.)	93012 and 93015 provide information useful in managing expected low returns to the Kenai River in 1994-1996.
93003	Salmon Egg to Pre-emergent Fry Survival	ADFG NOAA	$686.0	$361.6	Report being revised. Continuation of R60C. Expected to continue into 1994 and 1995.	Oil exposures completed for 1992 and 1993 brood years. Spawning of surviving adults is scheduled for September 1994 with possible long-term damage to genetics and survival of progeny to be determined in early 1995. Persistence of elevated embryo mortalities in oiled streams in 1992 indicate possible genetic damage to wild pink salmon populations from the *Exxon Valdez* oil spill. Preliminary laboratory studies support the genetic hypothesis. Additional laboratory studies demonstrate dose response of pink salmon embryos when incubated in gravel exposed to crude oil from the *Exxon Valdez*.	R60AB and R60C. 93067 provides fisheries managers with information critical for protecting these chronically damaged wild pink salmon populations from overexploitation in commercial fisheries.
93012	Genetic Stock Identification of Kenai River Sockeye Salmon	ADFG	$300.6	$68.1	Report being drafted.	Genetic data were collected during 1992 and 1993 from spawning populations contributing to mixed-stock harvest of sockeye salmon in Cook Inlet. These data were used in a pilot study to estimate the component of Kenai River stocks harvested in mixed-stock areas of Upper Cook Inlet.	Collection of spawning samples is being conducted by study 93015.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
93015	Kenai River Sockeye Salmon Restoration	ADFG	$512.6	$124.0	Draft report due 3/31/94.	Successful collection of baseline and fishery genetic samples. Successful inseason hydroacoustic survey of Upper Cook Inlet by subcontractor.	Genetic samples analyzed by 93012.
93024	Restoration of Coghill Lake Sockeye Salmon Stock	ADFG USFS	$191.9	$31.8	Lake fertilization completed for 1993 season. Lake morphology completed.	Monitoring showed the need for modifying both the type and concentrations of fertilizer.	None.
93032	Cold Creek Pink Salmon Restoration (NEPA Compliance)	ADFG	$5.0	$0.0	Final report completed.	Cost:benefit analysis showed project to be marginal.	R105.
93063	Anadromous Stream Surveys	ADFG USFS	$59.4	$36.3	Report for R105 is being revised.	This project was funded only for retrieving stream thermometers and completion of report for R105, not for field work. See R105 status report.	R105.
93067	Pink Salmon Coded Wire Tag Recovery	ADFG	$220.0	$10.5	Report being reviewed.	Reduced commercial exploitation of damaged wild pink salmon populations through timely inseason estimates of hatchery and wild contributions to harvest. Accurate and timely stock composition estimates were used by fisheries managers to justify restriction of fishing fleet to areas where interception of damaged wild populations in mixed-stock fisheries could be minimized.	93003 demonstrated chronic damage to wild pink salmon populations in western Prince William Sound.
93068	Non-Pink Salmon Coded Wire Tag Recovery	ADFG	$126.4	$7.3	Report being drafted.	Timely and accurate inseason estimates of hatchery and wild stock contributions to commercial harvest for improved management of wild stocks in mixed-stock fisheries.	93024 is designed to restore the natural population of sockeye salmon from Coghill Lake.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Marine Mammals			**$652.5**	**$163.4**			
93042	Killer Whale Recovery	NOAA	$127.1	$106.0	Report being drafted.	AB pod number has increased by one (a calf) to a total of 26. The 14 missing pod members were not present in 1993.	None.
93043	Sea Otter Demographics and Habitat	DOI	$291.9	$0.0	Field work and data collected complete; data analylsis and report writing ongoing. Reports will be completed 3/1/94. Habitat component dropped.	Aerial survey of sea otters in Prince William Sound completed Summer 1993; estimated abundance is approximately 18,000. Age distribution of sea otter carcasses recovered in Spring 1993 in western Prince William Sound is similar to prespill distribution. Age- and sex-specific survival rates generated from carcass data for sea otters in Prince William Sound.	
93046	Habitat Use, Behavior, and Monitoring of Harbor Seals in PWS (NEPA Compliance)	ADFG	$233.5	$57.4	Progress report has been completed.	Counts of seals at 25 trend sites in Prince William Sound were similar during pupping and molting in 1992 and 1993. However, 1993 pupping counts were 23% lower than in 1989. Molting counts were similar to 1989 postspill counts, but 27% lower than 1988 counts. Sixteen seals satellite-tagged since 1992 indicate that seals in central Prince William Sound haul out and feed near the same sites with little movement to other areas. Feeding usually occurs in depths of 100-200 meters, with a maximum recorded dive depth of 404 meters.	No related restoration projects. However, ADFG is conducting similar studies in southeast Alaska and near Kodiak.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Multiple Resources			**$40,494.3**	**$677.9**			
93038	Shoreline Assessment	ADEC ADNR ADFG NOAA USFS DOI	$539.2	$197.3	Report being drafted. Results presented to the Trustee Council 11/30/93.	Surface oil has become stable. Subsurface oil has decreased substantially since 1991. Oiling is discontinued throughout the study site.	93036
93041	Comprehensive Monitoring	NOAA	$237.9	$0.0	Request for proposals withheld by Trustee Council.	Not applicable.	All monitoring projects.
