

RPWG  
I

MEMORANDUM

CONFIDENTIAL

8 OCTOBER 1991

TO: RPWG  
FR: Stan

RE: Revised endpoints list

I have prepared a revised draft "endpoints" list, taking into account comments from five peer reviewers (Costa, Peterson, Siniff, Simonstad, and Roby). Please look these over and let me know of any comments or suggestions. Recall that we were planning to provide this to the Management Team in draft form before Friday's meeting.

Bear in mind that the species covered here only include those that were on the restitution list. Endpoints for some additional resources (e.g., coastal habitat) and services (e.g., recreation) need to be developed.

cc: David Street  
Bart Freedman  
Susan MacMullin  
Karen Klinge  
Robert Spies

Draft Working List of Restoration Endpoints<sup>1 2</sup>  
8 October 1991

sea otter

- minimize human disturbance
- protect/acquire marine and coastal habitats (e.g., sheltered coves, rich feeding areas)
- conduct research on population status/limiting factors<sup>3</sup> (e.g., contamination of prey) and develop restoration measures accordingly
- monitor recovery, including results of restoration actions

harbor seal

- minimize disturbance
- protect/acquire marine and coastal habitats
- conduct research on population status/limiting factors (e.g., competition for forage fish) and develop restoration measures accordingly
- monitor recovery, including results of restoration actions

common murre

- enhance productivity through manipulations at breeding colonies where murrens still nest or attempt to nest
- re-establish abandoned colonies and establish new colonies

---

<sup>1</sup>Restoration "endpoints" are generic goals for direct restoration, replacement, or acquisition of equivalent resources. For any given endpoint, there may be several different ways or options for obtaining the goal.

<sup>2</sup>Initially developed by the Legal Team (on 31 July) in the context of a restitution hearing in January.

<sup>3</sup>i.e., why is the population not recovering?

Privileged and Confidential  
Attorney Work Product  
Attorney-Client Communication

- minimize human disturbance at breeding colonies
- reduce predation
  - eliminate foxes and other introduced predators from breeding colonies
  - reduce/discourage avian "theft"<sup>4</sup> and predation of eggs and young
- protect/acquire marine and coastal habitats at and associated with breeding colonies
- monitor recovery, including results of restoration actions

marbled murrelet

- reduce incidental take of murrelets in gillnet fisheries
- maintain prey base and/or reduce competition for prey
- protect/acquire upland habitats (e.g., nesting)
- monitor recovery, including results of restoration actions

harlequin duck

- reduce human harvest
- eliminate sources of contaminated prey (e.g., mussel beds)
  - enhance productivity by providing artificial nest sites
- protect/acquire coastal and upland habitats (e.g., pre-breeding, nesting, and molting areas)
- monitor recovery, including results of restoration actions

---

<sup>4</sup>i.e., kleptoparasitism

Privileged and Confidential  
Attorney Work Product  
Attorney-Client Communication

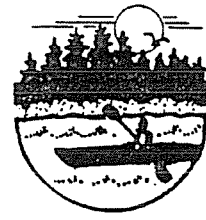
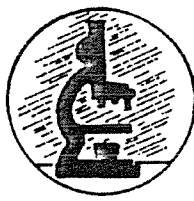
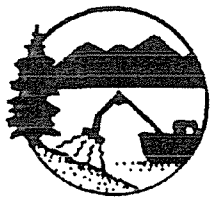
Dolly Varden/cutthroat trout

- reduce sport harvest
- redirect sport harvest to alternative streams
- enhance stream/lake habitats
- acquire access to alternative sport fishing streams
- protect/acquire coastal and upland habitats
- maintain water quality
- monitor recovery, including results of restoration actions

pink salmon

- refine management practices and adjust harvest levels to restore wild stocks and maintain genetic diversity
- enhance productivity through stream improvements (e.g., egg boxes, spawning channels, passes)
- maintain water quality
- protect/acquire upland and coastal habitats (e.g., anadromous streams)
- establish new/alternative stocks/species
- monitor recovery, including results of restoration actions

[SES:10/08/91:options.sum]



# OIL SPILL RESTORATION PLANNING OFFICE

---

437 E Street, Suite 301 Anchorage, Alaska 99501  
(907) 271-2461 FAX: (907) 271-2467

Privileged/Confidential\*\*Attorney Work Product\*\*Attorney-Client Communication

MEMORANDUM VIA FAX

13 SEPTEMBER 1991

TO: Restoration Peer Reviewers (see distribution)

FR: Stan Senner (ADF&G) *Stan Senner*

RE: Review of restoration endpoints

Recently we sent you a short list of restoration endpoints and invited comments on whether there should be changes to that list (memo & attachments dated 08/12). We had several responses, but are eager to hear from all of the peer reviewers who have participated in restoration meetings. I am enclosing another copy and invite your comments now.

There may have been some confusion about what the list represented: To clarify, its purpose is only to summarize the types of generic options or endpoints that we have identified that pass some minimal test of reasonableness. For purposes of our evaluation, we need to narrow the field to a short list of potential endpoints. In some cases, there may be several ways to reach these endpoints, or it may be that the endpoint is not readily attainable, but the listed endpoints at least should be worth further review. The list is not intended to describe specific restoration actions or projects; we are simply trying to weed out the endpoints that are obviously infeasible and/or inappropriate. (We also need to document why we are rejecting some endpoints, but that is a separate exercise.)

Please also note that only species which are considered to be priorities in the immediate context of a possible restoration case in a criminal restitution hearing are being considered. Other injured resources and species may be considered subsequently (e.g., coastal habitat).

Please indicate your comments in the margins of the list or summarize your thoughts separately, whichever is more convenient. I suggest faxing your response to RPWG at (907) 271-2467. The entire restoration group will appreciate your help with this request. May we hear from you by the close of business, Friday, 20 September?

attachment: 08/12 memo & list

distribution: D. Costa, M. Fry, P. Mundy, C. Simonstad, and D. Siniff

cc w/o attachment: B. Freedman, D. Street, and R. Spies

Privileged and Confidential  
Attorney Work Product  
Attorney-Client Communication

Working List of Generic Restoration Options<sup>1</sup>  
7 August 1991

Priority Spp. for possible January restitution hearing<sup>2</sup>

sea otter

- reduce harvest/incidental take
- minimize disturbance
- maintain prey base and/or reduce competition for prey
- eliminate sources of contaminated prey
- protect/acquire marine/coastal habitats (e.g., pupping areas)
- monitor recovery, including from restoration actions

common murre

- enhance productivity through manipulations at breeding colonies where murre still nest or attempt to nest
- re-establish abandoned colonies and establish new colonies
- minimize disturbance
- reduce predation
  - eliminate foxes and introduced predators from islands
  - reduce/discourage avian predators at colonies

---

<sup>1</sup>These generic restoration options might include specific actions which would be carried out as direct restoration, replacement, or acquisition of equivalent resources, or a combination of these.

