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## Speaker List for the Restoration Symposium

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*Royce Lardner travel*  
*for ISER*

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## ROBERT ADLER

We have heard a lot of talk about a "holistic" approach to restoration of Prince William Sound. But what exactly is a "holistic" approach? I have chosen to define, and discuss it in three different aspects:

- Spatial;
- Temporal; and
- Cause and effect.

The main issue of contention seems to be "where will we spend the restoration monies? What will be our primary focus?" In spatial terms, I believe we need to focus on restoring natural resources in the Sound, resources which use the Sound and deserve our protection. The most obvious of these resources are:

- Salmon - they deserve and need protection from the head waters to the high seas;
- Migratory Birds - need overwintering habitat, although resource channeling may be to Oregon or California to protect habitats critical to the existence of the species; and
- Marine Mammals - Whales and otters. Whales in particular use this zone during migration. It may be that we need to protect their habitats not only in Prince William Sound, but along their entire migration route. In any case, we can certainly say that whales are a significant natural resource which need and deserve our protection.

From the temporal perspective, we need to look at both the long and short term approaches. In the short term, we have in the Sound a sick and ailing patient. What the Sound needs immediately is care and rest which can be provided in the form of imposing immediate land use restrictions on timber rights and the like, to allow the ecosystem time to recover. Certainly users deserve compensation for these impacts, but the priority is to preserve and protect the system now to ensure its ultimate recovery.

In the long term, we need to preserve as many options as we can. We need to do a quick inventory of existing resources, and identify immediately the ones we need to protect. Where timber harvest will occur, we need to get immediate stays on these permits until long range decisions are possible.

We need to identify the sustainability of the ecosystem -- what is its carrying capacity? We can help preserve this by establishing protection through wildlife preservation, land use restrictions, implementing buffer strips along anadromous fish streams and the like. We need to work towards non-destructive economic sustainability in the area.

This can be done through conservation, scientific research and public education, for which precedence has already been set in such states as Virginia.

In terms of cause and effect, we are now looking at, and treating symptoms, not illness. We need to seek a cure for the illness itself. In this case, the illness is our

gluttonous use of oil. It is evident in our national energy policy, our regulations -- or lack thereof -- our transportation.

Oil industries need to support spill prevention. It should not be the responsibility of the citizen to pay for Exxon's double-hulled tankers. It is the obligation of the industry to cover these preventative costs.

Alaska state enforcement efforts need money, they need attention so that we can ensure that our regulations are strictly enforced.

In terms of our energy policy, we can organize statewide planning efficiency. Several steps need to be taken to ensure this:

- Rural caps -- reduce dependence on oil, while building towards a healthy economy, dependent upon other sources for its revenue;
- Government enforcement effort programs in Alaska -- we can retrofit existing buildings to be more energy efficient; and
- Timber -- we can buy rights, enforce buffer zones, replace the natural resources, make recycling mandatory among agencies, print all permit applications on recycled paper. It may even be possible to introduce a closed cycle plant, something which could further help the local economy.



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DENNIS KELSO

Commissioner, Alaska Department of Environmental Conservation

Last fall we literally walked every mile of shoreline in Prince William Sound that was significantly affected by the spill. Where the beaches were too steep, or inaccessible, we surveyed by skiff. We also reviewed conditions in other areas affected by the spill. Based on that assessment, about 119 miles of shoreline was either heavily or moderately oiled, in both sheltered and exposed areas. That is not continuous area, but represents an aggregate total of the areas affected. We don't expect this number to be static; however, we were surprised at how stable it had remained over the winter. As the weather warms, we are now beginning to see sheening from heavily oiled and exposed areas. The oil is beginning to thaw and soften, causing the oil to become more mobile, and slowly move downslope toward the water.

As a result of the fall surveys we have about 2500 pages of shoreline maps showing the location of surface and subsurface oiling. The next step is to build on the data acquired during those fall surveys. It is now time for us to begin the spring surveys, and get ready for the summer treatment efforts. We have already begun training personnel for spring surveys, and will continue until mid-April. These surveys will be a joint effort including state, Exxon, and Coast Guard personnel, and land owners and managers. These surveys will lay the foundation for this year's shoreline treatment.

