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15.2.1 Vol II

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Intecol

international Association for Ecology
Association Internationale d'Ecologie
Internationale Vereinigung für Ökologie
Asociación Internacional de Ecologia

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Institute of Ecology
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The Trustee Council
P.O. Box 20792
Juneau, AK 99802

13 X 89

Dear Sirs:

I have read with interest *The State Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill August 1989.* As a seabird biologist, and as Chairman of the Seabird Specialist Group ofIUCN/ICBP, I have a number of comments about the draft that I hope merit consideration and may reduce the likelihood of litigation against the Trusteees or of subpeonas by Senate subcommittees in the future.

My primary concerns is the time frame under which the Trustees apparently intend to act. Studies will conclude on 28 February 1990 (page 26); comments on this draft are due 30 October, having been extended 30 days from the original date. If studies are implemented immediately after the closing date of the comment period, this leaves four months. I note that this happens to be the Alaskan winter during which salmon do not spawn, seabirds do not nest, and shorebirds have mostly migrated out of the area. It is impossible in such a short time and under severe winter conditions to study these and most other subjects.

Com.	Topic	Issue	Sug.	Sort
1	4	0201		2

Although it is nowhere stated, I assume that some, but not necessarily all, of the studies have already begun and may have run during one breeding season. Given the presence of clean-up crews and containment efforts, conditions during the past season will hardly have been normal. Also it will only be after several years that we can assess survival of salmon or seabirds from last year's breeding efforts. Year to year variability in populations, reproduction and growth parameters make it extremely imprudent and scientifically foolhardy to base assessments on a single year.

There is a clear and present need for studies to continue for several years to assess the true impact of the *Exxon Valdez* accident. This is fair to both Exxon and the United States government. If the Trustees restrict operations to a four month winter period or even to the year following the spill on 24 March 1989, their data on damage will represent minima and there will be a need to extrapolate, based on very wide confidence limits, as to the maximum damage that occurred. Such extrapolation will no doubt be sought through the courts. This will cost taxpayers millions of dollars in legal fees on the government and NGO sides and cost consumers millions more in legal fees on the Exxon side. It also may result in the judiciary, rather than the Trustees, setting the final damage figures, thus negating the need for the Trustees. This in turn will prompt questions in Congress as to the prudent use of funds by the agencies involved.

I would urge therefore that the Trustees establish long-term programs with rigorously defined goals and with realistic termination dates to more accurately assess the damage. I would also urge that the Trustees involve the open scientific community in this work as much as possible. There are unfortunate rumors of gag rules for Alaskan scientists. By opening the evaluation, we can build a concensus about damage from the oil incident and avoid damage to the scientific reputation of the assessment, as may happen if outside biologists come in only at the end, as outside witnesses, whether for NGOS, Exxon or OMB, to evaluate the results.

Com.	Topic	Issue	Sug.	Sort
1				

Com.	Topic	Issue	Sug.	Sort
2	3	0200	X	2

Also I would urge that the Trustees consider novel definitions of restoration of habitats and populations. Restoration of habitats may have an extremely large cost, compared to the amount of restoration achieved. The Trustees may wish to consider biological equivalencies of restoration, such as acquiring of important seabird nesting or sea mammal roosting islands outside the affected area, to ensure populations of species that can not be restored through human means in the affected area.

Com.	Topic	Issue	Sug.	Sort
3	3	0150	X	2

I wish you every success in what is obviously an extremely difficult situation. I would be happy to be of further assistance or to identify scientists with expertise who could contribute to thorough evaluations.

Sincerely,

David Cameron Duffy PH.D.
Executive Officer, INTECOL and
Chairman, Seabird Specialist Group, IUCN/ICBP

cc: Senator W. Fowler

ROBERT G. TORRICELLI
9TH DISTRICT, NEW JERSEY

COMMITTEES:
FOREIGN AFFAIRS
SCIENCE, SPACE, AND TECHNOLOGY

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DuLac

Congress of the United States
House of Representatives
Washington, DC 20515

October 12, 1989

Trustee Council
P.O. Box 20792
Juneau, Alaska 99802

Dear Trustee Council Members:

This is in reference to the draft Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill made available on August 18, 1989. I commend the Trustee Council for preparing the draft for public review; however, I would like to take this opportunity submit as comments my serious concerns about the plan.

Com.	Topic	Issue	Sug.	Sub
1	4	0201	X	2

I am concerned that the damage assessment plan would limit all studies to one year. The study itself admits the oil will continue to have serious environmental impact for years to come. Many of these biological and ecological impacts will take years to become apparent. For example, it may take several years before the extent of damage done to the salmon population will be known. While the plan does provide for the possibility of future studies, decisions to extend studies would depend on impacts found in the first year, thereby ignoring damages that may emerge after one year.

Com.	Topic	Issue		
2	2	0207	X	2

Also, I am concerned that the trustees may let Exxon participate in the assessment. It is my understanding that Exxon will be doing its own studies, the results of which may be used in the assessment. Even with oversight from the Interior Department, we can not expect Exxon to provide objective information considering their direct interest in the results.

Com.	Topic	Issue		
3	3	0150	X	2

Perhaps of greatest significance is the plan's lack of focus on restoration, replacement, or acquisition of the equivalent of the injured resources. The D.C. Circuit Court of Appeals rejected several of the Interior Department's damage assessment regulations. It held that restoration or replacement of natural resources should be the basic measure of damages. However, the draft states that the rejected regulations are still being considered as an option when considering how to compensate for damage. It is essential that a restoration plan and damage assessment plan be developed that are consistent with the court's decision. Use value alone must not determine the extent of damages.

Com.	Topic	Issue		
4	3	0102	X	2

Finally, I am concerned about the vagueness of the study. Many details about the study were left out. For instance, I recently learned that the Trustee Council, to save costs, will only allow each research team to analyze ten samples (e.g. carcasses) for each study.

Such a limit will make it unlikely that damage assessment will be accurate considering that 29,541 birds, 922 sea otters, and several hundred seals already have been found dead. These are only fractions of the total numbers of animals killed by the spill. The Interior Department must provide more details on the study so that intelligent public comment will be possible on the plan's specifics.

Thank you for your consideration of these matters. Please contact me if you have any questions or concerns.

Sincerely,

ROBERT G. TORRICELLI
Member of Congress

RGT:rly

Du Lac

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Washington
State University

Department of Anthropology, Pullman, Washington 99164-4910 509-335-3441

October 18, 1989

Trustee Council
P. O. Box 20792
Juneau, AK 99802

Dear Sirs:

I have read over the Public Review Draft Statement of the State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill of August 1989. Specifically I would like to comment on Economics Uses Study Numbers 6 and 9.

Economics Uses Study Number 6

LOSSES TO SUBSISTENCE HOUSEHOLDS

(1) Local food and raw material resources are of extreme importance to Native American and Euro-American populations on a subsistence level of economy. Not only are the food resources important in terms of calories, but they also provide a balanced nutrition. When local populations turn to processed foods they are either uninformed about a proper balance of commercially available foods or they simply cannot afford the costs of maintaining a balanced diet with these foods.

(2) The impact of the oil spill in destroying local food resources is thus more than a reduction in caloric intake, but also results in a dietary imbalance when a substitution is made.

(3) The loss of raw materials for construction, the handicraft industry and the like is in some ways less serious, but at the same time is a loss not easily replaced by purchasing a manufactured equivalent. For the handicraft industry there is no equivalent.

Economic Uses Study Number 9

SURVEY OF ARCHAEOLOGICAL SITES IMPACTED BY THE EXXON VALDEZ OIL SPILL.

(1) Impacts to be considered as a result of the Exxon Valdez Oil Spill

(a) Radiocarbon dating analysis

The seepage of oil into the soil and midden matrix of archeological sites will undoubtably have a profound effect on the radiocarbon dating of the sites. The oil, which contains very ancient organic carbon, at first will be a coating on materials and then as it penetrates into the more porous organics will become incorporated. The presence of the ancient carbon will skew the date of the sample submitted for dating from the site.

(b) Soil Analysis

The introduction of oil to the soil structure could well disturb the soil chemistry of archeological sites. With a large amount of oil in the soil, sediments become very difficult to work with in the field as it masks color and textural characteristics. Many of the normal sediment studies such as grain size analysis, sinking rates of sediments in water columns, etc would not work until the oil is removed. The problem in soil chemistry, is that one does not know what else is removed during the process of cleansing the oil from the samples.

As oil congeals it can form bituminous-like pavements or hardpans. The effect of this cementation process on archeological sites is, likewise, an unknown impact and one that needs to be evalued.

(3) Artifact analysis

Artifacts are presently subjected to a variety of micro-analytic procedures which search for traces of blood residues, mineral pigments, resins for hafting and the like. Current methodology now limits the amount of handling of artifacts until such studies are completed as well as the avoidance of washing the artifacts. With a coating film of oil, I would doubt that these microanalytic procedures would be practical. We don't know what cleaning artifacts in a solvent does to amino-acids, pigment and resin residues.

(4) Preservation of archeological site materials

Would the presence of oil hasten biological decomposition? If the presence of the oil attracted a variety of new microorganisms then this might hasten the disintegration of organic artifacts, plant and animal remains in the site.

2. Site value

It is often very difficult to put a value on a site until the site is excavated to determine what information it contained. Sites also have value in terms of the scientific research problems that can be addressed using site information. Landforms and biotic resources are important criteria utilized in determining the reasons why particular sites were occupied. Site value or significance thus can be accessed in part through the study of local ecological relationships and site settings. For certain research questions, sites along an open coast might be more important than those within an embayment. In terms of other research problems, the prehistorian might be addressing the subsistence strategies of people who occupied different parts of an embayment. One has to conclude that all archeological sites are valuable as there are a multitude of research questions that can be asked of site data. Relatively modern sites thus may be as important to the investigation of a particular environmentally related archeological problem as those considerably older.

Significance of sites or site information is often measured by the rule of the potential for contributing new scientific data. While in some ways this works, in many other ways it does not. A 50 year old log cabin is often regarded as less significant than a 5000 year old prehistoric site as we know about the people who lived in cabins 50 years ago while we know nothing about people who occupied a site 5000 years ago. Unfortunately, written history has a way of short-changing us and we fail to record the familiar or the obvious. The 50 year old cabin ruin of today may be the vital bit of data needed by the scientists of the future.

3. Evaluation of the impact of the oil spill on archeological sites.

Not only will the number of sites, both surface and subsurface need to be determined to evaluate the impact of the oil spill, but different site types and site locations will have to be tested to determine the nature of the impact of the oil spill on archeological materials. It is important to stress that there are both surface and subsurface components in archeological sites. In coastal areas where erosion can cut into the side of an archeological site exposing the entire strata of occupation, both the surface and the subsurface components will be affected.

Yours Sincerely,

Robert E. Ackerman

Robert E. Ackerman
Director, Museum of
Anthropology and Professor
of Anthropology

cc. Judith E. Bittner
State Historic Preservation Officer.

58 Du Lac

NORTH GULF OCEANIC SOCIETY

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P.O. BOX 156
CORDOVA, ALASKA 99574

To: Trustee Council
P.O. Box 20792
Juneau, Alaska 99802

16 October 1989

Re: State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill.

Since most of these studies were organized shortly after the spill occurred and were an attempt to cover all possible biological aspects of the damage, it is difficult to make constructive comments until the first seasons results are in. This should be in January 1990.

Most of the studies revolve around individuals or agencies with prior expertise with the organisms or habitat under study and should incorporate previously collected "baseline" information. The lack of good baseline data in some cases will underline the need for these types of studies prior to possible disturbances in the future. In the case of some animals, such as marine mammals, that have long life histories and low mortality and recruitment rates long term studies provide the only reliable basis for assessment of impacts after an event such as the Exxon Valdez spill.

Com.	Topic	Issue	Sug.	Sort
1	4	0201	X	2

My field of expertise is with marine mammals, so I will limit my specific comments to these studies.

In regard the humpback whale study, there is probably a small chance of direct kill of these whales from ingestion of oil, since few humpbacks were present when the oil moved through the Sound and along the outer coast. Seldom are any number of humpbacks seen until late April or May. We do not know for certain (as the study plan suggests we do) that whales that feed in the Kodiak area are part of the same group that feeds in Prince William Sound. It would seem, though, that the most likely known feeding area that whales from the Sound would move into if displaced would be the Kodiak area. I have some concern that the Kodiak area will not receive enough attention in determining oil effects on humpbacks. Also of great concern is the long term food chain effects on these whales. Effects on the whales prey or on the whales themselves may not show up immediately, but intensify as hydrocarbons work their way up the food chain. I have some concern that the small fish and euphausids that make up the prey of these whales are not receiving the study they should and that problems in the prey populations might go undetected. Finally, I have strong doubts of the value of line transect surveys using boats and aircraft in an enclosed, irregularly shaped area such as the Sound and feel that photoidentification methods of population census provide the only reliable, cost effective research tool. This is especially true in light of the previous photoidentification work that has been completed and its value as a baseline.

new study

Com.	Topic	Issue	Sug.	Sort
2	3	1610	X	2

With the killer whale assessment work, I again feel that aerial surveys are a tool that may be used to determine areas where photocensus should occur, but has little value as a means of determining population parameters in the detail needed for determination of oil impacts. Again, it is fortunate the the photoidentification baseline exists in the Sound to examine the more subtle changes in population paramenters. To confirm changes (or lack thereof) a several year approach to study must be taken. Since interchange between killer whales from the Sound and Kodiak has been demonstrated, again, it would seem important to concentrate some effort in the Kodiak area if distributional information is important.

Com.	Topic	Issue	Sug.	Sort
3	3	1620	X	2

Com.	Topic	Issue	Sug.	Sort
4	1	1640	X	2

Com.	Topic	Issue	Sug.	Sort
5	1	1650	X	2

In regard the harbor seal and seal lion studies, I would consider these essential in light of the declining Steller sea lion populations in western Alaska and the declining harbor seal populations in the western Sound. It is my fear that the spill will excerbate the decline of these marine mammals. Again, without a several year perspective, the effects on these long lived animals will not be clear.

Com.	Topic	Issue	Sug.	Sort
6	3	1660	X	2

The need for extended sea otter work is certainly evident. The only concern is that since this research is "hands on" type work involving the insertion of radio transmitters, that no more otters be radio outfitted than is absolutely necessary to obtain statistically meaningful results. Considering the disasterous effects of oil on the otters that has already been documented, it would seem disturbance of the animals should be kept to the mimimum necessary to produce quantifiable results.

Com.	Topic	Issue	Sug.	Sort
7	4	1600	X	2

It should be clear that with all these marine mammal studies, a single season of study will not prove or disprove to the extent a court of law would require the extent of damages (or lack of damages) to these populations. Without a 2 or preferably a 3 year study, population paramenters necessary to assess oil impacts these long lived, slow reproducing animals cannot be adequately developed.

After these first year studies are reported upon it may be quite possible to reduce some of the costs by cutting segments of the studies that do not seem to yeild information directly pertinent to the question of oil related impacts on the population.

Com.	Topic	Issue	Sug.	Sort
8	3	2030	X	2

Finally, I am very concerned that the results of all these studies described in the draft plan, both long term and short term will not be centrally catalogued and available to other workers as well as the public. Is there some system for catalogueing and making available the final reports by all the various research groups and contractors?

Sincerely,

Craig O. Matkin, Director

cc: Rita Hendrickson, Prince William Sound Users Association
Michelle Straube, National Wildlife Federation

 DuLac

Prince William Sound Science and Technology Institute

P.O. Box 705 • Cordova, Alaska 99574 • (907) 424-5800 Fax (907) 424-5820

October 19, 1989

Trustee Council
P.O. Box 20792
Juneau, AK 99802

Gentlemen:

The Board of Directors of the Prince William Sound Science Center has directed me to advise you of two major concerns with respect to the Public Review Draft Report: State/Federal Natural Resource Assessment Plan for the Exxon Valdez Oil Spill. Aug., 1989. We regret that these comments reach you after the published deadline; unfortunately the Board did not meet for discussion of these materials until after that date.

The Board's principal concern is that the document appears preoccupied with short-term goals and tasks, rather than taking a considered long-term approach to restoration and future protection of the impacted natural resources. This is particularly perplexing in view of the introductory statement to reviewers that:

> ". . .the plan is focused on those studies necessary to determine injury to natural resources and to determine damages resulting from the loss of public use of those resources, and **on the strategy for restoration of natural resources.**" (emphasis added)

Reviewers of the August draft must conclude that the projected array of studies became so focused on the first two purposes that the third, and most environmentally important purpose received scant attention--apparently limited to the single inter-agency general planning study outlined on p. 186.

While that study clearly is in order to assure a comprehensive and cost-effective approach to restoration in the long term, there certainly are aspects of damaged habitat restoration which should be begun at once, without waiting for the comprehensive analysis and report proposed.

It would seem also that long-term planning should give significant attention to environmental protection against future disasters.

As a further suggestion, the perceived preoccupation with short-term tasks is heightened by the fact that most projects are described in a single-season time-frame context, even though many, particularly those addressing biological problems, will require continuity through a sequence of years to produce useful results. Projects requiring multi-year continuity should be so described, and include some projection of costs into subsequent years.

The Board of Directors' second concern more directly addresses implementation of the planned studies. It appears that the responsible agencies continue to debate what has to be done and which entity will be funded to do it, rather than getting on promptly with the tremendous tasks which clearly need immediate attention. The Board urges earliest possible inter-agency cooperative action on studies of recognized immediate importance.

The Board recognizes that considerable progress may already have been made toward addressing this concern. However, there is no general awareness that this is so. The Board therefore further recommends that progress reports on the scope and progress of work actually underway be widely disseminated within the scientific community and to the general public. It is worth noting in this context that the Prince William Sound Science Center recently attempted to convene a regional conference for precisely that purpose, but was forced to postpone that effort when it became apparent that the "gag order" in effect would not permit any such public review and discussion.

Com.	Topic	Issue	Sug.	Sort
3	6	1000	X	1

These comments are intended to be constructive in terms of needed future action, fully recognizing the time constraints and other difficulties under which this document had to be drawn together from multiple sources, and then approved for public review by the responsible agencies. Please be assured that the Prince William Sound Science Center is intensely interested in the issues involved and in the researches contemplated to address those issues. The Center is prepared to cooperate and participate in any way contributing to the ultimate success of those endeavors.

Yours sincerely,

John P. Harville
Interim Director, Prince William Sound Science Center

3036 Riverview Drive
Fairbanks, AK 99709
24 October 1989

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Trustee Council
State/Federal Natural Resource
Damage Assessment Plan
P.O. Box 20792
Juneau, AK 99802

Council members:

I have reviewed the public draft of the "State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill" (August 1989) and present the following comments.

The proposed scientific studies on the effects of the Exxon Valdez oil spill appear to have been prepared by knowledgeable specialists, and lacking sufficient background I cannot comment on those proposed studies. However, I am concerned about what is NOT in the plan, particularly studies dealing with the human impacts of the oil spill. Mention must be made of the archaeological sites which were disturbed by oil spill clean-up workers, particularly by the pot-hunters and souvenir collectors.

Com.	Topic	Issue	Sug.	Sort
1	3	2290		1

Most significantly, the plan made no mention of how people living in the oil spill-affected areas will be assessed; if this is not in the mandate of your study, then I urge that it be added. I particularly urge such an assessment be done as there is little, if any, human assessment information currently available. During the recent Alaska Science Conference session on the Prince William Sound oil spill, knowledge of only one human impact study was voiced. Your assessment plan MUST address the human impacts, particularly of subsistence-based villagers who have no other food sources then that fouled by the oil, and many of these individuals couldn't earn money in the clean-up because of age or other responsibilities. These folks will have no cash and very litte untainted subsistence foods.

Com.	Topic	Issue	Sug.	Sort
2	3	0113		2

I appreciate this opportunity to respond and am eager to see the final plan. I urge you to distribute copies to all Alaskan libraries so people can see the final plan; your work on behalf of the public is appreciated as long as it truly reflects that public's concerns.

Com.	Topic	Issue	Sug.	Sort
3	6	0100		1

Thank you,

Ronald K. Inouye

Ronald K. Inouye

cc: S. Cowper
R. Eluska, AFN
F. Murkowski
T. Stevens

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26 October 1989

Trustee Council
P.O. Box 20792
Juneau, AK 99802

Com.	Topic	Issue	Sug.	Sort
1	3	2290		2

Dear Sir(s):

The purpose of this letter is to comment on the draft of the "Natural Resource Damage Assessment Plan," open to review under the provisions of the Clean Water Act and the Comprehensive Environmental Response, Compensation, and Liability Act. As COPA (Council on Public Archaeology) representative from the State of Alaska to the Society for American Archaeology, I would like to enter some comments on behalf of three constituencies: the professional archaeologists of the State of Alaska; the members of the Department of Anthropology of the University of Alaska; and the members of the Society for American Archaeology. As such, there appear to be a number of important omissions or inadequacies in the plan as currently formulated. As you are aware, the plan attempts to document what studies will be necessary to assess injuries to the natural and social environment created by the oil spill, including determination of damages to be claimed for the loss of the resources in question. The economic value of lost or injured resources is to be based on "the services they provide [to] humans," by calculating "the reduction of these services (lost-use values) resulting from the spill." However, there is no provision in the plan as to how this might be applied to cultural resources, such as archaeological sites. I am not sure that the services they provide to humans" can be accurately measured, but "the reduction in services (lost-use values)" might be calculated by the number of man-days and other costs (in equipment, supplies, transportation, and per diem subsistence) that it would take to excavate all portions of sites affected by the oil spill. This might be a large figure, but should be included in claims for damages presented to the "potentially responsible parties." In large part, it is difficult to say what that figure is, until a detailed assessment can be made of all sites and parts of sites affected by the spill, as called for in the draft. In terms of the latter, the main problem with assessing the relationship of such potential costs to the amounts already included in the budget of this draft is that, although there are studies called for under a variety of categories, each of which has a dollar figure attached [for one-year field and analysis costs], impact to archaeological sites is not considered under any of these categories, including injury to coastal habitats [budget: $5.44 million]. Archaeological sites are considered only under a separate category involving determination of the economic value of resources impacted by the oil spill. Here, a total budget of $2.8 million is called for, but the dollar amount of the archaeological subcategory is unspecified. It is true that both literature search and field survey would be involved, with the latter

including determination of the number of sites affected, extent of impacts on the sites, types of sites lost or damaged, and uniqueness of those sites or parts of sites. However, a realistic budget needs to be developed for all of this work, which is not present here, as far as I can determine. And again, such work can only be looked at as prefatory to determining the actual cost of damage to the sites, which can only be assessed through excavation of damaged areas.

I thank you for the opportunity to comment on this draft on behalf of the Alaskan archaeological community.

Sincerely,

David R. Yesner

David R. Yesner
Dept. of Anthropology
University of Alaska
3211 Providence Drive
Anchorage, AK 99508

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DuLac

National Trust for Historic Preservation

October 27, 1989

Trustee Council
P.O. Box 20792
Juneau, AK 99802

Re: Draft Natural Resource Damage Assessment
Plan - Exxon Valdez Oil Spill (August, 1989)

Dear Trustees:

The following comments are submitted by the National Trust for Historic Preservation in the United States (the National Trust) in response to the draft State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill (the Draft Plan), prepared by the Trustee Council for public review. The National Trust commends the cooperative efforts of the State of Alaska, the U.S. Department of the Interior, the U.S. Department of Agriculture, and the U.S. Department of Commerce, in undertaking this comprehensive assessment, and hereby provides its comments on the portion of the Draft Plan dealing with injury to archaeological resources.

The National Trust is the congressionally chartered private nonprofit organization with over 225,000 members nationwide, which is charged with facilitating public participation in the preservation of the Nation's historic and cultural resources. The National Trust has a strong commitment to the preservation of our nation's irreplaceable archaeological sites and resources, the protection of which is critical to our ability to understand and learn about our past. For example, most recently, the National Trust has been working to secure passage of federal legislation designating the West Mesa petroglyphs near Albuquerque as a National Monument, in order to protect this unique archaeological resource. Congress has expressly recognized the importance of archaeological resources in enacting statutes such as the Archaeological Resources Protection Act, 16 U.S.C. § 470aa et seq., which protect archaeological resources on federal lands from loss and destruction, and the National Historic Preservation Act, 16 U.S.C. § 470 et seq., which requires federal agencies to consider the effects of their actions on historic properties.

On March 24, 1989, the tanker Exxon Valdez spilled 11,000,000 gallons of crude oil into the waters and onto the coastline of Prince William Sound, Alaska, causing devastating harm to that region's natural resources, and precipitating one of the

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largest, most costly clean-up efforts ever undertaken. The damage assessment process described in the Draft Plan seeks to identify the studies necessary to determine the extent and magnitude of this injury, and the corresponding damages. Adequately identifying the extent of the injury is a critical step in developing strategies for restoring or obtaining reparation for these lost resources under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Under the Draft Plan, the injured natural resources are divided into six resource categories (coastal habitat, air/water, fish/shellfish, birds, marine mammals, and terrestrial mammals), and a number of studies are recommended to assess the damage to each category. Each separate study is assigned its own budget, and the agencies responsible for undertaking or participating in each of the studies are identified. These studies are cumulatively allocated approximately $ 27 million.

After the injury to all categories of natural resources is quantified, the next step of the damage assessment process is to determine the economic value of the loss or injury to the natural resources. The Draft Plan describes nine "economic use" studies designed to measure the value of "services" provided by the various categories of natural resources (commercial and subsistence uses, recreation, research, intrinsic value, etc.) which provide the models used to measure the economic damages caused by the oil spill. The impact of the oil spill on archaeological resources is assessed as one type of economic use. These "economic use" studies are not assigned a lead agency, presumably because they assess the economic losses of several different types of natural resources, nor are they assigned separate budgets. The cumulative budget allocated to these studies is $ 2.8 million.

We are pleased that the Trustees have included in the Draft Plan a provision for studying the impact of the oil spill on archaeological resources. It is clear that the spill has had a devastating impact on these sites. For example, archaeological sites containing fire-cracked rock slate fragments, slate tools, and whale tooth fragments from early pacific eskimo cultures dating back to the first millennium were discovered in the areas overlooking McArthur Pass and Ragged Island, many of which were injured by the oil spill, and further threatened by clean-up activities.

Com.	Topic	Issue	Sug.	Sort
1	1	2290		1

We believe that the Draft Plan is flawed, however, due to its

failure to address the impact of the oil spill on archaeological resources as a type of natural resource rather than as an "economic use" of natural resources. As will be discussed further below, classification of archaeological resources as a "natural resource" is important for several reasons. First, archaeological resources are tangible, publicly-owned resources that are properly classifiable as "natural resources." This classification will enable the extent of this injury to these irreplaceable resources to be more comprehensively studied in the injury assessment phase of the process. By contrast, classification of archaeological resources as one type of "economic use" of resources deprives archaeological resources of the benefit of all applicable economic models for measuring damage to natural resources. Finally, we suggest a number of specific changes that should be made to the proposed studies in the Draft Plan to ensure that the injury to archaeological resources, and the associated economic damages, are adequately assessed.

Com.	Topic	Issue	Sug.	Sort
5	3	0100		2

Com.	Topic	Issue	Sug.	Sort
2	3	2290		2

Archaeological Resources Are "Natural Resources"

As the Draft Plan indicates, archaeological sites on the coastline area of the Prince William Sound and Gulf of Alaska include petroglyphs and pictographs (rock or cave drawings), weirs, and submerged stratigraphy. These sites clearly fall within the broad definition of "natural resources" under CERCLA. See 42 U.S.C. § 9601(16). First, they are owned either by the federal or the Alaska government. Moreover, archeological sites are tangible, physical resources that include "land" and "biota" such as rocks, shells, pollen grains, animal bones, carbonized seeds, wood samples, and a whole host of other materials. These are "natural resources" in the traditional sense that also, if properly studied, can provide important information about human history that is undocumented in any other way.

The far larger budget allocated to the "injury determination" phase of the damage assessment process reflects that assessing the nature and extent of injury to natural resources is by far the most complex and important aspect of the damage assessment process. Accordingly, it is important that archaeological sites be properly classified as a natural resource in order to ensure that the injury to these resources is accurately assessed, by the appropriate agencies with a specific budget.

Moreover, a comprehensive assessment of injury to archaeological resources is an inherently valuable process, since Alaska's coastlines have been largely untouched and contain a veritable

neither surveyed nor identified by the Alaska State Historic Preservation Office. Those resources that have not already been harmed by the oil are facing continued, and greater, threats of destruction or looting as a result of the ongoing clean-up activities. Adequate, comprehensive identification of these resources may be the most important contribution to the ultimate goal of protecting and preserving archaeological resources from further injury, as well as assessing the extent to which they have been already harmed.

On the other hand, assessing damages to archaeological resources only in the context of one of the studies designed to determine the economic value of lost resources will not result in an accurate measurement of monetary damages caused by the loss of archaeological resources. The primary value of these resources is intrinsic, not economic. The injury to and loss of archaeological resources, like other natural resources, is best measured by including this injury as an objective of several economic use studies, such as the study to determine the loss of intrinsic value of natural resources (Economic Uses Study Number 7), or the study to assess the loss of research programs or investigations (Economic Use Study Number 8). Moreover, inasmuch as measuring damages resulting from the spill involves a comparison with a "base-line" (i.e. pre-spill level) of use, a thorough process of identifying the injury to archaeological sites must first be undertaken in order to ensure that that economic damages caused by the spill are accurately measured.

Assessing Injury

In designing studies to carry out the injury identification/ quantification process, we offer the following comments. First, we suggest that the Damage Assessment Plan specifically identify the Alaska State Historic Preservation Office (SHPO) as the Lead Agency for coordinating archaeological injury assessment studies. The Alaska SHPO is the agency most knowledgeable about the existence and significance of archaeological sites in the affected area, as part of its statutory responsibility under federal and state law as guardian of these resources. 16 U.S.C. § 470a. Indeed, the SHPO has already played an important role in mitigating harm to these resources caused by the oil spill clean-up activities. In addition, federal agencies that manage federal lands affected by the spill (e.g., National Park Service, Bureau of Indian Affairs, Bureau of Land Management),

and land managing state agencies, should be assigned appropriate responsibility for carrying out assessment activities affecting lands under their jurisdiction or control.

Second, we suggest that the injury to archaeological sites from oil spill clean-up activities, as well as injury from the oil itself, be made part of the injury assessment process. For example, the use of high-pressured hot water as part of the initial oil spill clean-up effort may have damaged archaeological sites, and the vastly increased human presence in these areas as part of the clean-up effort has resulted in the unauthorized removal of archaeological resources. Even the process of studying and assessing the injury to other natural resources in carrying out the Damage Assessment Plan may disturb fragile archaeological sites. These injuries are causally related to the oil spill and should be assessed as well.

Measuring Economic Damage

We believe that the unique value of archaeological resources requires changes in the proposed economic use studies in order to measure adequately the damages resulting from their loss. The value of lost or injured archaeological resources simply cannot be measured by the cost of restoring or replacing these resources. In contrast to traditional natural resources, archaeological sites cannot be regenerated by breeding, planting, or purification. Once lost, they are irreplaceable, and once injured, they cannot easily be restored. Nor does their economic value stem from the "services" these resources provide to humans, since archaeological resources are optimally "used" by leaving them undisturbed. Hence, the "intrinsic value" (Economic Use Study Number 7) and the "research value" methodologies (Economic Use Study Number 8) provide the most helpful starting points for measuring damages. However, these methodologies require some modifications to measure adequately the loss of archaeological resources.

For example, the proposed economic use study for assessing damage resulting from research investigations and programs (Economic Use Study Number 8) limits the loss to research-based expenditures made or committed to before the oil spill. In the case of archaeological resources, however, few if any research studies had been planned prior to the spill for the simple reason that research studies to inventory and collect data on

Com.	Topic	Issue	Sug.	Sort
3	3	2280		2

archaeological resources frequently do not become necessary until the archaeological resources are threatened with loss or destruction. Thus, the threats to these resources from the oil spill, and the oil spill clean-up activities may make necessary studies not previously contemplated. Accordingly, we suggest that this economic use study focus on resource-based expenditures that are themselves necessitated by the oil spill, as well as studies planned or begun before the spill.

The "intrinsic valuation" study (Economic Use Study Number 7) is best suited for valuing the loss of resources, such as archaeological sites, whose value does not lie in providing services or uses for humans. This valuation methodology should specifically refer to archaeological resources, and should specifically address the need to develop "contingent valuation" methodologies to determine the value of resources the extent of which, by their very nature, humans had been largely unaware.

Com.	Topic	Issue	Sug.	Sort
4	3	2270		2

In devising methods and analyses for each of the economic use studies, we urge you to explore and incorporate into those studies some alternative analytical models that have already been developed to determine the value of archaeological resources. One such valuation methodology is contained in the regulations developed by U.S. Department of the Interior under the Archaeological Resources Protection Act, which include methodologies for determining the commercial (i.e. fair market) value of archaeological resources, the lost "research" value, and the costs associated with restoration and repair of injured archaeological resources. See 43 C.F.R. § 7.14.

Compliance with Federal Historic Preservation Laws

As a final note, we urge you to consider the costs of complying with and enforcing federal historic preservation laws, such as the Archaeological Resources Protection Act, 16 U.S.C. § 470aa et seq., which prohibits the unauthorized removal of archaeological resources from federal lands, and Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470f, which requires federal agencies to consider the effect of their undertakings on historic and archaeological resources, and, in consultation with the Advisory Council on Historic Preservation, to study ways in which to avoid or mitigate adverse impact. In particular, compliance with Section 106 may be required in connection with the damage assessment process itself, which

employs sampling and study techniques that may harm historic resources.