93045	Marine Bird / Sea Otter Surveys	DOI	$262.4	$0.0	Draft report in internal Fish and Wildlife Service review.	Overall marine bird population estimates in Prince William Sound have not changed significantly since 1989, but were 41% lower than 1972-1973 estimates. Rates of increase of goldeneyes and surfbirds were higher in the unoiled zone of Prince William Sound than in the oiled zone, whereas oystercatchers increased more rapidly in the oiled zone.	93033, 93034, 93035, and 93043.
93051	Stream Habitat Assessment and Habitat Information for Murrelets	ADFG USFS DOI	$1,222.3	$185.8	This is the second and final year of the project. It is a continuation of R47. Draft report on habitat information for murrelets is in internal Fish and Wildlife Service review. First draft report on stream habitat assessment is being revised.	Late season surveys, sites at the heads of bays, low elevations, high percentages of forest cover, and large trees were all consistent predictors of high murrelet activity. Radar performed better than humans in detecting murrelets and was cheaper than boat-based or ground-based surveys by humans. About 995 km of shoreline and 117 km^2 of uplands were surveyed for anadromous fish streams on private lands on the lower Kenai Peninsula and in Prince William Sound, resulting in discovery of 186 anadromous streams totaling about 57 km. Stream habitat parameters were collected along all streams, upper extents of anadromous distribution were documented and streams were mapped by GPS.	Information will be integrated into the restoration GIS (93062) and supplement 93033. Also related to 93045.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
93053	Hydrocarbon Database	NOAA	$105.5	$81.5	Report being drafted. Continuation of ST8.	Analyzed several thousand environmental samples, provided numerical correlations directly related to oil, and assessed associations of observed biological effects with concentrations of *Exxon Valdez* oil.	ST8, TS1 and TS3.
93057	Damage Assessment GIS	ADNR	$67.5	$55.6	Completed. No report necessary.	Provided mapping and database support for damage assessment studies. Cataloged and plotted over 160 maps for public access at OSPIC.	Supported numerous damage assessment projects, including B11, FS13, AW1, and CH1A.
93059	Habitat Identification Workshop	USFS	$42.3	$23.0	Final report completed.	Identified parcels of nonpublic land containing critical habitat necessary for the recovery of injured resources and services.	93046, 93051, 93059, 93063, 93064, and 93065.
93060	Accelerated Data Acquisition	USFS	$43.9	$42.9	Project completed. Data collected.	Collected and organized existing resource data needed for the analysis of private lands in the oil spill area.	93046, 93051, 93059, 93063, 93064, and 93065.
93062	Restoration GIS	ADNR	$123.3	$28.8	Completed. No report necessary.	Provided technical mapping and database support for restoration projects. Generated spill area map and land status maps for Kachemak Bay, Seal Bay, and Eyak lands.	Supported numerous restoration projects, including 93038, 93063, 93064 and R47.
93064	Imminent Threat Habitat Protection	ADNR ADEC USFS	$37,850.0	$63.0	Completed. The Comprehensive Habitat Protection process was reviewed at a workshop; recommendations were incorporated into the process.	Imminent Threat Evaluation and the first round of Large Parcel Evaluation were completed. $7.5 million from settlement funds were combined with $14.5 million from other sources for the purchase of private inholdings in Kachemak Bay. $29,950,000 was committed from the most recent court request for the initial payment for purchase of private land near Seal Bay on Afognak Island. The total purchase price of this transaction is $38,700,000 with the balance to be paid in three annual installments. References: "Opportunities for Habitat Protection/Acquisition" (2/16/93) and "Comprehensive Habitat Protection Process; Large Parcel Evaluation & Ranking, Volume I" (11/30/93).	Data sources: 93051, 93059, 93060, 93062, and 93063.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Seabirds			**$750.9**	**$102.8**			
93022	Monitor Murre Colony Recovery	DOI	$177.2	$0.0	Project report in preparation.	Murre productivity in the Barren Islands was 0.4 - 0.6 chicks per nest site in 1993, up from near zero in 1989. Population counts on plots were similar to or higher than in previous postspill years.	None.