What I observed this week was that some areas looked pretty good, at least on the surface, as a result of last summer's treatment activities and winter storms. This is encouraging. However, in many areas, there is still a lot of oil, both above and below the surface. There are other areas that are absolutely saturated with oil, and frankly don't look much different than last summer. It can be very discouraging to see that, but we must be up front about what we find there, the good and the bad, and figure out our strategy accordingly.

Here is how I think shoreline treatment should proceed this year:

- Complete the spring surveys;
- Determine the location and characteristics of the oil; and
- Overlay the locations of resources and human uses for those resources in order to help us set our priorities.

Our overall objective needs to be longterm restoration of whole ecosystems. However, we need to select our priorities in order to protect as many of those resources, and human uses of those resources as we can.



When we select shoreline treatment techniques we must base our decisions on conditions at particular sites. We must identify:

- The type of shoreline (substrate, exposure, etc.);
- The characteristics of the oil (asphalt, surface mousse, surface pools, subsurface, pooled on bedrock, interstitial, etc.);
- The sensitivity of the affected environment (what kind of ecosystem, i.e. salt marsh, freshwater estuary, marine intertidal, etc.); and
- The resource functions which could be potentially impacted by the treatment process, in addition to being impacted by oil (marine mammal pupping areas, salmon spawning areas, etc.).

Most importantly, we need to choose techniques that will produce the highest potential of longterm recovery, not just improvement in 1990. If our emphasis is only on environmental benefit in a single season, we may miss the opportunity to achieve greater longterm recovery. The goal of longterm maximum recovery may lead us to consider treatment techniques which may have greater impact on the environment initially, but lead to more complete recovery in the longterm. It is very important to choose treatments on a site by site basis, and match treatment techniques to the actual site conditions, based on what can lead to the most complete longterm recovery. In doing this, we will need the help of the public, particularly those who were affected by the spill, and live in the area.

We have three major steps ahead of us. Firstly, we must remove as much of the oil from the environment as possible. Secondly, we must complete the damage assessment using the best scientific methodology. And thirdly, we must restore the damaged resources by using a strong restoration program.

Removal of the oil is not the same as restoration of resources. Removal means getting oil out of the water, and off the shoreline by a variety of methods. These methods may include:

- Mechanical pick-up (break up and rake asphalted areas);
- Mechanical rock washing;
- Some combination of excavation and rock washing;
- Flushing (as long as we can keep the oil out of the water);
- Tilling and flushing;
- Fertilization for bioremediation; or
- Some combination of tilling and fertilization.

The combinations are numerous, but the objective (of longterm maximum recovery) should drive the methods or combinations we select.

Restoration, to me, means action to restore ecosystem functions after as much of the oil as possible has been removed. To my thinking, bioremediation is a removal technique, not a restoration technique.

I think we need to keep those distinctions in mind; however, some people may disagree with where I've drawn the line (between removal and restoration).

This is how I see the upcoming restoration phase, and the role of the public. Removal is difficult at best, and the task sometimes seems discouraging because it is just damage reduction. Restoration is a positive step, and is forward moving. It builds on the removal, rebuilding ecosystems, rebuilding resource productivity. And frankly, it strengthens the ability of the biological communities to support the human communities that depend on them. For that reason, I see this symposium as a first step in an important opportunity for all of us to be directly involved in the choices. To look ahead. To make commitments that will help to rebuild our damaged natural resource assets. And, very importantly, to work together.

One of the best things we did during the first year of the oil spill response was to rely on the public, local officials, fishermen, and other volunteers. When we needed to protect hatchery sites in Prince William Sound, we teamed up with the fishermen and other local folks, and we just went out and did it. When we were frustrated with the effectiveness of Exxon's on-the-water spill recovery, we just put a team of local folks, fishermen, and our people together, and went out and put our own effort together. That was the "mosquito fleet".

Saturday I visited another local effort put together by volunteers, coordinated by Nancy Latchco from Valdez. That group is conducting a debris pick-up operation on Disc Island.