Conclusion

In conclusion, the National Trust strongly urges the Trustee Council to strengthen the draft Damage Assessment Plan to assess more comprehensively and accurately the extent of injury to and loss of archaeological resources, and the damages associated with restoring these resources or compensating the public for their loss. The study contained in the Draft Damage Assessment Plan is a step in the right direction, but it is not strong enough.

The National Trust intends to continue monitoring this project, in light of the strong level of public interest in preserving and protecting archaeological resources among our constituency. We would appreciate being notified of the Trustee Council's issuance of a final Damage Assessment Plan. In the meantime, if the National Trust can be of any further assistance, please do not hesitate to contact us.

Sincerely,

J. Jackson Walter
President

cc: Judith Bittner, Alaska SHPO
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October 27, 1989

Trustee Council
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Dear Sirs:

We are in receipt of the public review draft of the State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill ("the Plan"), and offer the following comments for your consideration, pursuant to 43 C.F.R. §§11.32(c). These comments, which relate primarily to the assessment of resource and cultural damages in the Chugach Native Region, are submitted on behalf of the Chugach Alaska Corporation and the Native Village Corporations of Chenega, English Bay, Eyak, Port Graham and Tatitlek.

Chugach Alaska Corporation is the Native Regional Corporation for the Chugach Region, which includes Prince William Sound and Lower Kenai Peninsula, incorporated under the Alaska Native Claims Settlement Act and the laws of the State of Alaska. The village corporations of Chenega, English Bay, Eyak, Port Graham and Tatitlek are Native Village Corporations incorporated under the Alaska Native Claims Settlement Act and the laws of the

State of Alaska for Native Villages in the Chugach Region. The aggregate land holdings of the six corporations comprise the third largest block of ownership, after the State of Alaska and the U.S. Department of Agriculture, in the oil impact zone between eastern Prince William Sound and Kachemak Bay. Their shareholders residing in the area comprise 15% of the local population. The corporations also represent the largest group of private landowners in the entire impact zone, and because of their commitment to the preservation of Chugach Native culture, they are particularly concerned about the damage to archaeological and other culturally-sensitive sites caused by the oil spill.

The Native Corporations of the Chugach Region have joined forces in filing a single lawsuit against Exxon, et al., claiming, among other things, damages to lands and natural resources from oil contamination and the cleanup process. Since the date of the oil spill, the corporations have endeavored to cooperate with Exxon and federal/state authorities in providing input to the clean-up process in order to mitigate further damages by bringing their knowledge to the planning tables through a professionally-staffed oil spill response team. By this involvement, they have acquired a sound working knowledge of the event and bases for the subject draft report.

1. Study Termination Date

Com.	Topic	Issue	Sug.	Sort
1	4	0201		2

The Native corporations believe that the proposed study termination date of February 28, 1990 is totally unrealistic and inconsistent with the goal of making a complete assessment of the damages to the impact area and the length of time that the oil will be adversely affecting the entire ecosystem. Preliminary scientific studies indicate that the environmental havoc caused by the oil spill may well last for many years into the future, and it would be irresponsible for the Council not to make specific plans for in-depth, long-term studies of natural resources and economic damages, and studies concerning the long-term cultural and social impact on Alaska natives within the spill zone through at least 1995. For example, since some fish species are on a multi-year life cycle, it will take at least several years of study to determine the actual, rather than projected, impact.

2. Native Corporation Participation in Design of Studies

Com.	Topic	Issue	Sug.	Sort
2	6	0209		2

The Native corporations believe that the Council should establish a mechanism whereby the Native corporations will be allowed to participate directly with relevant state and federal personnel in the design of detailed study objectives and methodologies regarding all scientific and economic studies.

Participation by the Native corporations as property owners and "available parties" in joint Federal/State actions such as the studies described in the Plan is, in our view, mandated by 36 C.F.R. 800, Subpart B (the Section 106 Process). As property owners, the Native corporations have a particular interest in the preparation, coordination and execution of any CERCLA Damage Assessment Plan because of the federal government's special obligations arising from ANCSA §§12(a), 12(b) and 14(h)(1) selections, 3(e) determinations and other lands which have been selected but not yet conveyed to the corporations. Under Subpart B, the Native corporations also have a special interest in providing input regarding damage assessment of archaeological and culturally-sensitive sites.

Participation by the Native corporations in the planning process would provide the Council with the benefit of our detailed knowledge of Prince William Sound and much of the rest of the impacted area. For example, we could have advised the Council prior to the publication of the Plan that the map of the Wilderness Study Area on page 5 of the Plan is outdated in that the site for the village shown as "Chenega" was abandoned following its destruction by a tidal wave in the aftermath of the 1964 Good Friday earthquake. The new village of Chenega Bay on Evans Island should be shown on the map.

Com.	Topic	Issue	Sug.	Sort
3	3	0100		2

Com.	Topic	Issue	Sug.	Sort
4	3	0100		2

As another example, on page 14 of the Plan, the references to the locations where the oil first came ashore should indicate reference to Bligh Island. In addition, the description of the "important human activities" affected by the spill (p. 16) should make specific reference to the villages and communities encompassed by the Native corporations, which were in the direct line of the oil flow and which have been severely damaged by its impact on their lands, economy, culture and way of life. Tatitlek was the closest community to the spill and experienced severe air pollution during the Exxon burning mentioned on page 9 of the Plan. Eyak also suffered serious damage, and the lands owned by the Village Corporations of Chenega, Port Graham and English Bay, as well as lands owned by Chugach Alaska Corporation, were oiled more heavily than anywhere else in the impact zone. Indeed, Chenega Bay was surrounded by oil and its lands, as well as lands owned by other Native corporations, remain directly threatened by the oil trapped in the intertidal zone and seabed.

Com.	Topic	Issue	Sug.	Sort
5	6	0209		2

The need for the Native corporations to participate in the design of ongoing studies is particularly urgent since the studies described in the Plan generally lack the requisite specificity regarding methods, analyses, objectives, and procedures for determining the margin of error, for the corporations to provide meaningful comment. We, therefore, reserve the right to supplement these comments in the event

additional information is provided as to methodology, historical baseline data and other relevant factors.

3. Data Sharing

The Native corporations also believe that the Plan is inadequate in that it does not provide for access by them and other plaintiffs to the data and test results that will be collected as a result of the implementation of the studies. Timely access to data is, in our view, absolutely necessary in order that we may knowledgeably monitor the progress of the damage assessment studies and suggest appropriate study modifications or expansions.

Com.	Topic	Issue	Sug.	Sort
6	6	0209		2

4. Studies Relating to Clean-Up and Restoration

The Plan is deficient in that it does not encompass a study assessing the effectiveness of the clean-up operations, or the additional damage to property and the ecosystem directly resulting from the clean-up effort, including vandalism and other damage to archaeological sites. The Plan also lacks a study of which shoreline clean-up techniques should be continued and which ones should be abandoned (e.g., use of chemicals) because of their actual or potential danger to the environment. Particular emphasis should be placed on a study of the effectiveness of

Com.	Topic	Issue	Sug.	Sort
7	3	0106		2

Com.	Topic	Issue	Sug.	Sort
8	3	0106		2

bioremediation techniques, including a study of such techniques in a controlled and carefully monitored laboratory environment.

Com.	Topic	Issue	Sug.	Sort
9	3	2120		2

Although a study of restoration plans is proposed (pp. 184-188), there should be a recognition that cultural resources restoration is a vital and necessary part of the restoration process, especially where it involves the restoration of resource-based archaeological sites that are clearly part of the natural environment.

In general, the restoration planning process needs to involve the ANCSA landowners, just as they are included in other land planning programs.

5. Inclusion of Non-Economic Studies for Cultural Resources

Com.	Topic	Issue	Sug.	Sort
10	3	2290		2

Within the Section of the Plan dealing with "Inquiry Determination/Quantification" (pp. 28-184) should be included non-economic studies for cultural resources.

(a) For example, a study program should be implemented in consultation with the Native corporations to monitor the effect of increased activity and vandalism that has occurred since the oil spill on culturally-sensitive areas. It would be appropriate for the Native corporations to conduct such

monitoring on their own fee lands, selected lands and 14(h)(1) sites.

(b) Since numerous ANCSA 14(h)(1) sites have been oiled, a study should also be conducted of the impact of the oil spill and clean-up operations on properties and site locations critical to the preservation of intrinsic heritage values.

(c) A study should determine the injury to the radiocarbon integrity of cultural resource sites. While "Economic Uses Study Number 9" (pp. 200-201) makes vague reference to such a study, a specific design and methodology for this study must be developed. For example, experimental contamination and cleaning of samples of known (C14) age should be undertaken to determine whether a sample means can be found for removing oil contamination from radiocarbon samples.

(d) A study should involve test clean-up of a hypothetical site constructed under controlled conditions in a laboratory. The site should be contaminated and test-cleaned using a variety of methods (e.g., hydrocarbon solvents, water-based solvents, hot water, bioremediation, sponging and in situ cleaning by hand) to determine the injury from clean-up methods used.

The Native corporations, because of the special knowledge and expertise in these areas of their shareholders and staff personnel, should participate in the process of selection of which agency experts and/or consultants will be conducting these studies. In addition, all raw data, reports and field notes should be made available to the Native corporations and others for review and comment during the study process.

6. Comments on Part II Studies: "Development of Restoration Plans," pp. 184-188

In general, it should be recognized in the development of restoration plans that cultural resources are closely linked to natural and ecological resources in that cultural ecology includes resource-based archaeological sites that are clearly part of the natural environment.

(a) Concerning "Technical Services" (pp. 176-177), this study should extend to cultural resources, and a fourth "major objective of these analyses and subsequent evaluations" should read as follows:

> Conduct an exposure assessment of petroleum and chemical contamination on archaeological site radiometric dating techniques, especially radiocarbon. Measure controlled samples and measure contaminated samples for changes in the

Com.	Topic	Issue	Sug.	Sort
11	3	2000		2

ratio of radiocarbon as might affect oiled cultural resource sites.

(b) "Economic Uses Study Number 7" (p. 198) should be extended to include cultural resources such as historical places, archaeological sites, rock art, subsistence sites, and other cultural resources having great intrinsic value. However, a protective mechanism should be initiated to protect against disclosing in the study reports the location of important cultural sites. Publication of specific site locations will, unfortunately, only increase the rate of trespassing on and vandalism of these sites.

Com.	Topic	Issue	Sug.	Sort
12	3	2270		2

(c) In the "Concern/Justification" section of "Economic Uses Study Number 9" (pp. 200-201), the types of impact listed fail to include the following impacts on cultural sites: increased widespread knowledge of "sunset" information on site location, etc.; visitations by clean-up personnel; unauthorized removal of material and remains (including human remains); heavy pedestrian traffic; vandalism; and an anticipated increase in "pot hunting" in coming seasons.

Com.	Topic	Issue	Sug.	Sort
13	3	2290		2

(d) In the "Objectives" Section, additional objectives should be:

1) determining how many cultural sites have been indirectly impacted by the spill;

2) predicting what the future impacts on these sites will be;

3) determining the present and potential impact of the spill on cultural sites where human remains are located (an area of particular sensitivity to Native Alaskans).

(e) In the "Methods and Analyses" Section, it must be recognized that, in addition to model building, each cultural site must be studied individually as to its characteristics and value rather than being lumped together with other sites if the "degree of impact" is to be adequately determined. Recognizing the uniqueness of cultural sites, additional thought must be given to the definition of what a "representative sample" is and what is meant by the use of the term "sites with high potential" (para. 1). Certain objective standards must be developed and applied since the criteria for what is important to Native cultural interests may be different from those characteristics which makes a site significant for museum collection or private research purposes. In that regard, the connection between cultural sites and living cultures should also be explored.

(f) Criteria must also be developed as to what "archaeological tests" will be conducted (e.g., random, non-random, destructive, non-destructive); what criteria will be required to regulate entry on private lands during the study period, and provision should be made for the return of culturally-sensitive materials which have been curated as a result of the studies (as well as by Exxon personnel and contractors).

(g) We recommend that a fourth paragraph be added to the "Methods and Analyses" section setting forth precise criteria and methods for analyzing the degree of increased public knowledge of sites resulting from the spill and clean-up activities; whether increased vandalism can be predicted using historical data on public knowledge of affected sites as a baseline; what the life span is of a cultural resource once information about it becomes common knowledge; and how the spill has affected the cultural resource from the standpoint of the living culture of the Native communities.

We thank you for your consideration of our comments, and we look forward to participating in the process of assessing natural resource damages and planning for their restoration. We are

available to meet and discuss our comments in further detail at your earliest convenience.

Very truly yours,

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Re: Comments on State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill (August 1989)

Dear Members of the Trustee Council:

These comments on the Public Review Draft of the State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill (August 1989) (Draft Plan) released last summer by the Trustee Council are submitted on behalf of the National Audubon Society and Tri-State Bird Rescue & Research, Inc.

Audubon is a non-profit conservation organization with over one half million members, 4,500 of whom reside in Alaska. Audubon is dedicated to conservation of natural resources and protection of the natural environment. Audubon has an office in Anchorage, Alaska where its staff has worked to preserve Alaskan wildlife and wildlife habitat. Audubon has many programs to study, protect and enhance habitat along the Pacific Flyway for several of the bird species that migrate through Prince William Sound.

Tri-State Bird Rescue & Research is a multi-disciplined group of biologists, veterinarians, government agents, chemists, and statisticians formed in 1977 to study the effects of oil on birds and to implement the necessary measures to deal with affected widlife. Tri-State operates a full-time wild bird rehabilitation/research center in Delaware. The organization conducts research, trains both professionals and volunteers in wild bird rehabilitation, and maintains a 24-hour-a-day oil spill response capability. A list of some of the published research by the organization is enclosed with their comments.

This letter contains the general comments of both organizations on the Draft Plan. More detailed comments prepared by the staffs of both organizations on the specific proposed studies, especially on the proposed "birds injury assessment," are set forth in an enclosure to this letter.

When an agency releases a document for public review and comment sufficient information must be set forth in that document for meaningful public comment. Section 553 of the Administrative Procedure Act (APA), 5 U.S.C. Sec. 553., sets forth the minimum standards an agency must follow for public notification of proposed rulemaking. The Draft Plan is a "rule" within the meaning of Section 551(4) of the APA, 5 U.S.C. Sec. 551(4). At minimum, the APA requires that the public must be apprised of the "terms and substance" of the proposed rule or given "a description of the subjects and issues involved." 5 U.S.C. Sec. 553(b)(3). The Draft Plan falls far short of this legal standard.

Our general comments are set forth below:

Com.	Topic	Issue	Sug.	Sort
1	2	0102		2

1. The Draft Plan contains insufficient information even for the most imaginative reviewers. This has been compounded by the unwillingess of the Trustee Council to make underlying data, more explicit study design, and experts available to our experts. Had the process been more open, deficiencies in the information disclosed in the Draft Plan might have been cured, and our comments less harsh. Because it was not, many of our comments are based on inference; while others raise questions that might have been avoided or address concerns that may now be moot.

The dearth of information created serious problems for the technical reviewers in our two organizations. For example, our reviewers had to assess the adequacy of proposed studies that did not identify the individual(s) or organization(s) conducting the proposed work, contain an implementation schedule for study completion, nor describe what of the

work had already been accomplished. Descriptions of experimental methodology were sparse at best; most were lacking sufficient information to allow assessments of their merits. It is even unclear from the Draft Plan what, if any studies have been undertaken, let alone completed to date. The sparse information made it equally difficult to assess the adequacy of the proposed study budgets.

2. The proposed termination date (February 28, 1990) is unacceptable because many of the studies described in the Draft Plan will be unable to complete data acquisition by that date. We do not advocate "long-term research" here for the sake of long-term research. Rather, we insist that the research proposed in the Plan be realistic in its expectations about the time scale of ecological impact, and that sufficient investment in time and resources be made to accomplish the research goals as outlined in the Draft Plan's introductory remarks. The Trustee Council should propose individual termination dates for the various studies based upon a scientific determination of the length of time required to assess the projected impacts being studied, and not upon other considerations, such as available funding.

Com.	Topic	Issue	Sug.	Sort
2	4	0201		2

3. The selection of an economic value standard for natural resources that is based upon the "goods and services" these resources provide humans is unsupportable in law and science. While it is generally recognized that it is extremely difficult to place an economic value on wildlife or ecosystems, this does not justify the selection of a method of valuation that will significantly undervalue natural resources, as has been done in the Draft Plan.

Com.	Topic	Issue	Sug.	Sort
3	3	0100		2

Application of this standard to species at lower trophic levels or to ecologically important geographic areas that do not attract tourists or hunters will result in those resources being undervalued. For example, a wilderness area which has no hunting, trapping, fishing or tourism may still possess abundantly rich integrated biological communities which are priceless in terms of biological diversity and health of the planet.

Com.	Topic	Issue	Sug.	Sort
4	5	0100		2

Such an unnecessarily "crabbed" approach to evaluating natural resource values was rejected by the U.S. Court of Appeals for the District of Columbia Circuit in Ohio v. Interior Department, 880 F.2d 432 (D.C. Cir. 1989). See also Colorado v. Interior Department, 880 F.2d 481 (D.C. Cir. 1989). In that case, the Court held that restoration, meaning restoration, replacement or acquisition of equivalent resources, is the basic measure of damages, although damages can exceed restoration costs. The Court further ruled that use values for natural resources, including non-

consumptive use values, should be derived by summing up all reliably calculated use values, and that costs should not be limited to use value. Other relevant factors should be considered. The economic value standard proposed in the Draft Plan should be revised to reflect the Court's guidance.

4. Crucial elements are left out of the research design. The most important of these is an assessment of the impact that reduced sea otter populations will have on the movement of carbon through the affected ecosystems, and the significance of induced changes in carbon flow for wildlife and fisheries. Elimination by hunting of otters from different Aleutian Islands during the 19th Century has had profound and lasting impacts on marine ecosystems around those islands that otters did not re-establish populations (Science 245:170-173). The impacts arise because the otters feed on sea urchins. Where otters are not present, urchins reduce primary productivity by heavy grazing on kelp. The effect is large enough to be manifest at many trophic levels.

Com.	Topic	Issue	Sug.	Sort
5	3	0111		2

Another omitted element from the research design are potential chronic impacts from the spill, such as possible teratogenic, mutagenic and carcinogenic effects on wildlife.

Com.	Topic	Issue	Sug.	Sort
6	3	0111		2

We also recommend more work focused on habitat impacts as opposed to the predominantly single-species focus of the Draft Plan. More attention should be be given to integrating single-species studies with habitat and ecosystem work. Lack of detail on the proposed habitat studies makes it impossible to assess the degree to which habitat work can be integrated with species work.

Com.	Topic	Issue	Sug.	Sort
7	3	0100		2

5. Inadequate attention is paid, at best, in the Draft Plan to the need to synthesize the separate, patchwork studies into an holistic assessment of damages from the spill. In the bird studies, for example, while mention is made of using indicator species to provide a basis for estimating overall damage, no procedures are outlined that will accomplish this objective. The studies, in fact, appear to have been designed separately, in isolation, and without rigorous thought to their ultimate integration. Thought should be given to the development of a synthesis process that will integrate the individual studies into an overall damage assessment.

Com.	Topic	Issue	Sug.	Sort
8	3	0100		2

6. We recommend that the Trustee Council apply "worst case analysis" methodology throughout the studies, particularly in those studies where logistical and timing problems prevent the

Com.	Topic	Issue	Sug.	Sort
9	3	0100		2

gathering of definitive information about the full range of impacts. See 40 C.F.R. Sec. 1502.22. Applying "worst case analysis" to the effects of the oil spill will lend a needed measure of scientific conservatism to the assessment phase. Although the Draft Plan is not de facto an environmental impact statement, the goals of the two documents are comparable -- the assessment of future environmental impacts from an human intrusion onto the natural landscape.

7. The proferred page and a half strategy for development of restoration plans for the area is woefully inadequate for the task at hand. It contains neither criteria by which the effectiveness of individual restoration plans can be analyzed, nor any plan for monitoring or testing the success of restoration efforts. No standard for what will be considered adequate restoration or rehabilitation is proposed. There is no discussion of the possible need to acquire replacement resources, even though that is authorized in Section 311(f)(5) of the Clean Water Act, 33 U.S.C. Sec. 1321(f)(5). The strategy offers no clue as to whether Exxon will participate in the design or implementation of these plans -- a factor of some importance.

Com.	Topic	Issue	Sug.	Sort
10	3	0151		2

8. The Draft Plan is dominated by proposed research on the effects of the spill on fisheries, both in terms of the actual number of studies and in the percent of the potential funds to be spent. Almost 30% of the proposed funds will be spent on fisheries/shellfish research; only 8% will go to studies on seabirds, and even less to studies of marine mammals. Virtually nothing goes to the impact of the spill on adjacent terrestrial habitats. While the emphasis is understandable given the regional economic importance of commercial fishing, the balance in the Draft Plan is too tilted in that direction. This imbalance should be rectified in the final Plan.

Com.	Topic	Issue	Sug.	Sort
11	3	0208		2

Given the substantial nature of our concerns, we ask that the Trustee Council consider offering the public an opportunity to review a revised, more informative version of the Draft Plan. In making this recommendation, we recognize the need to proceed expeditiously in the research, and thus do not ask that all studies be delayed until a second comment period is concluded. Rather, we are more concerned that the gaps and failures in the Plan as a whole be addressed, and that the public have an opportunity to comment on revisions. We assume that any revisions to the proposed studies will reflect the results of work now underway; although that is not clear from the Draft Plan.

Com.	Topic	Issue	Sug.	Sort
12	6	0240		1

We appreciate this opportunity to submit these general comments on the Draft Plan and hope that they will be helpful in the development of a final plan. Detailed comments on the proposed studies by the staffs of the National Audubon Society and Tri-State Bird Rescue and Research, Inc. are enclosed together with the curriculum vitae of the individuals who prepared the comments. We hope they will be helpful as well. Our experts are available to discuss their comments in greater detail.

We urge the Trustee Council to continue an open dialogue with the public as studies and restoration plans are refined and implemented. Additional information about the content of proposed studies and the course of their implementation will be of critical importance to the restoration phase. An informed, participating public can only be an asset to the Trustee Council as it tackles the extremely difficult task of restoring the Prince William Sound ecosystem.

Com.	Topic	Issue	Sug.	Sort
13	6	0240		2

Sincerely,

Dr. J.P. Myers
Senior Vice President
Science and Sanctuaries

Hope M. Babcock
General Counsel

Comments on Specific Bird Studies Proposed in the August 1989 Public Review Draft of the "State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill"

Prepared by Staff of the National Audubon Society
Science and Sanctuaries Division

September 1989

GENERAL COMMENTS ON BIRD STUDIES

Com.	Topic	Issue	Sug.	Sort
14	2	1800		2

1. Our over-riding concern for the bird injury assessment is the lack of focus on synthesis and overall assessment. The plan states (p144) that the bird studies "will focus on species that best represent larger bird groups with similar life cycles..." and that " data on injury to indicator species will be related by inference to the larger groups they represent." This requires careful choice of indicator species and a well-developed plan for extrapolating measured damage to total impact. The Draft Plan as currently devised includes several poor choices of indicator species, lacks other important ones, and gives no description whatsoever as to how the results will be integrated. The most likely result, given its current state, is that the Draft Plan will result in a hodge-podge of single species studies with no hope of any synthesis or extrapolation even to species closely related to those chosen as indicators. It may be that the investigators have concrete and detailed methodologies developed to meet these goals; the Draft Plan gives no hint of them.

Com.	Topic	Issue	Sug.	Sort
15	3	1800		2

2. The desired outcome for the indicator species work undertaken should be estimations (most likely and worst case) for each species of (i) the number of individuals that were exposed to oil, (ii) the extent of exposure, (iii) the likely impact on survivorship and reproduction of exposure, and (iv) the population consequences of those impacts, including (iv.1) immediate as well as predicted (iv.2) for at least 10 (or preferably, the generation time for each species) years into the future. This set of

Com.	Topic	Issue	Sug.	Sort
16	3	1800		2

predictions for each indicator species would then have to be extrapolated to other members of the group represented by a given indicator and then the impacts would have to be summed across groups. This work will not be very precise and it will be dependent upon extensive computer simulations that match bird distributions, behavioral and ecological characteristics, and life histories with oil spill trajectories. We see no evidence in the Draft Plan that the studies are leading to integrated results of this nature.

3. A completion date of 28 February 1990 is unacceptable. While most direct mortality due to oiling should have taken place already, the population effects of oiling may take several years to unfold. These may be positive, negative, or neutral, depending upon the response of individual birds to oiling (Did they die, simply abandon the area for a year, or leave permanently?. Are breeding colonies in Prince William Sound net contributors to the Gulf of Alaska population of birds or are they sinks? If the former then the spill's impact will be vastly greater than what is now understood. If the latter it may be significantly less. Do pairs of seabirds breeding in Prince William Sound respond to oiling like seabirds studied in Hawaii, where oiling of eggs resulted in lower productivity for at least two years?). These various questions are representative of many that must be asked to gain a realistic estimate of the damage caused by the spill. None of them can be completed within a single season.

Com.	Topic	Issue	Sug.	Sort
17	4	0201		2

Unless studies involving breeding birds have been conducted this summer (1989) all of the studies except No. 14 will be seriously impaired. This requires at a minimum that the schedule be moved back a year, to conduct the proposed studies during the 1990 breeding season (May-August). With respect to restoration, one primary lesson from our restoration programs on the Maine coast is that the planning horizon is a decade, not a year. This is not due to a misplaced fascination for "long-term research." It is a simple recognition that the population effects must be dealt with on a time scale consistent with the generation time of the organism under consideration.

4. Each study has as its last objective "Identify potential alternative methods and strategies for restoration of lost use, populations, or habitat where injury is identified." None of the proposals however, provide any information on how this goal is to be met, nor do the study designs appear to be directed toward restoration strategies for populations or for damaged habitats (instead they are directed exclusively toward damage assessment).

Com.	Topic	Issue	Sug.	Sort
18	3	0100		2

5. The detailed studies on foraging behavior should not interfere with broad-scale population assessments. Only if real evidence should be presented that there are continuing problems with the spilled oil in known foraging areas would a detailed feeding study be warranted.

Com.	Topic	Issue	Sug.	Sort
19	4	1800		2

6. The language used in describing objectives throughout the bird study section is vague and unclear. In several studies the proposed methods are inadequately detailed to evaluate. For example, in Bird Study 1 it is stated, "A systematic survey using general methods described in the literature will be used." This is not specific enough to allow useful comments to be made.

Com.	Topic	Issue	Sug.	Sort
20	3	1800		2

7. In many cases the specific sampling methods are not identified, and it is therefore not possible to review whether the intensity of the sampling is adequate. The geographic scale of the sampling in general seems appropriate; most studies cover a range of areas. Middleton Island should act as a control colony for some of the studies.

Com.	Topic	Issue	Sug.	Sort
21	3	1800		2

8. We cannot evaluate the adequacy of the personnel to do the studies because they are not named nor are their experience and qualifications described. Furthermore, if and where contractors are to be used, there is no mention of who they will be, nor the extent of their participation. For these reasons also, it is not possible to evaluate the contract budgets.

Com.	Topic	Issue	Sug.	Sort
22	3	1800		2

9. The budgets are not reasonable as presented. In particular, equipment budgets seem outrageous, and travel budgets seem too small. It may be that aircraft and boat charter and operating expenses are included under "equipment" but this is not intuitive. If travel to and from study sites is included in the travel budgets, then the amount of field work to be done may be inadequate. In the budget throughout, it is also difficult to determine how much money is to be used for chemical analyses.

Com.	Topic	Issue	Sug.	Sort
23	4	1800		2

10. The success of the synthesis of effort depends on the GIS system working on schedule. Is it currently on schedule?

Com.	Topic	Issue	Sug.	Sort
24	6	1800		1

11. Overall, the proposed studies can document possible poor reproduction in the aftermath of the spill. Discovery of reduced breeding population size in affected areas, and a correlation between contamination and poor reproduction will point to the spill as the causative agent. Care should be taken, however, that not all "problems" are automatically blamed on the spill. Some reproductive failures, for instance, may result from other causes.

Com.	Topic	Issue	Sug.	Sort
25	3	1800		1

12. Where possible, we recommend that researchers collect random non-pathological samples of a small number of whole birds (both adults and chicks) for necropsy, and random pathological and non-pathological samples of feathers and blood (pathological samples of the latter will only be possible for moribund birds) for contaminant analysis. This will allow determination of the mean level of contamination of the population in relation to demonstrated pathological levels of contamination, and estimation of the lethal threshold of toxicity.

Com.	Topic	Issue	Sug.	Sort
26	3	1800		2

Review of the individual studies follow. The authors that have contributed to each review are specified.

Bird Study 1. Beached Bird Survey to Assess Injury to Waterbirds from the Exxon Valdez Oil Spill

Comments contributed by Dr. Wayne Hoffman, Biologist, Department of Field Research
and Dr. Carl Safina, National Raptor Coordinator and Principal Investigator, Department of Field Research

It is unclear to us how Objectives A and B differ. In addition, mortality is not defined; is it used here to mean total numbers or the fraction of the population. The language in Objective F is likewise unclear; what is "lost use?" and how does that differ from "habitat"?

Com.	Topic	Issue	Sug.	Sort
27	3	1810		2

The methods are too telegraphic to be evaluated. We need to know what "Appropriate numbers" of beaches are. The flotation time, longevity, and drift experiments can be valuable contributions, but again they are difficult to evaluate without information on carcass condition, species chosen, tracking methods, sample sizes, and locations of beaches. Care needs to be exercised in interpretation of the drift experiments because confidence limits in the proportion of birds reaching the beaches will be large and may vary seasonally.

Com.	Topic	Issue	Sug.	Sort
28	3	1810		2

Bird Study 2. Surveys to Determine Distribution and Abundance of Migratory Birds in Prince William Sound and the Northern Gulf of Alaska

Comments contributed by Dr. Wayne Hoffman, Biologist, Department of Field Research

Once again, the methods are too briefly presented. What are aerial survey parameters (altitude, speed, strip widths, etc.)? What size "plots" are intended? Assuming that sampling intensity and statistical designs are adequate to factor out the normal seasonal and geographic variability in bird

Com.	Topic	Issue	Sug.	Sort
29	3	1820		2

numbers, this study will probably provide some of the best information on mortality in the whole package.

Bird Study 3. Population Surveys of Seabird Nesting Colonies in Prince William Sound, the Outside Coast of the Kenai Peninsula, the Barren Islands, and Other Nearby Colonies Likely to be Impacted

Comments contributed by Dr. Wayne Hoffman, Biologist, Department of Field Research
and Dr. Stephen Kress, Principal Investigator, Department of Field Research

Assuming plot sizes are adequate and locations are appropriate, the methods for this study seem fairly straight-forward. However, more specific details concerning census methodology would prove useful. Natural population changes may mask any effect of the spill, unless the spill has a massive effect on many colonies.

Com.	Topic	Issue	Sug.	Sort
30	3	1830		2

We suggest that Middleton Island should be included as one of the controls. In general though we feel that "non-oiled" colonies are not a good control as these could also be suffering various effects from the spill.

Com.	Topic	Issue	Sug.	Sort
31	3	1830		2

Given the timing of the spill, it will be necessary to be very careful in comparing numbers at affected colonies to numbers at colonies not visited by the oil, because birds from "non-oiled" colonies could have been exposed to and affected by oil on their staging or winter habitats.

Com.	Topic	Issue	Sug.	Sort
32	5	1830		2

We do not agree with the choice of species here, and feel that the criteria for selecting "certain species" should be detailed. Burrowing alcids should also be included - Tufted Puffins, and perhaps Horned Puffins, as well as one or two auklets. Burrow occupancy rates might be a good measure of population changes.

Com.	Topic	Issue	Sug.	Sort
33	2	1830		2

Bird Study 4. Assessing the Injury of the Exxon Valdez Oil Spill to Bald Eagles

Comments contributed by Peter Bloom, Biologist, Department of Field Research
and Dr. Carl Safina, National Raptor Coordinator and Principal Investigator, Department of Field Research

Objective 'A' appears to be actually two separate objectives. It is also unclear in the methods whether just two surveys or weekly surveys are planned. We suggest that more than one remote nesting site be used in comparing this data with data from previous years (page 153, lines 3-4.)

Com.	Topic	Issue	Sug.	Sort
34	4	1840		2

Our suggestion for this study is that chlorinated hydrocarbons be looked at as closely as the hydrocarbons produced from the oil spill. If reproductive failures do occur we want to know which contaminants are responsible. If we don't have CH levels we may be left wondering whether the oil related hydrocarbons were really the principal culprits in declines of eagle populations.

Com.	Topic	Issue	Sug.	Sort
35	3	1840		2

This study involves feather, blood, dead bird, and addled egg samples. It would be useful to know how many blood samples of eagles will be analyzed. We suggest that a small (20) sample of fat be taken from adults of this species since blood reflects only the contaminants (CHs) consumed within the last few days (meals). Fat reflects the contaminants that have been stored over months or years.

Com.	Topic	Issue	Sug.	Sort
36	3	1840		2

An aspect of the Bald Eagle study which we strongly support is the determination of toxic effects of oil on eagles. Although it is likely that a few crippled eagles will need to be sacrificed for this study, we think it is worth it.