93033	Harlequin Duck Restoration	ADFG	$300.0	$102.8	Draft final report in preparation. Completed habitat evaluation assistance.	Only 3 harlequin broods observed in western Prince William Sound; 14 in eastern Prince William Sound. Decreased numbers of harlequins molting in western Prince William Sound in July. Suspect incomplete gonadal development in prenesting western Prince William Sound harlequins. Blood/physiological analysis and hydrocarbon analyses in process. Harlequin breeding stream/nest site model in preparation. Harlequin breeding assessment completed on North Afognak Island.	CH1B, R71, R103, and 94159. Project 93036 documents continued oil in prey species. 93045 surveys corroborate harlequin status in Prince William Sound. 93053: hydrocarbon database for sea duck samples.
93034	Pigeon Guillemot Recovery	DOI	$165.8	$0.0	Draft report in review.	One hundred eighty-four colonies, concentrated in southwest Prince William Sound and in the Naked Islands were identified. Guillemots continue to decline in Prince William Sound from a high of 15,000 in 1970 to a present population of 3,000 - 4,900.	93045
93035	Black Oystercatchers / Oiled Mussel Beds	DOI	$107.9	$0.0	Draft report in revision prior to submission to Chief Scientist.	Growth rates of oystercatcher chicks were lower on oiled than unoiled nest sites. Some alphatic compounds were detected in 1992 fecal samples from oiled sites. Breeding pairs increased on oiled Green Island from 1992 to 1993 but decreased on Knight Island from 1991 to 1993.	93036 and 93045.

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Services			**$389.8**	**$155.8**			
93016	Chenega Bay Chinook and Silver Salmon (NEPA Compliance)	ADFG	$10.7	$0.0	Final document due to lead federal agency (NOAA) on 1/14/94.	Not applicable.	Not applicable.
93017	Subsistence Food Safety Survey and Testing	ADFG NOAA	$307.1	$144.1	Analysis of samples collected is ongoing.	First round of tests for hydrocarbon contamination of subsistence resources showed little or no contamination. Results of second round of testing are pending. The observations of abnormalities in the tested resources caused a shift in concerns of subsistence users from oil contamination to what effects these abnormalities have on these resources.	This project depends on information from all resource restoration projects as well as the shoreline oiling survey.
93065	Prince William Sound Recreation	ADNR USFS	$72.0	$11.7	Continued as 94217. Analysis of findings and final report being drafted.	Recreation Injury Statement (10/93) was incorporated into the Draft Restoration Plan. Recreation restoration projects for Prince William Sound were prioritized through a public consensus process; high priority projects were included in the Draft 1994 Work Plan.	Expansion to other areas: 94216. High priority recreation projects: 94266, 94316, 94419, and 94420.
	1993 TOTAL		**$52,913.0**	**$4,671.9**			

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Status Report: 1992 *Exxon Valdez* Oil Spill Restoration Projects

(incorporating comments of the Chief Scientist)

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Administration			**$5,076.1**	**$4,019.0**			
AD	Administrative Director's Office		$2,248.7	$1,943.7	Ongoing.	Not applicable.	
RT	Restoration Team		$2,827.4	$2,075.3	Ongoing.	Not applicable.	
Archaeological Resources			**$408.0**	**$242.3**			
ARC1	Archeological Survey	ADNR	$248.8	$118.7	Project is complete. Report peer reviewed and released.	See Reger, D.R., J.D. McMahon, and C.E. Holmes. 1992. Effect of Crude Oil Contamination on Some Archaeological Sites in the Gulf of Alaska, 1991 Investigations.	None.
R104A	Site Stewardship	ADNR USFS	$159.2	$123.6	Project is complete. Report awaiting final review.	Increased public knowledge of archaeological sites following the spill led to increased vandalism. A stewardship program to train local residents to protect cultural resources was developed. A site stewardship manual and field notebook were written.	None.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Ecosystems			**$2,042.3**	**$1,729.8**			
CH1B	Hydrocarbons in Mussels	NOAA	$51.4	$31.1	Report being drafted.	*Exxon Valdez* oil is located in oiled mussel beds. Mussels are concentrating the oil.	93036, B11, R71, and R103.
R102	Herring Bay Experimental and Monitoring Study	ADFG	$485.6	$324.3	Report being revised.	Cover of the dominant intertidal alga, *Fucus gardneri,* was reduced at oiled/cleaned sites. *Fucus* recruitment was poor in the mid- to upper intertidal, probably due to lack of shelter from desiccation and heating by adult plants. Limpet densities continued to be lower in the upper intertidal. Recovery appeared to be occurring in the lower intertidal zone in 1990-1991 and in the upper intertidal in 1993. Results have been incorporated into an interaction web to elucidate potential oil spill effects on community dynamics.	B11, CH1A, R103, and TM3.