<sup>2</sup>As determined by Legal Team on 31 July.

- protect/acquire marine/coastal habitats (e.g., breeding colonies)

- monitor recovery, including from restoration actions

harlequin duck

- reduce harvest from sport and/or subsistence hunting
- enhance productivity by providing artificial nest sites

- eliminate sources of contaminated prey

- protect/acquire coastal/upland habitats (e.g., nesting and moulting areas)

- monitor recovery, including from restoration actions

Dolly Varden/cutthroat trout

- reduce sport harvest

- redirect sport harvest to alternative streams

- maintain water quality

- enhance stream/lake habitats

- acquire access to alternative streams

- protect/acquire coastal/upland habitats

- monitor recovery, including from restoration actions

Secondary spp. for possible January restitution hearing<sup>3</sup>

harbor seal

- reduce harvest/incidental take

- minimize disturbance

- maintain prey base and/or reduce competition for prey

---

<sup>3</sup>As determined by Legal Team on 31 July.

- protect/acquire marine/coastal habitat
- monitor recovery, including from restoration actions

marbled murrelet

- maintain prey base and/or reduce competition for prey
- protect/acquire upland habitats (e.g., nesting )
- monitor recovery, including from restoration actions

pink salmon

- refine management practices and adjust harvest levels to restore wild stocks and maintain genetic diversity
- enhance productivity through stream improvements (e.g., egg boxes, spawning channels, passes)
- maintain water quality
- protect/acquire upland/coastal habitats (e.g., anadromous streams)
- establish new/alternative stocks and/or species
- monitor recovery, including from restoration actions

Other possibly relevant species and resources<sup>4</sup>

pigeon guillemot  
 black oystercatcher  
 coastal habitat  
 archaeology

[SES:08/07/91:options.sum]

---

<sup>4</sup>Pending further guidance from the Legal Team, these are currently are not among the species and resources for which restoration options for the restitution hearing in January. Restoration options, however, can be or have been developed for these species and resources.





UNIVERSITY OF MINNESOTA  
TWIN CITIES

Department of Ecology, Evolution and Behavior  
109 Zoology  
318 Church Street S.E.  
Minneapolis, Minnesota 55455  
(612) 625-4466  
Fax (612) 625-4490

2 October 1991

MEMORANDUM

TO: Stan Senner  
Alaska Department of Fish and Game

FROM: Don Siniff

RE: Review of Restoration "end of points"

In respect to the sea otter restoration options, I feel the most appropriate are: 1) minimize disturbance, 2) protect/acquire marine/coastal habitats (e.g. pupping areas), and 3) monitor recovery, including from restoration activities.

However, there are a few points regarding the above list that require some discussion. With respect to number 2 above, I think the e.g. "pupping areas" should be deleted. There are certain areas where females and pups occur more often than others, but I think it should be based on habitat characteristics. That is, use criteria such as those areas where the best prey base, shelters, coves, or other features exist. There may be a shifting from one area to another within a relatively short time frame if based on population characteristics.

For the option "monitoring recovery" I am not sure what the phrase "including from restoration actions" exactly means. If there will be actions which cause disturbance to the near shore community, then clearly this would impinge upon the sea otter recovery in that area. Activities along the shoreline, such as road construction or activities connected with development, would be detrimental to sea otters in that particular area. However, monitoring recovery Sound wide is very important. Certainly, the spill in the central portion of the Sound probably had influence on expansion into vacant habitat areas, particularly in the east and in the southwest. Continued collection of data on the population characteristics of sea otters, both in the oil spill area and in other areas of the Sound are needed if one is to understand the long term impacts of the spill on the sea otter Sound wide.

Stan Senner  
Page 2  
2 October 1991

The other options that are listed, I feel, are rather impractical. Reducing native harvest and/or incidental take is not a bad idea, but would probably require changes in the current legal structure. At the current time, these activities are probably slight within the Sound although under the current legal determinations, native harvest may increase. The details of the extent of native take, will probably have to be worked out within some type of a management framework. This is currently being talked about by the Fish and Wildlife Service, the native community, and the State of Alaska.

The two options involving, (1) maintaining prey base and reducing competition, and (2) eliminating sources of contaminated prey, I think are probably unrealistic. It would seem rather impractical to reduce competition for prey as this would require some manipulation of other species in the system. Certainly sea otters are very capable predators when it comes to exploiting the near shore community and I really do not know any species group that would necessarily be a very competent competitor. The idea of eliminating sources of contaminated prey would probably require disturbance of the near shore community and I think that we are probably better off to simply let the system clean itself than to try and do any hands-on work in this area.

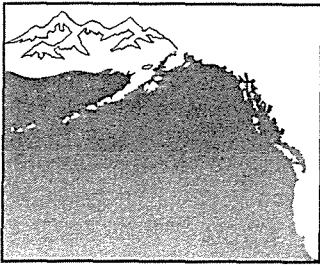
Finally, it may be inappropriate for me to comment, but I have considered the options that are outlined for restoration work with respect to the bird species that were impacted. The idea of reducing predations is probably worthwhile when it comes to considering introduced foxes on islands; however, I think it could be rather impractical when it comes to other aspects of predator control. Discouraging avian predators at colonies probably gets one into an area where it may cause more disturbance to the colony itself than the damage predators do with respect to the recovering populations. Without considering it on a case by case basis, it is rather difficult to predict what might happen, but certainly trying to reduce predation with respect to a recovering population is an area that could require a good deal of effort and could disturb other species in the system significantly. In general, I think efforts to discourage habitat destruction and general disturbance in the areas where the recovering populations exist are the most effective things that one could do in the recovery process.

With respect to the harbor seal, it would seem that considerable attention is needed to this species. Not only did the oil spill probably reduce the population in Prince William Sound, but other factors seem to have caused this population to decrease rather dramatically over the last few years. I would think that long term studies of the harbor seal are needed in

10/02/91 10:11  
Stan Senner  
Page 3  
2 October 1991

Prince William Sound in order to understand what is going on with this population. It may be that the native subsistence take is rather significant and the extent of this take needs to be documented. Further, identifying other factors that influence the population in Prince William need to be considered. This is a very important species in the Sound and within the restoration framework it would seem to be one that a significant amount of effort could be directed towards.

These are my immediate reactions to the restoration options that have been put forth. I apologize for taking so long to get comments to you and hope that they have not come too late to be useful. I will be in the office the rest of this week if discussions on the points I have raised seem appropriate.



FISHERIES RESEARCH INSTITUTE

University of Washington  
School of Fisheries, WH-10  
Seattle, Washington 98195  
Telephone 206-543-4650  
Telex 474-0096 UWUI  
FAX 206-685-7471

**WETLAND ECOSYSTEM TEAM**

19 September 1991

Stan Senner  
Alaska Department of Fish and Game  
**OIL SPILL RESTORATION PLANNING OFFICE**  
437 E. Street, Suite 301  
Anchorage, AK 99501

Dear Stan:

Here are my formal comments on the restoration "endpoints" that I transmitted verbally to Ruth Yender on August 27. I had hoped to get these written up earlier, but feared it was too late. Your reprehensive memorandum of 13 September allowed me to do so.