Com.	Topic	Issue	Sug.	Sort
37	1	1840		2

Bird Study 5. Impact Assessment of the Exxon Valdez Oil Spill on Peale's Peregrine Falcons

Comments contributed by Peter Bloom, Biologist, Department of Field Research

As with the Bald Eagle study, we likewise suggest for the Peregrine Falcon study that chlorinated hydrocarbons be looked at as closely as the hydrocarbons produced from the oil spill. Again, if reproductive failures do occur we want to know which contaminants are responsible. If we don't have CH levels we may be left wondering whether the oil related hydrocarbons were really the principal culprits in declines of bird populations.

Com.	Topic	Issue	Sug.	Sort
38	3	1850		2

This study also involves feather, blood, dead bird, and addled egg samples. We again suggest that a small (20) sample of fat be taken from adults of this species since blood reflects only the contaminants (CHs) consumed within the last few days (meals) whereas, fat reflects the contaminants that have been stored over months or years.

Com.	Topic	Issue	Sug.	Sort
39	3	1850		2

<u>Bird Study 6</u>. Assessment of the Abundance of Marbled Murrelets at Sites Along the Kenai Peninsula and Prince William Sound

Comments contributed by Dr. Wayne Hoffman, Biologist, Department of Field Research
and Dr. Stephen Kress, Principal Investigator, Department of Field Research

This study does not specify what analyses will be done on the collected adults. Furthermore, the number of observation periods (5), seems too small to accurately sample breeding activity.

Com.	Topic	Issue	Sug.	Sort
40	2	1860		2

Control sites for this assessment should be very distant from oiled sites, to minimize chances that the control population is not also suffering some effects. Even control birds may pick up oil at sea during migration or on the wintering range. We are especially concerned here about the validity of the "non-oiled" site within Prince William Sound as a control. Birds breeding in that area might well have dispersed to other parts of the Sound, especially in winter, and might have been affected as well. An additional control, perhaps in the Kodiak area would be valuable.

Com.	Topic	Issue	Sug.	Sort
41	3	1860		2

We also suggest that an attempt be made to assess numbers of Kittletz's Murrelets.

Com.	Topic	Issue	Sug.	Sort
42	4	1950		1

<u>Bird Study 7</u>. Assessment of the Effects of Petroleum Hydrocarbons on Reproductive Success of the Fork-Tailed Storm Petrel

Comments contributed by Dr. Fred Schaffner, Biologist, Department of Field Research
and Dr. Stephen Kress, Principal Investigator, Department of Field Research

The statement "This species generally represents the shearwaters and fulmars," is a gross over-simplification. Petrels are neither shearwaters, nor are they fulmars. Although many Procellariiformes (other than diving petrels) feed on surface prey, some of which is considered "plankton", specific prey types and prey species vary and the distributions and habits, including diurnal vertical migrations, of the prey vary as well. This means that prey species may vary in their risk of exposure to oiling. Fork-tailed Storm Petrels appear to be an excellent subject for this study (because of the years of baseline data on distribution and population size, and because of the work already conducted concerning the impact of oil on these "easy to get at" seabirds.) Nevertheless, without studying other Procellariiformes in the area, we urge caution in extrapolating these results to many other species not studied. The shearwaters with which we are concerned (Sooty and Short-tailed) are largely divers.

Com.	Topic	Issue	Sug.	Sort
43	3	1870		2

Objective B states "Assess the impact of crude-oil exposure on storm petrel reproduction by measuring the relationship between exposure and breeding adult foraging efficiency, chick physiological condition, and nesting success." 1) The term "exposure" is not adequately defined. Methods indicate that they will actually measure the amount of petroleum hydrocarbons in the proventricular fluids ("stomach oil"), an extremely indirect measure of the amount of North Slope Crude to which the adult birds were exposed, although it is a less indirect measure of the chicks' exposure. 2) "Breeding adult foraging efficiency" - the draft has made a very poor choice of terminology, and they have made no attempt to define this term. Foraging occurs at sea, and can never be studied directly at a breeding colony. No methodology is presented to study foraging. Does the draft really mean to study the adequacy of parents' provisioning of their young with food? However, the draft presents no methodology to address this question either.

Com.	Topic	Issue	Sug.	Sort
44	2	1870		2

Com.	Topic	Issue	Sug.	Sort
45	3	1870		2

Foraging: An overall foraging rate can be measured as either (1) the amount of prey collected per unit time, or (2) the amount of food energy collected per unit time. Foraging efficiency can be measured as (1) the energy acquired by collecting food / the energy expended in collecting the food, and capture efficiency can be measured as the proportion of successful prey capture attempts.

Com.	Topic	Issue	Sug.	Sort
46	5	1870		2

Provisioning: An overall provisioning rate can be measured as the amount of food (energy, biomass, items) delivered to chicks by their parents per unit time. The chick provisioning performance of breeding adults can be affected by numerous factors, including:

(a) Food availability to foraging adults.
(b) Adult foraging efficiency. This could be reduced if adults are weakened by ingestion of petroleum (perhaps inducing anemia?).
(c) Distance prey must be transported to the colony. If parents must now transport food over distances much greater than the usual, they will require more food themselves, and will on average deliver food to chicks at longer, less frequent intervals.
(d) Transport ability of parents. If adults are weakened by petroleum ingestion they may have to reduce the size of the food payload brought back to chicks.

At the breeding colony, the draft proposes to measure:

1) The amount of petroleum hydrocarbons in the proventricular fluid of chicks and occasionally adults, and oiling on plumage.
2) Oiling of eggs by incubating adults, and hatching success.
3) Survival of chicks.
4) Incidence of petroleum hydrocarbons in pathological samples of eggs and birds, and fresh eggs.

Clearly, the proposed methodology is inadequate to address any of the elements of Objective B other than nesting success. Chick physiology is not addressed. Crude-oil exposure is not addressed directly. Foraging is not addressed. Provisioning is not addressed.

Com.	Topic	Issue	Sug.	Sort
47	2	1870		2

Suggestions: All birds examined should be weighed and bill, tarsus, and wing chord measured in order to document overall physical condition of chicks and adults, and whether there is any abnormality in development of chicks. Conduct more detailed field work to measure provisioning, including continuous watches of several nests and periodic weighings of chicks during the feeding hours for several consecutive days, in order to determine the feeding intervals and payload sizes. Underweight chicks might be getting as much food as ever, and low body mass might be due to toxic effects of petroleum ingestion.

Com.	Topic	Issue	Sug.	Sort
48	3	1870		2

<u>Bird Study 8</u>. Assessment of Injuries to Waterbirds from the <u>Exxon Valdez</u> Oil Spill on the Reproductive Success of Black-legged Kittiwakes in Prince William Sound

Comments contributed by Dr. Fred Schaffner, Biologist, Department of Field Research
and Dr. Stephen Kress, Principal Investigator, Department of Field Research

This proposal is modest, and realistic in its objectives to document possible poor reproduction in the aftermath of the spill. Discovery of reduced breeding population size in affected areas, and a correlation between contamination and poor reproduction will point to the spill as the causative agent. Caution should be taken however, to consider the potential role of other factors that might have contributed to poor reproduction in that breeding year. Control colonies should be remote, but not so distant that local factors could further confound a comparison with the oiled colonies.

Com.	Topic	Issue	Sug.	Sort
49	3	1880		2

This is a good choice of species for population monitoring because of the extensive baseline data and accessibility of chicks. It is important though that sample sizes be indicated in the methods section. The replicate counts are very important and should be an integral part of the study.

Com.	Topic	Issue	Sug.	Sort
50	2	1880		2

Suggestions: As with Bird Study 7, all birds examined should be weighed, and bill, tarsus, and wing chord measured in order to document overall physical condition of chicks and adults, and whether there is any abnormality in development of the chicks.

Com.	Topic	Issue	Sug.	Sort
51	3	1880		2

<u>Bird Study 9</u>. Assessment of Injury to Waterbirds Based on the Population and Breeding Success of Pigeon Guillemots in Prince William Sound

Comments contributed by Dr. Fred Schaffner, Biologist, Department of Field Research
and Dr. Stephen Kress, Principal Investigator, Department of Field Research

This proposal has many of the same shortcomings as Bird Study 7. It proposes to assess habitat use and food availability, but provides no methodology to do this. Food availability in foraging areas,

Com.	Topic	Issue	Sug.	Sort
52	5	1890		2

and foraging habitat use can not be studied directly at a breeding colony. For chicks, however, food availability is exactly their parents' provisioning performance. Unfortunately, the study methodology described is inadequate to assess adults' provisioning of chicks.

For this species, the chick provisioning performance of breeding adults can be affected by numerous factors including:

(a) Food availability to foraging adults. In particular, will the spill's effects alter the age and size structure of prey populations such that individual food items are now smaller?
(b) Adult foraging efficiency. This could be reduced if adults are weakened by ingestion of petroleum (perhaps inducing anemia?).
(c) Distance prey must be transported to the colony. If parents must now transport food over distances much greater than the usual, they will require more food themselves, and will on average deliver food to chicks at longer, less frequent intervals.
(d) Transport ability of parents. If adults are weakened by petroleum ingestion (perhaps inducing anemia?), will their poorer condition also translate to longer, less frequent food delivery intervals.

Are chicks really only fed during a specific 5-hour period of the day? If petroleum contamination has altered the adults condition, it might also alter the feeding schedule. Watches alone cannot measure amount (size, mass) of prey per delivery.

Com.	Topic	Issue	Sug.	Sort
53	3	1890		2

This group probably has the greatest appeal to tourists, which enhances their "intrinsic value". Great care should be taken in generalizing from guillemots to puffins, auklets and murres. While they are all diving birds which sit on the water, they vary both in the depth of their dives and the distance at which they feed from the islands. The inshore feeding habits of the guillemots might make them more vulnerable if the spill happened near their colony, but less vulnerable if the colony was more remote. Such colonies could prove useful controls, especially if the guillemots stay near the breeding colony throughout the year.

Com.	Topic	Issue	Sug.	Sort
54	3	1890		2

Suggestions: At oiled and control colonies all birds examined should be weighed and bill, tarsus, and wing chord measured in order to document overall physical condition of chicks and adults, and whether there is any abnormality in development of chicks. Conduct more detailed field work to measure provisioning, including continuous watches of several nests and periodic weighings of chicks during the feeding hours for several consecutive days in order to determine the feeding intervals and payload sizes. Underweight chicks might be getting as much food as ever, and low body mass might be due to toxic effects of petroleum ingestion. Also, through observation, it may be

Com.	Topic	Issue	Sug.	Sort
55	3	1890		2

possible to compare oiled vs. non-oiled parents at the same colony. Effects on hatching success and success in rearing young could also be compared- that is if guillemots with oiled plumages survive long enough to attempt breeding. Also consider conducting a similar study with puffins or murres which feed further from colonies.

Bird Study 10. Assessment of Injury to Glaucous-Winged Gulls using Prince William Sound

Comments contributed by Dr. Wayne Hoffman, Biologist, Department of Field Research
and Dr. Stephen Kress, Principal Investigator, Department of Field Research

This appears to be a straight-forward, well-thought-out study. Nevertheless, the assumption that the Glaucous-winged Gull "generally represents" scavenging passerines (corvids) is incorrect. In the first place, their physiology is different (e.g. salt excretion). Secondly, different habits (swimming vs. not) greatly affect the thermal consequences of light oiling. Thirdly, differences in plumage thickness and texture, and uropygial gland oil amount and properties could have major unpredictable effects on oiling consequences.

Com.	Topic	Issue	Sug.	Sort
56	3	1900		2

As with almost all the proposals, this study should definitely be updated to include the 1990 field season. We think the egg analysis work will be particularly valuable. We also suggest that this study include growth studies of chicks reared by oiled and non-oiled parents. Because of the previous work done with this colony, this could be an especially useful study.

Com.	Topic	Issue	Sug.	Sort
57	4	1900		2

We foresee one potential confounding factor: the closing of the fishing seasons in Prince William Sound may have major effects on the gulls' food supply, thus reducing productivity in a less direct manner.

Com.	Topic	Issue	Sug.	Sort
58	3	1900		2

Bird Study 11. Injury Assessment of Hydrocarbon Uptake by Sea Ducks in Prince William Sound and the Kodiak Archipelago

Comments contributed by Dr. Fred Schaffner, Biologist, Department of Field Research

A basic assumption of this study seems to be that short-term effects observed in other species (seabirds) will translate to long-term effects in sea ducks. The term "reproductive potential" is not adequately defined and there is no indication in the methods as to how this will actually be measured. Similarly, it is not clear what is meant by "intrinsic values", nor is it stated in the methodology how this will be measured. In addition, how will birds be collected, and how many will be collected?

Com.	Topic	Issue	Sug.	Sort
59	3	1910		2

Bird Study 12. Assessment of Injury to Shorebirds Staging and Nesting in Rocky Intertidal Habitats of Prince William Sound and the Kenai Peninsula

Comments contributed by Dr. J.P. Myers, Senior Vice President for Science & Sanctuaries, Dr. G. Thomas Bancroft, Principal Investigator, Department of FieldResearch and Dr. Carl Safina, National Raptor Coordinator and Principal Investigator, Department of Field Research

The most important part of this study as estimated by the potential impact on numbers is Item G, as by far the majority of shorebirds using the Sound and likely to be affected by the spill are those that breed in western Alaska. It is not clear from the description of the work, however, whether the studies enabled by previous base line data are anything more than a shot in the dark, given the vastness of the breeding area. Were baseline data available on fall migration indices of breeding season success then it might be possible to gain insight as to whether the 1989 summer productivity was comparable to pre-spill years. Individual researchers working along the US Pacific flyway may have such results (see Point Reyes Bird Observatory or Bodega Marine Laboratory). Useful information might also be gleaned with a thorough review of selected Audubon Christmas Count data on well-known sites in Oregon, California, or Washington, combined with field work in the 1989-90 winter.

Com.	Topic	Issue	Sug.	Sort
60	3	1920		2

On the whole, the remaining objectives of the study appear good and complete. Methods for the remaining parts of the study, however, lack sufficient detail to determine if the objectives can be met. For instance, how can "the minimum proportion of shorebirds" as discussed in objective C actually be measured? As stated, it does not appear to be a realistic objective and the methods section provides no further clarification.

Com.	Topic	Issue	Sug.	Sort
61	3	1920		2

The historical data for the area will be important for determining if shorebirds avoid contaminated beaches. If shorebirds become overly concentrated on "clean" beaches, food shortages might lead to

Com.	Topic	Issue	Sug.	Sort
62	5	1920		2

delayed migration and breeding. The census techniques need to be carefully set up to be sure they are providing repeatable estimates. No information was given on the technique.

Com.	Topic	Issue	Sug.	Sort
63	3	1920		2

The species mentioned as having individuals captured and marked was surfbirds and the reason for this was unclear. It seems that other breeding (oystercatchers) and migrant species will need to be marked to determine the amount of time individuals were exposed to contaminated beaches. Estimates of the proportion of shorebirds directly contaminated with oil will need to take into account the length of time individuals stay on contaminated beaches and in Prince William Sound. How will these estimates be made; what species will be studied intensely to determine reproductive success at the Sound and further north? No information was given on how breeding success was to be determined. Are body counts to be made and individuals collected to determine the importance of direct mortality by oil?

Com.	Topic	Issue	Sug.	Sort
64	4	1950		2

Bird Study 13. Impact Assessment of the Exxon Valdez Oil Spill on Passerines and Other Nongame Birds in Prince William Sound

Comments contributed by Dr. G. Thomas Bancroft, Principal Investigator, Department of Field Research

This study appears straight-forward, although census techniques were not detailed and those used will be critical for determining the accuracy of population estimates. How will the effects of hydrocarbon levels in tissues be related to health, survival and reproductive potential?

Com.	Topic	Issue	Sug.	Sort
65	3	1930		2

Bird Study 14. Effects on Migratory Birds of Exposure to North Slope Crude Oil

Comments contributed by Dr. Fred Schaffner, Biologist, Department of Field Research
and Dr. Stephen Kress, Principal Investigator, Department of Field Research
and Dr. Carl Safina, National Raptor Coordinator and Principal Investigator, Department of Field Research

Com.	Topic	Issue	Sug.	Sort
66	3	1940		1

This is purely a contracts proposal, but the contracts budget cannot be evaluated because the contractors are not named.

Com.	Topic	Issue	Sug.	Sort
67	4	1950		2

The methodology is vague. It is unclear whether, or to what extent, otherwise healthy birds will be intentionally oiled. Which species will be examined? How will they be oiled? Basically, the methodology proposed will allow only for a comparison of the pathology of oiling in several species. It is unclear whether the proposed study will allow determination of pathological levels of contamination, and estimation of the lethal thresholds of toxicity. A comparison of fresh vs.weathered oil would also be useful. We further suggest including studies of banded birds to compare inter-year survival in oiled vs. non-oiled areas.

Com.	Topic	Issue	Sug.	Sort
68	6	1800		2

Before new research is initiated concerning the effects of petroleum on seabird physiology, contact David Peakall, Chief, Toxic Chemicals Division, Wildlife Management Branch, Canadian Wildlife Service, Ottawa, Ontario K1A OH3. He has conducted extensive research on the effects of ` on puffins, storm-petrels and other North Atlantic seabirds.

Specific Comments on Damage Assessment Plan

Comments contributed by Dorene Bolze, Environmental Policy Analyst, Science Division

Part I: Injury Determination/Quantification - Coastal Habitat Injury Assessment

The damage assessment plan appears to focus on the effects of the oil spill to various habitats through the Air/Water studies and the Coastal habitat study. It is very important that a comprehensive assessment be made by habitat as well as by wildlife species, since many species will be greatly affected by the indirect injury to habitat from the spill as well as by direct contact with the oil. Yet, the description of the coastal habitat study gives no details of the 45 types of categories that will be studied. It does not discuss which benthic species will be studied or whether or not kelp beds will be studied, nor does it describe how the other studies will be coordinated with it. This section should also explain how fines will be established based on the damage assessed from the coastal habitat study. In this section and elsewhere in the plan, those studies which compare oiled sites with non-oiled areas, laboratory data and field baseline data should be consistently used. Obviously when evaluating areas that have been oiled where there are no pre-spill data, then the effects need to be compared to a comparable clean site. But, pre-spill baseline data is best and should be used wherever possible.

Com.	Topic	Issue	Sug.	Sort
69	3	1100		2

Part I: Injury Determination/Quantification - Air/Water Injury Assessment

The implication of this section is that studies on the water column will focus on violations of water standards for various pollutants, i.e. hydrocarbons. This is inadequate if this is the only approach to water column issues. Federal and state standards for hydrocarbons are typically based on human health effects only. Although these studies are important in determining fines for violations of the Clean Water Act, etc., the studies also need to focus on determining water concentrations of those components of the oil spill that have biological effects on the wildlife and ecosystems. Though study #3 states this as one of its objectives, it should be a major objective. It appears that study #2 plans to use the same submersible as that used for Fish study #20. In this case a variety of depths should be collected, not just the top 2 cms to determine how the oil has become incorporated into the sediments.

Com.	Topic	Issue	Sug.	Sort
70	2	1200		2

Com.	Topic	Issue	Sug.	Sort
71	3	1200		2

As an alternative it may prove less expensive to use grabs deployed from ships rather than deploying a submersible to collect sediment samples of only the top 2 cms. None of the air/water studies, including study #2, plan to use plots and do wildlife density studies of the benthos. Such plots are used in other studies and are important here to assess the effects of the oil on the bottom sediments. For both studies #2 and #4, it may be possible to estimate the total acreage of bottom sediment oiled and then base the fine on this figure, thus, attempting to assess the fine in terms of the ecological damage rather than just the commercial damage.

Com.	Topic	Issue	Sug.	Sort
72	3	1200		2

Part I: Injury Determination/Quantification - Fish/Shellfish Injury Assessment

Of the 26 proposed studies, this group recieves by far the most attention in the damage assessment plan. The fisheries studies appear to be more concerned with determining the long-term effects of the oil spill than any of the other major study sections. Study #3 directly states the long-term effects of the spill as an objective. This appears to be in contradiction to the introduction of the damage assessment plan, which states that studies are not designed for long-term issues. There is no rationale given for why the three species of clams were specifically selected in study #13. The tremendous lack of information on which species will be studied in the Coastal Habitat Study has made it extremely difficult to evaluate in this study which clam species that are important wildlife food sources have been overlooked. A similar concern is raised for study #26 on green sea urchins. Although this species may be commercially important, they are also an integral part of the marine food chain and affect habitat structure. High sea urchin density keeps kelp bed growth low and thus, lowers a significant source of carbon to the coastal community. Sea otters feed on urchins and as a result kelp bed acreage expands with sea otter populations. This translates into increased biomass production. The plan does not discuss whether these important roles in habitat productivity will be examined either in this study or in the coastal habitat study. One possible means of putting a value on the damage to a kelp bed would be to estimate the reduced number of commercially valuable fish the habitat will not produce until it is restored (or forever). In considering the overall damage assessment plan we are concerned with the fact that both for seabirds and marine mammals a representative species was chosen for study. While for the fisheries, almost every commerical species is targeted for at least one study if not for several studies addressing the effects on various stages of the life cycle (ie., pink salmon). This would appear to be too heavily weighted towards the study of those species that are obviously commerically valuable, while ignoring those species that appear to have only intrinsic values (i.e., fish that are important wildlife food sources, seabirds, wilderness, etc.)

Com.	Topic	Issue	Sug.	Sort
73	2	1300		2

Com.	Topic	Issue	Sug.	Sort
74	2	1300		2

Com.	Topic	Issue	Sug.	Sort
75	3	1560		2

Com.	Topic	Issue	Sug.	Sort
76	3	1600		2

Part I: Injury Determination/Quantification - Marine Mammals Injury Assessment

There is no explanation in this section of why a porpoise species has not been selected for study, or if it is intended that information from the Orca study will be extrapolated to this group of mammals. For study #3 on necropsies, it might be useful to include strandings that occur in the Bering Sea (for the migrating species like the gray whale). Not all effects from the oil spill will be acute and result in strandings in the Gulf unless the migrating individual moves slowly. Depending on the rate of migration, some strandings even as far north as St. Lawrence Island, near where most gray whales feed in the summer, could be a result of exposure to the spill during migration. It is not clear in study #5 on the harbor seal, how the researchers will be able to decipher the effects of the spill from the effects of other stresses that have recently been causing a sharp decline in the harbor seal population. The plan does not explain why there is interest in the long-term effects of the spill on sea otters (study #6) as opposed to the long-term effects on other species. Study #7, does not mention where individual otters to be released have come from, nor the intended release sites. It is not clear whether rehabilitated otters will be released in various areas for comparison (such as non-oiled sites and treated sites.) In addition, the plan does not identify how a fine would be set based on a finding that the sea otter population will be depressed for 5 years. There is no rationale in this section to explain why only seven studies are designed for marine mammals even though numerous other species are identified as potentially being affected. This section also does not clarify whether Exxon will be fined under the Marine Mammal Protection Act or the Endangered Species Act, or whether information from these studies will be available for such consideration.

Com.	Topic	Issue	Sug.	Sort
78	3	1600		2

Com.	Topic	Issue	Sug.	Sort
79	3	1630		2

Com.	Topic	Issue	Sug.	Sort
80	3	1650		2

Com.	Topic	Issue	Sug.	Sort
81	3	1660		2

Com.	Topic	Issue	Sug.	Sort
82	3	1670		2

Com.	Topic	Issue	Sug.	Sort
83	5	1600		2

Com.	Topic	Issue	Sug.	Sort
84	6	1600		2

Part I: Injury Determination/Quantification - Terrestrial Mammals Injury Assessment

Study #6 does not specify whether minks will be exposed only to various concentrations of new crude oil, or also to various weathered samples. Study #5 appears to involve only a minimal effort to trap small mammals (considered here as a food source) on some oiled areas. However, these small mammal studies can give a good idea of the effect of the spill on the food source, which may be as important, if not more, than the larger mammals (predators) actually being oiled or eating oiled carcasses. A more extensive trapping program to determine density should be done at a variety of sites, i.e., clean to heavily oiled areas as well as treated sites.

Com.	Topic	Issue	Sug.	Sort
85	3	1700		2

66 DuLac

EXXON SHIPPING COMPANY

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October 27, 1989

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Gentlemen:

Exxon Shipping Company (ESC) has received the Draft of the Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill, dated August 1989. The attached document provides the ESC response and comments on that Draft.

From the outset, ESC has attempted to deal fairly with both the private and public aspects of the spill. A comprehensive claims handling process was established to deal with claims from private individuals, communities, and government agencies. With respect to public interests, ESC has repeatedly offered to participate and cooperate with the Trustees in order to identify environmental impacts and consider restoration activities.

Moreover, the April 13 agreement between the Trustees and ESC provided for ESC's participation in development of the Assessment Plan as specified in the Department of Interior's NRDA regulations. Now, however, since much of the work described in the Draft has been completed and study plans for remaining work appear irreversible, the opportunity for ESC to cooperate or provide substantive input to the assessment has been significantly circumscribed, if not foreclosed. This adversarial posture does not serve the public interest; its continuation will seriously impede definition and timely completion of an optimum restoration plan.

The principal issue in the Draft Assessment Plan appears to be injury identification, with scant attention to restoration of the impacted resources. In contrast, an appropriate plan will undertake to identify impacted services and what, if any, restoration steps beyond natural recovery are warranted.

Com.	Topic	Issue	Sug.	Sort
1	0	0206		2

Finally, the principles and procedures contained in the DOI NRDA regulations have not been incorporated in the Trustees' process. Whether or not the Trustees are required to follow the regulations, it would be prudent to utilize them as a model of procedures and methodologies to assess damages. Had these regulations been followed, the Trustees' program would have been significantly different than described in the Draft.

Com.	Topic	Issue	Sug.	Sort
2	5	0130		2

ESC remains willing to participate in an assessment process, consistent with the DOI regulations, to conduct valid studies to determine environmental impacts and to design a restoration plan.

Sincerely,

Frank Iarossi

FJI:mw

EXXON SHIPPING COMPANY

STATE/FEDERAL NATURAL RESOURCE DAMAGE ASSESSMENT PLAN FOR THE EXXON VALDEZ OIL SPILL AUGUST 1989

PUBLIC REVIEW DRAFT

REVIEW COMMENTS OCTOBER 30, 1989

TABLE OF CONTENTS

PART 1

EXECUTIVE SUMMARY

Introduction

Exxon Shipping Company (ESC) has received the Draft of the Natural Resource Damage Assessment Plan ("Draft") for the Exxon Valdez Oil Spill, dated August 1989. This document was issued by the U.S. Departments of Interior, Commerce, and Agriculture and the state of Alaska as Trustees for natural resources affected by the spill. The Draft will elicit comments from both the public and potentially responsible parties ("PRP") regarding the process and program to determine impact on resources.

After the spill on March 24, 1989, ESC offered to participate and cooperate with the Trustees to identify environmental impacts and engage in restoration activities. However, a similar spirit of cooperation is notably absent from the assessment process outlined in the Draft. The Draft and the work it describes are biased and adversarial in tone. One trustee has already filed a lawsuit against ESC, an action which was launched before collaboration was attempted or the Draft was issued.

ESC's attempts to cooperate on the assessment and restoration issues have been repeatedly rebuffed. In May, ESC met with Trustees' counsel in Washington to discuss joint action in conducting studies or selecting scientific protocols. At Trustee counsel's suggestion, by a letter dated May 26, 1989, ESC formally requested meetings with Trustee Council representatives to explore these issues further. There has been no response to that proposal. As a consequence, no collaboration was possible on the development of an objective program. All attempts by ESC to jointly plan this effort and avoid duplication of technical studies have been rejected by the Trustees.

Com.	Topic	Issue	Sug.	Sort
3	5	0206		2

ESC has maintained a consistent willingness to cooperate and expeditiously settle reasonable claims. Shortly after the spill, ESC established a comprehensive claims-handling process to deal with private individuals, communities, and governmental agencies. Through September 1989, ESC dealt with more than 13,000 claims and paid more than $100 million to mitigate the effects of the spill on claimants. ESC's spirit of cooperation with the relevant government authorities to seek a timely and effective restoration of the environment and economies affected by the spill is further evidenced by ESC mounting the largest spill cleanup in history in a remote and, sometimes, physically hostile environment. This cleanup activity involved more than 11,000 people and 1400 boats. This effort provided the best opportunity for the natural restoration process to begin even before the winter of 1989. ESC also established and funded numerous animal, bird, and eagle rescue operations and rehabilitation centers. In light of these cooperative steps, there is no apparent basis for the adversarial positions being taken.

Because of the adversarial postures of the Trustees reflected in the Draft, expressed by Department of Justice correspondence to ESC on September 29, and indicated by the state's lawsuit, ESC now finds it difficult to provide a constructive reply to the Draft. The public interest would be best served by a set of technical studies that will accurately evaluate natural resource injury and the best means of restoring environmental services. Clearly, all parties should have as their objective the execution of such studies to serve as the basis for future decision-making.

ESC's comments are summarized as follows:

Cooperative Process

The Trustees should conduct the assessment as part of a cooperative effort with the PRPs. Cooperation between the Trustees and the PRPs on damage assessments is recognized as an important element in reaching settlement for resource damages by both the Department of Interior's Natural Resource Damage Assessment (NRDA) regulations and the court, Ohio v. Department of Interior.[1] On April 13, ESC signed an agreement with the Trustees providing a voluntary advance payment of $15 million to fund natural resource damage assessment studies. That agreement provided for ESC's participation in development of the Assessment Plan as specified in the Department of Interior's NRDA regulations.

Similar requests for participation in the NRDA process were expressed to Trustees in subsequent meetings and letters. Despite these repeated attempts to cooperate with the Trustees on the assessment, ESC has been repeatedly denied any role by the Trustees in the assessment process. Moreover, since much of the work described in the Draft has already been completed or study plans for remaining work have become irreversible, the opportunity for PRPs to cooperate or provide substantive input to the assessment has been circumscribed, if not foreclosed.

Com.	Topic	Issue	Sug.	Sort
4	3	0206		2

Draft Lacks Restoration Emphasis

The issue of highest concern is the Draft's focus on injury identification studies rather than restoration. This focus on injury to individual species or habitats obscures the importance of comprehensive planning to restore services provided by natural resources. Oil spilled from the Exxon Valdez affected very small portions of the vast ecosystems present in Prince William Sound, the Gulf of Alaska, and Lower Cook Inlet. Had restoration been the objective, the Draft would have differed significantly from the adversarial approach presented.

Com.	Topic	Issue	Sug.	Sort
5	3	0151		2

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1 880F.2d 432 (D. B. Cir. 1989), rehearing denied, September 11, 1989.

Natural Recovery

The Draft ignores the natural recovery processes which rapidly dissipate the effects of oil spills. For an oil spill, a key element in achieving restoration is the ability of ecosystems to recover naturally in a timely manner. Over the last 25 years, oil spills have been extensively studied by both government and academia in environments ranging from tropical and temperate climates to colder waters similar to those in Alaska. These studies--covering large spills at Santa Barbara and from the Amoco Cadiz and the Argo Merchant--show that adverse environmental consequences associated with oil spills persist only a few years. The initial adverse impacts on fish, animals and birds are quickly rectified through natural recovery.

Com.	Topic	Issue	Sug.	Sort
6	5	0105		2

Cleanup Effects

The Draft also ignores the effects of the extensive cleanup activities undertaken by ESC. In the case of the Valdez spill, the natural recovery processes have been accelerated by a massive effort to remove oil undertaken by ESC over the spring and summer of 1989 and conducted at the direction of the Federal On-Scene Coordinator. Instead of recognizing that natural recovery, enhanced by the cleanup process, will occur, the Draft program consists of detailed studies of the initial impacts of the spill to be conducted in a single year.

Com.	Topic	Issue	Sug.	Sort
7	5	0100		2

Deficient Technical Studies

Irrespective of the relevance of the individual studies to the overall restoration objective, the methodologies selected by the Trustees for their studies are deficient in many cases and will not provide valid data for an assessment. For example, the use of a submersible vehicle for underwater observations is not an accepted method for sediment sampling on a broad scale. Likewise, in a large number of studies the Trustees propose to measure injury to species or habitats using techniques which will not provide statistically significant results. There are a large number of different factors which can affect the abundance and vitality of the various species to be investigated in the Trustees' programs. In order to detect and document injury, it is imperative that the studies be designed to statistically determine the impact of all factors, including the oil spill. From the information provided in the Draft, there is no indication that such designs have been adopted. Final conclusions drawn from such defective studies will not be valid. Compounding these problems, in numerous instances the studies are not described in sufficient detail to assess their utility or adequacy for the assessment process, nor is the necessary information otherwise available to the public or scientific community.

Com.	Topic	Issue	Sug.	Sort
8	4	0103		2

Com.	Topic	Issue	Sug.	Sort
9	5	0102		2

Relationship between Measurements and Restoration

In a broader sense, many of the methodological problems result from a failure to identify clear hypotheses which relate scientific studies explicitly to a damage assessment and restoration strategy. The Draft offers no information concerning the methods which will be used to translate small-scale, localized injuries identified in the studies to conclusions concerning the impacts on the ecosystem as a whole. Moreover, there is no description in the Draft regarding how localized injury studies will be utilized in designing restoration steps which might be undertaken.

Com.	Topic	Issue	Sug.	Sort
10	5	0151		2

NRDA Regulations

The Trustees continue to disregard both the spirit and the requirements of the NRDA regulations. Whether or not the Trustees are required to follow the regulations, they are a model of both procedures and methodologies that can be employed to assess damages. The NRDA regulations were designed by the Department of Interior to provide standardized and cost-effective procedures for assessing natural resource damages. These regulations were developed through a lengthy rulemaking review process involving government agencies, technical and environmental experts, and other interested parties. They incorporate and fully describe the technical, economic, and legal elements needed to conduct an assessment. Moreover, both the structure and general content of those regulations were examined and upheld in a recent Circuit Court decision.