R103	Oiled Mussels	ADFG NOAA DOI	$874.0	$879.8	Report being revised. Project continued as 93036.	Identified 27 mussel beds with total petroleum hydrocarbons greater than 10,000 mg/g wet weight. Minimally intrusive site manipulation was conducted at three heavily oiled mussel beds. black oystercatchers fed in oiled mussel beds. Chicks raised on oiled sites grew more slowly than chicks raised on unoiled sites. Differences in levels of blood haptoglobin and Interleukin-6 ir, which were previously found to be elevated in river otters inhabiting oiled compared to nonoiled areas in Prince William Sound, were not observed in Summer 1992. Additionally, river otters from oiled areas continued to regain body size from levels noted in 1990. This suggests that river otters may be recovering from chronic effects that were observed in 1990 and 1991. Consequently, no adverse effects in 1992 could be attributed to oiled mussel beds from areas where river otters were captured.	B11, B12, CH1B, R7, TM3, 93035 and 93036.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
ST1A	Subtidal Sediments	NOAA	$103.5	$96.5	Report being drafted.	Subtidal sediments have been found to be contaminated at no fewer than 15 sites within Prince William Sound by June 1990. Contamination had reached at least 20 meters at some sites. Evidence of hydrocarbon movement downslope into subtidal sediments was detected by 1991.	ST1B
ST1B	Subtidal Microbial	ADEC	$17.1	$3.2	Final report accepted.	The numbers and activity of oil-degrading microorganisms were measured in sediments periodically for two years after the oil spill. Populations of oil-degrading microorganisms were significantly higher in sediments collected at oiled sites relative to reference sites. This information is useful in establishing the extent of contamination of the oil with time and also provides evidence that biodegradation is occurring naturally in Prince William Sound.	93047
ST2A	Shallow Benthic	ADFG	$109.8	$68.9	Final report being revised.	At oiled sites there was a decrease in some subtidal organisms relative to unoiled sites. Partial recovery observed in 1991.	B11, CH1A, R103, and TM3. Provides population assessment information for 94320 (Ecosystem Study Plan).
ST2B	Deep Water Benthic	ADFG	$44.9	$54.0	Report being revised.	Analyses of 1990 data collected approximately 16 months after the oil spill indicate that the deep benthic environment within the spill region appeared healthy. It appears that movement of water within the region of the oil trajectory was sufficient to flush out toxic fractions, resulting in minimal damage to life at depths of 40 to >100 meters.	CH1A, ST1B, ST2A, ST4, ST5, ST6, ST7, ST8, and TS1.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
ST3A	Caged Mussels Damage Assessment	NOAA	$39.1	$24.2	Report being revised.	Mussels transplanted along spill trajectory accumulated particulated oil at concentrations that decreased with depth, elapsed time, and distance from heavily oiled beaches. In 1990 and 1991, low concentrations of polynuclear aromatic hydrocarbons were sporadically detected at locations adjacent to heavily oiled beaches. Petroleum hydrocarbons were detected only sporadically in mussels deployed in locations outside Prince William Sound in 1989.	ST3B.
ST3B	Sediment Traps Damage Assessment	ADEC	$50.9	$24.5	Report being drafted.	The subtidal sediment trap study demonstrated that oiled particulated matter derived from oil-impacted beaches in Prince William Sound contaminated adjacent subtidal sediments. The study further showed that the transfer rate of oil from beach to subtidal sediment was highest the year following the spill, and declined steadily thereafter.	ST3A and ST4.
ST7	Demersal Fishes Damage Assessment	NOAA	$60.4	$55.1	Report being reviewed.	Results show continuing exposure of several benthic fish species and pollock, suggesting continuing petroleum contamination of subtidal sediments, water and food in 1990 and 1991 at sites up to 400 miles from the spill origin.	ST1A
ST8	Sediment Data Synthesis	NOAA	$205.6	$168.2	Report being drafted. Project continued as 93053.	Analyzed several thousand environmental samples, provided numerical correlations directly related to oil, and assessed associations of observed biological effects with concentrations of *Exxon Valdez* oil.	TS1, TS3, and 93053.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
Fish/Shellfish			**$5,531.9**	**$3,756.3**			
FS1	Spawning Area Injury	ADFG	$64.3	$32.8	Report being drafted (combined with R60B).	Documented oil contamination of Prince William Sound pink salmon spawning area. Improved current and historic pink salmon escapement estimates which are necessary for accurate estimates of total wild returns. For preliminary results, see 1989, 1990 and 1991 NRDA Drafts Status Reports.	FS1, FS2, FS3, FS4A, and FS4B measured oil damages to specific life stages. FS28 incorporated their results into a model to estimate population level damages.
FS11	Herring Injury	ADFG	$303.6	$212.2	Report being revised.	Adult herring migrating to the spawning grounds in 1989 were exposed to oil. Exposure to oil continued throughout 1989 and into 1990. Internal tissues were damaged but the short- and long-term effects are speculative. There may have been a short-term effect which inhibited egg deposition and a long-term reproductive impairment (reduced survival of offspring). Eggs were deposited in oiled areas in 1989. Larvae hatched from exposed embryos suffered reduced survival.	None.