Please recognize that most of the priority species do not fall within my expertise, at least at the population level, but I have made some comments based upon their role in the estuarine/nearshore marine ecosystem.

I hope these comments are of some value.

Sincerely,

A handwritten signature in cursive script, appearing to read "Charles A. Simenstad". The signature is written in dark ink and is positioned above the printed name.

Charles A. Simenstad  
WET Coordinator

**Privileged/Confidential\*\*Attorney Work Product\*\*Attorney-Client Communication**

Comments on Working List of Generic Restoration Options

*Priority Spp.*

Sea Otter:

- \* I certainly defer to Don Siniff relative to this species.
- \* This may be one of those species that would suffer more from intervention, even if designed as "restoration", than if just left along to recover on its own; we all know that they have a phenomenal potential to repopulate vacant viable habitat!
- \* However, monitoring of chronic injury should be maintained to determine whether contaminated prey resources are introducing a persistent, sublethal injury (but manifested in a population effect).
- \* If chronic injury persists, and its likely source is contaminated benthic prey (e.g., clams), some options for alternative prey/habitats should be considered, e.g., translocation of population using contaminated prey to "clean" areas, removal of contaminated prey, introduction or enhancement of alternative (e.g., preferred), uncontaminated prey resources such as crab
- \* monitoring of recovery of sea otter population should be a high priority
- \* relative to protecting/acquiring marine/coastal habitats, do we know or can we predict pupping areas? What criteria would we use to select these areas?

Common Murre:

- \* I also defer to Mike Fry or someone with more expertise on this species.
- \* If it can be shown that introduced predators are significantly inhibiting breeding colonies or have eliminated colonies from some islands, the elimination of these exotic predators and re-establishment of colonies would likely be the most effective restoration.

Harlequin Duck:

- \* *ibid* re. expertise
- \* Elimination of sources of contaminated prey might produce more, rather than alleviate, injury if this would eliminate all foraging potential at restricted feeding sites? What information do we have that contaminated prey would actually inhibit population restoration, e.g., reproductive success/carrying capacity? How selective are harlequins when feeding in the intertidal? Can they discriminate contaminated from uncontaminated prey (e.g., mussels)? Are contaminated prey distributed homogeneously or are there just heterogeneous patches? Would enhancement/augmentation of prey just

**Privileged/Confidential\*\*Attorney Work Product\*\*Attorney-Client Communication**

Comments on Working List of Generic Restoration Options

*Priority Spp.*

Sea Otter:

- \* I certainly defer to Don Siniff relative to this species.
- \* This may be one of those species that would suffer more from intervention, even if designed as "restoration", than if just left along to recover on its own; we all know that they have a phenomenal potential to repopulate vacant viable habitat!
- \* However, monitoring of chronic injury should be maintained to determine whether contaminated prey resources are introducing a persistent, sublethal injury (but manifested in a population effect).
- \* If chronic injury persists, and its likely source is contaminated benthic prey (e.g., clams), some options for alternative prey/habitats should be considered, e.g., translocation of population using contaminated prey to "clean" areas, removal of contaminated prey, introduction or enhancement of alternative (e.g., preferred), uncontaminated prey resources such as crab
- \* monitoring of recovery of sea otter population should be a high priority
- \* relative to protecting/acquiring marine/coastal habitats, do we know or can we predict pupping areas? What criteria would we use to select these areas?

Common Murre:

- \* I also defer to Mike Fry or someone with more expertise on this species.
- \* If it can be shown that introduced predators are significantly inhibiting breeding colonies or have eliminated colonies from some islands, the elimination of these exotic predators and re-establishment of colonies would likely be the most effective restoration.

Harlequin Duck:

- \* *ibid* re. expertise
- \* Elimination of sources of contaminated prey might produce more, rather than alleviate, injury if this would eliminate all foraging potential at restricted feeding sites? What information do we have that contaminated prey would actually inhibit population restoration, e.g., reproductive success/carrying capacity? How selective are harlequins when feeding in the intertidal? Can they discriminate contaminated from uncontaminated prey (e.g., mussels)? Are contaminated prey distributed homogeneously or are there just heterogeneous patches? Would enhancement/augmentation of prey just

introduce a unnatural prey resource (level) that would ultimately result in population decline when it was terminated?

- \* Thus, do we know enough about harlequin feeding/population ecology to predict reliably the outcome of such restoration scenarios?

Dolly Varden/Cutthroat Trout:

- \* I'm still under the impression/opinion that we need to determine the mechanism of contamination that likely resulted in acute mortalities and may still result in a depressed population before we can come up with viable restoration options. Are we confident that acute toxicity resulted in a one-time population loss or is there evidence of continued decline, perhaps as a result of contaminated prey? If there's still contaminated prey out there, wouldn't any enhanced populations be exposed to the same injury, albeit likely a rapidly declining one?
- \* If we are relatively confident that there is no longer a chronic contamination problem, then I would favor restoration of spawning and rearing habitat over any restrictions on sport harvest (assuming that the harvest is at a comparatively low exploitation rate) or artificial enhancement.
- \* Monitoring of this population should be of high priority! There is probably no better case "endpoint" which should be thoroughly documented by continued monitoring and research. Relative to the research, it seems to me that duplicating and independently verifying the tagging results obtained from the past three years, and obtaining more information on the estuarine/marine movements, residence time, diet and growth, would contribute significantly to our ability to restore these populations in this and future situations.

Harbor Seal:

- \* I would think that reduction of harvest, if it is documented to be a significant fraction of the reproductive population, would be one of the most effective and immediate mechanisms to enhance/restore these populations.
- \* It is very unlikely, given the diversity and motility of harbor prey resources, that manipulation/enhancement of their prey resource would be effective.
- \* But, obviously, if disturbance of pupping sites can be shown to inhibit reproduction or pup mortality, reduction of such disturbance factors would also be an effective approach.

Marbled Murrelet:

- \* This seems like a very problematic endpoint, and potentially too difficult to tackle.
- \* How much do we know about specific nesting habitat requirements? Do we

know enough to predict that protection/acquisition of "new" sites would result in a population response down the line?

- \* Given the impossible manipulation of motile, neritic fishes that likely form the predominant biomass in their diet, maintenance of prey base and/or reduction of competition for prey is not a viable restoration option.