Com.	Topic	Issue	Sug.	Sort
11	5	0130		2

Management Process

Because of the procedural and technical inadequacies contained in the Draft, the Trustees should become directly involved in the management of the assessment process. The uncooperative and adversarial positions assumed by the U.S. Department of Justice and the state of Alaska are in no party's best interest. More importantly, these positions may ultimately impede the restoration of areas impacted by the spill. Focusing on restoration would be best achieved by designation of a lead agency to conduct technically sound projects with the involvement of the PRPs.

ESC remains willing to participate in such a process, consistent with the DOI regulations, to design and conduct valid studies to determine environmental impacts and to design a restoration plan.

Com.	Topic	Issue	Sug.	Sort
12	4	0200		2

PART 2

COMMENTS ON THE INTRODUCTION IN THE DRAFT

The Draft contains an Introduction (pp. 1-28) which discusses a broad variety of issues and topics, both related and unrelated to the resource damage assessment process. This part of the response addresses deficiencies and errors in that section of the Draft with respect to both the relevant statutes and the Department of Interior (DOI) regulations for Natural Resource Damage Assessments (43 C.F.R. 11).[1]

I. LEGAL AND REGULATORY ISSUES

It is apparent that the NRDA process depends on information and data developed from sound technical and economic studies of the affected resources. A balanced and coordinated program, which blends these studies with restoration objectives in the context of the statutes and DOI regulations, will lead to a timely, cost-effective, and reasonable recovery of natural resources affected by a spill.

A. The design of the Draft assessment studies are inconsistent with the stated goal of restoration.

Com.	Topic	Issue	Sug.	Sort
13	5	0100		2

The first paragraph of the Executive Summary states that "restoration is the primary objective of the state and federal Trustees and EPA and will be undertaken expeditiously" (Draft, Ex. Sum. i). Elsewhere, consistent with this goal, the Draft reports that "restoration techniques and strategies will be evaluated and an assessment of the feasibility and costs of each will be made" (Draft, p. 27). However, after identifying restoration as the "primary objective" of the Trustees' efforts, the Draft's apparent approach is to assess the amount of injury to resources caused by the spill, on the basis of essentially first-year data without any consideration of natural restoration, extrapolate from these data to determine the longer-term losses caused by the spill, derive a dollar damage figure to be assessed against the responsible parties, and then proceed with restoration financed by these damages.

The errors of the Draft's approach toward determining damages are reflected in a number of instances. Figure 7 (Draft, p. 21), which is stated to be the basis for determining damages (Draft, p. 20) ignores restoration costs and instead focuses exclusively on the value of resources damaged by the spill as measured by effects on human uses, services, market factors, and other values, such as "intrinsic, tourism, and recreation." Likewise, the Draft states (p. 17), that "quantification of the injury is then used by the trustees to estimate the amount of money to be sought as compensation" and (p. 20) that "determination of damages involves the assessment of economic

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[1] Because the Trustees purport to have retained the option of following the DOI regulations it is appropriate to point out the discrepancies between those regulations and the Trustees' approach. In any event, even if the Trustees should in the future disavow compliance with DOI regulations, those regulations will still serve as a basis for judging the reasonableness of the Trustees' approach.

values, or damages, that may be claimed for the cumulative injury sustained by all resources." Thus, while restoration is the stated goal, the Draft appears to be overly focused on determination of the dollar damage of injury rather than the cost of reasonable restoration.

Com.	Topic	Issue	Sug.	Sort
14	5	0100		2

Such an approach to the calculation of damages and the funding of restoration ignores both the terms of § 311(f)(4) of the Clean Water Act (CWA), 33 U.S.C. § 1321(f)(4) and the regulations that have been published by the Department of the Interior to calculate damages for purposes of § 311(f)(4). That section of the CWA provides that:

> The costs of removal of oil . . . for which the owner or operator of a vessel . . . is liable under subsection (f) of this section shall include any costs or expenses incurred by the Federal Government or any State government in the restoration or replacement of natural resources damaged or destroyed as a result of a discharge of oil . . . in violation of subsection (b) of § 311.

Section 311(f)(4) specifies the "costs or expenses" entailed in achieving "restoration or replacement" of natural resources damaged or destroyed in an oil spill; it does not impose any general liability upon owners or operators of vessels for natural resource damages, apart from restoration or replacement costs. Consistent with § 311(f)(4) of the CWA, § 311(f)(5) of that Act empowers the President or a representative of a state to act as "trustee of the natural resources to recover for the costs of replacing or restoring such resources." Further, any sums recovered under § 311(f)(4) "shall be used to restore, rehabilitate, or acquire the equivalent of such natural resources."

The regulations promulgated by the Department of the Interior to provide a means of assessing the damages contemplated by § 311(f)(4) contain detailed procedures for calculating damages when using a restoration or replacement approach. Three sections of the regulations--§§ 11.80, .81, and .82--are pertinent.

Section 11.80(c) states that "as part of the Assessment Plan concerning the appropriate measure of damages to be employed during the Damage Determination phase, the authorized official shall use either the restoration methodology provided in § 11.81 . . . or one of the use-value methodologies provided in § 11.83 . . . ." Further, § 11.80(c) requires "for assessments that use the restoration methodology, a Restoration Methodology Plan ("RMP") as described in § 11.82 . . . shall be prepared . . . ."

Section 11.81--"Damage Determination Phase--Restoration Methodology"--§ 11.81(f) unambiguously states that:

> The damage amount as measured by restoration or replacement is the cost to accomplish the cost-effective alternative that provides the lost services,

occasioned by an oil spill. More specifically, under § 11.81(c)(1):

> restoration or replacement measures are limited to those actions that restore or replace the resource services to no more than their baseline . . . as determined in § 11.72 . . . .

The "baseline," within the meaning of § 11.72(b)(1)

> . . . should reflect conditions that would have been expected at the assessment area had the discharge of oil . . . not occurred, taking into account both natural processes and those that are the result of human activities.

Section 11.81(d)(1) directs that "alternative methods to achieve the restoration or replacement of the resource services shall be developed," while § 11.81(d)(2) provides that "selection of the cost-effective restoration or replacement methodology shall be documented in the RMP as required in § 11.82." In short, § 11.81 limits restoration-based damages to those that are required to return resources to the service levels that would have been expected, absent the spill, taking into account both "natural processes" and other "human activities" which might affect such resource service levels.

Section 11.82 places additional requirements on the RMP. Section 11.82 states that the "purposes of the RMP developed under § 11.82 are to ensure that the restoration or replacement alternative that forms the basis of the measure of damages is cost effective and to serve as a basis for the more detailed restoration or replacement plan that shall be completed after a damage award." Section 11.82(d)(2)(i) states the RMP "shall include a range of restoration and replacement alternatives . . . including a 'No Action Natural Recovery' alternative and other alternatives that reflect varying rates of recovery, management actions, and resource acquisitions." Additionally, § 11.82(f)(1) states the Trustees must select the cost-effective alternative means of achieving restoration.

Given the Trustees' stated goal of restoration and the clear guidance in the regulations as to the requirements for an RMP, the Draft must be modified to include an RMP that identifies alternative restoration strategies, including the "No Action Natural Recovery" alternative, which specifies that the cost-effective alternative will be adopted and incorporates a resource recoverability analysis as required by § 11.73 of the DOI regulations. The present Draft improperly focuses too many studies and resources on injury determination.

Com.	Topic	Issue	Sug.	Sort
15	3	0151		2

The program outlined in the Draft apparently started with the assumption that all resources were injured and that research was needed without regard to the restoration activities which might be undertaken. Such research cannot be squared with the restoration goal.

The Draft should seek restoration to a "without spill" condition. Contrary to the assumptions underlying at least some of the studies described in the Draft, the regulations do not envision a return to a "pristine" environment or the calculation of damages based on the perturbation of such an environment. Instead, § 11.81(c) of the regulations limits restoration or replacement "to those actions that restore or replace the resource services to no more than their baseline . . . ." Section 11.71(e) provides that "services include provision of habitat, food, and other needs of biological resources, recreation, other products or services used by humans, flood control, ground water recharge, waste assimilation, and other such functions that may be provided by natural resources."

Com.	Topic	Issue	Sug.	Sort
16	3	0150		2

Thus, restoration is complete when these services are restored, not when a "pristine" condition is reestablished. Moreover, the "proper measure of services is inextricably linked with the economic methodology selected in the Damage Determination phase," and "damages can only be claimed for natural resources with committed use as defined in this rule."[2] This suggests, consistent with the language of § 11.71(e), a definition of restoration that focuses on the services provided by those resources. The cost-benefit analysis required by § 11.35(c) for restoration also plainly requires a focus upon human use: "The benefits of restoration or replacement . . . shall be the value of the restored uses . . . ."

By assuming that the objective of restoration will be a "pristine" condition, the Draft fails to focus upon a return to "without spill" resource service levels. Had the Trustees not made this error, both the content and methodologies utilized by the Trustees' studies would have been far different; instead of focusing on injured resources, the studies would have emphasized the impairment of services provided by those resources.

Com.	Topic	Issue	Sug.	Sort
17	3	0100		2

B. The Draft focuses on a number of issues that are not pertinent to a natural resource damage assessment plan.

The Trustees state that their assessment in this case is based on the CWA and CERCLA but the Draft includes a number of studies that assess damages to third parties rather than the government. The CWA allows reimbursement only to federal and state governments of the costs incurred in the restoration or replacement of natural resources damaged as a result of a spill, while CERCLA § 107(f)(1) makes clear that natural resource damages shall be available solely to sovereigns, not to individuals.

Com.	Topic	Issue	Sug.	Sort
18	5	0132		2

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2 51 Fed. Reg., p. 27713.

This focus on damages to the government is discussed in the introduction to the Department of Interior NRDA regulations:[3]

> The losses compensable to a Federal or State Agency acting as a trustee under CERCLA are for uses of the resource by members of the public at large. They do not include any direct or indirect losses suffered by a private commercial user of public resources. Direct private commercial losses appropriately are not recovered by a public body acting for the public at large (p. 27680).

Thus, third parties whose commercial or property interests are impaired as a result of an oil spill or the release of a CERCLA hazardous substance may not pursue natural resource damage claims.

Com.	Topic	Issue	Sug.	Sort
19	5	0132		2

The damage-determination studies ignore this basic requirement. Instead of focusing on the restoration of such resources, these economic studies focus primarily upon commercial losses suffered by the fishing industry and other economic losses that are not properly part of a natural resource damage assessment.

For example, Economic Uses Study 1 refers to the "closures of entire fisheries and various fishery districts . . . as a result of the oil spill," and notes that such closures and reduction of future catches ". . . may affect the prices of fish products for producers and to consumers." The objectives of the study are to "measure the effects of the spill in terms of changes in consumer surplus prices and product prices," and to "analyze the competitiveness of output markets for commercial fisheries affected by the spill" (Draft, p. 190).

Com.	Topic	Issue	Sug.	Sort
20	5	2210		2

Such a study has little, if anything, to do with the calculation of natural resource damages or restoration. For example, some of the salmon fishing areas have been closed this year on grounds having nothing to do with oil spill impacts on salmon. The closure of a fishery for this reason implies nothing about damage to salmon--the resource that fishermen are exploiting. This study accordingly cannot be justified as part of a natural resource damage assessment plan. Even more clearly, Economic Uses Study 2, which seeks to assess the effects of the oil spill as a result of higher labor costs, tender availability, and the movement of fishermen into unaffected areas, is not relevant to natural resource damages or restoration assessment.

Com.	Topic	Issue	Sug.	Sort
21	5	2220		2

The same is also true of Economic Uses Study 4. Although the allegedly injured party is the federal or state government in its capacity as land owner, the purported losses are not of natural resources, but instead, loss of the commercial value of public lands affected by the spill if sold to third parties. Nothing in CERCLA, the CWA nor the DOI regulations supports the recovery of such damages.

Com.	Topic	Issue	Sug.	Sort
22	5	2240		2

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3 51 Fed. Reg., pp. 27674-27753.

Moreover, by conducting studies regarding impacts upon commercial fishery operations and/or diminished market values of state or federally owned lands, while simultaneously pursuing other studies to calculate the damages regarding the natural resources exploited by fishermen or resources residing on such lands, the Draft ignores the prescription against double counting of damages set forth in § 11.84(c)(1) of the regulations.

Com.	Topic	Issue	Sug.	Sort
23	5	0133		2

Of course, third parties are free to pursue state common law or statutory remedies, subject to applicable federal maritime law principles, for injuries to their business or property directly caused by a discharge of oil or hazardous substance. ESC has, accordingly, opened claims-paying facilities to assist fishermen and others whose businesses have been injured as a result of the spill. Moreover, under the TransAlaska Pipeline Authorization Act (TAPAA), 43 U.S.C. § 1653(c), ESC and the TAPAA fund collectively have strict liability of up to $100 million "for all damages . . . sustained by any person or entity . . . as a result of discharges of oil from" vessels bearing North Slope crude.

C. The Draft fails to comply with DOI regulations.

Although noting the existence of the DOI regulations published pursuant to the CWA and CERCLA for the purpose of determining natural resource damages, the Draft (p. 18) states that "the Trustees have not yet decided whether, or to what extent, to utilize these regulations in conducting the assessment." Further, it reports that the Trustees have not yet "determined whether the potentially responsible parties should participate in the damage assessment or the extent of that participation."

Com.	Topic	Issue	Sug.	Sort
24	5	0130		2

The Draft has departed so fundamentally from both the procedures and substance required by the DOI regulations that the Trustees have significantly circumscribed, if not foreclosed, the option of conducting an assessment in compliance with those regulations.

Com.	Topic	Issue	Sug.	Sort
25	5	0206		2

The Draft does not afford adequate participation of the PRP in the assessment process. The Draft avoids the clear requirements of the regulations concerning the development, content, and timing of an Assessment Plan. It frustrates the cooperative process between Trustees and PRPs envisioned by the regulations. The DOI clearly recognized the special role of early involvement by the PRP in effective resolution of damage cases and designed the assessment process accordingly. The regulations do not contemplate publication of an incomplete and inadequate draft for comment by PRPs and the public after assessment studies were well under way.

Section 11.32(a)(2)(iii)(A) directs PRPs to participate "in the development of the type and scope of the assessment and in the performance of the assessment." No such invitation was extended to the PRPs in this case; they were, instead, on June 6, 1989 invited generally to participate in the "assessment process." ESC accepted that invitation and, pointing to § 11.32(a)(2)(iii)(A), stated that it wished to participate "in the development of the type and scope of the assessment and in the performance of the assessment" in its letter to Trustees on July 5, 1989.

The Trustees responded to ESC's acceptance of the invitation to participate on August 22, by requesting ESC's comments on the Draft on exactly the same basis as members of the public. In these circumstances, the Trustees clearly have not complied with § 11.32(a)(2).

The regulations require that studies are not to be commissioned until after publication of an Assessment Plan. The very fact that the Trustees have attached to the Draft a description of 72 studies, for many of which data-gathering is complete, demonstrates that the Trustees have not complied with § 11.31 of the regulations. As is made clear at § 11.31(a), the Assessment Plan is to be used to inform PRPs and the public "of the scientific and economic methodologies that are expected to be performed during the Injury Determination, Quantification, and Damage Determination phases . . . . [Emphasis added.]" One of the basic purposes of an Assessment Plan is to provide "a means of evaluating whether the approach used for assessing the damage is likely to be cost-effective and meets the definition of reasonable costs," within the meaning of the regulations (§ 11.31(a)(2)).

Com.	Topic	Issue	Sug.	Sort
26	5	0205		2

Here, instead of performing these functions, the Draft presents to the PRPs and the public a fait accompli reporting the scientific and economic methodologies that the Trustees have already commissioned and upon which they have already expended millions of dollars. The Assessment Plan, when it is ultimately published after review of the Draft, cannot meet the basic regulatory purpose for which it is intended.

Com.	Topic	Issue	Sug.	Sort
27	5	0130		2

Contrary to the position taken by the United States Department of Justice on behalf of the Trustees, letter from Diane Kelly to John Seddelmeyer, dated September 29, 1989, the studies described in the Draft cannot be justified on the basis of § 11.22 of the DOI regulations. That section permits only the collection of field samples or the initiation of site visits to preserve data and material that are likely to be lost. § 11.22(b). Manifestly, it does not contemplate the expenditure of vast sums of money, such as has occurred here, to survey injury to all resources possibly affected by a spill, to analyze such data, and to base an injury determination upon it.

The Draft gives no assurance that restoration costs will not be unreasonable. In the light of the court's decision in Ohio v. Department of the Interior,[4] the Trustees are no longer governed by the rule embodied in § 11.35(b)(2), limiting natural resource damage recovery to the lesser of use values or restoration costs. However, the court made clear that restoration costs should be compared to use values. The Draft gives no assurance that, in achieving the "primary objective" of restoration, this principle will be respected. To the extent that the No Action - Natural Recovery Alternative is selected for particular resources, as ESC believes will be generally the case, there is no need to compare restoration costs and use values. If the

Com.	Topic	Issue	Sug.	Sort
28	5	0107		2

[4] 880F.2d 432 (D.C. Cir. 1989), rehearing denied, September 11, 1989.

Trustees contemplate that there is a chance that some resources will require an active restoration program, the Trustees must ensure that restoration costs are not unreasonable when compared to the lost-use values associated with the resource.

The Draft combines Injury Determination and Quantification phases in the assessment process. Section 11.13(a) of the DOI regulations envisions a planned and phased approach to the assessment of natural resource damages. Section 11.13(e) first requires an injury determination phase to establish whether natural resources have been injured, followed by a quantification phase focusing only on those resources as to which injury occurred. The studies attached to the Draft blur the distinction between the various phases of the assessment process. As a result, funds may be expended in the quantification of damages to resources that were not injured. Also, by combining injury determination and quantification, the Draft eliminates the post-injury-determination-phase review of the Assessment Plan required by § 11.32(f)(1).

Com.	Topic	Issue	Sug.	Sort
29	5	0204		2

The studies described in the Draft are not limited to resources with committed uses. The court in Ohio v. Department of the Interior upheld the requirements that "only committed uses . . . of the resources or services over the recovery period will be used to measure the change from the baseline resulting from injury to a resource," § 11.83(b)(2). As DOI made clear, this requirement prevents an award of damages for "speculative uses."[5] Neither the introductory section of the Draft nor its description of the 72 studies recognizes this significant constraint on the NRDA process. To the contrary, it appears that in many instances significant sums have been committed for the study of resources for which uses are speculative and as to which the Trustees will not be able to show a committed use--e.g., Economic Uses Studies 4, 8, and 9.

Com.	Topic	Issue	Sug.	Sort
30	5	2200		2

The Draft fails to provide adequate assurance of compliance with CERCLA's and the DOI regulations' proscription of double counting. Both CERCLA § 107(f)(1) and the DOI regulations, §§ 11.15(a)(1)(iii) and 11.84(c)(1), proscribe double recovery and double counting, a directive which the Trustees acknowledge in the Draft (p. 26). However, in numerous ways the Draft shows that this statutory and regulatory requirement is likely to be violated--e.g., Economic Uses Study No. 4, focusing on reductions in the value of public land, while the Trustees elsewhere survey injuries to the natural resources on those lands; the analysis of injury to resources, such as commercial fisheries and those used for subsistence, that are already the subject of private litigation; the failure to identify interdependent services (see § 11.71(b)(4)); and the failure to consider response actions (see § 11.84(c)(2)).

Com.	Topic	Issue	Sug.	Sort
31	5	0133		2

The Draft fails to select a discount rate. DOI's regulations provide that a 10% discount rate shall be used in calculating lost use values, § 11.84(e), a requirement that was specifically upheld by the court of appeals, 880 F.2d at 464-65. The Draft (p. 26) states that the Trustees have not yet decided

Com.	Topic	Issue	Sug.	Sort
32	5	0142		2

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5 51 Fed. Reg., p. 27722.

whether to use that discount rate, indicating that Trustees erroneously believe they are free to disregard the rate adopted in the regulations.

The other points developed at length above demonstrate further departure from the DOI regulations For example, the failure to utilize the appropriate restoration methodology in a study whose "primary objective" is restoration and the use of the natural resource damage assessment process to calculate what are essentially commercial damages. There are, in addition, many other respects in which the Draft deviates from the regulations that are described in the response comments concerning the technical and economic studies in Part 3 of this document.

Com.	Topic	Issue	Sug.	Sort
33	5	0130		2

The Trustees have embarked on a procedure for assessing damages that does not comply with the regulations and accordingly will not have the benefit of the rebuttable presumption given to a study that is conducted in accordance with the regulations[6] or the right to recover assessment costs.[7]

Com.	Topic	Issue	Sug.	Sort
34	5	0200		2

II. FATE AND EFFECTS OF SPILLED OIL

A. General Comments

The discussion on fate and effects (Draft, pp. 11-16) of spilled oil is an oversimplification of the physical, chemical, and biological processes which occur when petroleum is released into the marine environment. Certain important features of different dissipation processes are completely omitted. Those features which are retained are then combined to produce a biased treatment of the subject.

Com.	Topic	Issue	Sug.	Sort
35	3	0100		2

Thru 2-14 p

Processes which play important roles in determining the fate and effects of spilled oil are drift, spreading, evaporation, dissolution, dispersion (oil droplets into the water column), photochemical oxidation, emulsification (incorporation of water into the oil phase), microbial degradation (primarily oxidation), sedimentation (adsorption on particulate matter), and stranding on shorelines. These processes have been investigated in connection with numerous spills in tropical, subtropical, and subarctic marine environments and much knowledge has been gained through these investigations that can be transferred to the spill in Prince William Sound. An excellent treatise on this subject appears in a recent National Research Council (NRC) publication.[8] The effects of petroleum on organisms is also discussed in great detail in the NRC document. The findings represent a consensus on the fate and effects of spilled oil of many scientists from academia, government, and industry.

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6 CERCLA § 107(f)(2)(C), 43 C.F.R. § 11.10.

7 CERCLA § 107(a)(4)(C); 43 C.F.R. § 11.10

8 National Research Council, Oil in the Sea: Inputs, Fates, and Effects, National Academy Press, Washington, D. C., 1985.

The authors of the "Fate and Effects of the Spilled Oil" section in the Draft overlook many of these findings. Moreover, the Draft discussion appears to address the fate and effects of oil spilled into the environment as if no action had been taken to remove and recover bulk oil from the water or shorelines. This omission is further compounded in the Draft through misleading statements that the oil will persist "for decades" (Draft, p. 13). The cleanup action taken by ESC through mid-September 1989, has been massive--involving over 1400 boats, more than 11,000 people, and fifty skimmers--to treat almost 1100 miles of shoreline to an environmentally stable condition by removing gross oil contamination. These treated beach segments include all shorelines categorized by ADEC and Coast Guard as having any oil spill impact.

The discussion in the Draft on fate and effects of the spilled oil does acknowledge that a high degree of variability exists concerning the effect of the oil on the environment. This is a key point which will ultimately pervade the entire assessment process. Shoreline impacts will likely be highly localized, site-specific, and limited to only a very small fraction of the Prince William Sound shoreline and much less of Kenai, Kodiak, and Alaska Peninsula shorelines.

B. Specific Comments

Draft, Page 11, "The oil's more volatile and soluble components evaporate into the atmosphere or dissolve into the water." In discussing "evaporate" and "dissolve" the authors give the impression that these may be of equal importance in the dissipation of an oil spill at sea. The NRC document notes that the most soluble hydrocarbons in oil (such as benzene and toluene) are also the most volatile and are likely to be preferentially removed by evaporation, which is typically orders of magnitude faster than dissolution into the water column.[9]

Draft, Page 11, ". . . small droplets of oil may be beaten into the surface water, thereby increasing both the speed with which it is accommodated in the water and the potential toxicity to plankton and fish." "Accommodate" is a term not ordinarily used by scientists studying the fate and effects of oil. Accommodation in this context apparently represents the sum of petroleum which dissolves (very small) and which disperses (very large). Dispersed oil is much less bioavailable, therefore less toxic, to marine organisms than dissolved oil. The high wave energy in the Gulf of Alaska will help disperse the oil droplets to ever- decreasing concentrations both in the vertical as well as horizontal directions in the water column.

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9 Ibid, p. 277.

Draft, Page 11, "As much as half of the oil may be washed away within the first 18 months, although pools of oil are likely to collect in hollows among the rocks, where it may remain for years." In high-energy environments, such as the northern Gulf of Alaska, it is likely that much more than fifty percent of the oil will be washed away in this time interval. This quoted statement also completely ignores the effectiveness of the 1989 shoreline cleanup operations which removed bulk oil. Moreover, natural weathering and biological degradation will transform the pools mentioned in this statement into a relatively inert residue having low toxicity.

Draft, Page 11, "On cobble or coarse sand beaches, the oil may sink deeply into the sediments. Wave erosion is less effective in these environments, and slow biodegradation assumes a more important role in removal of the oil." Cobble and coarse sand beaches represent high-energy environments while silts and muds typify low-energy environments.[10] Thus, wave erosion would still be effective in removing oil on affected cobble and coarse sand shorelines. This wave erosion, combined with the great amount of precipitation that falls in September and October in Prince William Sound and adjoining bodies of water, can be expected to remove much of the remaining oil. It is also remarkable nothing is said in the Draft about tidal action in this portion of the fate and effects section. U.S. Department of Interior[11] notes that tides along the Gulf of Alaska are semidiurnal with maximum diurnal inequalities of up to 4.4 meters. Since tidal currents are much larger in confined embayments than along the coast, tidal action certainly will play an important role in removing oil from shorelines in impacted areas.

Draft, Page 11, ". . . some of it (oil) may gradually return to the water, and once again affect the life there." The oil which returns to the water from the shoreline is certainly highly weathered and of extremely low toxicity to marine life. The NRC document notes that most of the toxic effect of petroleum is due to the lower-molecular-weight (C12-C24) n-paraffin compounds and to the monoaromatic fraction (e.g., benzene, toluene, xylenes, etc.).[12] Essentially all of these compounds would have been weathered from the oil by the time it reenters the water.

Draft, Page 13, ". . . but because muddy bottoms usually are found in low-energy environments (such as wetlands), the stranded oil may persist for decades." It is true that oil may persist for decades in muddy sediments located in highly restricted, low-circulation environments. However, these types of shorelines represent less than 10% of the total shoreline in Prince William Sound, and very little of this type of shoreline was impacted by the spill.

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10 J. Cairns, Jr. and A. L. Buikema, Jr., Restoration of Habitats Impacted by Oil Spills, Butterworth Publishers, Boston, 1984, pp. 12-13.

11 U.S. Department of Interior, Gulf of Alaska/Cook Inlet Sale 88: Final Environmental Impact Statement, Minerals Management Service, Alaska OCS Region, Anchorage, Alaska, July 1984, Vol. 1., p. III-19.

12 National Research Council, p. 372.

Draft, Page 13, "Tar balls also may be eaten by bottom-feeding fish, possibly tainting their flesh." It is very doubtful that highly weathered oil, such as tarballs, could cause tainting. Lower-molecular-weight hydrocarbons, particularly the monoaromatics, are more likely to cause tainting, but they would have been removed by weathering processes before tarballs were formed.

Draft, Page 13, "Prince William Sound is generally a fiord/estuary system, and not a high-energy, open coastal environment." Although Prince William Sound is not an open coastal environment, it is still a high-energy environment. The abundance of rocky coasts and boulder, cobble, and coarse sand beaches, and the sparseness of fine sand, silty, and muddy beaches, particularly in the assessment area, are indicators of a high-energy environment.[13]

Draft, Page 13, "Oil is likely to be moved deeper into the fiords rather than being flushed out." The Draft suggests that "flushing" of waters does not occur in this environment. The U.S. Department of Interior notes that for the Gulf of Alaska region, "During the winter, prevailing easterly winds cause an onshore transport which causes downwelling, thus flushing the shelf with low-salinity, low-temperature waters."[14] Additionally, flushing is further enhanced by adverse winter weather when wind speeds are likely to exceed 34 knots 10 percent of the time and wind speeds in excess of 100 knots have been recorded accompanying severe storms.[15] This adverse weather, combined with annual precipitation in excess of 200 centimeters (most of which falls as rain in the fall), certainly promotes "flushing" of the Gulf of Alaska and adjoining fiords, bays, and inlets. Royer notes that over the entire year the average rate of freshwater influx into the Alaska Coastal Current, which flows near to shore in the northern Gulf of Alaska, is about 1.2 times the average discharge of the Mississippi River.[16] Royer also notes that more than 320 inches of precipitation falls on Montague Island in Prince William Sound annually.[17]

Draft, Page 13, "The entrances to the fiords are sheltered, rocky headlands, where oil may stick to rocks in the intertidal zone." Based on the previous discussion, it seems very unlikely that (1) entrances to fiords in Prince William Sound could be classified as "sheltered", and (2) oil would stick to rocks in the intertidal zone. Moreover, the 1989 cleanup was focused on removing bulk oil from these areas.

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[13] J. Cairns, Jr. and A. L. Buikema, Jr., Restoration of Habitats Impacted by Oil Spills, Butterworth Publishers, Boston, 1984, pp. 12-13.

[14] U.S. Department of Interior, p. III-18.

[15] Ibid, p. III-16.

[16] T. C. Royer, "Where is the Exxon Valdez Oil Spill Going and Why?" Institute of Marine Science, University of Alaska-Fairbanks Press Release, Fairbanks, Alaska, April 1989.

[17] Ibid.

Draft, Page 13, "With little abrasive wave action, oil could remain in such areas for years, with only slow chemical and biological processes to degrade it." Based on the previous discussions, above, concerning tidal action and adverse weather, it is expected there would be appreciable abrasive wave action on the rocks at the entrances to fiords. This statement also completely ignores shoreline cleanup activities.

Draft, Page 13, "The potential exists for the oil released in the Exxon Valdez incident to persist in and on these Prince William Sound coastlines for many years." This is a misleading statement. Most of the oil has already been removed by the massive cleanup undertaken in 1989. Moreover, there is significant potential that any remaining oil will be removed by the ongoing bioremediation processes and natural phenomena--storms, precipitation, and tides--in a one or two year period.

Draft, Page 14, ". . . when the toxic aromatic components are most concentrated in the upper few meters of the water." It is misleading to state that the toxic aromatic hydrocarbons are mostly concentrated in the upper few meters of the water column during the early stages of a spill. Nothing is said about the competing processes of evaporation and dispersion, which rapidly remove or dilute these hydrocarbons in the water column. Additionally, water-quality measurements taken immediately after the spill, both by ESC and the Trustees, have never identified aromatic hydrocarbon levels above 10 ppb, which is well below acute toxicity levels for fish or other marine organisms.

Draft, Page 14, "The pre-spill population of sea otters in the affected portions of Prince William Sound was estimated at approximately 2,500 animals, with similar or greater numbers along the Kenai and Alaska Peninsulas." Otter population estimates are quite variable and have been quoted in other publications as up to 8,000 animals in Prince William Sound and over 20,000 in the spill-affected areas. Thus, the 2,500 figure quoted appears to seriously understate the total otter population and, thereby, overestimate the spill impact on the total population.

Draft, Page 14, "Terrestrial mammals near the spill in the early days also were exposed to strong petroleum vapors." The statements about exposure of terrestrial mammals to petroleum fumes and vapors are pure conjecture on the part of the Trustees.

Draft, Page 14, "Those marine mammals that do not rely on hair or fur for thermal regulation (whales, porpoises, and harbor seals as opposed to sea otters) appear to be less sensitive to oiling. However, their overall vulnerability is not well known." Concerning the vulnerability of cetaceans (whales and porpoises) to oil, NRC states in its summary of the effects of oil on marine mammals that "Cetaceans were little or only transiently affected by oil exposure."[18]

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[18] National Research Council, p. 430.

Draft, Page 14, "Many of the birds were killed as the result of direct exposure to the oil. Others may be affected indirectly through loss of habitat or food. Seabirds were just returning to breeding and nesting colonies in the Sound and along the coast. Their success in breeding could be diminished by loss of habitat, loss of food, and the death of eggs and chicks." ESC is not aware that any determination has been made as to the cause of death of recovered dead birds, so this Draft argument is at least premature. Moreover, in discussing the effects of the spilled oil on seabirds, the natural recoverability of seabird populations should be addressed. NRC notes that, "despite various concerns and considering the large losses of seabirds from oil pollution, there may not be a material impact on the total population of a given species."[19]

Draft, Page 15, "Recovery of intertidal populations may take many years." While some populations may take many years to recover, the majority of populations will recover relatively quickly. This occurs because the oil remaining in the gravel and among the rocks is highly weathered, geographically dispersed, and essentially non-toxic.

Draft, Page 15, "Pacific herring are second in importance only to salmon among the fishery resources in Prince William Sound . . . Prince William Sound accounts for about half of Alaska's total commercial harvest of pink salmon . . . that could result in lower returns of adult fish in 1991 . . . . Four other species of salmon are found in the Sound . . . . The production and survival of the 1989 fry from all of these species are at risk, as is the spawning success of adults returning in the fall of 1989 . . . . The eggs and larval forms of many species of fish and shellfish were in near-surface waters at the time of the spill. The concentrations of hydrocarbons in the water beneath the floating slicks in Prince William Sound probably were sufficient to kill many of them, raising the possibility of delayed population effects in some species." NRC states that there is no clear indication that commercially important fish stocks have been severely disrupted by either chronic or catastrophic oiling of their environment.[20] NRC also states that present census techniques remain too crude to provide clear knowledge of standing fish stocks, while natural variabilities in the stocks probably mask any impacts from petroleum that may exist.