FS13	Effects of Hydrocarbons on Bivalves	ADFG	$75.8	$51.8	Report being revised.	This study needs more extensive analyses of the data on which the conclusions are based and proper interpretations of the results.	Clams are an important prey for ducks, sea otters, river otters, and bears. This study is related to studies of these species.
FS2	Pre-emergent Fry	ADFG	$29.3	$11.4	Final report being reviewed.	Measured higher embryo mortalities in oil-contaminated streams than in unoiled streams.	FS1, FS2, FS3, FS4A, and FS4B measured oil damages to specific life stages. FS28 incorporated their results into a model to estimate population level damages.

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FS27	Sockeye Salmon Overescapement	ADFG	$630.0	$354.6	Report accepted.	Approximately ten- to fifteenfold reduction in Kenai River smolt when compared to brood year 1987. Reduced smolt production from Akalura and Red Lakes, Kodiak Island. Reduced harvests for the Kenai are forecast for 1994 with returns below escapement levels possible for 1995 and 1996. Minimal harvests of Kenai River sockeye salmon are likely. Reduced harvest are forecast for Red and Akalura Lakes for 1994 through 1996. See Schmidt, D.C. and K.E. Tarbox. 1993. Sockeye Salmon Overescapement. State/Federal Natural Resource Damage assessment Status Report. FRED Technical Report 136. 65 pp.; and Schmidt, D.C., J.P. Koenings, and G.B. Kyle. In press. Predator induced changes in diet vertical migration of copepods in Skilak Lake, Alaska; a hypothesis to explain the decrease in overwinter survival of juvenile sockeye salmon (Onchorhynchus *nerka*). In GUTSHOP Proceedings.	R53 acquired new information to facilitate management of anticipated reduced future runs. R113 examined potential for hatchery-reared fry in Red Lake, but forecasted returns make the project unfeasible.
FS28	Run Reconstruction	ADFG	$250.6	$126.4	Report being revised.	Estimated losses to adult populations from oil damages to early life stages at 2 to 3 million in 1990, and 40 to 70 thousand in 1991. Projected losses of 100 to 200 thousand adults in 1993 and 1994.	Through this project, results from FS1, FS2, FS3, FS4A and FS4B were incorporated into a model to estimate population level damage.
FS3	Coded-Wire Tags Damage Assessment	ADFG	$126.7	$38.7	Final report being reviewed.	Unable to detect significant differences in survival to adults from fry emerging from oiled and control streams. Also unable to detect significant difference in survival of hatchery fish reared in oiled versus unoiled areas of Prince William Sound.	FS1, FS2, FS3, FS4A, and FS4B measured oil damages to specific life stages. FS28 incorporated their results into a model to estimate population level damages.

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FS30	Database Management	ADFG	$202.5	$151.1	Report accepted.	Software was written to provide access to fish harvest database using the ADFG commercial fisheries Wide-Area Network (WAN). Procedures were implemented to provide reports in numerous database, spreadsheet, and statistical formats. Documentation and guidelines for using the harvest database were completed. WAN capability is now available between Juneau, Cordova, Anchorage, Kodiak, Soldotna, and Homer. See DiCostanzo, C. and B.P. Simonson. 1993. Database Management. Final Report, State/Federal Natural Resource Damage Assessment. 14 pp.	This database provides a repository for all NRDA and restoration projects information.
FS4A	Early Marine Salmon Damage Assessment	ADFG	$145.2	$99.1	Report being revised.	Detected reduced growth and survival of fry rearing in oiled areas in 1989. No significant differences in growth and survival between oiled and nonoiled areas in subsequent years. Rate of adult returns to unoiled hatcheries twice that of oiled hatcheries in 1990.	FS1, FS2, FS3, FS4A, and FS4B measured oil damages to specific life stages. FS28 incorporated their results into a model to estimate population level damages.
FS4B	Juvenile Pinks	NOAA	$119.4	$121.6	Revised report in review.	Documented exposure and contamination of juvenile salmon in Prince William Sound. Contamination was associated with reduced growth. Ingestion of oil or oiled prey was route of contamination.	FS4A, AW3, and ST3A.
FS5	Dolly Varden Damage Assessment	ADFG	$22.2	$4.2	Report being revised (combined with R90).	See R90.	
R105	Instream Survey Restoration Implementation Planning	ADFG	$348.1	$148.5	Final report in preparation.	Results of Cost:Benefit Study Implementation has been integrated and design planning has been completed. Awaiting construction funding. Cost:Benefit analysis for improved barrier bypass for Little Waterfall Creek on Afognak Island is positive.	Related projects: FS1, R47, 93024, 93032, and 93063. New project proposal: 94139.