#### Pink Salmon:

- \* If it can be shown that chronic contamination of tidal freshwater spawning habitat is a persistent source of egg contamination and egg-emergence, fry or juvenile mortality, high priority should be given to removal of these contamination sources and enhancement of clean spawning gravel.
- \* Given the pervasive wandering and recolonization potential of pink salmon (?), I would think that establishment of new/alternative stocks would not be necessary/feasible. Aren't they colonizing all viable habitat?
- \* Alternatively, protection of endangered spawning and estuarine rearing habitat or removal of any blockages to spawning habitat would allow natural enhancement to occur?
- \* If there is no detectable difference in pink salmon stocks from any post-spill depression, real or perceived (e.g., natural noise), at this time, I do not think that continued monitoring and "tweaking" of management practices for the purposes of restoration are justifiable.

#### Other Possibly Relevant Species and Resources:

- \* Two resources should be considered for at least secondary priority: (1) black oystercatcher, and (2) coastal habitat.
- \* The black oystercatcher populations, if they have been definitively impacted, should be much easier to evaluate, monitor, and potentially enhance than, say, marbled murrelets! Prey manipulation and reduction of disturbance are two potentially limiting factors that could be considered as restoration options.
- \* Selected components of the coastal habitat should seriously be considered for long-term monitoring in order to evaluate the longevity of injury even if the injury is not economically important.....acquisition of new scientific knowledge that enhances our ability to understand the impact of oil on estuarine/coastal ecosystems function and predict future consequence is a form of restoration!





Southern Illinois University at Carbondale  
Carbondale, Illinois 62901-6504

Cooperative Wildlife Research Laboratory  
618-536-7766

MEMORANDUM

DATE: 20 August 1991

TO: Stanley E. Senner  
Oil Spill Restoration Planning Office  
Alaska Department of Fish and Game

FROM: Daniel D. Roby, Restoration Peer Reviewer  
Cooperative Wildlife Research Laboratory **DDR**

RE: Review of restoration endpoints

In response to your memo of 12 August, I have reviewed the Working List of Generic Restoration Options, paying particular attention to bird species. Although I do not feel there is need for major changes, I would like to make some suggestions for modification. Below is your list of restoration options; my suggested additions are in bold-face and suggested deletions are in parentheses.

Priority Spp. for possible January restitution hearing

common murre

- enhance productivity through manipulations at breeding colonies where murren still nest or attempt to nest (**e.g., decoys and playbacks of calls, enhance availability of secure nest sites**)
- re-establish abandoned colonies (and establish new colonies)
- minimize **human disturbance at breeding colonies**
- reduce **mammalian predation at breeding colonies**
  - eliminate foxes and **other** introduced predators from **breeding islands and headlands**
- reduce/discourage avian kleptoparasites and predators of eggs and young at colonies (e.g., gulls, ravens)

- protect/acquire **breeding colonies** (marine/coastal habitats (e.g., breeding colonies))

- **mitigate incidental take of murre by commercial fisheries within the Gulf of Alaska portion of the EEZ**

- monitor recovery, including from restoration actions

harlequin duck

- **prohibit** (reduce) harvest from sport and/or subsistence hunting in **PWS**

- (enhance productivity by providing artificial nest sites)

- eliminate sources of contaminated prey

- protect/acquire coastal/upland habitats (e.g., **pre-breeding, nesting and moulting areas**)

- monitor recovery, including from restoration actions

Secondary spp. for possible January restitution hearing

marbled murrelet

- maintain prey base and/or reduce competition for prey

- protect/acquire upland habitats (e.g., nesting)

- **mitigate incidental take of murrelets by commercial fisheries within the Gulf of Alaska portion of the EEZ**

- monitor recovery, including restoration actions

### Justification for Proposed Modifications

#### common murre

For a long-lived species with low fecundity, such as the common murre, an increase in adult mortality would have a greater population-level effect than a decline in productivity. A complete lack of reproductive success for an extended period would, of course, have serious consequences, but mitigating losses of adults may be the most effective means of restoration. I am not informed about the level of incidental take of adult murre in the spill-affected area, but it may be high enough to warrant special efforts to mitigate incidental take. Adults are also taken at breeding colonies by foxes. Arctic and red foxes, whether native or introduced, could be the object of control activities that would appreciably enhance the survival of adults, as well as egg and chick survival.

Productivity at colonies affected by the spill is reportedly suffering from a lack of reproductive synchrony and low hatching success, apparently due to a dearth of experienced breeders. Social facilitation of reproduction may be enhanced by playbacks of murre calls (using solar-powered tape players) and painted wooden decoys. This method may also be the only available option for re-establishing murre colonies that have been eliminated in the aftermath of the spill. These methods have proved effective in stimulating Atlantic Puffins to nest on islands off the coast of Maine where they have been absent for over a century. I do not recommend attempting to establish new breeding colonies where there is no history of murre reproduction, as there may be a myriad of factors that render a site unsuitable. A possible exception would be islands near active breeding colonies that are suitable except for the presence of mammalian predators that could be eliminated.

Productivity can also be appreciably enhanced by an increase in the availability of suitable nesting ledges (inaccessible to mammalian predators) at active breeding colonies. In some instances fairly minor modifications to a site may render it inaccessible to foxes and other potential egg and chick predators. Gulls (i.e., Herring and Glaucous-winged) and occasionally ravens can be a major source of egg and chick mortality at murre colonies. Most murre colonies have at least a small gull colony associated. By oiling gull eggs at nests near murre colonies, adult gulls can be discouraged from preying on murre eggs and young. Gulls have a much higher reproductive potential than murre and populations in the Gulf of Alaska are increasing, so temporary gull control measures would enhance murre productivity without threatening gull populations.

#### harlequin duck

If feasible, I recommend closure of all taking of harlequin ducks as a

restoration endpoint until the breeding population in PWS is restored. Erecting artificial nest structures should only be used as a restoration endpoint if it can be demonstrated that harlequin ducks will use nest boxes. Even if nest boxes have been used on occasion elsewhere, nest boxes may not be suitable for harlequins nesting in the PWS area because of potential nest site competitors. If harlequin ducks use marine habitats (e.g., estuaries) during the pre-breeding period, then these habitats may be as critical for successful reproduction as upland habitats.

marbled murrelet

It is difficult to conceive of a mechanism for achieving the goal of maintaining the prey base, but this may be crucial for the restoration of several of the most damaged wildlife species. Consequently, I think it should be maintained as a potential restoration endpoint. Incidental take of marbled murrelets in gill nets is a significant source of mortality for this species off the coast of British Columbia. Mitigating incidental take significantly enhance survival in some portions of the Gulf of Alaska and provide an additional restoration endpoint.