III. CHRONOLOGY

The Draft contains a summary chronology of the spill and response effort. The chronology is a discussion of liability, is not relevant to a damage assessment, and is erroneous in many respects. However since the chronology serves no purpose in the Draft, ESC will not address it in these comments.

Com.	Topic	Issue	Sug.	Sort
36	5	0109		2

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[19] Ibid, pp. 434-435.

[20] Ibid, p. 15.

PART 3

COMMENTS ON INJURY DETERMINATION/QUANTIFICATION STUDIES

This Part provides comments on the individual Injury Determination/ Quantification studies, Restoration and Implementation Plans, Damage Determination studies, related tables, and Appendices A and B described on pages 29-224 of the Draft State/Federal Natural Resource Damage Assessment Plan for the Exxon Valdez Oil Spill, August 1989. This response provides both technical and regulatory comments which address information provided in the Draft for all studies listed. Following this general discussion, specific comments appropriate to individual studies are included. All section references are from the DOI NRDA regulations 43 C.F.R. Part 11.

I. COMMENTS CONCERNING ALL STUDIES

ESC agrees that technical and economic studies are necessary for the execution of a natural resource damage assessment and the development of a restoration strategy and plans. Both scientific and economic data are necessary to make reasoned judgements and decisions concerning the actions which might be undertaken to enhance the natural recovery processes which operate on oil spills. Conversely, it is imperative that such studies be closely coordinated with an objective of restoring the environment in a timely manner and data be gathered or measured using valid methodologies. It is not apparent that the Draft meets either of these requirements.

Com.	Topic	Issue	Sug.	Sort
37	5	0100		2

A. The Draft does not demonstrate that the study projects are well designed and incorporate sound statistical methods.

Com.	Topic	Issue	Sug.	Sort
38	5	0103		2

Statistical design of studies is of paramount importance to the validity of the results in at least two respects. First, resource injury determination can only be done using a statistically based process which compares impacted resources to "without spill" conditions at suitable control sites. Second, recovery cannot be defined on an absolute basis such as "pristine" as stated by the Draft. Rather, recovery of the affected resources occurs when impacted and unimpacted areas provide the same levels of resource services.

These same considerations on the statistical design will invalidate many of the studies described in the Draft which rely on historical data to establish the "without spill" conditions for a resource. There are many factors--such as weather, predation, natural diseases, food supplies, etc.--which cause significant interannual variations in population and vitality of resources, and make comparisons with historical data statistically inconclusive.

Without more detailed information on the methodologies proposed in the Draft, it is impossible to evaluate three key statistical aspects which are necessary for good laboratory experimental or field sampling designs. These aspects are control, sample size, and (in many cases) replication.

Com.	Topic	Issue	Sug.	Sort
39	5	0100		2

The presence of controls is the cornerstone of good experimental design and sampling. In those cases where no controls are to be used, the studies appear to be flawed. In those cases where controls are mentioned, lack of adequate information makes it impossible to evaluate if they are satisfactory in quality and quantity. In addition, the criteria for selecting control sites or stations need to be uniformly defined for all studies.

Establishment of good control is particularly important since two recent natural occurrences could have impacted results observed from these studies. First, the 1988-1989 winter was very severe with extended periods of extremely cold weather. This could have significantly decreased population levels and food sources of some species. Second, the 1989 spring was especially dry in Alaska. This reduced the flow of the Alaska coastal current which influences the Prince William Sound ecosystem and could have had a dramatic impact on the trophic food web.

Com.	Topic	Issue	Sug.	Sort
40	5	1000		2

Sample size is a second important aspect of statistical design, since it relates directly to the reliability of the information gathered. In deciding how large a sample should be taken, sample variation must be considered. Before most of the samples were gathered in these studies, preliminary information was probably available to estimate a reasonable sample size. However, none of the studies describe the rationale regarding their chosen sample size. The reason for sample size concern is that conclusions could be drawn from results that are based on inadequate statistical assessments, and hence scientific validity would be lost.

Replication, the identical assessment made on multiple samples of the same-item or short-time displaced items (such as water samples) is necessary in most studies to estimate a mean value accurately. A statistical design that does not consider adequate replicate size for each of its assays or bioassays is inadequate.

Com.	Topic	Issue	Sug.	Sort
41	5	0112		2

<u>B. The Draft does not clearly describe how cause and effect will be demonstrated.</u>

In order to demonstrate a clear cause and effect relationship, a link must be established between the spilled oil and the observed differences. This link must demonstrate that hydrocarbons are present, the source of the hydrocarbons is the <u>Exxon Valdez</u> spill, and those hydrocarbons alone are responsible for the observed effects. Many of the studies proposed in the Draft will have difficulty demonstrating exposure to the oil, since there is little, if any, coordination between samples collected for chemical and biological analyses.

Com.	Topic	Issue	Sug.	Sort
42	5	0100		2

<u>C. The studies inappropriately envision use of unweathered Prudhoe Bay crude oil in many studies of biological effects.</u>

Based on the information provided, the proposed toxicological studies apparently intend to use fresh Prudhoe Bay crude, rather than weathered oil. In doing so, they ignore the compositional changes that occur with oil over time. Many natural processes, particularly biodegradation and photo-oxidation, play an important role in determining the eventual fate and effects of spilled oil. The Draft itself recognizes the importance of these processes on biological impact. It states that the oil is usually ". . . most toxic during the early stages in a spill . . ." (Draft, p. 14), but ". . . the acute toxicity of the remaining oil diminishes" (Draft, p. 13) as the volatile aromatic fraction of the fresh oil is lost.

Com.	Topic	Issue	Sug.	Sort
43	5	1000		2

Moreover, the importance of using weathered, rather than fresh, oil was emphasized in the NRC review on the fate and effects of oil.[1] In addition the DOI regulations (§ 11.62(f)(4)(i)(E)) require that the ". . . oil or hazardous substance used in the test must be the exact substance or a substance that is reasonably comparable to that suspected to have caused death to the natural population of fish." Thus, if weathered oil is thought to be responsible for harming an organism in the field, confirmatory toxicological data must be done using weathered, and not fresh, oil.

D. The Draft outlines a number of technical and economic studies which are inappropriate for incorporation in the Natural Resource Damage Assessment process.

Com.	Topic	Issue	Sug.	Sort
44	5	0133		2

As noted above, page 2-5, the Trustees cannot recover for damages payable to commercial users of the resource. Many of the studies in the Draft appear to focus on resources that are commercially exploited and which are the subject of claims and litigation. The Trustees will not be able to recover for those same damages in the assessment process due to the prohibition on double counting. Table 3-1 lists the studies having substantial commercial emphasis which are unlikely to be recoverable within the context of the regulations.

E. The Draft does not demonstrate that studies will be cost effective or reasonable.

Cont on p 3-4

Com.	Topic	Issue	Sug.	Sort
45	5	0107		2

The purpose of the DOI NRDA regulations is "to provide standardized and cost-effective procedures for assessing natural resource damages" (§ 11.11). This purpose is implemented in the regulations by setting requirements for methodologies which constrain the activities which might be undertaken by Trustees in performing an assessment. Section 11.13(a) states that "the process established . . . uses a planned and phased approach to the assessment of natural resource damages." Section 11.13(c) states, "The Assessment Plan ensures that the assessment is performed in a planned and systematic manner and that the methodologies chosen demonstrate reasonable cost." Section 11.13(e)(1-3) describes the phases in this planned and systematic manner. Further, § 11.31(a)(2) requires that the Plan, "shall be of sufficient detail to serve as a means of evaluating whether the approach used for assessing the damage is likely to be cost effective and meets the definition of reasonable cost."

Section 11.14 defines the terms cost effective and reasonable cost:

(j) "Cost effective" or "cost effectiveness" means that when two or more activities provide the same or a similar level of benefits, the least costly activity providing that level of benefits will be selected.

(ee) "Reasonable cost" means the amount that may be recovered for the cost of performing a damage assessment. Costs are reasonable when: the Injury Determination, Quantification,

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[1] It found that ". . . experiments using unweathered oils do not indicate those responses expected when the same organisms are exposed to aged oils. Experiments designed to assess the impact of oil must take this disparity into account" (National Research Council, p. 136).

and Damage Determination phases have a well-defined relationship to one another and are coordinated; the anticipated increment of extra benefits in terms of the precision or accuracy of estimates obtained by using a more costly injury, quantification, or damage determination methodology are greater than the anticipated increment of extra costs of that methodology; and the anticipated cost of the assessment is expected to be less than the anticipated damage amount determined in the Injury, Quantification, and Damage Determination phases.

Thus, the regulations require that each and every study performed be both cost effective and reasonable. As will be demonstrated in the following comments, many of the studies in the Draft fail to meet either test. In many cases, the studies envision use of expensive techniques which could not be justified as cost effective in comparison to other techniques. These problems are compounded by the failure of the Trustees to justify either expenditures or studies within the context of the reasonable cost requirements of the regulations. Other than references to commercial impacts, which are likely small after payable claims are considered, the Draft provides no basis for the extra costs incurred in many detailed studies in comparison to the expected economic benefits to be obtained; i.e., in most studies none of the required linkage has been made between study costs and expected benefits. Table 3-2 lists studies which are not reasonable or cost effective and appear to be partially or wholly unrelated to NRDA issues, or focused on research activities. These studies should not be fully compensable under the damage assessment. Moreover, such research-related studies appear to be projects which would be conducted in the normal course of government agency activities and would be further excluded from recoupment by § 11.30(c)(2).

Com.	Topic	Issue	Sug.	Sort
46	5	0130		2

F. The Draft deviates from the DOI regulations in many other significant respects.

- Sections 11.30(c)(1) and (2) and 11.60(d)(1) and (2) specify the types and natures of expenditures which are reasonable and necessary for developing the Assessment Plan, conducting the assessment, and developing the Restoration Methodology Plan. In no case do the regulations provide that capital or equipment expenditures are reasonable and compensable by the PRP. Such invalid expenditures are listed in the Draft in the studies listed in Table 3-3.

- The scientific methodologies expected to be used in Injury Determination and Quantification described for the studies are too vaguely identified to meet the requirements of § 11.31(a)(1) and allow analysis of the Draft. Moreover, there is insufficient detail of scientific and economic methodologies to serve as a means of evaluating whether the approach used for assessing the damage is likely to be cost effective and whether it meets the definition of reasonable cost, as required in § 11.31(a)(2).

- The scientific methodologies provided in the Draft do not contain sufficient detail concerning sample and survey designs, numbers and types of samples to be collected, analyses to be performed, and preliminary determination of the recovery period, and other such information, as required in § 11.31(a)(2).

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Com.	Topic	Issue	Sug.	Sort
47	5	0130		2

Com.	Topic	Issue	Sug.	Sort
48	5	0102		2

Com.	Topic	Issue	Sug.	Sort
49	5	0102		2

- The geographical areas defined in the studies are broad and lack sufficient detail to determine actual sampling locations within those geographical areas, as required in § 11.31(a)(2).

- The Draft does not demonstrate that the damage assessment has been coordinated to the extent possible with any remedial investigation feasibility study or other investigations, as required in § 11.31(a)(3).

- The Draft does not contain procedures and schedules for sharing data, split samples, and results of analysis with any potentially responsible parties upon request, as required in § 11.31(a)(4).

- Section 11.31(c)(2) requires that an Economic Methodology Determination, as prescribed by § 11.35, be included in the Plan. The Draft fails to meet any of the requirements of § 11.35 with regard to the Economic Methodology. While the recent Court of Appeals decision (Ohio v. Dept. of Interior, 880F.d2 432 (D. C. Cir. 1989) overturned the "lesser of" rule in § 11.35(b)(2), § 11.35 still requires the restoration or replacement to be technically feasible (§ 11.35(b)(3)), and that the Assessment Plan estimate and document the costs of restoration or replacement and the benefits gained from such actions. By failing to address these matters, the Draft is seriously flawed and cannot satisfy the requirements that the assessment be performed at a reasonable cost, as required by § 11.30(b).

Com.	Topic	Issue	Sug.	Sort
50	5	0107		2

- Section 11.34 of the regulations addresses confirmation of exposure. The Draft does provide required information on confirmation as required in § 11.34(a)(1). However, the extensive work undertaken by the Trustees on all aspects of sample acquisition and analyses for baseline or injury is clearly in violation of the limitations on the scope of such work by § 11.34(b)(2) and (3).

Com.	Topic	Issue	Sug.	Sort
51	5	0102		2

- The Draft does not provide sufficient information to determine if the injuries will be well documented, as required in § 11.61(b).

Com.	Topic	Issue	Sug.	Sort
52	5	0102		2

- Insufficient information is provided in the Draft to determine if the methodologies for the Injury Determination phase are based upon cost effectiveness, as required in § 11.61(d)(2).

- The methods used to determine injury to a biological resource require that each of four criteria be met as specified in § 11.62(f)(2). The biological response measured must be a commonly documented response and known to occur in both free-ranging organisms and controlled experiments as a result of exposure to oil or hazardous substance. In addition, the response must be detectable using methods that are practical to perform and which produce scientifically valid results. The Draft does not provide sufficient information to demonstrate compliance with these requirements.

Com.	Topic	Issue	Sug.	Sort
53	5	1000		2

- Insufficient information is provided in the Draft to determine if the objectives considered available information from response actions relating to the oil release, exposed resource, oil characteristics, potential injury and pathway of exposure, as required in § 11.64(a)(2).

Com.	Topic	Issue	Sug.	Sort
54	5	0102		2

- Insufficient information is provided in the Draft to determine if the methodologies selected for Injury Determination are 1) demonstrated to have performance under conditions similar to those anticipated; 2) cost effective; 3) needed to make the determination and will produce data that were previously unavailable; and 4) going to produce data consistent with the quantification phase, as required under § 11.64(a)(3).

Com.	Topic	Issue	Sug.	Sort
55	5	0102		2

- Insufficient information is provided in the Draft to determine if the selected Injury Determination testing and sampling methodologies consider 1) physical state of the discharged oil; 2) duration, frequency, season, and time of release of oil; 3) the range of concentrations of compounds to be analyzed in different media; 4) detection limits, accuracy, precision, interferences, and time required to perform alternative methods; 5) potential safety hazards to obtain and test samples; and 6) cost of alternative methods and other specific guidance, as required under § 11.64(a)(4).

Com.	Topic	Issue	Sug.	Sort
56	5	0102		2

- The Draft does not provide sufficient information on any of the studies to evaluate whether the service reduction quantification, which should be performed according to § 11.71(a), follows the guidelines outlined in § 11.71(b-g).

Com.	Topic	Issue	Sug.	Sort
57	5	0102		2

In addition to the general exceptions cited above, individual studies also deviate from various other provisions of the regulations and from standards of good science. For brevity in the following study discussions, the exceptions will be referred to in the text by the letter convention shown in Table 3-4.

Table 3-1: Assessment Studies Having Substantial Commercial Emphasis

Study	Title	$, Thousands
F1	Salmon Spawning Area Injury	144.8
F2	Egg and Pre-emergent Fry Sampling	149.1
F3	Coded-Wire Tagging	1943.4
F4	Early Marine Salmon Injury	829.2
F5	Dolly Varden Injury	437.4
F6	Sport Fishery Harvest & Effort	175.9
F7	Salmon Spawning Area Injury, Outside PWS	320.3
F8	Egg & Pre-emergent Fry Sampling, Outside PWS	111.4
F9	Early Marine Salmon Injury, Outside PWS	348.5
F10	Dolly Varden and Sockeye Injury, Lower Cook Inlet	152.6
F11	Herring Injury	374.5
F12	Herring Injury, Outside PWS	60.0
F14	Crab Injury	142.9
F15	Spot Shrimp Injury	60.5
F16	Injury to Oysters	30.5
F17	Rockfish Injury	45.6
F18	Trawl Assessment	738.8
F19	Larvae Fish Injury	413.4
F20	Underwater Observations	550.1
F22	Crab Injury, Outside PWS	111.5
F23	Rockfish Injury, Outside PWS	108.4
F24	Trawl Assessment, Outside PWS	2495.8
F25	Scallop Mariculture Injury	53.8
F26	Sea Urchin Injury	45.0
Economic Studies		
1	Estimated Price Effects on Commercial Fisheries	NA
2	Fishing Industry Costs	NA
3	Bioeconomic Models for Damage Assessment	NA
TOTAL		9,843.4

Table 3-2: Studies That Are Not Completely NRDA Related[2]

tudy	Title	$, Thousands
AW2	Injury to Subtidal	883.0
AW4	Injury to Deep Water	378.9
AW5	Injury to Air	106.5
F1	Salmon Spawning Area Injury	144.8
F2	Egg and Pre-emergent Fry Sampling	149.1
F3	Coded-Wire Tagging	1943.4
F4	Early Marine Salmon Injury	829.2
F5	Dolly Varden Injury	437.4
F6	Sport Fishery Harvest & Effort	175.9
F7	Salmon Spawning Area Injury, Outside PWS	320.3
F8	Egg & Pre-emergent Fry Sampling, Outside PWS	111.4
F9	Early Marine Salmon Injury, Outside PWS	348.5
F10	Dolly Varden and Sockeye Injury, Lower Cook Inlet	152.6
F11	Herring Injury	374.5
F12	Herring Injury, Outside PWS	60.0
F14	Crab Injury	142.9
F15	Spot Shrimp Injury	60.5
F16	Injury to Oysters	30.5
F17	Rockfish Injury	45.6
F18	Trawl Assessment	738.8
F19	Larvae Fish Injury	413.4
F20	Underwater Observations	550.1
F22	Crab Injury, Outside PWS	111.5
F23	Rockfish Injury, Outside PWS	108.4
F24	Trawl Assessment, Outside PWS	2495.8
F25	Scallop Mariculture Injury	53.8
F26	Sea Urchin Injury	45.0
MM1	Humpback Whale	226.0
MM2	Killer Whale	200.0
MM3	Cetacean Necropsy	73.0
MM4	Sea Lion	270.0
MM5	Harbor Seal	245.0
MM6	Sea Otter Injury	763.0
MM7	Sea Otter Rehabilitation	108.0
TM1	-Injury to Sitka Black-Tail Deer	87.0
TM2	Injury to Black Bear	139.7
TM3	Injury to River Otter and Mink	287.7
TM4	Injury to Brown Bear	162.7
TM5	Injury to Small Mammals	302.4
TM6	Reproduction of Mink	192.2
B2	Censuses and Seasonal Distribution	565.0
B3	Seabird Colony Surveys	440.0
B5	Peale's Peregrine Falcons	43.5
B6	Marbled Murrelets	115.7
B7	Storm Petrels	135.0
B8	Black-Legged Kittiwakes	190.0
B9	Pigeon Guillemots	109.5

Continued

Table 3-2: Studies That Are Not Completely NRDA Related[2]
(continued)

Study	Title	$, Thousands
B10	Glaucous-Winged Gulls	73.0
B11	Sea Ducks	146.0
B12	Shorebirds	166.0
B13	Passerines	59.0
	TOTAL	16,311.20

[2] Some portions of these studies would not be compensable because they are not cost effective or reasonable or are solely research related.

Table 3-3: Studies With Non-Compensable Capital Equipment Expenditures

Study	Title	$, Thousands Equipment
CH1	Comprehensive Assessment	871.0
AW1	Geographical Extent in Water	27.5
AW2	Injury to Subtidal	20.0
AW3	Hydrocarbons in Water	25.0
F1	Salmon Spawning Area Injury	11.1
F2	Egg and Pre-emergent Fry Sampling	40.0
F3	Coded-Wire Tagging	407.1
F4	Early Marine Salmon Injury	88.4
F5	Dolly Varden Injury	67.9
F6	Sport Fishery Harvest & Effort	20.0
F7	Salmon Spawning Area Injury, Outside PWS	13.3
F8	Egg & Pre-emergent Fry Sampling, Outside PWS	8.8
F9	Early Marine Salmon Injury, Outside PWS	40.0
F10	Dolly Varden and Sockeye Injury, Lower Cook Inlet	6.4
F11	Herring Injury	113.0
F13	Clam Injury	3.0
F14	Crab Injury	22.0
F15	Spot Shrimp Injury	11.0
F16	Injury to Oysters	6.0
F17	Rockfish Injury	1.0
F18	Trawl Assessment	142.0
F19	Larvae Fish Injury	100.0
F20	Underwater Observations	230.0
F21	Clam Injury, Outside PWS	2.3
F22	Crab Injury, Outside PWS	7.0
F23	Rockfish Injury, Outside PWS	13.0
F24	Trawl Assessment, Outside PWS	67.0
F26	Sea Urchin Injury	3.0
MM1	Humpback Whale	8.0
MM2	Killer Whale	2.0
MM3	Cetacean Necropsy	2.0
MM4	Sea Lion	11.0
MM5	Harbor Seal	9.5
MM6	Sea Otter Injury	395.0
MM7	Sea Otter Rehabilitation	25.0
TM3	Injury to River Otter and Mink	14.0
TM4	Injury to Brown Bear	11.1
TM5	Injury to Small Mammals	31.5
B1	Beached Bird Survey	78.0
B2	Censuses and Seasonal Distribution	288.0
B3	Seabird Colony Surveys	127.0
B4	Bald Eagles	75.0
B5	Peale's Peregrine Falcons	1.5
B6	Marbled Murrelets	30.0
B7	Storm Petrels	10.0
B8	Black-Legged Kittiwakes	85.5
B9	Pigeon Guillemots	30.0

Continued

Table 3-3: Studies With Non-Compensable Capital Equipment Expenditures
(continued)

Study	Title	$, Thousands Equipment
B10	Glaucous-Winged Gulls	15.0
B11	Sea Ducks	40.5
B12	Shorebirds	10.0
B13	Passerines	2.5
TS1	Chemistry	300.0
TS2	Histopathology	14.0
TS3	Mapping	239.5
RP1	Restoration Planning	30.0
	Total	4252.4

Table 3-4: Regulatory Deviations of Individual Studies

Exception	Comment
A	Insufficient information is provided to determine if the injury results from the discharge of oil based upon the exposure pathway, as required in § 11.61(a), and not as the result of other non-oil spill related phenomena.
B	This study provides an inadequate description of the statistical analysis employed to evaluate the data. Thus, it is impossible to evaluate whether the injury determination will be based on a statistically significant difference in the biological response between the impacted and control areas, as required in § 11.62(f)(3).
C	Insufficient information is provided to evaluate whether this study can adequately determine the exposure pathway, as required in § 11.63. This requires that the following are considered: chemical and physical characteristics of the discharged oil, rate or mechanism of transport, combination of pathways, and demonstration of the presence of oil.
D	Insufficient information is provided to assess whether modeling methods satisfy specific requirements in § 11.63(d).
E	Insufficient detail and lack of documentation of testing methodologies make it impossible to determine whether the methodologies meet criteria listed in § 11.64(a)(3)(i-iv). Only those methodologies shall be selected: a) for which performance under conditions similar to those anticipated at the assessment area has been demonstrated; b) that ensure testing and sampling performance will be cost effective; c) that will produce data that were previously unavailable and that are needed to make the determinations; and d) that will provide data consistent with the data requirements of the Quantification phase.
F	Insufficient detail and lack of documentation make it impossible to determine if specific factors listed in § 11.64(a)(4)(i-vi) were considered when the testing methodologies were selected. These factors include a) physical state of the discharged oil; b) duration, season, and time of the discharge; c) detection limits, accuracy, precision, interferences, and time required to perform alternative methods; and d) costs of alternative methods.

Continued

Table 3-4: Regulatory Deviations of Individual Studies
(continued)

Exception	Comment
G	This study does not provide sufficient information to evaluate if the testing and sampling methods for injury determination meet the requirements of § 11.64(b). These requirements include: adequate description in the Assessment Plan, use of analytical methods which are generally accepted or have been scientifically verified and documented, and use of sampling methods which are generally accepted.
H	Insufficient information and lack of documentation make it impossible to determine whether the study will adequately quantify any injury, as required in § 11.70(a-b).
I	Insufficient information and lack of documentation make it impossible to determine whether the extent of injury, baseline condition, baseline services recoverability, and reduction in service that may result will be adequately estimated, as required in § 11.70(c).
J	Insufficient information is provided to evaluate whether this study adequately satisfies § 11.71 general guidelines on service reduction qualification. This includes whether or not this resource and these methods should have been selected, determining a real extent, and determining services.
K	It is not apparent that direct quantification of the service is consistent with the needs of the economic methodology, as specified in § 11.71(a)(2). Also, it is not apparent that direct quantification of the service can be demonstrated to have resulted from injury to the natural resource, as required in § 11.71(f)(1-3).
L	Lack of documentation makes it impossible to determine whether the testing methodologies selected for the Injury Quantification phase were selected based on the consideration of the following factors: a) degree to which a particular resource or service is affected by the discharge; b) degree to which a given resource or service can be used to represent a broad range of related resources or services; c) consistency of the measurement with the requirements of the economic methodology; and d) technical feasibility or quantification of changes in a given resource or service at reasonable cost (§ 11.71(d)(1-4)).
M	This study does not adequately determine the services provided by the surface water or sediment, as required by § 11.71(h).

Continued

Table 3-4: Regulatory Deviations of Individual Studies
(continued)

Exception	Comment
N	Insufficient information is provided to evaluate whether this study can adequately meet service reduction requirements according to § 11.71(j). This includes determining geographical areas affected, degree of impairment, and period of impairment.
O	The methods used for population estimates are not described in sufficient detail to determine whether standard, widely accepted techniques are employed, as required in § 11.71(l)(5)(i).
P	Insufficient information is provided to determine whether reliable baseline age structure data are available for the population being assessed, as required in § 11.71(l)(5)(ii).
Q	Insufficient information is provided to assess whether mortality estimates follow the regulations in § 11.71(l)(5)(iii). Mortality from single incidents may be used to estimate changes in populations only when baseline population data are available, and when corrections can be made for potential sampling biases. This study provides no information on how the correction factors are determined. Thus, it is impossible to evaluate if they adequately adjust for sampling biases. Additional correction factors may need to be considered. It is also impossible to determine that the adaptation of § 11.71(l)(5)(iii)(A) methods for measuring mortality are adequately documented, as required in § 11.71(l)(5)(iii)(B).
R	This study does not describe any baseline services determination as would be determined in the general guidelines of § 11.72.
S	Insufficient information is provided to determine whether baseline data are selected according to the general guidelines in § 11.72(b). These guidelines require that the baseline data 1) reflect conditions had the release of oil not occurred; 2) include the normal range of physical, chemical, or biological conditions; 3) are accurate, precise, complete, and representative of the resource; and 4) are collected by comparable methods. Also, the baseline data collection is restricted to those data necessary for a reasonable cost assessment.
T	Lack of documentation makes it impossible to determine if baseline data will be obtained as required by § 11.72(b)(2).

Continued

Table 3-4: Regulatory Deviations of Individual Studies
(continued)

Exception	Comment
U	Insufficient information is provided to assess whether the historical data accurately represent baseline conditions, as required in § 11.72(c).
V	Insufficient information is provided to assess whether the areas unaffected by the oil spill, i.e., control areas, satisfy requirements of § 11.72(d). This includes selecting control areas based upon their similarity to the assessment areas and lack of exposure to the release of spilled oil, demonstrating comparability to the assessment area, establishing the normal variability in the characteristics being measured, using comparable methods for the collection of data, and demonstrating values reported are comparable to literature values.
W	This study does not adequately follow the baseline services determination guidelines listed in § 11.72 and, specifically, the surface water resource additional guidelines in § 11.72(g).
X	In addition, insufficient information is provided to assess whether additional guidance on determining baseline services for biological resources under § 11.72(k) is being followed.
Y	Insufficient information is provided to assess whether the resource recoverability will satisfy requirements of § 11.73. This includes estimating recovery time if no restoration efforts are undertaken beyond the response actions, evaluating the technical feasibility of restoration efforts, and estimating the recovery time with any restoration efforts.

II. COMMENTS ON THE COASTAL HABITAT INJURY ASSESSMENT PROGRAM

The coastal habitat study program intends to estimate the effects of the spill and associated cleanup activities in terms of 1) abundance of intertidal and subtidal organisms used as food by valued resource species, 2) contamination of these same food resources by oil, 3) quantification of injury over the entire affected area, and 4) recovery of various habitat types after cleanup treatments.

Com.	Topic	Issue	Sug.	Sort
58	3	1100	X	2

The cost of the one study ($5,436,000) in this program is excessive and this study is poorly coordinated with other studies proposed in the Draft. Moreover, because this program does not take into consideration that the only feasible restoration strategy for coastal habitats is natural recovery after beach cleanup is completed, the approach used in this study will neither be cost effective nor meet the definition of reasonable cost.

COMMENTS ON COASTAL HABITAT STUDY NUMBER 1

(CH1) COMPREHENSIVE ASSESSMENT ($5,436,000)

This study attempts to assess injury to coastal habitat resources by comparing degree of oiling of coastal sediments with changes in biological community composition.

Com.	Topic	Issue	Sug.	Sort
59	3	1110	X	2

Technical Comments

The study description fails to supply sufficient information to determine that samples for chemical and biological analyses will be collected synoptically and at the same locations. This is critical so that any biological changes can be correlated with levels and compositions of petroleum contamination.

The study provides no information on the following: a) method for extrapolating from study site to the entire impact zone; b) method for relating observed ecological effects to oil content; c) whether all differences between reference and exposed sites will be ascribed to oil; and d) statistical methods for analyzing the data.

There is no discussion on the factors to be considered in developing a "statistically valid site selection and sampling strategy." No rationale is given for the selection of study sites, or how they will be "ground truthed." The randomization method is critical for this type of study and is not specified. Apart from a token reference to § 11.72, there is no discussion of how reference sites will be selected.

In addition, the study refers to "fifteen additional study sites representing light and moderate to heavy oiling in Prince William Sound. . ." Reference sites (with selection criteria specified) are also needed for these Prince William Sound sites. The criteria for selecting the location of the four transects within each sampling site must be described. Even a very careful randomization scheme for site selection can be largely negated by subjective transect selection within the site.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, F, G, H, I, M, P, Q, S, T, U, X, and Y shown in Table 3-4 of this document.

III. COMMENTS ON THE AIR/WATER INJURY ASSESSMENT PROGRAM

The Draft describes five studies costing $2,307,400 (not including analytical cost) to evaluate the injury to the air and water resources. One study focuses on computer modeling of air at a cost of $106,500. The other four studies evaluate water injury at a cost of $2,200,900. The water evaluation includes computer modeling, water and sediment analysis, manned submersible visual observations, and biological indicator measurements.

This program does not take into consideration that the only feasible restoration of air/water resources, beyond immediate shoreline cleanup, is natural recovery. The volatile oil components released in the air would quickly dilute to very low concentrations. Likewise, soon after the spill, only background levels of hydrocarbons were detected in the waters of Prince William Sound due to strong natural flushing and other natural processes.

Com.	Topic	Issue	Sug.	Sort
60	3	1200	X	2

An air/water program this elaborate is not justified. As proposed in the Draft, the overall program is excessive, impractical, and expensive. Many of the techniques employed are not cost effective. In addition, the total program cost of $2,307,400 is not reasonable when considering that the air/water resources have recovered soon after the spill.

The Draft fails to provide any details of the methodologies used in the studies, making a rigorous review impossible. However, from the brief description available, many of the results obtained will be questionable. Further, the modeling efforts are not necessary and heavily rely on many assumptions which cannot be validated and will most likely generate results that are inconclusive approximations.

COMMENTS ON AIR/WATER STUDY NUMBER 1

(AW1) GEOGRAPHICAL EXTENT IN WATER ($343,500)

This study attempts to determine the source, geographic extent, and temporal persistence of floating oil.

Com.	Topic	Issue	Sug.	Sort
61	3	1210	X	2

Technical Comments

The success of this study will depend heavily on the use of visual observations and satellite data acquired during the first three months of the spill. The usefulness and accuracy of these techniques should be demonstrated before proceeding. Some of the problems expected to be encountered include limited spatial coverage, heavy cloud cover causing reduced visibility, and sensors not designed to detect floating oil.

Satellite imagery for the determination of surface-oil concentrations will lead to erroneous results. Satellite images may not have the resolution to determine surface-oil patches. Moreover, due to the existence of natural slicks and especially algal masses floating in the water, false positive results can be a problem using this technique. This could overstate the areal extent of the slick.

Aerial photography or satellite imagery will not likely be able to identify the source of the "surface oil" (e.g., Exxon Valdez natural sheen or diesel from a spill or boat wake). Therefore, the sampling and analysis of slicks will be critical for interpretation of the aerial data; otherwise, misinterpretation of the aerial data is likely.

Insufficient information is provided concerning computer modeling for this study. Concerns include: demonstrating applicability of models used; processes simulated by the model; mathematical and statistical methods used; adaptation, alteration, and documentation of computer code; and validity of model results.

From a cost-effectiveness standpoint, ADEC appears to be proposing development of a similar NOAA model for oil movement through the Sound. Additional modeling should only be completed if it is demonstrated to be a significant improvement over the existing work. If the program is just a refinement of NOAA's maps, then it is overpriced and unnecessary. A key limitation is the qualitative nature of the source documents (the overflight maps). The resulting information is highly qualitative and cannot be used for any quantitative work.

The study of surface oil slicks relates only indirectly to environmental restoration. The assumption cannot be made that surface sheens and slicks are environmentally damaging without information about their chemical composition and toxicity.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, G, M, W, and Y shown in Table 3-4 of this document.

COMMENTS ON AIR/WATER STUDY NUMBER 2

(AW2) INJURY TO SUBTIDAL ($883,000)

This study attempts to evaluate injury to subtidal marine sediments by analyzing for petroleum hydrocarbons and visual observations.

Com.	Topic	Issue	Sug.	Sort
62	3	1220	X	2

Technical Comments

This project is research oriented and actual benefits to either the Injury Documentation or Quantification Phases of the regulations do not justify the high cost of this study.