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R106	Dolly Varden Restoration	ADFG	$34.9	$16.2	Final report being revised.	The nature and extent of injury to Dolly Varden and cutthroat trout was documented in FS5. The goal of R106 was to provide information for developing a management plan to protect impacted stocks, while allowing for continued recreational fishing for sport anglers where stocks could support fisheries. Sixty-one streams were surveyed to provide this information.	FS5, R106, and 94320 (Ecosystem Study Plan).
R113	Red Lake Sockeye Salmon Restoration	ADFG	$55.9	$54.3	Report being reviewed.	Red Lake does not need restoration effort but Ayakulik does.	FS27
R53	Kenai River Sockeye Salmon Restoration	ADFG	$674.2	$434.6	Report being revised.	Successful collection of baseline and fishery samples for genetic stock identification. Unsuccessful in choosing new adult inriver hydroacoustic equipment. Successful hydroacoustic enumeration of returning adult salmon in Upper Cook Inlet.	R59 analyzed genetic samples collected by this project.
R59	Genetic Stock Identification	ADFG	$320.9	$257.2	Report being revised.	Genetic data were collected during 1992 from spawning populations contributing to mixed-stock harvests of sockeye salmon in Cook Inlet. These data can be used to estimate the presence of Kenai River stocks in mixed-stock areas of Upper Cook Inlet.	R53 collected spawning samples.
R60AB	Prince William Sound Pink Salmon	ADFG	$1,479.7	$1,204.3	Final R60A report being revised. R60C report being drafted (combined with FS1).	The CWT program (R60A) helped reduce the commercial harvest on damaged pink salmon populations by providing fishery managers with timely inseason fishery stock composition estimates. The escapement project (R60B) provided improved pink salmon escapement information which was essential for the precise fisheries management required to protect damaged wild stocks.	R60C monitors and investigates mechanisms for oil damage to early life stages of pink salmon populations. R60AB allows fisheries managers to protect damaged stocks from overexploitation.

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R60C	Pink Salmon Egg/Fry	ADFG NOAA	$492.8	$369.9	Report being revised. Project continued as 93003. Expected to be continued into 1994 and 1995.	Oil exposures completed for 1992 and 1993 brood years. Persistence of elevated mortalities among embryos in oiled streams versus those in nonoiled streams suggests genetic damage. Spawning of surviving adults is scheduled for September 1994 with possible long-term genetic damage and survival of progeny to be determined in early 1995.	Related projects: B11, CH1B, R60AB, R103, 93003 and 93036.
R90	Dolly Varden Char Monitoring	ADFG	$91.5	$34.2	Report being revised (combined with FS5).	Two populations of Dolly Varden and cutthroat trout emigrated from lakes into the wake of the spill. Growth from 1989-1990 was 24% and 22% slower for recaptured subadult and adult Dolly Varden and 36% to 43% slower for subadult and adult populations of cutthroat trout in populations associated with the oil. This difference persisted through 1991 for cutthroat trout but not for Dolly Varden. Chronic starvation and direct exposure to petrogenic hydrocarbons were hypothesized as effects leading to reduced growth and accelerated mortality of both Dolly Varden and cutthroat trout.	R90 and R106 provide information on populations of Dolly Varden and cutthroat trout for 94320 (Ecosystem Study Plan).
ST5	Shrimp	ADFG	$47.7	$15.9	Report accepted.	Hydrocarbon analyses did not detect oil contamination with sampled spot shrimp. Shrimp collected in unoiled areas had more inflammatory gill lesions than did shrimp from the oiled area. These results indicate that oil contamination had little or no effect on spot shrimp. See Trowbridge, C. 1992. Injury to Prince William Sound Spot Shrimp. Final Report, State/Federal Natural Resource Damage Assessment. 83 pp. + appendices.	Relates to all other fish studies. Shrimp are a principal food source for fish and some whales.

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ST6	Rockfish Damage Assessment	ADFG	$16.6	$17.3	Final report being revised.	Oil was determined to be the cause of death for a small number of demersal rockfish in Prince William Sound. Dead and dying rockfish were reported from the spill area. Of the five fish that were fresh enough to be necropsied, exposure to crude oil was found to be the cause of death. These results prompted additional testing for hydrocarbons in live fish. These tests showed at least 11 of 36 rockfish tested from oiled sites had been exposed to oil within 2 weeks prior to testing. None of the 13 fish from unoiled sites were exposed to oil. Subsequent studies showed some indications of sublethal injuries to rockfish from exposure to oil.	ST2A and ST2B.
Marine Mammals			**$275.3**	**$231.9**			
MM1	Humpback Whales Damage Assessment	NOAA	$17.3	$13.6	Report being revised.	No documented injury.	None.