THE UNIVERSITY OF NORTH CAROLINA  
AT  
CHAPEL HILL

Institute of Marine Sciences  
919/726-6841  
FAX: 919-726-2426

The University of North Carolina at Chapel Hill  
3407 Arendell Street  
Morehead City, North Carolina 28557

22 August 1991

TO: Stan Senner  
FROM: C. H. "Pete" Peterson *Pete Peterson*  
SUBJECT: Restoration endpoints memo of 12 August

Dear Stan and RPWG:

The list of restoration endpoints is a thoughtful, readily defensible set of goals for the restoration process. I urge only some additions:

(1) Adequate field observation exists from this summer's survey to indicate that contamination of mussel beds with relatively unweathered petroleum is widespread. This contamination persists a full 2 1/2 years after the spill. It clearly limits subsistence harvest of mussels in many native communities; a group whose interests seem overlooked in this present list of restoration endpoints. The contaminated mussels may be responsible too for the continuing reproductive failure of harlequin ducks as well as problems with sea otters and river otters. There is a clear and substantial need to address this broad issue of contaminated mussels. We need to design and support studies to assess whether contaminated mussels are the cause of the problems with the harlequin duck, river otter and sea otter. Based on that knowledge, we then need to conduct the proper clean-up and restoration of the mussel beds, which give every sign of not recovering without intervention and restoration. This is a very big issue from an ecological, social, and economic (i.e., cost of restoration) perspective. This restoration project should have high priority and is likely to carry a large price tag. Why is it absent from the list of restoration endpoints?

(2) The stories that I hear about the violations of native burial sites and the destruction of archaeological sites by clean-up workers imply to me that this issue deserves more attention in restoration.



THE UNIVERSITY OF NORTH CAROLINA  
AT  
CHAPEL HILL

Institute of Marine Sciences  
919-726-6841  
FAX: 919-726-2426

The University of North Carolina at Chapel  
3407 Arendell Street  
Morehead City, North Carolina 28557

TELECOPY TRANSMITTAL FORM

To: STAN SENNER

Location: \_\_\_\_\_

FAX No.: (907) 271-2467

From: DR. C. H. PETERSON

UNC- INSTITUTE OF MARINE SCIENCES

FAX No.: (919) 726-2426

Total No. of Pages, including this page 2

Date: 8-22-91 Time: 1105 a.m. \_\_\_\_\_ p.m.

If you do not receive all pages, please contact our  
office at (919) 726-6841.

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



DEPARTMENT OF THE NAVY  
OFFICE OF THE CHIEF OF NAVAL RESEARCH  
ARLINGTON, VIRGINIA 22217-5000

IN REPLY REFER TO

September 23, 1991

Stan Senner  
Oil Restoration Planning Office  
437 E. Street, Suite 301  
Anchorage Ak.  
99501

Dear Stan:

I apologize for this late response to your request for review of the Restoration End Points. I was away when it came in and only recently found it in a corner of my office. Overall the outline gives a good overview of the topics covered in the meeting. With respect to sea otters some of the points are important to consider but of no practical value. For example, it states that we should reduce the harvest or incidental take. This is important to keep low. However, I doubt that it was or is significant before or after the spill. I think it is important to eliminate sources of contaminated prey. However, there still is some disagreement that the prey are contaminated. This should be determined prior to suggesting or implementing a recovery option. It is most important to continue to monitor the decline or recovery of the population. This should be done until we can at least see a recovery in sight. As it is now, we are still documenting a decline or at least no recovery. A prudent recovery plan would require that we understand why the population is not recovering. Is it due to contaminated prey? or some other factor?

With respect to the common murre. Prior to initiating a restoration plan, it is imperative to consult with USFWS biologists to identify which colonies if any we depleted or destroyed. If any colonies were depleted, will restoration efforts work? I encountered some skepticism among seabird biologists after the meeting about this issue.

They found 4 marbled murrelet nests in Prince William Sound this year and confirmed that they are nesting in old growth trees. This may give a better argument for the potential restoration endpoints.

Harbor seals are difficult to come up with a viable end point, but they are very important and I think that every effort should be made to document the decline and come up with a recovery plan. This could be considered mitigation. This is where an ecosystem plan is very important. The present model of single species issues clouds the real goal of maintaining the PWS ecosystem. The decline of the Harbor seal is but one index of the decline of the marine community of PWS.



DEPARTMENT OF THE NAVY  
OFFICE OF THE CHIEF OF NAVAL RESEARCH  
ARLINGTON, VIRGINIA 22217-5000

IN REPLY REFER TO

I have a new address and phone number. For the next two years I will be at the Office of Naval Research Code 1141, 800 N. Quincy St, Arlington, VA. 22217-5000. Phone (703) 696-2085, Fax (703) 696-1212. My numbers are still good at UCSC, but things will be slow getting to me since they will be forwarded to me here. This is a temporary assignment and I will be returning to Santa Cruz.

I hope these comments are useful.

Respectfully,

A handwritten signature in cursive script, appearing to read "Dan Costa".

Daniel P. Costa



# FACSIMILE COVER SHEET



Systems Biology Program  
Code 1141SB  
Office of Naval Research  
3333 R. Ruffin Street  
Arlington, Virginia 22217

FAX: (703) 696-1212  
Voice: (703) 696-4053

Total number of pages (including this page)

3

TO

Name	Stan Sennner		
Address	Oil Spill Restoration Office		
Phone	(907) 271-2461	FAX	(907) 271-2462

FROM

Name	Dan Costa		
Phone	(703) 696-2085		

Message: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Working List of Restoration Endpoints<sup>1 2</sup>  
8 October 1991

sea otter

- minimize human disturbance
- protect/acquire marine and coastal habitats (e.g., sheltered coves, rich feeding areas)
- conduct research on population status/limiting factors<sup>3</sup> (e.g., contamination of prey) and develop restoration measures accordingly
- monitor recovery, including results of restoration actions

harbor seal

- minimize disturbance
- protect/acquire marine and coastal habitats
- conduct research on population status/limiting factors (e.g., competition for forage fish) and develop restoration measures accordingly
- monitor recovery, including results of restoration actions

common murre

- enhance productivity through manipulations at breeding colonies where murrens still nest or attempt to nest
- re-establish abandoned colonies and establish new colonies

---

<sup>1</sup>Restoration "endpoints" are generic goals for direct restoration, replacement, or acquisition of equivalent resources. For any given endpoint, there may be several different ways or options for obtaining the goal.

<sup>2</sup>Initially developed by the Legal Team (on 31 July) in the context of a restitution hearing in January.

<sup>3</sup>i.e., why is the population not recovering?