The public is essential to what we are doing, and has been essential throughout this thing. The local knowledge, the results people have to live with, the future of local communities being directly involved, and the wisdom, the sound pragmatic advice we get from the local folks really makes the difference.

I want to say that the State is committed to full public participation in the restoration planning process. This symposium is an important step in that direction, and we have a long way ahead of us.

In conclusion, I would like to say that it is clear that the spill caused severe environmental damage. Some of this damage is obvious, some of it is not yet understood. It hurt people and communities, as well as biological resources. So far we have been fighting to slow the damage, to stop it where we can. It is now time to look ahead and choose a vigorous, positive course of action. To do this work well, we will need to not only work together, but to think broadly. What will be involved in the restoration phase? Here we are charting new territory. Let us keep our horizons wide enough, and consider all possible choices. Let us pay full attention to the people that live in, and know the local areas. Let us set our goal at achieving full recovery for the spill area. Let us bring our resolution to this task, and stay until the job is done.



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## DR. WILLIAM JORDAN

### Arboretum and Center for Restoration Ecology University of Wisconsin

#### Key Note Speaker #2

The Center for Restoration Ecology hasn't dealt with major ecological disturbance such as has been experienced in Prince William Sound. In the case of the Sound, a substantial measure of restoration may not even be possible, although certainly Prince William Sound does present the challenge for restoration.

Restoration at the University of Wisconsin Arboretum has come to mean bringing back the native, historical landscape, the landscape of the prairies and tall grasses, the savannahs. This tradition began in 1934 under the direction of Aldo Leopold. It began with an explicit commitment to restoration, a tie to a historical model of the landscape.

This utopian, quixotic idea was established, and articulated, and the commitment was made to repair the native plant and animal communities to the landscape. This was to serve as a model for people everywhere.

Thirteen years ago, there was certainly almost no interest in this idea, either in the ecological, or the environmental community. Some interest had been displayed in the University of Wisconsin landscape architecture program, but this was minimal. So I had to ask myself "what is unique about the ecological society of restoration?" and the obvious answer was this tradition of restoration, the act of restoration not only for the landscape, but for our relationship with the landscape. In fact, this act of restoration provides something which our culture desperately needs, and that is a model for a healthy relationship with these ecological systems. Through this act, we begin to develop a basis beyond preservation; the act of restoration provides a means for re-inhabiting systems as preservationists. It provides the opportunity for individuals, be they from the industrial, post-industrial, or agricultural society, to become functional members of the system, who influence the system, like Thoreau's muskrats.

And so the act of restoration becomes a tie to history with the landscape. It becomes a powerful means of time travel through which we can explore the impacts of our development, such as the ploughing up of the prairies, or the cessation of burning, which led to the loss of the prairies. It is the re-enactment of history in reverse, and a way of exploring our relationship with the system. It provides the opportunity for re-capitulating cultural evolution; it provides a means of re-entering the system as hunters/gatherers, farmers, agriculturalists, and as scientists. It is, in effect, re-experiencing the classical/natural landscape.

And so, I have come to see restoration as a performing art. It is a way of exploring, defining, and ultimately celebrating our relationship with classical ecosystems, ecosystems which Loren Isely said "we had thought we could simply set aside and forget about."



In this context, what might be thought of as damage, or destruction, can be seen as the first step in a relationship. But in Prince William Sound, with the millions of gallons of oil spilled, my thinking bogs down; this spill is far outside the realm of give and take with the system. Restoration, in any fine sense, may well be impossible. Although I certainly agree with the spirit of everything that's been said here this morning, we all know, or have some sense, as Mr. Adler pointed out, that in our heart of heart's this system will never be back as it was before. And so you see, that in many ways, I am very far from Prince William Sound in my philosophy, and in my experience. Because restoring the prairies and the grasses, and some of the restoration work that is going on now in California with tree planting and the like, is fun. People enjoy it. It is gardening. But here, in Prince William Sound, we obviously do not have what could be called a "celebration" in restoration, because here, the work is nasty. It is not enjoyable. And yes, we do have a reversal of history, but it is a trivial one. No one needs, or wants, to be reminded of the oil tanker which spilled so recently. And so it is very different from the prairies and savannahs where we need to be reminded of our history of 100 years ago. Certainly here in the Sound, the restoration is a way of learning about the system, and we will learn about it in many respects, but it hasn't been worth it. We have insulted the system. And so this philosophy doesn't work in Prince William Sound. In fact, I would suggest that the restoration ethic forbids oil spills. Unlike agriculture, there is no room for oil spills within the restoration ethic, because the oil spill is a step outside any "normal" relationship with a system. It amounts to a gross insult to the system, and yet, we can, we need to profit from this experience as a culture, as humans.