MM2	Killer Whales Damage Assessment	NOAA	$33.3	$23.9	Report accepted.	Whales missing from AB and AT pods. A total of 14 AB pod members lost from 1988-1990 due to unknown causes.	None.
MM6	Sea Otters Damage Assessment	DOI	$199.7	$191.9	Most reports being revised; some accepted.	Direct mortality was probably on the order of 4000 sea otters, and the majority of the mortality probably occurred within Prince William Sound. In late 1991, patterns of mortality, as reflected in a relatively high number of prime-age carcasses, were abnormal compared to prespill patterns. Surveys showed no increase in abundance, and juvenile survival was low in oiled areas of western Prince William Sound. Preliminary data from 1992-1993 indicate some improvement in survival of jeuvenile and middle-aged sea otters.	93043

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R73	Harbor Seals	ADFG	$25.0	$2.5	No final report for R73. A final report for MM5 is being reviewed.	Harbor seals continue to use heavily oiled haulouts even when unoiled sites were available nearby. They were observed to give birth and care for their pups on these sites. The pelage of both pups and adults became oiled when they used these sites or contacted oil in the water. however, the pelage became cleaner with time if they did not continue to use oiled sites. Many carcasses recovered were either stillborn or died shortly after birth. Observations suggest that stress and/or toxic effects of oil resulted in abortions, premature births, and increased mortalities in heavily oiled areas.	MM5
Multiple Resources			**$4,405.2**	**$2,982.1**			
AW1	Surface Oil Maps	ADEC	$17.0	$8.4	Report overdue.	Maps have been developed depicting the spread of oil on a daily basis for the first three months following the spill.	None
B2	Boat Surveys	DOI	$48.5	$58.4	Report being revised.	Populations of 9 species or species groups (black oystercatcher, pigeon guillemot, cormorants, harlequin duck, loons, scoters, newgull, arctic tern, northwestern crow) declined more than expected in the oiled zone of Prince William Sound suggesting an oil effect. Most injured species were ecologically tied to intertidal or nearshore areas.	93045
CH1A	Coastal Habitat Damage Assessment	USFS	$2,358.5	$1,454.7	Final report submitted and in review.	Serious and long-term lasting effects on intertidal algae. Recovery occurring but slow to none in upper intertidal habitat. Full recovery expected. Intertidal invertebrates indicate negative effects from spill. Intertidal fish findings were inconclusive.	B11, CH1A, FS13, R102, R103, MM6, R71, ST3A, TM3, TS1.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
R47	Stream Habitat Assessment	ADFG	$399.6	$323.9	Report accepted.	About 250 km of shoreline and 260 km^2 of uplands were surveyed for anadromous fish streams on private lands on Afognak Island, resulting in discovery of 167 anadromous streams totaling about 56 km. Stream habitat parameters and upper extents of anadromous distribution were documented, and streams were mapped by GPS. Kuwada, M. and K. Sundet. 1993. Stream Habitat Assessment Project: Afognak Island. Habitat and Restoration Division Technical Report No. 93-3, *Exxon Valdez* Restoration and Habitat Protection Planning. 104 pp.	R47 information was used in evaluating lands for habitat protection and to supplement habitat information for marbled murrelet and harlequin duck projects.
R92	GIS Mapping and Analysis: Restoration	ADNR DOI	$125.5	$105.7	Completed. No report necessary.	Provided mapping and database support for restoration projects. Developed timber harvest database and land status and parcel maps for imminent threat parcels. Contributed to a 3-volume data dictionary produced for the Trustee Council by the Nature Conservancy.	Supported numerous restoration projects.
ST4	Fate and Toxicity Damage Assessment	NOAA	$52.6	$53.2	Report returned for revision.	Results indicate that some toxicity was still associated in 1990 and 1991 with sediments from lower intertidal zones of heavily oiled sites. The fate of *Exxon Valdez* oil will include transformation of most constituents (through biodegradation and photooxidation) mainly into carbon dioxide and water, although some constituents may persist indefinitely.	AW4, ST1, ST2, ST3A, ST3B, ST7, TS1 and response studies.
TS1	Hydrocarbon Analysis	NOAA DOI	$1,028.3	$711.2	Report being reviewed.	Coordinated the chemical analysis of all samples collected by damage assessment studies to develop a single set of analytical data comparable across projects.	ST8 and TS3.
TS3	GIS Mapping and Analysis: Damage Assessment	ADNR DOI	$375.2	$266.6	Completed. No report necessary.	Provided mapping and database support for damage assessment projects.	Supported numerous damage assessment projects, including FS 4, FS13, CH1A and R47.