Limited information is provided concerning methods employed during visual checks for oil in bottom sediments, making it impossible to evaluate the methodology. However, visual observations are very subjective and a strong possibility of biases exists. Additionally, insufficient information is provided to assess the coordination of near-shore sites with intertidal sampling sites. Lack of information provided makes it impossible to evaluate any attempt to scale site-specific results to other broader regions.

A manned submersible cannot be used efficiently to check for oil in bottom sediments. Only massive deposits of oil, forming a visible layer on the bottom, might be detected in this way. Given the large area to be investigated, looking for such deposits with a submersible is neither feasible nor cost effective. Certainly, surface-based sampling approaches are adequate for determining levels in sediments in a more cost-effective manner.

The plan does not provide a means of distinguishing differences in sediment oiling due to geographic variation from those due to the effects of time. Thus, neither geographic nor temporal trends can be determined.

The study plan mentions that TOC analyses will be conducted on "selected samples", but gives no indication how these samples are selected. Similarly, no information concerning analyses of "grain size on representative samples" is given. There is no information provided to determine how samples will be prescreened "prior to full GC/MS analysis in areas with low likelihood of oiling."

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, G, H, I, M, and Y shown in Table 3-4 of this document.

COMMENTS ON AIR/WATER STUDY NUMBER 4

(AW4) INJURY TO DEEP WATER ($378,900)

Com.	Topic	Issue	Sug.	Sort
64	3	1240	X	2

This study attempts to evaluate injury to deepwater (>20 meters) benthic infaunal resources through chemical and biological analyses.

Technical Comments

Injury to deepwater benthic resources is expected to be minimal and very isolated. The high cost of this study is not justified.

The statement, "If injury to these communities is demonstrated . . . violation of state and federal water quality criteria is conclusive," is not valid and is a poor justification of this expensive study.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

It is doubtful that changes in microbial communities can be used to define injury to the benthic biological resource. The study does not state what type and magnitude of change will be used to define injury.

This study needs to address how stations will be compared, since no mention is made of reference stations. Several factors can influence infaunal community structure. It is not defined how petroleum concentration and composition, water depth, sediment grain size, sediment total organic carbon, and other factors are accounted for in determining if changes in community structure are due to oil.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, G, H, I, J, M, X, and Y shown in Table 3-4 of this document.

COMMENTS ON AIR/WATER STUDY NUMBER 3

(AW3) HYDROCARBONS IN WATER ($595,500)

Com.	Topic	Issue	Sug.	Sort
63	3	1230	X	2

This study attempts to determine the geographic extent and temporal distribution of dissolved hydrocarbons in water by monitoring water-column and mussel-tissue hydrocarbon concentrations.

Technical Comments

No details are given for methods used to sample water at various depths. It is extremely difficult to collect water-column samples without contamination from surface slicks, sheens, or even vapor-phase hydrocarbons. Unless adequate precautions are taken to avoid such contamination and account for that which did occur, the resulting data on petroleum hydrocarbons in the water column are useless.

The plan description does not specify a schedule for documenting when the mussel cages were set. Mussel cages are of little value in documenting the damage of crude oil more than a few weeks after the spill in that hydrocarbon concentration would be extremely low.

A description of statistical testing methods is necessary, together with a demonstration that the sampling design is adequate. It is improper to use the source of experimental mussels in Southeast Alaska as control sites. In using the mussels as indicators of water quality and bioaccumulation, it would be necessary to know the variability of oil in the mussels before exposure to Sound waters.

Since no adverse effects for mussels are being measured in this study, it is unclear how the bioaccumulation data will be interpreted. It may give relationships between water sample and tissue concentrations of hydrocarbons; however, bioaccumulation is not necessarily a deleterious effect.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, G, H, I, J, M, X, and Y shown in Table 3-4 of this document.

COMMENTS ON AIR/WATER STUDY NUMBER 5

(AW5) INJURY TO AIR ($106,500)

Com.	Topic	Issue	Sug.	Sort
65	3	1250	X	2

This study attempts to evaluate the injury to air by computer modeling the volatile organic compounds released from the oil, both geographically and temporally, and comparing resultant concentrations to National Institute of Occupational Safety and Health (NIOSH) standards.

Technical Comments

Insufficient information is provided concerning computer modeling for this study. Omissions include demonstrating applicability of models used; processes simulated by the model; mathematical and statistical methods used; adaptation, alteration, and documentation of computer code; and validity of model results.

It is doubtful whether there are sufficient data on air/water temperature, vertical profiles of wind speed and direction with emphasis on near-surface winds, sea-wave height and direction information, etc., to parameterize the air-dispersion models for valid use in the damage assessment. The resulting model system will be extremely complex and many of the rate parameters and coefficients are poorly understood and must be estimated or approximated. Thus, use of such a model to predict the aerial and temporal distribution and concentration of VOC in the air over sea and land is subject to large errors and does not account for normal weathering processes.

The study states it will "allow prediction of possible unhealthful conditions as measured by standards established by NIOSH." NIOSH requirements, besides being chemical-specific, may not be appropriate guidelines since they are for humans, not birds and wild mammals, working for prolonged time periods.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs C, D, H, N, R, and Y shown in Table 3-4 of this document.

IV. COMMENTS ON FISH/SHELLFISH INJURY ASSESSMENT PROGRAM

Com.	Topic	Issue	Sug.	Sort
66	3	1300	X	2

The Draft describes 26 studies costing $10,038,400 (not including analytical cost) to evaluate injury to fish, shellfish, and commercial resources. The major emphasis is on studies that involve commercially valuable species such as salmon ($3,999,300), herring ($434,500), and other fish caught in trawls ($3,802,000). Two studies will examine recreational fishing at a cost of $613,000.

Some studies on fish and shellfish resources are warranted to assess injury and subsequent restoration of these valuable natural resources. However, the proposed studies go far beyond the requirements to identify and quantify damage and become research programs to expand knowledge on the ecology and fisheries of Prince William Sound and adjacent waters. Moreover, these studies do not address restoration, even though restoration is professed to be the primary goal of the Trustees' program.

The overall cost of the fish/shellfish program is not reasonable. The thrust of much of this work is to determine the impact to commercial fishermen, which is not compensable under NRDA since private claims have and will be paid directly to the fishermen. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable. The total cost of these fish/shellfish studies is $9,776,300 (Table 3-2). Moreover, two of the studies (F16 and F25) solely involve commercial resources at a cost of $84,000. Other proposed studies provide non-NRDA related information. Many of the 26 studies have some research components attributed to them, but three studies (F2, F8, and F20) are completely research oriented at a cost of $810,600.

The Draft fails to provide any details of the methodologies used in the studies, making a rigorous review impossible. However, from the brief description available, many of the studies appear poorly designed. Poor study design, minimal exposure to hydrocarbons, and the large amount of natural variation in these biological resources, may prevent statistically valid conclusions concerning impact. Even if an impact is detected in the "patchy" highly oiled areas, the primary restoration mechanism is the natural ecological recovery process.

Specific Comments

Page 48, ". . . 300,000 angler days participating in these recreational fisheries in 1987." The stated number of angler days for Homer and Seward alone differs significantly from Fish/Shellfish Study #6 which states that "during 1987 a total of approximately 215,000 angler days of recreational fishing effort were sustained" in Prince William Sound, Resurrection Bay (Seward), Kachemak Bay (Homer), and Chiniak Bay (Kodiak) combined.

Page 48, "The fisheries impacts of the oil spill were immediate. Commercial fisheries for herring, shrimp, and groundfish in the Sound were closed. Bookings with fishing guides, charter boat operators, and fishing lodges were cancelled. A fishing industry that depended on the reputation of quality born of a pristine Alaska found that reputation potentially tarnished; markets for Alaska seafood were placed in jeopardy." To the extent that these comments concern commercial damages compensable through the claims process, they are not NRDA related.

Page 48, "Most fish and deep-water shellfish die unseen within the water." Fish and shellfish mortalities only occur as a result of the oil if they are exposed to high enough concentrations of oil over a sufficient period of time. The available data measured shortly after the spill show water hydrocarbon concentrations well below reported toxicity limits.

Page 48, "How those deaths of fish and shellfish affect the commercial, recreational, and subsistence values of fisheries is the crux of the assessment of injury to fishery resources." This statement suggests that the Trustees have already assumed that all fisheries are injured and are now being quantified. This is another example of the misapplication of the DOI NRDA regulations. Section 11.13(a) of these regulations first requires an injury-determination phase to establish that the natural resources have been injured. Only after injury is established should the Quantification Phase start.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 1

(F1) SALMON SPAWNING AREA INJURY ($144,800)

Com.	Topic	Issue	Sug.	Sort
67	3	1310	X	2

This study attempts to determine and quantify injury to salmon spawning areas in Prince William Sound by documenting distribution of oil in intertidal habitats and measuring abundance of spawning salmon in intertidal and upstream areas for approximately 100 streams.

Technical Comments

The Concern/Justification section for this study states: "Wild stocks of salmon provide a major fishery in Prince William Sound." The Draft goes on to point out that the value of the 1988 commercial catch of salmon was $76 million to the fisherman. Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing, location, and duration of sampling should be described since each is a potential source of sampling error. Selection of the 100 sites, from the 211 sites available, is not discussed, nor are the selection criteria given.

This study claims that it "will determine whether salmon have suffered abnormal mortality or changes in abundance as a result of the degree of oiling." The study description provides no statistical basis for comparing abundance levels and provides no methods to differentiate natural phenomena effects. Without such, any results generated will be inconclusive.

Juvenile and adult salmon are unlikely to be adversely affected by petroleum hydrocarbons at concentrations that have been documented to occur in the water column of Prince William Sound. Since there were no immediate fish kills, it is extremely unlikely that any long-term impacts on salmon stocks directly attributable to the spill can be documented.

The linkage between the oil spill and sockeye salmon spawning habitats is vague since they are not known to spawn intertidally.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 2

(F2) EGG AND PRE-EMERGENT FRY SAMPLING ($149,100)

Com.	Topic	Issue	Sug.	Sort
68	3	1320	X	2

This study attempts to determine and quantify injury to salmon eggs and pre-emergent fry in Prince William Sound by measuring abundance and overwinter mortality of eggs and fry in study streams.

Technical Comments

The Concern/Justification section for this study states: "Wild stocks of salmon provide a major fishery in Prince William Sound." The same section for Study F1, which covers the same area, cites the value of the 1988 commercial catch of salmon from the same area was $76 million to the fishermen. Thus, the thrust of this study is to determine the impact to the fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The relevance of this study for determining the impact of an oil spill in Prince William Sound is highly questionable. The Concern/Justification section of the study description states: "The freshwater survival of Prince William Sound salmon could be adversely affected as a consequence of the presence of oil. [Emphasis added.]" However, it is physically impossible for oil spilled in Prince William Sound to travel upcurrent in a freshwater stream to impact salmon egg survival. Abundance and overwinter mortality for these species in intertidal areas cannot be extrapolated from the freshwater areas proposed for study in this project.

The details of the sampling, experimental, and analytical methods used in this study are not provided in the study description. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. Some methods used for sampling spawning areas to determine egg and pre-emergent fry abundance have high sampling error.

The study emphasizes coverage of a maximum number of streams rather than more complete documentation at fewer streams. The location and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

The study description provides little statistical basis for comparing abundance of eggs and pre-emergent fry, tissue hydrocarbon concentrations, or overwinter mortality between control and assessment areas. Without a statistical analysis, any results generated will be inconclusive.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 3

(F3) CODED-WIRE TAGGING ($1,943,400)

Com.	Topic	Issue	Sug.	Sort
69	3	1330	X	2

This study attempts to determine and quantify injury to juvenile salmon in Prince William Sound by measuring salmon marine survival rates for streams, estuaries, and hatcheries. The abundance of salmon smolts emigrating from study streams will also be measured.

Technical Comments

The Concern/Justification section for this study states: "Wild stocks of salmon and salmon from five hatcheries provide a major fishery in Prince William Sound." The same section for Study F1, which covers the same area, cites the value of the 1988 commercial catch of salmon was $76 million to the fisherman. An appreciable portion of the study involves salmon from the five hatcheries in particular. Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The details of the sampling, experimental, and analytical methods used in this study are not provided in the study description. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. Likewise, the timing, location, and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Marine survival rates are a function of many factors including winter stream temperature, occurrence of ice in streams, zooplankton densities during spring, and possibly oil contamination. Unless the possible oil-contamination factor can be quantified separately, this study has little meaning in terms of damage assessment. No information is provided on how these differences will be accounted for in this study. There can be very large variations in the survival rates not only among the various species (pink, chum, sockeye, coho, chinook), but also among the various races within a species. For example, survival rates for the Copper River stock of sockeye salmon can differ from that for the Susitna River stock of sockeye salmon in Cook Inlet.

The methods and analyses section of this study description states that, "In accordance with the Quality Assurance program, sufficient samples will be taken to make the sampling error around these estimates as small as practical." The Draft, however, contains only a Quality Assurance program for analytical chemistry (Appendix A), not sample design.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 4

(F4) EARLY MARINE SALMON INJURY ($829,200)

Com.	Topic	Issue	Sug.	Sort
70	3	1340	X	2

This study attempts to determine and quantify injury to juvenile salmon in Prince William Sound by examining abundance, growth, feeding habits, behavior, migration patterns, and tissue hydrocarbon concentrations of juvenile salmon in their rearing habitats.

Technical Comments

The Concern/Justification section for this study states: ". . . wild and hatchery stocks [of salmon] were heavily impacted . . . these impacts may have detrimentally affected the viability of salmon production in Prince William Sound and the resultant viability of present fisheries and the related economy." The same section for Study F1, which covers the same area, cites the value of the 1988 commercial catch of salmon was $76 million to the fisherman. An appreciable portion of the study involves salmon from the five hatcheries in particular. Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing, location, and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to evaluate if statistically significant differences between effects due to natural phenomena and those due to discharges or spills can be determined. The study description provides no basis for making the pair-wise comparisons. Many factors influence migration, feeding, growth, etc. Unless causation can be shown, any results will be inconclusive. The use of catch-per-unit-effort data is probably meaningless in relation to this damage assessment.

Juvenile and adult salmon are unlikely to be adversely affected by petroleum hydrocarbons at concentrations that have been documented to occur in the water column of Prince William Sound. If there were no immediate fish kills, it is extremely unlikely that any long-term impacts on salmon stocks, directly attributable to the spill, can be documented.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 5

(F5) DOLLY VARDEN INJURY ($437,400)

Com.	Topic	Issue	Sug.	Sort
71	3	1350	X	2

This study attempts to determine and quantify injury to Dolly Varden char and cutthroat trout in Prince William Sound by estimating survival and exploitation rates.

Technical Comments

The Concern/Justification section for this study states: "Any reduction in abundance due to the oil spill could cause loss of catch and, ultimately, losses in revenue related to these resources." Thus, some portion of the study involves commercial interests covered by the private claims process, which may not be compensable under NRDA. Residual losses would likely not justify the cost of this study. Moreover, the cost of the study may outweigh the cost of the impact. The study cites 81,000 recreational angler days in Prince William Sound in 1987 as partial justification for conducting this research. However, these were primarily from recreational fishermen attempting to catch salmon. A far smaller subset of recreational fishermen were fishing for Dolly Varden char and cutthroat trout.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed.

Because both species overwinter and reproduce in freshwater, only juveniles and adults are likely to be in environments where oil may have been present at the surface. However, only low concentrations of oil have been documented in the water column of oil-impacted areas. Thus, it is unlikely that these species will have injury attributable to the oil spill.

Marine/estuarine survival rates are a function of many factors including temperature, abundance of food or predators, and possibly oil contamination. Unless the possible oil-contamination factor can be quantified separately, this study has little meaning in terms of assessing a possible effect resulting from the oil spill.

The study incorrectly assumes that survival rates in the survey and control areas were equal before the oil spill. This is unlikely. Both control areas are on the southern sides of islands, exposed to the Gulf of Alaska. The survey areas are all within Prince William Sound. Control and assessment areas are likely to represent different habitats or ecosystems.

No information is provided on how the large variations in the survival rates for different races are accounted for in this study.

Insufficient information is provided to determine whether the study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills. Without a statistical analysis, any results generated will be inconclusive.

Objective C states that the study will, "Assess exploitation rates in recreational fisheries of Dolly Varden char and cutthroat trout overwintering in oiled and non-oiled areas. [Emphasis added.]" No information is provided on how the researchers plan to measure exploitation rates in a recreational fishery. Both species overwinter in freshwater lakes. Since there are no freshwater lakes which have been oiled as a result of this spill, the measurement of exploitation rates provides no information on either detection of injury or its quantification.

The linkage between oil contamination and char and cutthroat trout survival is vague and there is virtually no useful baseline data for comparison.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 6

(F6) SPORT FISHERY HARVEST & EFFORT ($175,900)

Com.	Topic	Issue	Sug.	Sort
72	3	1360	X	2

This study attempts to determine and quantify injury to sport fishery harvest and effort in Prince William Sound and Gulf of Alaska by surveying recreational fishermen to determine catch, fishing effort, and possible contamination of fish.

Technical Comments

The Concern/Justification section for this study expresses a concern that "any loss of fish abundance . . . could result in . . . serious loss of revenue to the local communities and to the state." Thus, some portion of the study involves commercial interests covered by the private claims process, which may not be compensable under NRDA. Residual losses would likely not justify the cost of this study.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing, location, and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed.

The methods section states: "Sport catches will be examined for signs of oil contamination, including unpalatable flesh and residues of oil in the digestive tracts." There is strong suspicion that nonscientific methodologies are being used here, since no information is provided on methods to detect "signs of oil contamination." Standard methods must be employed to avoid introduction of bias. Interviews with sportsmen about damage or injury should be carefully evaluated.

The data generated will be of little or no value for damage assessment. Even if a change in the recreational fishery can be detected, the proposed study has no way of determining the cause.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, J, K, S, U, V, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 7

(F7) SALMON SPAWNING AREA INJURY, OUTSIDE PWS ($320,300)

Com.	Topic	Issue	Sug.	Sort
73	3	1370	X	Z

This study attempts to determine and quantify injury to pink/chum salmon spawning areas outside Prince William Sound by documenting distribution of oil in intertidal habitats and measuring abundance of spawning salmon in intertidal and upstream areas of 109 streams.

Technical Comments

The Concern/Justification section for this study states: "Wild stocks of pink and chum salmon provide major fisheries in areas outside Prince William Sound . . ." The Draft goes on to point out that the value of the 1988 ". . . commercial catch of wild and hatchery stocks of salmon from the oiled Lower Cook Inlet to the south Alaska Peninsula/Aleutians area was more than $210 million to the fisherman." Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

This study should not be conducted as part of the NRDA effort. Juvenile and adult salmon are unlikely to be adversely affected by petroleum hydrocarbons at concentrations that have been documented to occur in the water column of Prince William Sound. Since there were no immediate fish kills, it is extremely unlikely that any long-term impacts on salmon stocks, directly attributable to the spill, can be documented.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing, location, and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 8

(F8) EGG & PRE-EMERGENT FRY SAMPLING, OUTSIDE PWS ($111,400)

Com.	Topic	Issue	Sug.	Sort
74	3	1380	X	2

This study attempts to determine and quantify injury to pink/chum salmon eggs and pre-emergent fry in areas outside Prince William Sound by measuring abundance and overwinter mortality of eggs and fry in study streams.

Technical Comments

The Concern/Justification section for this study states: "Wild stocks of pink and chum salmon provide major fisheries in areas outside Prince William Sound . . . ." The same section for Study 7, which covers the same area, cites the value of the 1988 commercial catch of salmon area was more than $210 million to the fisherman. Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The relevancy of this study for determining the impact of an oil spill in areas outside Prince William Sound is highly suspect. The Concern/Justification section of the study description states: ". . . the freshwater survival of salmon may be affected by lower- or higher-than-desired levels of escapement as a consequence of the inability to harvest salmon in traditional fishing areas due to the presence of oil in those areas. [Emphasis added.]" Abundance and overwinter mortality for these species in intertidal areas cannot be extrapolated from the freshwater areas proposed for study in this project.

The details of sampling, experimental, and analytical methods used in this study are not provided in the study description. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. Some methods used for sampling spawning areas to determine egg and pre-emergent fry abundance have high sampling error.

This study fails to provide sufficient information to determine if statistically significant differences between effects due to natural phenomena and those due to discharges or spills can be detected.

The study information provided does not explain how other causes of salmon egg and pre-emergent fry mortality will be distinguished from mortality resulting from possible exposure to oil.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 9

(F9) EARLY MARINE SALMON INJURY, OUTSIDE PWS ($348,500)

Com.	Topic	Issue	Sug.	Sort
76	3	1390	X	2

This study attempts to determine and quantify injury to young salmon in areas along Kenai Peninsula and in the Kodiak/Shelikov Strait by examining abundance, growth, feeding habits, and tissue hydrocarbon concentrations of juvenile salmon in their nearshore rearing habitats.

Technical Comments

The Concern/Justification section for this study states: "these impacts may have detrimentally affected the viability of salmon production from the Kenai Peninsula and points west and the resultant viability of present fisheries and the related economy." The same section for Study 7, which covers the same area, cites the value of the 1988 commercial catch of salmon was more than $210 million to the fisherman. An appreciable portion of the study involves salmon from five hatcheries in particular. Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

This study should not be conducted as part of the NRDA effort. Juvenile and adult salmon are unlikely to be adversely affected by petroleum hydrocarbons at concentrations that have been documented to occur in the water column of Prince William Sound. If there were no immediate fish kills, it is extremely unlikely that any long-term impacts on salmon stocks, directly attributable to the spill, can be documented.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing, location, and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed.

This study fails to provide sufficient information to determine if it can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills. The study description provides no basis for making pair-wise comparisons. Many factors influence migration, feeding, growth, etc. Unless causation can be shown, any results will be inconclusive. The use of catch-per-unit-effort data is probably meaningless in relation to this damage assessment.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 10

(F10) DOLLY VARDEN AND SOCKEYE INJURY, LOWER COOK INLET ($152,600)

Com.	Topic	Issue	Sug.	Sort
76	3	1400	X	2

This study attempts to determine and quantify injury to Dolly Varden char and sockeye salmon in areas along the Lower Kenai Peninsula by estimating salmon survival rates and extent of oil migration.

Technical Comments

The Concern/Justification section for this study states that these fish are ". . . caught in sport, commercial, and subsistence fisheries in lower Cook Inlet." Thus, some portion of the study involves commercial interests which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

This study should not be conducted as part of the NRDA effort. Dolly Varden char overwinter and reproduce in freshwater, so only juveniles and adults are likely to be present in environments where oil may have been present. This life stage is unlikely to be adversely affected by the concentrations of oil documented in the water column of oil-impacted areas of the Sound. Thus, it is unlikely that Dolly Varden char will have injury attributable to the oil spill.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description. The lack of sufficient detail in the methods prevents a discussion of other potential errors or omissions in the methodology.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

Marine/estuarine survival rates are a function of many factors including temperature, abundance of food or predators, and possibly oil contamination. Unless the possible oil-contamination factor can be quantified separately, this study has little meaning in terms of assessing a possible effect resulting from the oil spill. The study incorrectly assumes that survival rates in the survey and control areas were equal before the oil spill. This is unlikely. Control and assessment areas are likely to represent different habitats or ecosystems.

No information is provided on how the large variations in the survival rates for different races of the same species are accounted for. The study does not explain how effects on survival caused by the oil spill will be separated from the large inherent variance in survival naturally caused by other factors.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, P, Q, U, V, X, and Y shown in Table 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
77	3	1410	X	2

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 11

(F11) HERRING INJURY ($374,500)

This study attempts to determine and quantify injury to herring spawning areas, herring eggs, and juvenile and adult herring in Prince William Sound by estimating the abundance of the spawning herring, egg density, ratio of live to dead eggs, number of newly hatched larvae, and presence of visible abnormalities. In addition, hydrocarbon concentrations will be measured in herring tissue and eggs.

Technical Comments

The Concern/Justification section for this study states: "The Prince William Sound herring stock supports commercial fisheries with a 1988 exvessel value of $12 million . . . ." Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

Insufficient details are given about how lethal and sublethal effects of the oil spill on juvenile and adult herring growth, survival, and reproduction will be measured. These studies may be inconclusive because of the migratory habits of this species.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
78	3	1420	X	2

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 12

(F12) HERRING INJURY, OUTSIDE PWS ($60,000)

This study attempts to determine and quantify injury to herring spawning areas, herring eggs, and juvenile and adult herring in areas along Kodiak and Alaska Peninsula by estimating the abundance of spawning herring and herring eggs and determining the lethal and sublethal effects on egg survival and adult herring growth and reproduction.

Technical Comments

The Concern/Justification section for this study states: "Kodiak and Alaska Peninsula herring stocks support commercial fisheries with a 1988 exvessel value of $2.8 million and $0.5 million, respectively . . . ." Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

is study fails to provide sufficient information to determine if it can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills. Insufficient details are given about how lethal and sublethal effects of the oil spill on juvenile and adult herring growth, survival, and reproduction will be measured. These studies may be inconclusive because of the migratory habits of this species.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O,-P, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 13

(F13) CLAM INJURY ($86,200)

Com.	Topic	Issue	Sug.	Sort
79	3	1430	X	2

This study attempts to determine and quantify injury to clams in Prince William Sound by estimating abundance of live and dead clams, and measuring tissue hydrocarbon concentrations, growth, and recruitment of young.

Technical Comments

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

This study fails to provide sufficient information to determine if it can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills. Without a statistical analysis, any results generated are inconclusive.

The study states that necropsy analysis will establish cause of death. Sufficient baseline data may not be available to provide an adequate understanding of "normal" tissues to make such a statement. This may well be impossible when the time of death is unknown. Since uptake of oil can occur in dead invertebrate tissues, the presence of oil alone will not be conclusive.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 14

(F14) CRAB INJURY ($142,900)

Com.	Topic	Issue	Sug.	Sort
80	3	1440	X	2

This study attempts to determine and quantify injury to crabs in Prince William Sound by measuring tissue hydrocarbon concentrations and reproductive factors, and assessing shell abnormalities.

Technical Comments

The brown king crab portion of this study involves commercial resources, which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The proposed studies with brown king crab do not seem feasible and technically justifiable. Brown king crabs are restricted to deep waters where the likelihood of encountering oil, in either water or sediment, is remote.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills. Without a statistical analysis, any results generated are inconclusive.

The study does not describe a standard method for obtaining Dungeness crab larvae under laboratory conditions.

This study states that "crabs are known to be very sensitive to hydrocarbons," but the hydrocarbon concentrations in the subtidal region of this spill are over three orders of magnitude lower than what crabs are known to be sensitive to. There seems to be little justification for the biological studies proposed.

There is not a demonstrated cause/effect relationship between limb loss by Dungeness crabs and hydrocarbons.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 15

(F15) SPOT SHRIMP INJURY ($60,500)

Com.	Topic	Issue	Sug.	Sort
81	3	1450	X	2

This study attempts to determine and quantify injury to spot shrimp in Prince William Sound by estimating abundance, catch-per-unit effort, and reproductive factors.

Technical Comments

The Concern/Justification section for this study states: "In 1988 the commercial harvest of spot shrimp in Prince William Sound amounted to over $500,000 . . . ." Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

This study should not be part of the NRDA effort. Only very low concentrations of oil have been documented in the water column. Further, adult shrimp are not particularly sensitive to the low concentrations in the water. Thus, it is unlikely that adult shrimp will be adversely affected.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or oil spills. Further, any results generated will be inconclusive in demonstrating a pathway.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 16

(F16) INJURY TO OYSTERS ($30,500)

Com.	Topic	Issue	Sug.	Sort
82	3	1460	X	2

This study attempts to determine and quantify injury to oysters in Prince William Sound by examining growth, condition, mortality, and tissue hydrocarbon concentrations.

Technical Comments

The Concern/Justification section for this study states: "There are three oyster farms in the Sound . . . ." There are no natural populations of Pacific oysters in Prince William Sound. Thus, this entire study involves commercial resources which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena, oyster farms, and those resulting from the oil spill.

Data from the Amoco Cadiz oil spill demonstrate that the post-settling Pacific oysters are not at all sensitive to crude oil and few histopathological or biochemical lesions were observed. In fact, growth was actually stimulated because of the increased bacterial biomass available as food, due to increases in populations of hydrocarbon-degrading bacteria.

At the Perry Island mariculture operation, it is extremely unlikely that significant biological effects of the oil on oyster populations will be detected in this study. Mortality, growth, and condition are fairly gross parameters and probably will be relatively insensitive to the oil or too variable to use as indices of biological effects.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 17

(F17) ROCKFISH INJURY ($45,600)

Com.	Topic	Issue	Sug.	Sort
83	3	1470	X	2

This study attempts to determine and quantify injury to rockfish in Prince William Sound by assessing population abundance, catch-per-unit effort, and organoleptic (taint) testing.

Technical Comments

The Concern/Justification section for this study states: "A decline in rockfish populations due to the oil spill could harm sport, commercial, and subsistence fisheries by reducing harvest . . . ." Thus, some portion of this study involves commercial resources which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

It is unlikely that this study will demonstrate an exposure pathway, since only adult rockfish, which are normally in subtidal areas deeper than 20 meters, will be collected.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those related to the oil spill. No information is provided on the criteria used to select the reefs so that they represent adequately the Prince William Sound population.

The organoleptic testing program needs to describe how the taste panels will be chosen and what criteria will be employed. This study will not yield valid results unless trained taste panels are employed under rigorously controlled test conditions.

The study states that they will collect "a sample of any dead fish on the surface or fishing for live fish with hook and line." Visitation to the location of observed fish kills presumes the fish are in the location where they were killed. This is quite unlikely in most places in Prince William Sound. Collecting live fish from the location of some dead fish (on the surface) could be very misleading and inconclusive. Moreover, the use of long-line gear for estimating changes in fish abundance is questionable.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 18

(F18) TRAWL ASSESSMENT ($738,800)

Com.	Topic	Issue	Sug.	Sort
84	3	1480	X	2

This study attempts to determine and quantify injury to bottom fisheries (such as Tanner crab, king crab, sidestripe shrimp, halibut, pollock, sablefish, and Pacific cod) in Prince William Sound by conducting trawl surveys to measure population abundances and to collect fish samples for age structure and tissue hydrocarbon analyses.

Technical Comments

The Concern/Justification section for this study states: "Prince William Sound supports bottom fisheries worth several million dollars annually . . . ." Thus, an appreciable portion of the study involves commercial resources which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

This study should not be conducted as part of the NRDA effort. Since only low concentrations of oil have been observed in the water column, it is unlikely that any adverse effects will be demonstrated.

It is extremely difficult if not impossible to document an impact of an oil spill on stock size and year class strength of a commercial fishery species by conventional stock assessment techniques. Often, there is too much natural variability in space and time in these parameters, so that only really massive, catastrophic changes in abundance and recruitment can be measured using this technique.

Measuring "the incidence of tarballs in the demersal environment and in stomachs of groundfish" is a seriously flawed objective. Fish can swallow tarballs that are caught in the trawl.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, P, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 19

(F19) LARVAL FISH INJURY ($413,400)

Com.	Topic	Issue	Sug.	Sort
85	3	1490	X	2

This study attempts to determine and quantify injury to larval fish/shellfish, including pollock, halibut, Pacific cod, black cod, herring, flathead sole, starry flounder, yellowfin sole, Tanner crab, spot shrimp, pink shrimp, and king crab in Prince William Sound by measuring larval density and abundance of spawning fish. Also, larval growth will be compared to water hydrocarbon concentrations.

Technical Comments

The Concern/Justification section for this study states: "All of these species are important to commercial, sport, subsistence, and personal use fisheries." Thus, some portion of this study involves commercial resources which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

It is unlikely that concentrations of petroleum in the water column will ever be as high as those that kill marine fish and crustacean larvae in acute laboratory exposures. Also, the oil in the field is weathered and so its toxicity is much less than that of crude oils used in most laboratory toxicity tests.

This project will mostly provide research data on Prince William Sound rather than demonstrate an effect of the spill. The study states that: "These samples will represent the first data collected on the relative abundance of larvae of shellfish and groundfish in the Sound . . . ." The study does not assure that the samples collected in April, in advance of the arrival of the oil, were collected using the same methods as later on. The extremely patchy distribution of plankton will make it unlikely that an adequate background or control (non-oiled) data will be available to evaluate the effects of the spill on larval fish.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing, locations, and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

Without a tight linkage, a clear cause/effect relationship cannot be established and the study does not meet the requirements for assessing injury to a biological resource. There are so many natural environmental and seasonal factors that affect the abundance of larvae in the plankton in a particular location and at a particular time, that changes in larval abundance will be difficult to attribute statistically to the oil spill.

A technically sound approach is not evident for correlating larval abundance to physical oceanographic parameters and concentrations of hydrocarbons in the water column determined on other surveys.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 20

(F20) UNDERWATER OBSERVATIONS ($550,100)

Com.	Topic	Issue	Sug.	Sort
86	3	1500	X	2

This study attempts to determine and quantify injury to brown king crab, spot shrimp, rockfish, and halibut in Prince William Sound and areas outside Prince William Sound by conducting visual observations for oil on the bottom and recording general abundance of fish and shellfish using manned or remote operated submersible vehicles.

Technical Comments

The study as described may generate good natural-history data, but little of use in direct support of the NRDA. It is simply a search for some oil over thousands of square miles of bottom with a tool designed to look at very small areas in great detail. Given the proposed technical scope and costs for this project it is doubtful that petroleum can be detected in bottom sediments at a reasonable cost using ROVs or manned submersibles. The data that the investigators propose to use to verify their visual observations will provide more credible evidence of possible oil contamination at a much lower cost.