To do so we must step outside of comfortable, healthy, conventional rituals, to find models for the breakdown of a relationship with the natural landscape. We need to look to drastic experiences, tragedy, as seen in our literature, and the cycle of sin, prophecy and salvation as seen by the prophet Jeremiah. We need to look to these models for the possibility of regaining a relationship that has been violated, and then regained through inevitable, and sometimes terrible suffering.

Now I'm not giving you a literature lecture, I'm talking here about the psychology of how humans inhabit the planet. I'd like to stress the parallel in Shakespeare's King Lear; the parallel begins with a failed relationship. In the case of Lear we have the terrible, unimaginable suffering, and yet, at the end, Lear achieves some sort of salvation even in the midst of his family's disillusion, and even at the cost of his life. This is an individual event, the experience of an individual, and as such, does not work for us as well as we would like. Perhaps a better source of wisdom would come from the old testament, and that great rhythm in the old testament of sin, prophecy, and salvation, particularly clear in the book of the prophet Jeremiah.

Jeremiah flourished around the beginning of the sixth century B.C. during which time Israel was under siege; to the south by Egypt, to the north by Babylonia. Again, the parallel is a problem of a relationship. In this case, the relationship with God and His people. But we can substitute "Nature and Her people" in many instances.

The Israelites were a people who defined themselves in terms of a covenant established with God, a covenant defining a certain and peculiar relationship. Jeremiah felt that this covenant had been violated; the people had been making sacrifices to pagan gods,



and had made alliances with the Philistines, with the gentiles in Egypt in particular. He prophesied doom and destruction. Interestingly for us, his description of doom is in terms of the landscape: "I looked on the earth, and lo, it was waste and void, I looked and there was no man, and all the birds of the air had fled. I looked, and lo all the fruitful land was a desert, and all its cities were laid in ruin."

Jeremiah expressed his ideas to a very unwilling audience performatively. He used the example of the potter, who, seeing he has made a malformed pot, destroys it, and with the remnants, recreates a new, whole and well pot. Just so, Yahweh would have to refashion his people into some new kind of entity. Jeremiah took a completed pot, and smashed it in the desert, to show the dissolution of the tribes of Israel. Yet Jeremiah's vision was never one of pure gloom and doom. This is important. Yahweh had come to wreck and ruin, and to build and plant.

Jerusalem fell to Babylon, and Jeremiah resisted the political alliance with Egypt to protect the Israelites, and to free them from their bondage to Egypt. He placed a yoke around his neck, to show that the penance of captivity was the road to salvation. And when one of his adversaries smashed the yoke, Jeremiah replaced it with an iron one, insisting on the moral efficacy of the suffering of the Babylonian captivity. When given the opportunity, he bought land, the farm of his cousin, for next to nothing. He bought this land while he was in prison, in a land under siege, when the land had a value of nearly zero, to symbolize his faith in the return of the land to his people. He envisioned a new covenant community which would rest on the remnants of the people taken into Babylonian captivity and saved through suffering. In the new covenant, laws would be written on the heart, not in the books, and the new laws would provide the basis for Yahweh's new people.

There are several lessons which we can learn from this story. First, the story is fiercely ecological. It tells of the relationship between a people and the Lord and the land. It is a story of the failure of a relationship, but the retrieval of hope through redemption. It insists on suffering as a means of redemption. It shows the need for the courageous and articulate use of performative action; it will not be easy, people will not listen. And finally it shows that we need to allow for change and the emergence of something new and different. It is a qualification of the idea of restoration beyond the earlier, ideal state.