Privileged and Confidential  
Attorney Work Product  
Attorney-Client Communication

- minimize human disturbance at breeding colonies
- reduce predation
  - eliminate foxes and other introduced predators from breeding colonies
  - reduce/discourage avian "theft"<sup>4</sup> and predation of eggs and young
- protect/acquire marine and coastal habitats at and associated with breeding colonies
- monitor recovery, including results of restoration actions

marbled murrelet

- reduce incidental take of murrelets in gillnet fisheries
- maintain prey base and/or reduce competition for prey
- protect/acquire upland habitats (e.g., nesting)
- monitor recovery, including results of restoration actions

harlequin duck

- reduce human harvest
- eliminate sources of contaminated prey (e.g., mussel beds)
  - enhance productivity by providing artificial nest sites
- protect/acquire coastal and upland habitats (e.g., pre-breeding, nesting, and molting areas)
- monitor recovery, including results of restoration actions

---

<sup>4</sup>i.e., kleptoparasitism

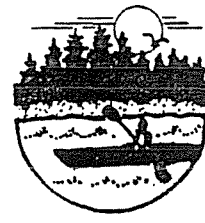
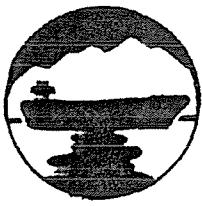
Dolly Varden/cutthroat trout

- reduce sport harvest
- redirect sport harvest to alternative streams
- enhance stream/lake habitats
- acquire access to alternative sport fishing streams
- protect/acquire coastal and upland habitats
- maintain water quality
- monitor recovery, including results of restoration actions

pink salmon

- refine management practices and adjust harvest levels to restore wild stocks and maintain genetic diversity
- enhance productivity through stream improvements (e.g., egg boxes, spawning channels, passes)
- maintain water quality
- protect/acquire upland and coastal habitats (e.g., anadromous streams)
- establish new/alternative stocks/species
- monitor recovery, including results of restoration actions

[SES:10/08/91:options.sum]



# OIL SPILL RESTORATION PLANNING OFFICE

---

437 E Street, Suite 301 Anchorage, Alaska 99501  
(907) 271-2461 FAX: (907) 271-2467

Privileged/Confidential\*\*Attorney Work Product\*\*Attorney-Client Communication

MEMORANDUM VIA FAX

13 SEPTEMBER 1991

TO: Restoration Peer Reviewers (see distribution)

FR: Stan Senner (ADF&G) *Stan Senner*

RE: Review of restoration endpoints

Recently we sent you a short list of restoration endpoints and invited comments on whether there should be changes to that list (memo & attachments dated 08/12). We had several responses, but are eager to hear from all of the peer reviewers who have participated in restoration meetings. I am enclosing another copy and invite your comments now.

There may have been some confusion about what the list represented: To clarify, its purpose is only to summarize the types of generic options or endpoints that we have identified that pass some minimal test of reasonableness. For purposes of our evaluation, we need to narrow the field to a short list of potential endpoints. In some cases, there may be several ways to reach these endpoints, or it may be that the endpoint is not readily attainable, but the listed endpoints at least should be worth further review. The list is not intended to describe specific restoration actions or projects; we are simply trying to weed out the endpoints that are obviously infeasible and/or inappropriate. (We also need to document why we are rejecting some endpoints, but that is a separate exercise.)

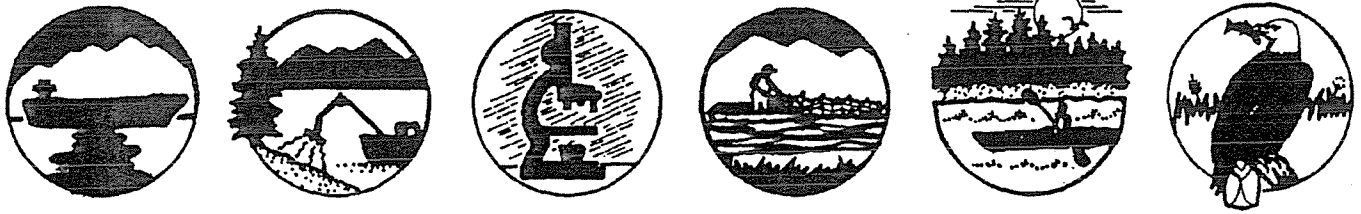
Please also note that only species which are considered to be priorities in the immediate context of a possible restoration case in a criminal restitution hearing are being considered. Other injured resources and species may be considered subsequently (e.g., coastal habitat).

Please indicate your comments in the margins of the list or summarize your thoughts separately, whichever is more convenient. I suggest faxing your response to RPWG at (907) 271-2467. The entire restoration group will appreciate your help with this request. May we hear from you by the close of business, Friday, 20 September?

attachment: 08/12 memo & list

distribution: D. Costa, M. Fry, P. Mundy, C. Simonstad, and D. Siniff

cc w/o attachment: B. Freedman, D. Street, and R. Spies



## OIL SPILL RESTORATION PLANNING OFFICE

---

437 E Street, Suite 301 Anchorage, Alaska 99501  
(907) 271-2461 FAX: (907) 271-2467

MEMORANDUM

12 AUGUST 1991

TO: Restoration Peer Reviewers--Daniel Costa, Michael Fry,  
Philip Mundy, Charles Peterson, Daniel Roby, Charles  
Simondstad, Donald Siniff

FR: Stan Senner (ADF&G)

RE: Review of restoration "endpoints"

Please find enclosed a summary listing of generic restoration endpoints that have been developed for some of the species that are subjects of the Natural Resources Damage Assessment. This summary does not address specific mechanisms or options, but rather is intended to broadly cover possible endpoints or outcomes of various restoration actions.

Would you look over this list, paying particular attention to the species for which you have special expertise or knowledge? The Restoration Group would like to have your comments. Are there endpoints that should be added, modified, or deleted?

Please telephone or fax your reply no later than Friday, 23 August. The telephone number is 907-271-2461. I will be away from the 13th until the 19th, but Ruth Yender (EPA) will be here both this week and next. Ask for either of us. The RPWG fax number is 907-271-2467.

Thank you for your consideration and help.

enclosure (1)

cc: Bart Freedman, Preston et al.  
David Street, Dept. of Justice  
Robert Spies, chief scientist

Privileged and Confidential  
Attorney Work Product  
Attorney-Client Communication

Working List of Generic Restoration Options<sup>1</sup>  
7 August 1991

Priority Spp. for possible January restitution hearing<sup>2</sup>

sea otter

- reduce harvest/incidental take
- minimize disturbance
- maintain prey base and/or reduce competition for prey
- eliminate sources of contaminated prey
- protect/acquire marine/coastal habitats (e.g., pupping areas)
- monitor recovery, including from restoration actions

common murre

- enhance productivity through manipulations at breeding colonies where murrens still nest or attempt to nest
- re-establish abandoned colonies and establish new colonies
- minimize disturbance
- reduce predation
  - eliminate foxes and introduced predators from islands
  - reduce/discourage avian predators at colonies

---

<sup>1</sup>These generic restoration options might include specific actions which would be carried out as direct restoration, replacement, or acquisition of equivalent resources, or a combination of these.

<sup>2</sup>As determined by Legal Team on 31 July.