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Seabirds			**$1,398.2**	**$1,216.4**			
B11	Harlequin Ducks Damage Assessment Closeout	ADFG	$22.9	$21.7	Final report in second revision.	Petroleum exposure confirmed in four species of sea ducks. Hydrocarbons in food, liver and bile. Diverse intertidal prey used by ducks. Blue mussels are a key contaminated prey. 1990-1992 low harlequin breeding densities and negligible harlequin stream activity and production in western Prince William Sound. Report not yet accepted.	B2: status of populations. CH1B: contaminated prey. TS1: hydrocarbon analysis of food/tissues. Others: R71, and R103 (mussels), and 93036.
B12	Shorebirds Damage Assessment Closeout	DOI	$20.7	$11.4	Report revised and submitted for final approval. Revised report in review.	Spring migrant shorebirds (surfbirds and black turnstones) escaped impacts because shorelines used by these species (particularly around Montague Island) were largely unoiled. Black oystercatcher breeding was disrupted and hatching success reduced. Chicks raised on oiled beaches grew more slowly than chicks raised on unoiled beaches, perhaps due to ingestion of contaminated food.	R103 and 93035.
B3	Murres Damage Assessment Closeout	DOI	$75.7	$62.9	Report accepted.	Numbers were reduced, nesting was delayed, and productivity rates were far below normal at major colonies within the spill trajectory. Reproductive success improved slightly in 1991.	R11 and 93049.
B4	Eagles Damage Assessment Closeout	DOI	$60.6	$65.7	Report revised and submitted for final approval.	Reproductive success of Prince William Sound bald eagles was significantly impaired in 1989, and nest failures were correlated with the distribution of crude oil on beaches. Although estimated direct mortality throughout the spill area was relatively large (about 300 - 900 eagles), no change in the population could be detected due to wide variation in population counts. The Prince William Sound eagle population was expected to return to its prespill level by 1993.	None.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
B6	Marbled Murrelets Damage Assessment Closeout	DOI	$24.8	$23.4	Report being revised.	The marbled murrelet population at a site within the path of the oil (Naked Island) was lower in 1989 than in prespill years, but returned to normal in 1990. Murrelet numbers in Kachemak Bay where oiling was minimal did not change following the spill.	R15 and 93051B.
B7	Storm Petrels Damage Assessment Closeout	DOI	$7.5	$7.1	Report accepted.	At the largest storm-petrel colony within the spill trajectory (Barren Islands), no evidence of adverse effects to breeding petrels was found. Burrow occupancy rates were above average, nesting chronology was not delayed, and productivity was normal.	None.
B8	Kittiwakes Damage Assessment Closeout	DOI	$7.5	$5.1	Revised report in review.	The number of breeding pairs did not decline at colonies in the oiled area of Prince William Sound but reproductive success in 1989 was less than expected, apparently due to low hatching success. Reproductive success did not recover by 1992 but whether the decline was due to the spill is unknown.	None.
B9	Pigeon Guillemots Damage Assessment Closeout	DOI	$18.0	$37.0	Report being revised.	The population at a major breeding site within the spill trajectory (Naked Island) declined by 50% compared to 1972-1973 levels. The long-term decline predated the spill and, therefore, could not be attributed to the spill. Reproduction was largely normal following the spill.	93034
R11	Murre Recovery Monitoring	DOI	$316.7	$385.7	Report being revised.	Numbers of murres breeding at major colonies within the trajectory remained lower in 1992. Breeding chronology was delayed. Productivity at the Barren Islands was high than in other postspill years, but still lower than normal. Productivity at Puale Bay was normal	B3 and 93049.
R15	Marbled Murrelet Restoration Study	DOI	$419.3	$396.8	Annual progress report reviewed.	Using ground search techniques, 10 tree nests were found on Naked Island in 1991 and 1992. Nest trees were in stands of high volume and size class trees, and upland activity of murrelets throughout Prince William Sound was highest in such stands.	B6 and R15.

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No.	Title	Agencies	Amount Budgeted*	Amount Spent*	Status	Results and References	Related Projects
R71	Harlequin Duck Restoration and Monitoring	ADFG	$424.5	$199.6	Report being revised.	Comparative harlequin data in eastern Prince William Sound for B11. 1991-1992 harlequin production in eastern Prince William Sound similar to prespill. Techniques devised to capture and track harlequins. Breeding stream parameters and nest sites described. Additional oiled mussel beds identified.	B2 corroborated harlequin status in Prince William Sound. R103 documented continued oiled prey.
Terrestrial Mammals			**$74.0**	**$16.1**			
TM3	River Otter and Mink Damage Assessment in Prince William Sound	ADFG	$74.0	$16.1	Report being revised.	The results indicate that differences in home range, habitat selection, and latrine site abandonment, as well as changes in food habits, occured in river otters.	CH1B and R103.
	1992 Total		**$19,211.0**	**$14,193.9**			

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