Only large quantities of petroleum physically coating the bottom would be detected by video cameras on an ROV or visual observations from a manned submersible. Such massive deposits of oil have not been reported anywhere in the Sound or the Gulf of Alaska resulting from this spill. Given the nature of the spilled oil and the environmental conditions at the spill site, if such deposits do occur, they are likely to be of very limited areal extent. Therefore, it is not reasonable to spend large sums of money to look for such deposits in submersibles.

This study is not reasonable since it is mainly research oriented and does not directly support the damage assessment as it pertains to the fishery resources of the vicinity. Moreover, exposure to oil and its possible effects can be more directly demonstrated by other studies.

The concept of this study is seriously flawed. It is purely observational, will not produce any quantitative data, and lacks detailed methodology. Use of visual observations to select sampling locations for oiled versus non-oiled comparisons is very subjective. The possibilities for producing biased, statistically invalid results are immense. Moreover, it is difficult to see how comparable estimates can be obtained between oiled and non-oiled areas when "transect density will be increased where evidence of oil is found."

The study is based on the assumption that random transects in the vicinity will show the extent of tarballs and weathered oil in the deep habitats which support demersal fisheries. The coverage of this type of vehicle is so limited that 60 days of painstaking effort would cover only a minuscule portion of the extensive areas described.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, C, E, F, H, I, S, U, V, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 21

(F21) CLAM INJURY, OUTSIDE PWS ($108,800)

Com.	Topic	Issue	Sug.	Sort
87	3	1510	X	2

This study attempts to determine and quantify injury to clams outside Prince William Sound by estimating abundance of live and dead clams and measuring tissue hydrocarbon concentrations, growth, and recruitment of young.

Technical Comments

According to the Draft (p. 9), "currents and winds moved the oil (in the form of mousse and tarballs) out of Prince William Sound and along the coast of the Kenai Peninsula toward Kodiak Island and the entrance to Cook Inlet." The Draft later states: ". . . the aromatic constituents of petroleum tend to be acutely poisonous. These same components (benzene, toluene, xylene, naphthalene) also are among the first to dissipate. As they evaporate and dissolve, the acute toxicity of the remaining oil diminishes (p. 13)." Thus, the beaches proposed to be studied in this project were impacted by weathered oil. Any possible effects to bivalves would result from this weathered oil.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those resulting from the oil spill.

The study states that necropsy analysis will establish cause of death. Sufficient baseline data may not be available to provide an adequate understanding of "normal" tissues to make such a statement. This may well be impossible where the time of death is unknown. Since uptake of oil can occur in dead invertebrate tissues, the presence of oil alone will not be conclusive.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, C, E, F, H, I, O, P, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 22

(F22) CRAB INJURY, OUTSIDE PWS ($111,500)

Com.	Topic	Issue	Sug.	Sort
88	3	1520	X	2

This study attempts to determine and quantify injury to crabs outside Prince William Sound by measuring tissue hydrocarbon concentrations, reproductive factors, and assessing shell abnormalities.

Technical Comments

The Concern/Justification section for this study states: "The diverse marine habitats of Kodiak Island, Cook Inlet, and the Aleutian Islands support a wide variety of commercial, sport, and subsistence crab species. Dungeness crab support commercial fisheries in Cook Inlet and near Kodiak Island valued at $4 million annually. The commercial values, when included with the subsistence and sport harvests, make this species extremely valuable." Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

Clearly, the expense of this project is not warranted, since damage to the crab is expected to be minimal. Moreover, it is unlikely that an exposure pathway can be demonstrated, because oil in the subtidal regions is expected to be minimal and spotty outside of Prince William Sound. Further, even if oil were present, it would be a highly weathered crude oil, which would not be expected to cause injury.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing, location, and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those resulting from the oil spill.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, S, U, V, X, and Y shown in Table 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 23

(F23) ROCKFISH INJURY, OUTSIDE PWS ($108,400)

Com.	Topic	Issue	Sug.	Sort
89	3	1530	X	2

This study attempts to determine and quantify injury to rockfish, halibut, and lingcod along the Lower Kenai Peninsula by assessing population abundances and tissue hydrocarbon concentrations.

Technical Comments

The Concern/Justification section for this study states: "These species are also harvested by commercial and subsistence fisherman." Thus, some portion of this study involves commercial resources which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the costs of this study may not be reasonable.

It is unlikely that this study will demonstrate an exposure pathway, since only adult rockfish, which are normally in subtidal areas deeper than 20 meters, will be collected.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

It is unlikely that an exposure pathway can be demonstrated for this study, since no oil is expected in the subtidal regions (>20 meters) outside of Prince William Sound where adult rockfish reside. Further, even if oil were present, it would be a highly weathered crude oil, which would not be expected to cause injury.

As discussed for Fish/Shellfish Study #20, the use of an ROV to detect oil in bottom sediments is neither reliable, reasonable, nor cost effective.

The organoleptic testing program needs to describe how the taste panels will be chosen and what criteria will be employed. This study will not yield valid results unless trained taste panels are employed under rigorously controlled test conditions.

The study states that they will collect "a sample of any dead fish on the surface or fishing for live fish with hook and line". Visitation to the location of observed fish kills presumes the fish are in the location where they were killed. This is quite unlikely in most places in Prince William Sound. Collecting live fish from the location of some dead fish (on the surface) could be very misleading and inconclusive. Moreover, the use of long-line gear for estimating changes in fish abundance is questionable.

Regulatory Comments

This study deviates from the regulations, as described by paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Table 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
90	3	1540	X	2

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 24

(F24) TRAWL ASSESSMENT, OUTSIDE PWS ($2,495,800)

This study attempts to determine and quantify injury to fish/shellfish, including Tanner crab, red king crab, halibut, pollock, and sablefish outside Prince William Sound by conducting trawl surveys to measure population abundances, and to collect fish samples for age determinations, tissue hydrocarbon analyses, and reproductive potential.

Technical Comments

The Concern/Justification section for this study states: "Groundfish and crab fisheries yield multi-millions of dollars annually for species such as . . . ." Thus, an appreciable portion of the study involves commercial resources which are not compensable under NRDA, since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the cost of this study may not be reasonable.

The excessive expense of this study also makes it unreasonable, since damage to these resources is expected to be minimal. Moreover, it is unlikely that an exposure pathway can be demonstrated because oil in the subtidal regions is expected to be minimal and spotty outside of Prince William Sound. Further, even if oil were present, it would be a highly weathered crude oil, which would not be expected to cause injury.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

Measuring "the incidence of tar balls in the demersal environment in stomachs of groundfish" is a seriously flawed objective. Fish will swallow tarballs that are caught in the trawl.

It is extremely difficult if not impossible to document an impact of an oil spill on stock size and year class strength of a commercial fishery species by conventional stock assessment techniques. Often, there is too much natural variability in space and time in these parameters, so that only really massive, catastrophic changes in abundance and recruitment can be measured using this technique.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, E, F, H, I, O, P, S, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 25

(F25) SCALLOP MARICULTURE INJURY ($53,800)

Com.	Topic	Issue	Sug.	Sort
91	3	1550	X	2

This study attempts to determine and quantify injury to scallops in Kodiak waters by comparing growth, survival, and tissue hydrocarbon concentrations at several sites.

Technical Comments

The Concern/Justification section for this study states: "Weathervane scallops form the basis of a commercial fishery based primarily out of Kodiak." In fact, Part IV of the Assessment Plan itself lists the title for this project as "Scallop Mariculture Injury." The study states that "Results will be analyzed to estimate the effects of the spill on the stocks of wild scallops that support active commercial fisheries in this area. [Emphasis added.]" No natural stocks of these scallops will be studied. Thus, the entire study seemingly involves commercial resources which are not compensable under NRDA. Damage to wild scallops is expected to be minimal and the cost of this study may not be reasonable.

The assertion in the study description that the "oil spill has put this program at risk" is unsupported. The entire study is based on the assumption that damage has occurred and, without further supporting evidence, this assumption appears invalid.

Scallops are subtidal benthic bivalves and are mainly found in waters deeper than 30 meters. Their habitat renders them unlikely to encounter potentially toxic concentrations of petroleum hydrocarbons in the ambient medium. Although significant amounts of oil, primarily in the form of mousse, did reach the vicinity of Kodiak, the concentrations of oil in the water column, especially near the bottom, have been extremely low or undetectable. Thus, scallops in the vicinity of Kodiak should not be considered to be at significant risk of exposure to ecologically significant concentrations of toxic fractions of petroleum.

Wild scallop populations are probably less at risk than mariculture scallops. Wild scallops live on top of the sediments whereas mariculture scallops are held higher in the water column. If mariculture scallops are studied, for the reasons stated above it will not be feasible to extrapolate results to stocks of wild scallops in the area.

The details of the sampling, experimental, and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, E, F, H, I, O, Q, S, U, V, X, and Y shown in Tables 3-4 of this document.

V. COMMENTS ON MARINE MAMMALS INJURY ASSESSMENT PROGRAM

Com.	Topic	Issue	Sug.	Sort
93	3	1600	X	2

The Draft describes seven studies costing $1,885,000 to evaluate the injury to marine mammals ($499,000 for whales and porpoises, $515,000 for sea lions and seals, and $871,000 for sea otters). Five species have been selected for intensive study and roughly six additional species will be included in a more general assessment.

For all the studies, inadequate details for sampling, experimental and analytical methods are presented in the study descriptions.

These studies are not reasonable. Previous studies on the effects of oil spills on whales and porpoises would not justify the cost of the cetacean studies proposed in this Draft.

The proposed studies do not address how information gained will be relevant to restoration. The program does not take into consideration that the only feasible restoration of most marine mammal resources, beyond immediate shoreline cleanup, is natural recovery.

COMMENTS ON MARINE MAMMALS STUDY NUMBER 1

Com.	Topic	Issue	Sug.	Sort
94	3	1610	X	2

(MM1) HUMPBACK WHALE ($226,000)

This study attempts to assess the injury from the oil spill to humpback whales in Prince William Sound, Southeast Alaska, and the Kodiak Archipelago by determining population numbers and distribution.

Technical Comments

This study will not determine if humpback whales have "abandoned" Prince William Sound. Movements of whales are poorly understood. Since individual whales from the Sound have been seen in southeastern Alaska, such movements after the spill constitute only ambiguous evidence of abandonment.

Moreover, any change in numbers and/or distribution of humpback whales observed from surveys may not necessarily be attributed to exposure to oil.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON MARINE MAMMALS STUDY NUMBER 2

(MM2) INJURY TO KILLER WHALES ($200,000)

Com.	Topic	Issue	Sug.	Sort
140	3	1620	X	2

This study attempts to assess the injury from the oil spill to killer whales in Prince William Sound, the Kodiak Archipelago, and Southeast Alaska by determining population numbers and distribution.

Technical Comments

This study certainly will add to the knowledge of the life history and social behavior of killer whales. However, the relevance of the study to the impacts of the oil spill is not apparent.

The proposed study will be unable to separate the effects of oil from the effects of temporary disturbance and other factors. Killer whales are irritable (in the physiological sense) and highly mobile, migratory, large mammals. Also, insufficient information is provided on the Sound-wide movements of killer whales to determine if a cause/effect relationship to the oil spill can be demonstrated.

The locations of the "principal areas" mentioned in the Draft to be surveyed are not provided.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON MARINE MAMMALS STUDY NUMBER 3

(MM3) CETACEAN NECROPSY ($73,000)

Com.	Topic	Issue	Sug.	Sort
95	3	1630	X	2

This study attempts to assess the injury from the oil spill to cetaceans (whales and porpoises) by performing necropsies on stranded animals.

Technical Comments

Insufficient information is provided to determine whether surveys will be conducted often enough to document the approximate time of stranding and whether full necropsies will be conducted on all dead or stranded cetaceans as soon as possible after location of the carcass. Necropsies must emphasize the identification of cause of death, not just the presence of hydrocarbons. Pathway must be established.

The number of carcasses found is not an indication of impact from the oil spill, but rather is a reflection of the intensity of effort to find beached carcasses. Baseline data for comparison of stranding rates during pre-spill and post-spill periods are not available. Historical records of strandings and beached carcasses along the Alaska coastline are quite limited.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, V, and X shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
96	3	1640	X	2

COMMENTS ON MARINE MAMMALS STUDY NUMBER 4

(MM4) INJURY TO SEA LIONS ($270,000)

This study attempts to assess the injury from the oil spill to Steller sea lions in Prince William Sound and the Gulf of Alaska by estimating the number of sea lions using rookeries and haulouts, documenting premature birthing rates, estimating pup production and mortality on rookeries, and determining presence of hydrocarbon contamination and histopathological effects in sea lions.

Technical Comments

Continued decline in pupping found as a result of this study cannot be attributed to the oil spill since, as the study description mentions, sea lions are already in a state of decline.

It will not be possible to determine the effects of the oil spill on the Steller sea lion population in the northern Gulf of Alaska, since little is known about their population dynamics.

It will not be possible to accurately compare estimates of the number of sea lions using rookeries and haulouts obtained through aerial photography with any historical data base, recent or past. Aerial photographs yield point-in-time counts only, while the number of sea lions using any particular haulout may vary (by hundreds) hourly.

The study provides no description of the methods for measuring premature birthing rates. Premature pupping was documented at several haulout areas and rookeries during OCSEAP studies in the late 1970s; however, no conclusions were ever developed about the cause.

The study does not describe the method for estimating pup production. The pup counts will yield information on pup production in 1989, but will yield no information how this relates to the impact of the oil spill.

None of the pup mortalities can be attributed to the oil spill without the benefit of direct observation of the death and the immediate necropsy of the carcass.

Statistical design is missing in the study description. Information about estimated number of sites is lacking. Insufficient information is provided to assess the precision and accuracy of the data collected by the photo surveys.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON MARINE MAMMALS STUDY NUMBER 5

Com.	Topic	Issue	Sug.	Sort
97	3	1650	X	2

(MM5) INJURY TO HARBOR SEALS ($245,000)

This study attempts to assess the injury from the oil spill to harbor seals in Prince William Sound and adjacent areas by evaluating numbers of harbor seals in oiled and non-oiled areas, measuring reproductive success and pup survival, and examining tissues of seals for contamination and histopathologic effects.

Technical Comments

It will not be possible to attribute to the oil spill any additional decline in the numbers of harbor seals counted in 1989 since, as noted in the study description, there has been a 40% decline in the number of seals at major haulout sites over the last five years.

With the methods proposed in this study, it will not be possible to evaluate the effects of the oil spill on the distribution of harbor seals at haulouts within the Sound during pupping and molting seasons. Though change in distribution of harbor seals may occur, it will not be possible to ascribe that change either to the spilled oil or to other factors.

The study provides no information on the statistical validity of the shoreline surveys. No estimate is made of the number of sites. No information is provided on the number or location of sites sampled, the number of replicates obtained, or sampling design.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON MARINE MAMMALS STUDY NUMBER 6

(MM6) INJURY TO SEA OTTERS ($763,000)

Com.	Topic	Issue	Sug.	Sort
98	3	1660	X	2

This study attempts to assess the injury from the oil spill to sea otters in Alaska by comparing numbers of live and dead sea otters in oiled and non-oiled areas, estimating populations, including decline, of live otters in the region and documenting presence/persistence of hydrocarbons/toxins in live and dead sea otters.

Technical Comments

The cost of this study ($763,000) does not seem reasonable, particularly considering the fact that no consideration is given to how to restore this resource to a level it would have been if the spill had not occurred. Much of the work proposed in this study is of a research nature, rather than NRDA related.

Insufficient information is provided to assess the adequacy of the methods for detecting and quantifying injury to sea otter populations. No information is provided whether sea otter populations are increasing or declining in the affected areas.

Statistical design is lacking in the study description. No information is provided on the number of sites (oiled and non-oiled), the number of samples collected, nor the number of replicates. No information is provided on the criteria for selecting non-oiled control areas.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON MARINE MAMMALS STUDY NUMBER 7

Com.	Topic	Issue	Sug.	Sort
99	3	1670	X	2

(MM7) SEA OTTER REHABILITATION ($108,000)

This study attempts to assess the fate of sea otters oiled and rehabilitated as a result of the spill by monitoring their movement, behavior, and survival via radio transmitters.

Technical Comments

This study is not cost effective because of its serious overlap with Study MM6 and the invalid methods used to establish pathway.

Neither the objectives nor methods address the issue of possible effects of implanted transmitters on the survival and behavior of sea otters.

There is no explanation of where sea otters will be released (in previously oiled but cleaned areas; in areas where they were captured; in unoiled areas), nor is there any mention of how sea otters will be located (airplane surveys, boat surveys, etc.). The timing of the location efforts is too vague--"often enough to evaluate survival"--to be informative.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs H, I, and Y shown in Tables 3-4 of this document.

VI. COMMENTS ON THE TERRESTRIAL MAMMALS INJURY ASSESSMENT PROGRAM

Com.	Topic	Issue	Sug.	Sort
100	3	1700	X	2

The Draft describes six studies costing $1,171,700 (not including any analytical cost) to evaluate the injury to terrestrial mammal resources. Nineteen terrestrial mammal species have been identified as potentially impacted. Five species (Sitka black-tailed deer, brown bear, black bear, river otter, and mink) have been selected for intensive study and nine species for a general assessment. The intensive studies account for $677,100 or about 58% of the total for terrestrial mammals.

This program fails to consider that the only feasible restoration of terrestrial mammal resources, beyond immediate shoreline cleanup, is natural recovery.

It is unlikely that population studies for terrestrial mammals can demonstrate an oil spill related injury. Another serious flaw with this program lies in its inability, by the methodologies described, to establish any exposure pathway to the spilled oil. Thus, the studies appear not to be necessary or cost effective.

From the extremely brief descriptions available for the individual studies, many of the studies appear poorly designed and will produce questionable conclusions.

All of the terrestrial mammal studies provide inadequate descriptions of the statistical analyses employed to evaluate the data. It is impossible to evaluate whether any identified injury will be based on a statistically significant response between impacted and control areas.

COMMENTS ON TERRESTRIAL MAMMALS STUDY NUMBER 1

Com.	Topic	Issue	Sug.	Sort
101	3	1710	X	2

(TM1) INJURY TO SITKA BLACK-TAIL DEER ($87,000)

This study attempts to assess the injury from the oil spill to Sitka black-tailed deer in Prince William Sound by quantifying the number of dead deer per unit area on oiled and non-oiled islands and determining if tissue and rumen contents have been contaminated by oil.

Technical Comments

Since no pathway of exposure to the spilled oil has been established, this study is clearly not related to the NRDA process and should not be included in the Draft.

The timing and location (i.e., islands selected) of transect sampling for deer carcasses are not described. These are critical to fulfilling the objectives of this study. Use of only one affected island and one control island will limit the applicability of study results to other areas.

With the current design of the study, there is no way to know whether the deer collected for tissue hydrocarbon analyses were exposed to oil, since deer are not usually in the affected habitat (tidal areas) during August. Thus, the study will not be able to demonstrate a clear cause and effect relationship.

The need to determine the number of dead deer with rumen contents in the lungs is not explained.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON TERRESTRIAL MAMMALS STUDY NUMBER 2

(TM2) INJURY TO BLACK BEAR ($139,700)

Com.	Topic	Issue	Sug.	Sort
102	3	1720	X	2

This study attempts to assess the injury from the oil spill to black bear in Prince William Sound by determining mortality rates in heavily oiled habitats, determining changes of productivity of females in the oil-contaminated areas, and calculating population declines.

Technical Comments

There are too many unknown variables to be able to attribute the decline of black bear populations to adverse changes in viability, resulting from oil contamination. Differences in habitat, food habits, and population dynamics (especially dispersal) among oiled and control areas will seriously compromise any interferences and simulations from the population modeling effort described for this study.

The study description provides no statistical basis for inferring changes in the black bear population from a population model. No information on the sensitivity of the model to initial input conditions or on the accuracy and precision of the model predictions is presented.

The mainland of the Kenai Peninsula cannot be used as a "control" area. The habitats in oiled areas of Prince William Sound are not comparable in habitat with the mainland area of the Kenai Peninsula.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, Q, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON TERRESTRIAL MAMMALS STUDY NUMBER 3

Com.	Topic	Issue	Sug.	Sort
103	3	1730	X	2

(TM3) INJURY TO RIVER OTTER AND MINK ($287,700)

This study attempts to assess the injury from the oil spill to river otter and mink in Prince William Sound by determining mortality and documenting any declines of populations and changes in distributions.

Technical Comments

The cost of this project appears excessive and not reasonable. Sampling procedures of this study (i.e., eight animals killed per month per site) will likely result in more mortalities in these species than have been recorded as spill related. River otters and mink should be studied only if there is convincing evidence that they were exposed to oil and that they were impacted.

No specific sites, only general areas, are provided for consideration as sample and control locations. It is not stated whether there is one site/area or several sites per area. It is also unclear if Kenai and Alaska Peninsulas will be treated in the same way as sites closer to the spill.

The objectives of 1) determining mortality and documenting any declines of river otter and mink populations and 2) determining changes in distribution of river otter and mink, and changes in their food habits in oiled and non-oiled habitats are not achievable because of the lack of baseline data necessary for comparison.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, Q, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON TERRESTRIAL MAMMALS STUDY NUMBER 4

Com.	Topic	Issue	Sug.	Sort
104	3	1740	X	2

(TM4) INJURY TO BROWN BEAR ($162,700)

This study attempts to assess the injury from the oil spill to brown bears on the Alaska Peninsula by determining mortality rates in heavily oiled habitats, determining changes of productivity of females in the oil-contaminated areas, and calculating population declines.

Technical Comments

The study description provides no statistical basis for comparing brown bear mortality, abundance, or productivity between oiled and non-oiled areas. An inherent problem with many monitoring programs, even when they are properly designed, is their inability to detect statistically significant differences between effects due to natural phenomena and those resulting from man's interaction.

This study fails to provide details of an adequate statistical analysis. The only hint of a control is that tissue and scat samples will be collected "from uncontaminated areas." Apparently, no non-oiled site will be surveyed for brown bear mortality, abundance, or productivity. The study provides insufficient information on sampling design and no information on whether replicate samples will be obtained.

Mortality and productivity of brown bears in the oil-affected area and control area cannot be compared since habitat use and population characteristics of the marked bears in two areas are likely dissimilar.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, Q, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON TERRESTRIAL MAMMALS STUDY NUMBER 5

(TM5) INJURY TO CARNIVORES AND SMALL MAMMALS ($302,400)

Com.	Topic	Issue	Sug.	Sort
105	3	1750	X	2

This study attempts to assess the injury from the oil spill to carnivores and small mammals outside Prince William Sound by determining changes in abundance, by performing necropsies on dead mammals, and by analyzing tissues for hydrocarbons.

Technical Comments

This project is not cost effective, since the likelihood of measurable effects occurring to populations of these species is very small. Any mortality as an immediate effect of the spill would quickly be recovered through recruitment of individuals from adjacent areas. In addition, studying populations of these animals will yield inconclusive data on the effects of the spill since there is so much natural variation in their populations.

The magnitude of the study leaves the methods and analyses unfocused. The objective of determining the direct effects of oil on carnivores and small mammals is so vague that it could encompass anything from mortality to feeding behavior.

The study methods do not address objectives and are sketchy and haphazard. For instance, scent stations can only provide an index, not a direct measure, of abundance. This method is of questionable utility for any NRDA study since it was developed in arid and semi-arid areas of the western U.S. and is untested in the wet maritime climate of coastal Alaska.

The study emphasizes abundance, but nowhere is it stated how abundance in affected habitats will be compared with baseline or control data.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, H, I, O, Q, U, V, X, and Y shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
106	3	1760	X	2

COMMENTS ON TERRESTRIAL MAMMALS STUDY NUMBER 6

(TM6) REPRODUCTION OF MINK ($192,200)

This laboratory study attempts to assess the effect of ingested oil from the spill on mink reproduction and to extrapolate the results to other mammals with similar reproductive systems.

Technical Comments

This laboratory study is not cost effective for an NRDA-related program because: 1) there is no justification for a two-year feeding program since it is impossible to comprehend an environmental scenario which a two-year study would mimic; and 2) mink's delayed implantation may not be representative of typical reproductive biology of the majority of terrestrial mammals potentially impacted.

This laboratory study cannot be justified for damage assessment unless there is accurate information available on the amount and condition of oil ingested by minks during the spill.

In the study description nothing is said about using weathered oil rather than fresh oil. Mink and other mammals in affected areas were exposed to oil that has weathered over time; therefore, each stage of reproduction was not affected by oil with the same characteristics.

There is no description of types of statistical analyses nor of criteria for determining numbers of replicates overall (or even by type of assay to be completed).

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs H, I, and Y shown in Tables 3-4 of this document.

VII. COMMENTS ON THE BIRD INJURY ASSESSMENT PROGRAM

Com.	Topic	Issue	Sug.	Sort
107	3	1800	X	2

The Draft describes fourteen studies costing $2,755,700 (not including any analytical cost) to evaluate the injury to the bird resources. One study estimates waterbird mortality for $258,000. Two studies survey bird populations for $1,005,000. The remaining eleven studies total $1,492,700 and collect more general information and detailed data on particular species.

Some bird studies are needed, but this program is not focused on information necessary to restore bird resources and goes far beyond collecting information necessary to assess injury. Instead, the multiple studies appear to be a research program designed to expand the information available on the many different species in the area, thus ignoring the proper use of indicator species as required in the regulations. Because of the research focus, much of this program is not NRDA related.

A detailed program such as this is clearly not warranted. Because of natural variability, the mobility of birds, the migratory nature of some species, and the vast area of interest, any conclusions on injury to birds attributable to the oil spill can only be a rough approximation. Further, when considering the large, healthy populations of bird species unimpacted by the spill, the primary restoration mechanism is natural recovery.

The Draft fails to provide any details of the methodologies used in the studies, making a rigorous review impossible. However, from the brief description available, many of the studies appear poorly designed and will produce questionable conclusions. Although it is stated that "many studies will use unaffected control areas for comparison" (p. 144), poor study design may make these comparisons statistically invalid.

COMMENTS ON BIRD STUDY NUMBER 1

(B1) BEACHED BIRD SURVEY ($258,000)

Com.	Topic	Issue	Sug.	Cert
108	3	1810	X	2

This study attempts to estimate bird mortality related to the oil spill by applying correction factors to actual bird mortality observed.

Technical Comments

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid. The study neither defines nor explains how the "minimum mortality" will be used in the final "overall mortality of waterbirds" estimate. In addition the number, locations, and methods of the "systematic survey" should have been provided in the Draft since this information was readily available.

There is insufficient information presented in the Draft to evaluate whether the methodological and analytical strategies are sound. The objectives require the implementation of flotation and scavenging experiments. These types of studies require assumptions and subjective determinations, and it is critical that more detail be provided and reviewed by all concerned parties. Also, the means by which adjustments to total mortality from the oil spill will be made to account for natural mortality will need careful and expert consideration.

There is no mention of any results being statistically validated. Without adequate statistical design, any results generated will be inconclusive.

Considering the high degree of subjectivity of this study and the objective to calculate "overall mortality in conjunction with bird population surveys and seabird colony censuses," there is a strong possibility the external influences of these other studies will dictate correction factors, thus compromising the usefulness of this study. Moreover, any mortality estimates will be nothing more than rough order-of-magnitude approximations.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, C, Q, S, and U shown in Tables 3-4 of this document.

COMMENTS ON BIRD STUDY NUMBER 2

Com.	Topic	Issue	Sug.	Sort
109	3	18.20	X	2

(B2) CENSUSES AND SEASONAL DISTRIBUTION ($565,000)

This study attempts to determine the distribution and abundance of migratory birds by surveys.

Technical Comments

This is one of several studies assessing bird population impacts. The information generated from this study may overlap with other studies. This study and/or possibly some of the other similar studies are more research oriented and not necessary to assess natural resource damages as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

Insufficient information is provided to evaluate if this study can determine that any reduction observed in oiled areas represents actual mortality or simply movement out of the area.

Details on the statistical treatment of the data are not provided in this study; thus it is impossible to determine if any results will be conclusive. Conclusions may be compromised by the intention of using unproven "new" aerial survey techniques and historical data as a basis for injury determination.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, O, R, S, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON BIRD STUDY NUMBER 3

Com.	Topic	Issue	Sug.	Sort
110	3	1830	X	2

(B3) SEABIRD COLONY SURVEYS ($440,000)

This study attempts to determine the population of seabird nesting colonies by surveys.

Technical Comments

This is one of several studies assessing bird population impacts. The information generated from this study may overlap with other studies. This study and/or possibly some of the other similar studies are more research oriented and not necessary to assess natural resource damages, as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

This study focuses on cliff-nesters and ignores crevice- or burrow-nesters. An unstated assumption that cliff-nesters and burrow/crevice-nesters are affected equally by the spill and its aftereffects is not tenable. Hence, no simple extrapolation to these birds should be done.

Although this study mentions that some results will be evaluated using statistical procedures, more details of the statistical components being used are necessary to evaluate the study design. One or two surveys conducted sometime during the previous 17-year period are scarcely an adequate base on which to calculate possible reductions in breeding colony sizes that can be related to oil spill effects.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, O, S, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON BIRD STUDY NUMBER 4

(B4) BALD EAGLES ($445,000)

Com.	Topic	Issue	Sug.	Sort
111	3	1840	X	2

This study attempts to assess the injury from the oil to bald eagles by surveying populations, examining nest and eggs, radio-tagging 60 eagles, analyzing blood samples, and necropsying dead eagles.

Technical Comments

This study is ambitious and methods are not described adequately to evaluate their potential to determine the impacts of oil on bald eagles. It is uncertain if the degree of impact measured is equivalent only to the degree of oiling, or if it also will include characteristics such as short-term avoidance of disturbed areas.

Manipulative methods such as trapping and tagging 60 eagles and collecting blood samples might influence behavior. It is not clear from information provided how these effects can be discerned from oil-related effects. Further, in the analysis of blood samples "to determine contaminant concentrations" there is no definition of what contaminants are.

There is no mention of any results being statistically validated. Without a sound statistical design, any results generated will be inconclusive. In particular, "data from a remote nesting site" implies only a comparison of one such site is made and is likely to be inconclusive.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, O, S, U, V, X, and Y shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
112	3	1850	X	2

COMMENTS ON BIRD STUDY NUMBER 5

(B5) PEALE'S PEREGRINE FALCONS ($43,500)

This study attempts to assess the injury from the oil spill to Peale's peregrine falcons by surveying populations, examining nest and eggs, banding adults, and analyzing feathers and blood.

Technical Comments

This is one of several studies assessing bird population impacts. The information generated from this study is only marginally important to either a damage assessment or recovery efforts. Moreover, since few of the raptors recovered by bird search teams were falcons, and since a substantial raptor study also exists, this study is not necessary or reasonable.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

The survey techniques of this study deviate from previous studies in that they cover new "suspected nesting territories" on which no historical data are available and they use new methods such as helicopter surveys when previous surveys were conducted from boats. This makes any historical comparisons scientifically invalid.

Further, peregrines are not particularly easy to locate. Surveys, especially using new techniques, need to be performed with particular care to avoid any mistaken conclusions based on inadequate field effort.

The study will utilize methodologies (helicopter observation, trapping of adults in nets, blood sampling, and inspection of nests) to draw conclusions about injuries to these species. There is no indication that these intrusive methodologies will be performed on control groups, so results from this study will be inconclusive.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, O, S, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON BIRD STUDY NUMBER 6

Com.	Topic	Issue	Sug.	Sort
113	3	1860	X	2

(B6) MARBLED MURRELETS ($115,700)

This study attempts to assess the impact from the oil spill to marbled murrelets by surveying populations, checking breeding activity, and analyzing 10 birds for contaminants.

Technical Comments

This is one of several studies assessing bird population impacts. The information generated from this study may overlap with other studies. This study and/or possibly some of the other similar studies are research oriented and not necessary to assess natural resource damages, as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

The use of "on-land watches" for determining breeding activities is unconventional. Furthermore, the visibility in most areas of the Sound is often too poor to allow for adequate visual counts.

Although this study mentions some results will be evaluated using statistical procedures, more details of the statistical components being used are necessary to evaluate the approach. In particular, a control size of only one non-oiled site may be too small to be valid statistically.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, O, S, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON BIRD STUDY NUMBER 7

(B7) STORM PETRELS ($135,000)

Com.	Topic	Issue	Sug.	Sort
114	3	1870	X	2

This study attempts to assess the impact from the oil spill to the reproductive success of fork-tailed storm petrels and other species by searching colonies, analyzing birds and addled eggs, and analyzing fresh eggs. Storm petrels are used as an indicator species representing shearwaters and fulmars (seabirds).

Technical Comments

This is one of several studies measuring reproductive success and, thus, population impact. The information generated from this study may overlap with other studies. This study and/or possibly some of the other similar studies are research oriented and not necessary to assess natural resource damages, as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

The determination of "persistence of crude oil in the marine environment" by extrapolation of oils in storm-petrel stomachs is extremely questionable. Likewise, the extrapolation from storm petrels to "other species with similar distribution and feeding behavior" is questionable, considering the other species are fulmars (which eat anything and scavenge from fishing boats) and shearwaters (which could be contaminated anywhere between Alaska and their southern hemisphere breeding grounds). In addition, they generally do not feed at the surface, as do storm petrels.