- protect/acquire marine/coastal habitats (e.g., breeding colonies)

- monitor recovery, including from restoration actions

#### harlequin duck

- reduce harvest from sport and/or subsistence hunting
- enhance productivity by providing artificial nest sites

- eliminate sources of contaminated prey

- protect/acquire coastal/upland habitats (e.g., nesting and moulting areas)

- monitor recovery, including from restoration actions

#### Dolly Varden/cutthroat trout

- reduce sport harvest

- redirect sport harvest to alternative streams

- maintain water quality

- enhance stream/lake habitats

- acquire access to alternative streams

- protect/acquire coastal/upland habitats

- monitor recovery, including from restoration actions

#### Secondary spp. for possible January restitution hearing<sup>3</sup>

##### harbor seal

- reduce harvest/incidental take

- minimize disturbance

- maintain prey base and/or reduce competition for prey

---

<sup>3</sup>As determined by Legal Team on 31 July.



- protect/acquire marine/coastal habitat
- monitor recovery, including from restoration actions

marbled murrelet

- maintain prey base and/or reduce competition for prey
- protect/acquire upland habitats (e.g., nesting )
- monitor recovery, including from restoration actions

pink salmon

- refine management practices and adjust harvest levels to restore wild stocks and maintain genetic diversity
- enhance productivity through stream improvements (e.g., egg boxes, spawning channels, passes)
- maintain water quality
- protect/acquire upland/coastal habitats (e.g., anadromous streams)
- establish new/alternative stocks and/or species
- monitor recovery, including from restoration actions

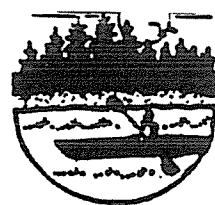
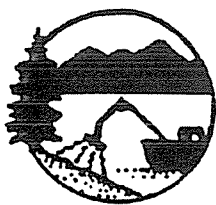
Other possibly relevant species and resources<sup>4</sup>

pigeon guillemot  
black oystercatcher  
coastal habitat  
archaeology

[SES:08/07/91:options.sum]

---

<sup>4</sup>Pending further guidance from the Legal Team, these are currently are not among the species and resources for which restoration options for the restitution hearing in January. Restoration options, however, can be or have been developed for these species and resources.



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/13/91

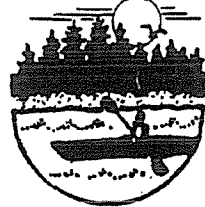
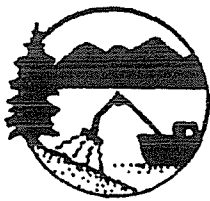
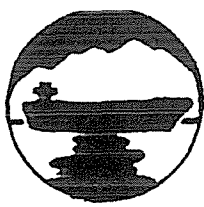
- [ ] BRODERSEN, Mark.....465-2378
- [ ] COMERCI, Linda.....271-2467
- [ ] RABINOWITCH, Sandy.....257-2510
- [ ] RICE, Ken.....276-7178
- [ ] SENNER, Stan.....271-2467
- [ ] STRAND, John.....789-6608
- [  ] WEINER, Art.....563-7122

- [ ] \_\_\_\_\_
- [ ] \_\_\_\_\_
- [ ] \_\_\_\_\_
- [ ] \_\_\_\_\_

FROM: Stan Senner

Pages (including coversheet) 9

MEMO



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/13/91

TO: Donald Fry

PHONE: \_\_\_\_\_ FAX: (916) 750-8960

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 6

MEMO:

Management Team

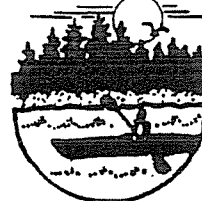
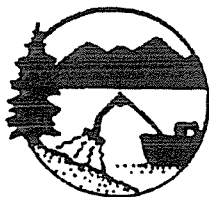
M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerci  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/13/91

TO: Robert Spies

PHONE: \_\_\_\_\_ FAX: (415) 373-7834

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 6

MEMO:

Management Team

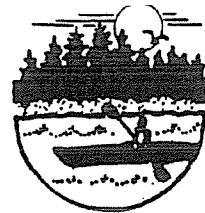
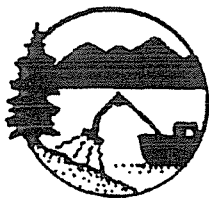
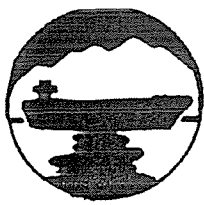
M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerchi  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/13/91

TO: Charles Simonstad

PHONE: \_\_\_\_\_ FAX: (906) 545-7471

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 6

MEMO:

Management Team

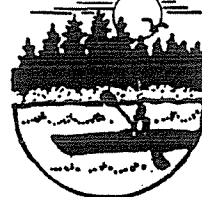
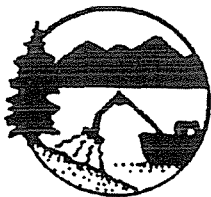
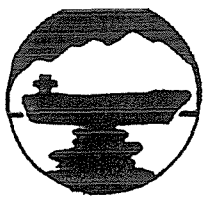
M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerci  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/13/91

TO: Phillip Mundy

PHONE: \_\_\_\_\_ FAX: (503) 235-4228

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 6

MEMO:

Management Team

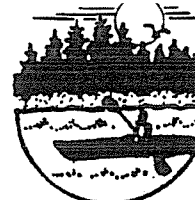
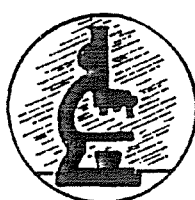
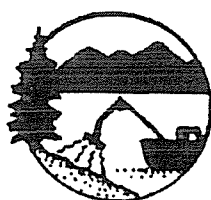
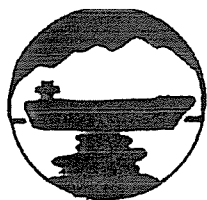
M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerchi  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/16/91

TO: Bart Freedman

PHONE: \_\_\_\_\_ FAX: (906) 693-7092

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 2

MEMO:

Management Team

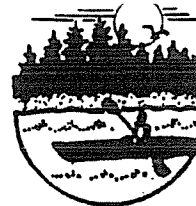
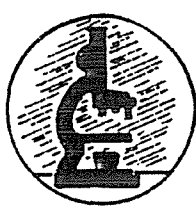
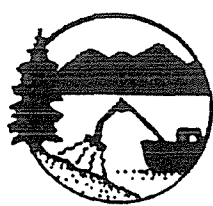
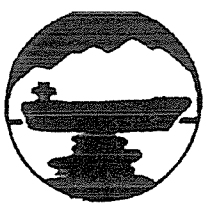
M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerci  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/13/91

TO: David Street

PHONE: \_\_\_\_\_ FAX: (907) 514-8245

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 2

MEMO:

Management Team

M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

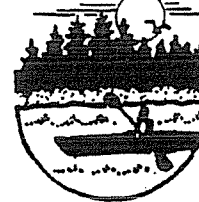
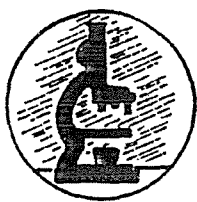
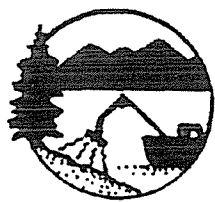
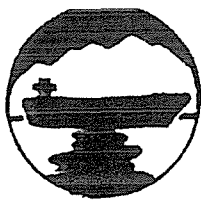
Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerci  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner





# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/13/91

TO: Donald Siniff

PHONE: \_\_\_\_\_ FAX: (612) 625-4490

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 6

MEMO:

Management Team

M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerci  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner



# OIL SPILL RESTORATION PLANNING OFFICE

437 E Street, Suite 301 Anchorage, Alaska 99501  
 (907) 271-2461 FAX: (907) 271-2467

DATE: 9/16/91

TO: Daniel Costa

PHONE: (703) 696-2085 FAX: (703) 696-1212

FROM: STAN SENNER

ALASKA DEPARTMENT OF FISH AND GAME

PAGES (INCLUDING COVERSHEET): 6

MEMO:

Management Team

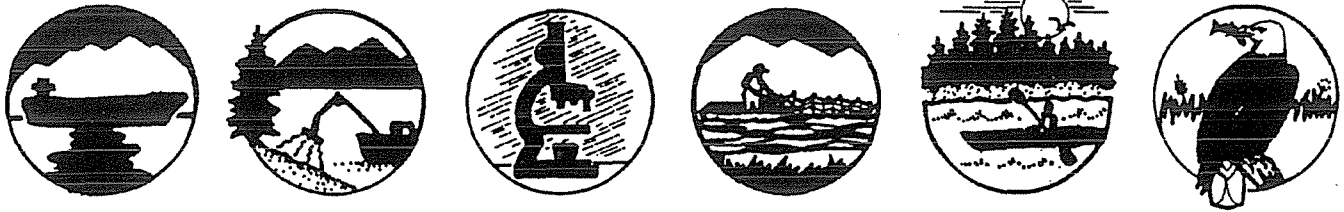
M. Brodersen  
 P. Gertler  
 D. Gibbons  
 J. Montague  
 B. Morris  
 S. MacMullin  
 C. Roy  
 B. Spies

Legal Team

G. Belt  
 G. Fisher  
 M. Fox  
 B. Freedman  
 M. Lisowski  
 C. O'Connor  
 A. Swiderski  
 J. Tangen

RPWG

M. Brodersen  
 L. Comerci  
 S. Rabinowitch  
 K. Rice  
 S. Senner  
 J. Strand  
 A. Weiner



## OIL SPILL RESTORATION PLANNING OFFICE

---

437 E Street, Suite 301 Anchorage, Alaska 99501  
(907) 271-2461 FAX: (907) 271-2467

MEMORANDUM

12 AUGUST 1991

TO: Restoration Peer Reviewers--Daniel Costa, Michael Fry,  
Philip Mundy, Charles Peterson, Daniel Roby, Charles  
Simondstad, Donald Siniff

FR: Stan Senner (ADF&G)

RE: Review of restoration "endpoints"

Please find enclosed a summary listing of generic restoration endpoints that have been developed for some of the species that are subjects of the Natural Resources Damage Assessment. This summary does not address specific mechanisms or options, but rather is intended to broadly cover possible endpoints or outcomes of various restoration actions.

Would you look over this list, paying particular attention to the species for which you have special expertise or knowledge? The Restoration Group would like to have your comments. Are there endpoints that should be added, modified, or deleted?

Please telephone or fax your reply no later than Friday, 23 August. The telephone number is 907-271-2461. I will be away from the 13th until the 19th, but Ruth Yender (EPA) will be here both this week and next. Ask for either of us. The RPWG fax number is 907-271-2467.

Thank you for your consideration and help.

enclosure (1)

cc: Bart Freedman, Preston et al.  
David Street, Dept. of Justice  
Robert Spies, chief scientist

Privileged and Confidential  
Attorney Work Product  
Attorney-Client Communication

Working List of Generic Restoration Options<sup>1</sup>  
7 August 1991

Priority Spp. for possible January restitution hearing<sup>2</sup>

sea otter

- reduce harvest/incidental take
- minimize disturbance
- maintain prey base and/or reduce competition for prey
- eliminate sources of contaminated prey
- protect/acquire marine/coastal habitats (e.g.,  
pupping areas)
- monitor recovery, including from restoration actions

common murre

- enhance productivity through manipulations at  
breeding colonies where murrens still nest or attempt to nest
- re-establish abandoned colonies and establish new  
colonies
- minimize disturbance
- reduce predation
  - eliminate foxes and introduced predators from  
islands
  - reduce/discourage avian predators at colonies

---

<sup>1</sup>These generic restoration options might include specific actions which would be carried out as direct restoration, replacement, or acquisition of equivalent resources, or a combination of these.

<sup>2</sup>As determined by Legal Team on 31 July.

- protect/acquire marine/coastal habitats (e.g., breeding colonies)

- monitor recovery, including from restoration actions

#### harlequin duck

- reduce harvest from sport and/or subsistence hunting
- enhance productivity by providing artificial nest sites

- eliminate sources of contaminated prey

- protect/acquire coastal/upland habitats (e.g., nesting and moulting areas)

- monitor recovery, including from restoration actions

#### Dolly Varden/cutthroat trout

- reduce sport harvest

- redirect sport harvest to alternative streams

- maintain water quality

- enhance stream/lake habitats

- acquire access to alternative streams

- protect/acquire coastal/upland habitats

- monitor recovery, including from restoration actions

#### Secondary spp. for possible January restitution hearing<sup>3</sup>

##### harbor seal

- reduce harvest/incidental take

- minimize disturbance

- maintain prey base and/or reduce competition for prey

---

<sup>3</sup>As determined by Legal Team on 31 July.

- protect/acquire marine/coastal habitat
- monitor recovery, including from restoration actions

marbled murrelet

- maintain prey base and/or reduce competition for prey
- protect/acquire upland habitats (e.g., nesting )
- monitor recovery, including from restoration actions

pink salmon

- refine management practices and adjust harvest levels to restore wild stocks and maintain genetic diversity
- enhance productivity through stream improvements (e.g., egg boxes, spawning channels, passes)
- maintain water quality
- protect/acquire upland/coastal habitats (e.g., anadromous streams)
- establish new/alternative stocks and/or species
- monitor recovery, including from restoration actions

Other possibly relevant species and resources<sup>4</sup>

pigeon guillemot  
 black oystercatcher  
 coastal habitat  
 archaeology

[SES:08/07/91:options.sum]

---

<sup>4</sup>Pending further guidance from the Legal Team, these are currently are not among the species and resources for which restoration options for the restitution hearing in January. Restoration options, however, can be or have been developed for these species and resources.