There is no mention of any results being statistically validated. Without a statistical analysis, any results generated will be inconclusive.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, N, Q, S, U, V, X, and Y shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
115	3	1880	X	2

COMMENTS ON BIRD STUDY NUMBER 8

(B8) BLACK-LEGGED KITTIWAKES ($190,000)

This study attempts to assess the impact from the oil spill to the reproductive success of black-legged kittiwakes by surveying colonies, analyzing liver tissue of dead birds, and analyzing eggs and prey samples of kittiwakes. Kittiwakes are used as an indicator species representing non-scavenging gulls (for example: mew gulls, sabines, and other seabirds).

Technical Comments

This is one of several studies measuring reproductive success and, thus, population impact. The information generated from this study may overlap with other studies. This study and/or possibly some of the other similar studies are research oriented and not necessary to assess natural resource damages, as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

Use of black-legged kittiwakes as an "indicator species" is not a good choice because this species undergoes tremendous interannual variations in reproductive performance in the Bering Sea and Gulf of Alaska. Since the species had reproductive failures in the Gulf within the last five years, a breeding failure in 1989 would provide inconclusive results.

Although this study mentions some results will be evaluated using statistical procedures, more details of the statistical components being used are necessary to evaluate the study design.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, N, S, U, V, X and Y shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
116	3	1890	X	2

COMMENTS ON BIRD STUDY NUMBER 9

(B9) PIGEON GUILLEMOTS ($109,500)

This study attempts to assess the impact from the oil spill to the pigeon guillemots and other species by surveying populations, examining nest sites, and analyzing birds, eggs, and prey samples of pigeon guillemots. Pigeon guillemots are used as an indicator species representing puffins, auklets, and murres (seabirds).

Technical Comments

This is one of several studies measuring reproductive success and, thus, population impact. The information generated from this study may overlap with other studies. This study and/or possibly some of the other similar studies are research oriented and not necessary to assess natural resource damages, as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

Comparison with pre-spill data does not establish "a direct link to diminished populations." Cause-effect needs to be established, other factors eliminated, and results statistically verified before any relationship to the oil spill is conclusive.

Extrapolating data on pigeon guillemots to puffins, auklets, and murres is unsound. Although they are all alcids, they differ widely in foods, breeding habits, and other aspects of life history.

The first part of the methods section indicates there will be population censusing; however it is not mentioned in the objectives. This census information significantly overlaps information generated in other studies, and is not needed to assess damages as required by the NRDA regulations.

Observations of "chick-feeding" for five hours will provide inconclusive information for the damage determination process and should not be performed. Inconclusive results will be obtained if "chick feeding rates" are used to "determine if prey is less abundant in oiled areas than in non-oiled areas" as stated in the objectives.

The objectives state the investigators will check if "petroleum hydrocarbons are present in adult pigeon guillemots, unhatched eggs, dead chicks, or prey." However, there is no indication of any control parameters; without such, all results are inconclusive. There is no mention of any results being statistically validated.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, J, S, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON BIRD STUDY NUMBER 10

(B10) GLAUCOUS-WINGED GULLS ($73,000)

Com.	Topic	Issue	Sug.	Sort
117	3	1900	X	2

This study attempts to assess injury from the oil spill to glaucous-winged gulls and other species by surveying a nesting colony, examining nest sites, and analyzing chicks and egg samples. Glaucous-winged gulls are used as an indicator species representing scavenging birds such as herring gulls and scavenging passerines (seabirds).

Technical Comments

This is one of several studies measuring reproductive success and, thus, population impact. The information generated from this study may overlap with other studies. This study and/or possibly some of the other similar studies are more research oriented and not necessary to assess natural resource damages, as required in the NRDA regulations.

This study focuses on Egg Island, which actually is quite far east of the spill areas. Since no other "oiled" data will be collected by this study, this study is only of research value and will have no conclusive benefit for a damage assessment.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

The statement, "Since the Exxon Valdez oil spill, a high percentage of glaucous-winged gulls observed have been oiled," is of questionable validity. Other observations in the most heavily oiled area of Prince William Sound suggest the oiling rate is far less than 1%. This is not a high percentage.

This species does not adequately represent "the scavenging birds, such as herring gulls and scavenging passerines." For example, gulls may be oiled on the water or on beaches; passerines may be oiled only on beaches.

Insufficient information is provided on the statement "Future research will likely be compromised by oil spill effects."

Although a connection between raw Prudhoe Bay crude and problems in gulls has been shown, no studies have been done on the effects of weathered Prudhoe Bay crude and problems in gulls. Most of the volatile aromatic (i.e., most toxic) fractions were gone by the time the gulls were affected. Hence an across-the-board extrapolation of effects from raw oil (laboratory studies) to those from weathered oil is not valid.

There is no mention of any results being statistically validated. Without a statistical analysis, any results generated are inconclusive.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, N, S, U, V, X, and Y shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Draft
118	3	1910	X	2

COMMENTS ON BIRD STUDY NUMBER 11

(B11) SEA DUCKS ($146,000)

This study attempts to assess the injury from the oil spill to sea ducks by collecting ducks and analyzing food items in gut samples.

Technical Comments

This is one of several similar studies. This study and/or possibly some of the other similar studies are research oriented and not necessary to assess natural resource damages as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

The objective to "develop a data base describing food habits of sea ducks" is irrelevant to assessing oil effects for an injury damage assessment. Although possible hydrocarbon levels may be documented, this study fails to describe any methodology which would conclusively identify what the individual or population effects might be. Thus, it will provide no information useful to a damage assessment.

There is no mention of any results being statistically validated. Without a statistical analysis, any results generated are inconclusive.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, N, S, U, V, X, and Y shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Cert
119	3	1920	X	2

COMMENTS ON BIRD STUDY NUMBER 12

(B12) SHOREBIRDS ($166,000)

This study attempts to assess the injury from the oil spill to shorebirds by surveying populations, watching bird behavior, and tagging shorebirds.

Technical Comments

This is one of several similar population impact studies. This study and/or possibly some of the other similar studies are research oriented and not necessary to assess natural resource damages as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

There is little likelihood that the objectives will be fulfilled in their entirety. Sampling will have to be both intensive and extensive to fulfill these stated objectives. It will require a complete head count of each species of shorebird throughout Prince William Sound and in oiled areas so that "total numbers" and "proportions" can be estimated. Such a census is technically infeasible to accomplish.

Information obtained from measuring the amount of time that individual birds spend in oiled areas will not be conclusive. This does not determine "the amount of time individual shorebirds are exposed to contaminated beaches," as stated in the objectives. It only measures the amount of time a bird is spending in an oiled area; time spent on other, non-oiled beaches will not be observed so this methodology is flawed.

There is no mention of any results being statistically validated. Without a statistical analysis, any results generated are inconclusive.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, N, S, U, V, X, and Y shown in Tables 3-4 of this document.

Com.	Topic	Issue	Sug.	Sort
120	3	1930	X	2

COMMENTS ON BIRD STUDY NUMBER 13

(B13) PASSERINES ($59,000)

This study attempts to assess the injury from the oil spill to passerines and other non-game birds by surveying populations, observing behavior, and examining bird and prey samples of passerines.

Technical Comments

This study is research oriented and not necessary to assess natural resource damages as required in the NRDA regulations.

The details of the experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if: standard and widely accepted methods are employed; possible biases are accounted for; surveys accurately represent assessment areas; possible errors in scaling results are accounted for; and results are statistically valid.

Although this study mentions some results will be evaluated using statistical procedures, no details are provided in the study description.

It is questionable if the objective to relate "hydrocarbon levels in tissue" to effects on passerines can be achieved. With the limited information provided in the Draft, this study does not have the scope to adequately relate hydrocarbon levels in tissue to "changes in relative abundance and distribution of birds in the Sound."

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, G, H, I, N, S, U, V, X, and Y shown in Tables 3-4 of this document.

COMMENTS ON BIRD STUDY NUMBER 14

(B14) EXPOSURE TO NORTH SLOPE OIL ($10,000)

Com.	Topic	Issue	Sug.	Sort
121	3	1940	X	2

This study attempts to assess the effects of oil exposure on migratory birds by reviewing existing literature and devising and implementing laboratory or field experiments.

Technical Comments

Insufficient information and lack of documentation make it impossible to determine what "relevant information" is being reviewed, what criteria will determine "adequacy of past studies in representing the current situation," and what type of birds will be analyzed.

Regulatory Comments

This study states, "Based on review and evaluation of existing information, staff will devise and implement laboratory or field experiments." This intentionally avoids the regulations by creating and implementing laboratory and field experiments without proper documentation, demonstrated need, assurance of following NRDA regulations, and proper review and comment period by Trustees, principal responsible parties, and the public.

The study deviates from the regulations, as described by Paragraphs B, H, I, U, and Y shown in Tables 3-4 of this document.

VIII. COMMENTS ON THE TECHNICAL SERVICES PROGRAM

Com.	Topic	Issue	Sug.	Rank
122	3	2000	X	2

The Draft describes three technical service studies costing $3,360,200. One study focuses on hydrocarbon analytical support services and analysis of distribution and weathering of spilled oil at a cost of $2,300,000. The other two studies cover histopathology and mapping methodologies at combined costs of $1,060,200.

The analytical chemistry study is sizable, but few details are provided for the different analytical methods. It is impossible to determine if this analytical support is cost effective. No estimates are given for the number of samples to be analyzed, either in the total assessment program or in individual studies.

The "Methods and Analyses" Section of the analytical chemistry study is completely unacceptable in terms of content. No procedures for generating analytical data of acceptable quality are presented either in this section or in QA/QC document listed in Appendix A of the Plan. Lack of information makes it impossible for concerned parties to review the methodologies to ensure that quality data are being generated.

The other technical service studies on histopathology and mapping also suffer from lack of details provided in the study descriptions. This inadequate documentation makes it impossible to determine if the proposed methodologies meet the very specific criteria listed in § 11.64(a)(3).

Com.	Topic	Issue	Sug.	Work
123	3	2010	X	2

COMMENTS ON TECHNICAL SERVICES STUDY NUMBER 1

(TS1) CHEMISTRY ($2,300,000)

This study attempts to provide quality-controlled analytical chemistry support for the resource-oriented studies.

Technical Comments

The total cost of this study is enormous, yet virtually no information on the chemistry analytical program is presented. Since the study fails to provide even the estimated number of samples being analyzed, it is impossible to assess a rough cost-per-sample value. At the very minimum there should be a list of the number and types of analyses from each component study, which can be consolidated and costed in TS1.

The study fails to provide even a general description of any methods which are used in the chemical analyses. The Methods and Analyses section is completely unacceptable in terms of content. The statement, "Procedures set forth for generating analytical data of acceptable quality are included in the QA/QC document listed as Appendix A," is incorrect. There are no procedures provided anywhere in the Draft on this matter. It is also stated that "changes in analytical methodology . . . shall be validated . . . to the satisfaction of the Analytical Chemistry Group." This process does not allow opportunity for review by other concerned parties to ensure valid data are generated. The whole system contains no accountability, and data generated are likely to be of questionable quality.

Another major flaw of this study is its isolation from the field studies. There is no description anywhere in the Draft of how intrasite variability will be taken into account to ensure that the appropriate number of replicate samples are taken at each site for analyses to describe any changes over time and area in a statistically significant manner. There is no point in putting a great deal of effort into ensuring accuracy and precision to +/- 15% if the field sampling plan is unsound.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs E, F, G, and L shown in Tables 3-4 of this document.

COMMENTS ON TECHNICAL SERVICES STUDY NUMBER 2

(TS2) HISTOPATHOLOGY ($440,200)

Com.	Topic	Issue	Sug.	Cont
124	3	2020	X	2

This study attempts to provide histopathology support for the resource-oriented studies.

Technical Comments

This is not really a separate study. Rather, it represents a specific component of many of the other studies. Details of the methods are not given. Consequently it is impossible to know if standard histological methods will be used.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs E, F, L, and T shown in Tables 3-4 of this document.

COMMENTS ON TECHNICAL SERVICES STUDY NUMBER 3

Com.	Topic	Issue	Sug.	Sort
125	3	2030	X	2

(TS3) MAPPING ($620,000)

This study attempts to provide mapping and data base support for all studies described in the Draft.

Technical Comments

Because of lack of details, it is not known what will be the products of this study and whether the study will be cost effective.

No information is given on scale of maps, whether the data base will be pertinent, whether the maps can be used to determine levels of hydrocarbons in the sediments or in the water column, and whether the maps will show the area and levels of impact by chosen hydrocarbon levels.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs E and F shown in Tables 3-4 of this document.

Com.	Topic	Issue	Resp.	No. P
126	3	2200	X	2

IX. COMMENTS ON ECONOMIC USES STUDY PROGRAM

The Draft contains proposals for nine separate studies of economic uses. The study proposals exhibit the following shortcomings:

Inadequate documentation. None of the studies is properly documented. The individual study plans lack specificity, contain inadequate study designs, and provide no integration among the economic studies or between the economic and science studies.

Unrelated to restoration. The economic study plans do not address restoration which is referred to in the Draft as "the primary objective of the state and federal trustees." The economics studies have no relevance to the development of restoration techniques and strategies.

Double counting. The proposals for economic uses studies abound with instances of clear double counting of damages. Examples include studies designed to quantify damages to commercial fisheries which are covered by private claims and litigation, attempts to account separately for land values and land use damages, and separate assessment of "intrinsic value" damages which consist of values measured by other studies. Further, various studies propose to measure damages that are not within the responsibilities of the Trustees.

Neither cost-effective nor reasonable cost. The Draft includes a budget of $2,800,000 for the economic studies, but does not indicate how the funds would be allocated among the studies. No budget management plans are provided, and no basis to support the costs is given. The budget is excessive and cannot be efficiently spent in the period to February 28, 1990. Given the lack of damages or extremely small damages projected for a number of these studies, study costs are unlikely to be reasonable.

Com.	Topic	Issue	Sug.	Cert
127	3	2210	X	2

COMMENTS ON ECONOMIC USES STUDY NUMBER 1

ESTIMATED PRICE EFFECTS ON COMMERCIAL FISHERIES (Cost Unspecified)

Economic Uses Studies 1, 2, and 3 are intended to estimate private losses suffered by the commercial fishing and processing industries. The plan for Study 1, like the plans for the other economic uses studies, lacks sufficient detail for an evaluation of the analysis or the methodologies employed. The "soundness of the scientific approach," an important consideration mentioned in the assessment plan, cannot be determined from the proposal.

The proposed study is devoted to estimates of private use losses. It does not consider restoration. Private claims for reduced earnings are subject to private litigation, and do not fall under the aegis of the Trustees.

The study plan fails to identify any relevance of fish prices to damages covered by NRDA regulation. No valid economic or legal relationship exists between degree of competition in output markets and damages related to public trusteeship. Moreover, the study plan confuses the concepts of consumer surplus and product price.

ESC has already mitigated income losses resulting from the spill by reimbursing commercial fishing and processing industry workers for lost wages and/or profits (net income) plus unavoidable costs in fisheries which have been postponed, cancelled, or less successful than predicted. Additional offsets have been provided by engaging displaced resources (labor and equipment) in spill cleanup. Little or no damages can be anticipated from this study and any costs associated with conducting the study are most likely unreasonable.

Com.	Topic	Issue	Sug.	Sort
128	3	2220	X	2

COMMENTS ON ECONOMIC USES STUDY NUMBER 2

FISHING INDUSTRY COSTS (Cost Unspecified)

The plan for Study 2 also lacks sufficient detail for evaluation of the analysis or the methodologies employed. Like Study 1, Study 2 does not address restoration. It is intended to estimate damages suffered by commercial fishermen. Such damages do not come under the Trustees' jurisdiction. Private claims for reduced earnings are subject to private litigation, and do not fall under the aegis of the Trustees.

Some fishing industry costs have risen due to increased demand for limited Alaskan resources (including labor and equipment) employed in the spill cleanup effort. Even assuming arguendo, contrary to the limitations of CERCLA and NRDA regulations, that the trustees could recover for the economic losses suffered for these reasons by commercial fishermen, such losses were more than offset by the general gains in the Alaskan economy associated with compensation and procurement expenditures in support of the cleanup. In any event, the degree of competition in input markets is not relevant to damages claims.

ESC has already mitigated income losses resulting from the spill by reimbursing commercial fishing and processing industry workers for lost wages and/or profits (net income) plus unavoidable costs in fisheries which have been postponed, cancelled, or less successful than predicted. Additional offsets have been provided by engaging displaced resources (labor and equipment) in spill cleanup. Little or no damages can be anticipated from this study so costs of the study are, most likely, unreasonable.

COMMENTS ON ECONOMIC USES STUDY NUMBER 3

BIOECONOMIC MODELS FOR DAMAGE ASSESSMENT (Cost Unspecified)

Com.	Topic	Issue	Sug.	Cont
129	3	2230	X	2

Many of the comments on Studies 1 and 2 also apply to Study 3. Specifically, the study plan lacks detail sufficient to evaluate the analysis or the methodologies employed. The plan's vagueness makes it impossible to evaluate the "soundness of the scientific approach" to be employed in the study. ESC agrees that technical and economic studies are necessary for the execution of a natural resource damage assessment and the development of restoration strategy and plans. Both scientific and economic data are necessary to make seasoned judgements and decisions concerning the actions which might be undertaken to enhance the natural recovery processes which operate on oil spills. Conversely, it is imperative that such studies be closely coordinated within an objective of restoring the environment in a timely manner and data be gathered or measured using valid methodologies. It is not apparent that the Draft meets these final requirements on coordination and valid methodologies.

Further, like the first two economic studies, Study 3 makes no reference to restoration. Its intent is to develop tools which might help assess damages sustained by commercial fishermen which do not fall within the Trustees' jurisdiction. Private claims for reduced earnings are subject to private litigation, and do not fall under the aegis of the Trustees. Moreover, ESC has already mitigated income losses resulting from the spill by reimbursing commercial fishing and processing industry workers for lost wages and/or profits (net income) plus unavoidable costs in fisheries which have been postponed, cancelled, or less successful than predicted. Additional offsets have been provided by engaging displaced resources (labor and equipment) in spill cleanup.

There is the possibility of overestimating (double counting) damages if short-term biomass estimates are based on commercial fishermen's catch rate/harvest data. As evidenced this year, recreational fishermen, who compete for a fixed stock of fish directly with commercial fishermen, experience net gains when commercial fishery effort is reduced. These sportfishing gains offset, to some degree, the reductions in commercial harvest estimated by models of the type described in the study plan. Care must be taken to evaluate such benefits accruing in all sectors of the economy not captured by the model.

Damages from a correctly specified study are unlikely to be significant. Bioeconomic modeling, however, can be very costly. It is not clear that such costs would be reasonable.

Com.	Topic	Issue	Sug.	Sort
130	3	2240	X	2

COMMENTS ON ECONOMIC USES STUDY NUMBER 4

EFFECTS OF THE OIL SPILL ON THE VALUE OF PUBLIC LANDS (Cost Unspecified)

The study plan lacks sufficient detail for an evaluation of the analysis or the methodologies employed. The plan's vagueness makes it impossible to evaluate the "soundness of the scientific approach."

Justification for Study 4 is based on extension of Trustee responsibility to the role of proprietor rather than representative of the public trust. Such extension is not supported by CWA, CERCLA, or regulation.

The study does not address restoration.

The study will double count vis-a-vis resource losses calculated elsewhere, since land values are based on property use and non-use values, reductions of which are being calculated in other studies. For example, Coastal Habitat Study No. 1 will determine injury to tidal and subtidal lands, while this study seeks to determine the diminished lease or sale price for such lands.

Reduced land values become actual Trustee losses only if sales actually take place (or were planned to) before restoration is complete and if the natural recovery period extends beyond the period in which new uses will occur. In addition, increased land values in other areas and lease/permit sales to spill-cleanup and research-related activities must be taken into account as damage offsets.

Because of the vast supply of near substitutes for almost any parcel of property in Alaska, the "scarcity value" for lands in Alaska is low. In addition, most of the impacted area consists of state and federal lands and is rarely subject to sale. Therefore, the compensable damages to land values are expected to be very low. Consequently, study costs are unlikely to be reasonable.

COMMENTS ON ECONOMIC USES STUDY NUMBER 5

ECONOMIC DAMAGES TO RECREATION (Cost Unspecified)

Com.	Topic	Issue	Bud.	Sort
131	3	2250	X	2

The study plan is very vague about how recreational activities and options are being affected by the spill. The general nature of the impacts needs to be clarified before empirical studies can be done.

The study does not address restoration. It can be applicable to use losses only to the extent that private commercial damages, such as tourism and commercial recreation industry losses, are not included in the study. These private damages are being recovered via ESC's claims process and through private litigation.

Not all valuation methodologies mentioned in this study are applicable. The study provides no explanation as to which methodology will be used or how the various methodologies will be employed. Contingent valuation methods, for example, are not applicable because the recreation services provided by the resources are not unique and substitute options are reasonably available.

Data on changes in recreational participation might be misleading for two reasons. First, reductions in participation in some areas may be matched by increases in others; reporting only the losses would considerably overstate damages. Second, short-term response to the spill may exaggerate the likely long-term effect, due to both natural recovery of the resources and diminishing adverse publicity over time. In addition, it is possible that visits increase due to the publicity, desire of some to view the spill (as has happened this year), and increased income resulting from cleanup employment (which allows Alaskans greater recreation opportunities).

While some recreation losses are possible, ESC is not able to compare those damages with study costs since this study plan, like the other economic use studies, does not include budget information.

Com.	Topic	Issue	Sug.	Dort
132	3	2260	X	2

COMMENTS ON ECONOMIC USES STUDY NUMBER 6

LOSSES TO SUBSISTENCE HOUSEHOLDS (Cost Unspecified)

The study plan seems to overstate the possible problems related to cleanup activities and attendant economic effects. Some subsistence households might have been injured by the spill while others benefitted from the opportunity to supplement their incomes by working on the cleanup.

The study makes no reference to techniques or strategies for restoration of services used by subsistence households.

The study plan ignores private litigation initiated by native corporations and ESC relief efforts to deliver food and materials to subsistence villages. Subsistence activities are private endeavors in which harvest value constitutes income. This is the economic position set forth by private litigation and confirms that losses to subsistence households do not come under jurisdiction of the Trustees.

Damage estimates are likely to be overstated due to overlapping loss categories. It is unclear how the study will separate "subsistence losses" from "damage to subsistence property" since subsistence losses only occur when resources used by subsistence households are impacted.

The study must identify those who gained from the spill (via increased opportunities to earn labor and rental--including quasi-rent--income) as well as those who lost. For example, higher food prices for subsistence uses may be more than offset by higher incomes generated by cleanup-related jobs. Thus, income gains from employment in the cleanup effort, which may have caused inflation in some local areas, may represent net benefits and explain (through revealed preference) why subsistence households ceased to rely on traditional sources.

Study costs cannot be compared with expected damages since projects are not individually budgeted. It is likely, however, that the net damages will be very low (or even negative) given the offsets provided by ESC's relief efforts (food and material delivery to isolated subsistence villages in the aftermath of the spill) and income gains from cleanup work.

COMMENTS ON ECONOMIC USES STUDY NUMBER 7

STUDY OF LOSS OF INTRINSIC VALUES DUE TO THE EXXON VALDEZ OIL SPILL (Cost Unspecified)

Considerable uncertainty surrounds the measurement of non-use or intrinsic damages given the state of the art in contingent valuation survey work. It is unlikely that a defensible study can be done, given the complexity of the situation.

The categories listed represent an exhaustive list of overlapping non-use value concepts. None of those concepts, however, apply to the present short-term disturbance of the environment; rather those concepts are founded on the premise of irreversible resource damage or development which precludes some future use. It is not clear that they apply at all when reversibility or restoration is considered.

It is unlikely that a meaningful contingent valuation study measuring intrinsic value losses can be carried out. It will be difficult to specify 1) the precise resources affected by the spill, 2) similar resources that remain unspoiled, and 3) how long the effects may be felt (natural recovery process). These and other problems are likely to yield estimates that are indefensible.

Study costs cannot be compared with expected damages because projects are not individually budgeted. Damages could be quite small given the natural ability of the resource to recover. Consequently, study costs are unlikely to be reasonable.

Com.	Topic	Issue	Sug.	Cont
134	3	2280	X	2

COMMENTS ON ECONOMIC USES STUDY NUMBER 8

ECONOMIC DAMAGE ASSESSMENT OF RESEARCH PROGRAMS AFFECTED BY THE EXXON VALDEZ OIL SPILL (Cost Unspecified)

There is no indication in applicable law or regulation that Trustee responsibility extends to assessment of possible loss of research activities. The study plan provides no indication of the studies that were affected, except for one involving tagging fish in Prince William Sound.

The study plan does not clarify how scientific study delays will be valued. As to future lost opportunities, any approach taken will be wholly speculative (indefensible) and involves uncommitted use of the resource. Also, there have been significant research opportunities afforded by the spill. There are dozens of ongoing studies costing many millions of dollars, which will provide data and scientific research activities and learning that would not have come forth in the absence of the spill.

Study costs cannot be compared with expected damages since projects are not individually budgeted. Given the offsetting benefits, however, expected damages will certainly be very small. Consequently, the study costs are unlikely to be reasonable.

COMMENTS ON ECONOMIC USES STUDY NUMBER 9

SURVEY OF ARCHAEOLOGICAL SITES IMPACTED BY THE EXXON VALDEZ OIL SPILL (Cost Unspecified)

Com.	Topic	Issue	Org.	Sort
135	3	2290	X	2

There are no clear legal or regulatory terms which appear to extend Trustee responsibility to assessment of damages to archaeological sites.

The study plan provides no indication of how damaged study sites will be valued. Restoration costs may exceed any value associated with sites. The study plan suppositions of damages due to upland site erosion or inland oil contamination appear unfounded.

The key to assessing the significance of any losses will be an accurate assessment of the importance of the sites. Also, there is the possibility that the reduction in value of known and unknown archaeological sites will be double counted in other studies.

The question of how to value the reduction in benefits imposed by a short-term aberration to the resource is also pertinent. There may be no realized losses if no archaeological research is (or was planned to be) undertaken prior to recovery.

Study costs cannot be compared with expected damages since projects are not individually budgeted. Expected damages, however, given the offsetting benefits, are expected to be very small and study costs are unlikely to be reasonable.

X. COMMENTS ON THE RESTORATION PLANS PROGRAM

Com.	Topic	Issue	Sug.	Sort
136	3	2100	X	2

The Draft describes one study for $500,000, which attempts to focus on a restoration strategy designed to identify specific actions which will be taken to restore the ecological health of Prince William Sound and other affected areas.

This program of major importance appears to have major shortcomings in its conception. Greater thought should have been given at the inception of the program to the methods by which it could be conducted and its data requirements. By doing so at the start, modifications could have been made to assessment studies that would ensure that appropriate and adequate data are available for this restoration planning effort.

There are no clear definitions of terms (e.g., injury, restoration, ecological health) which are often used in the program description. Their meanings are critical for understanding the program and its intended results.

Com.	Topic	Issue	Sug.	Sort
137	3	2110	X	2

COMMENTS ON RESTORATION STUDY NUMBER 1

(RP1) RESTORATION PLANNING ($500,000)

This study attempts to develop strategies, schedules, and plans for restoring the ecological health of Prince William, and other affected areas, to conditions that existed prior to the Exxon Valdez oil spill.

Technical Comments

There is a conceptual error in this study. The Trustees repeatedly say that restoration should proceed to "pre-spill" conditions. This is not consistent with NRDA regulations which define recovery as a return to baseline services and further define baseline services as reflecting conditions that would pertain to the affected area had the spill not occurred. This apparent lack of understanding will likely lead to invalid decisions regarding restoration.

Many of the investigations proposed in this study provide static data rather than dynamic data needed for assessing predictive changes and for the development of a restoration plan.

The lack of modeling efforts and the failure to indicate that statistical analysis will be incorporated into this restoration planning effort raise serious concern about its adequacy. The traditional approach for such restoration planning activities would be the development of models that predict the fate of oil remaining in the environment and the expected population changes, both natural and as impacted by oil in the environment. Such models would include consideration of natural recovery as a viable restoration alternative.

Regulatory Comments

Absence of any detail in the description of this study makes it impossible to determine if it is intended to address DOI NRDA regulations §§ 11.73, 11.80 through 11.82, or 11.93.

There is no discussion about estimating the time needed for each injured resource to recover to baseline condition, as required in § 11.73(a).

There is no discussion of the amount of time needed for recovery if no restoration efforts are undertaken beyond response actions, as required in § 11.73(a)(1).

There is no discussion of the preparation of a Restoration Methodology Plan, as required in § 11.80(c).

Nothing is said in the study description about the consideration of alternative methods to achieve restoration, as required in § 11.81(d)(1).

Nothing is said about the use of an Economic Methodology Determination for defining whether restoration and/or replacement costs will form the basis of the measure of damages, as required in § 11.82(a).

XI. COMMENTS ON APPENDIX A

ANALYTICAL CHEMISTRY QUALITY ASSURANCE/QUALITY CONTROL

Com.	Topic	Issue	Sug.	Sort
138	3	2400	X	2

The Draft does not contain sufficient information on the sampling and analytical methodologies to allow for a review of the technical rigor of the approaches. However, the Draft often cites study-specific Standard Operating Procedures (SOPs) used by individual agencies. These and other pertinent information such as audits and reports should be made available to the PRPs and public so appropriate reviews can be made. Standards from the National Institute of Standards and Technology used for intercalibration exercises should also be made available to PRPs for purposes of uniformity.

Information assuring that sample collection activities are being conducted appropriately is insufficient. It is impossible to determine if the plan for field assessment includes assurance that samples are collected from the indicated location and that appropriate controls and control areas are designated. In addition, it cannot be determined if sufficient protection of sample integrity exists to preclude inadvertent oiling of collected samples or loss of volatiles, etc.

Due to the sudden and rushed nature of these studies it is questionable if in the early stages of the spill the State/Federal agencies have required "each analytical laboratory" to demonstrate its capability "prior to the initiation of work."

A "unique" sample identification usually implies a single, controlled identification system that at the time of sampling absolutely restricts multiple assignments of individual sample numbers. From the information provided it cannot be determined if this is guaranteed across the entire Trustees' program.

The list of petroleum hydrocarbon compounds (p. 219) which are to be considered for identification and quantification is insufficient and scientifically suspect for use in an oil spill program. A good portion of the listed PAH compounds either are not found in petroleum at detectable levels, or are minor constituents.

The Draft fails to acknowledge a documentation standard.

The Draft states that in the intercalibration exercise "unacceptable performance will result in the discarding of the associated data." However, "associated data" are not defined, there is no description of criteria for laboratory disqualification, and it is not clear what or how much information could be lost for "unacceptable performance."

XII. COMMENTS ON APPENDIX B

Com.	Topic	Issue	Sug.	Sort
139	3	2420	X	2

HISTOPATHOLOGY GUIDELINES

Com 140 on p 3-58

The Draft does not contain sufficient information on the histopathological guidelines to allow for a rigorous review of their approaches. However, the Draft cites "standard protocols for necropsy and preservation of tissue sample" shall be used during the assessment studies. It further specifies "different protocols have been designed to accommodate the different groups of animals encountered." These protocols and other pertinent information such as audits and reports should be made available to the PRPs and public so appropriate reviews can be made.

The introduction clearly acknowledges that a "definitive diagnosis often does not result from histological examination." It should be further noted that chemical analysis provides the only conclusive means to determine the presence and source of oil.

The interpretation of results does not describe if a sufficient number of samples will be read by a pathologist blinded to possible oil exposure information for each species to ascertain the statistical validity of the diagnosis.

COMMENTS ON FISH/SHELLFISH STUDY NUMBER 26

(F26) SEA URCHIN INJURY ($45,000)

Com.	Topic	Issue	Sug.	Sort
92	3	1560	X	2

This study attempts to determine and quantify injury to sea urchins off Kodiak Island by assessing sea urchin abundance, roe production, condition, reproductive abnormalities, tissue hydrocarbon concentrations, and toxicity to larvae.

Technical Comments

The Concern/Justification section for this study states: "Green sea urchins support a rapidly growing commercial fishery in Kodiak with an exvessel value of $152,000 in 1988." Thus, the thrust of this study is to determine the impact to commercial fishermen, which is not compensable under NRDA since private settlements have and will be made. Therefore, any remaining damage will be quite small, and the cost of this study may not be reasonable. Moreover, some portion of this work is unnecessary since it duplicates information collected in the Coastal Habitat Study.

The details of the sampling, experimental and analytical methods used in this study are not available in the description provided. Therefore, it is impossible to determine if standard and widely accepted methods are employed, possible biases are accounted for, surveys accurately represent assessment areas, and results are statistically valid. The timing and duration of sampling are not described in the study. Each is a potential source of sampling error which should have been addressed in the study description.

Insufficient information is provided to determine if this study can detect statistically significant differences between effects due to natural phenomena and those due to discharges or spills.

According to the Draft (p. 9), "currents and winds moved the oil (in the form of mousse and tar balls) out of Prince William Sound and along the coast of the Kenai Peninsula toward Kodiak Island and the entrance to Cook Inlet." The Draft later states that ". . . the aromatic constituents of petroleum tend to be acutely poisonous. These same components (benzene, toluene, xylene, naphthalene) also are among the first to dissipate. As they evaporate and dissolve, the acute toxicity of the remaining oil diminishes (p. 13)." Thus, by the time the spilled oil reached the Lower Kenai Peninsula, it was highly weathered. Wild sea urchins off Kodiak could not be exposed to the toxic, volatile aromatic compounds because they were no longer present in the oil.

Regulatory Comments

The study deviates from the regulations, as described by Paragraphs A, B, C, E, F, H, I, O, P, Q, S, U, V, X, and Y shown in Tables 3-4 of this document.