In the context of the oil spill, our dependence on oil represents a breaking of a covenant with nature. Within this context, the disaster in Prince William Sound is not a "big deal" as compared to the higher problem of global climate change, for example. Rather, the oil spill that occurred here is just one consequence for our society's over-dependence on fossil fuels. The spill in Prince William Sound is equal to Jeremiah's breaking of the pot in the desert - it is symbolic of dissolution - of the broken covenant, and the need for restoration. And, as Jeremiah had, we need to have a vision for the outcome, for the future in which the ultimate outcome will be better than before, because of the experience. We need to provide the public the opportunity to participate in the restoration--to exploit the benefits of active restoration for those who participate.

What will we have to look forward to in the future, as we see more oil spills, and possibly, the increase in global temperatures with tremendous natural consequence? How are we to approach this dim coming time? We could be indifferent. Clearly this is a choice which many people, for one reason or another, have chosen. Secondly, we could establish

an attitude of unrelieved doom. Fortunately, that isn't what I've seen happening here so far this morning where we are seeing restoration as an opportunity. Yet there is the danger of this attitude based on the idea that humans are essentially outside of nature. This desperate point of view was given particularly clear articulation in a recent book by Bill McKibben, preposterously named The Death of Nature. I will only read you one sentence of it: "The end of nature probably also makes us reluctant to attach ourselves to its remnants for the same reason that we usually don't choose new friends from the terminally ill." I would suggest that we have had enough of that sort of thing. That this is a horribly ugly and selfish idea. And what culture is one coming from when one suggests or takes it for granted that one does not make friends with the terminally ill? One thinks of the judeo-christian tradition in which everything goes against this idea. You think of the lost sheep, of the good thief dying on the cross, you think of Jesus healing the sick, even of bringing the dead back to life, and finally you think of Jeremiah's remnants, and building a whole new covenant on these remnants from the people returning from captivity in Babylon. I want to underline that this idea is desperate, and it is destructive. We've seen this very clearly in our restoration work in the midwest when we see that communities have been destroyed by the idea that the best thing you can do for a community is to leave your hands off of it. The tall grass oak savannahs in particular, have nearly vanished from the landscape, very much as a part of the system being set aside, and not touched, when in fact these systems desperately need our attention.

We need to undertake this restoration program in the same spirit as Jeremiah's breaking of the pot: that we see it in the context of the greater picture that we have to come to; that we see it as a very bad situation, but one through which we might hope to achieve some kind of wisdom in the end, and one through which we must keep the hope for the future alive.

Finally, to conclude with Jeremiah, speaking of the remnants in Babylon, the people who survived the sword, and found grace in the wilderness, "I have loved you with an everlasting love. Therefore I have continued my faithfulness to you. Again I will build you and you shall be built, oh virgin Israel."



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LEE HARDING

Environment Canada

Panel #1 - Coastal Habitat

I came here today to share my experience with a spill that occurred primarily along the west coast of Vancouver Island. We thought it was quite a bad spill when it first hit the coast. There was a lot of oil and it was widely distributed. The spill originated from a barge located off Grays Harbor, Washington, and dumped about 850 metric tonnes of Bunker C oil into the water. Approximately 50 to 100 metric tonnes were estimated to have landed along the Canadian shoreline. The spill occurred on December 23, 1988. It first hit Vancouver Island on December 31, 1988, and had reached some small islands just north of Vancouver Island by mid-January. Most of the oil had dissipated by that time.

Most of the oil landed along the outer, exposed headlands and islands, and did not go into the sheltered estuaries or the long, deep fjords to any appreciable extent. A few sheltered areas were impacted; however, most of the oil landed on the sharp rocky outer coast, which is exposed to heavy wave action. Approximately 350 locations were known to have been contaminated by oil along Vancouver Island.

The outer coast of Vancouver Island is an area of immense scenic beauty and contains a wealth of natural resources. The area contains important fish and shellfish resources, marine mammal haul out and feeding areas, migration routes, and shorebird feeding and nesting sites. Two units of the Pacific Rim National Park, several Ecological Reserves, important native harvest areas, and many salmon and shellfish mariculture operations are also located along the west coast.

The environments impacted by the Nestucca spill (the Nestucca was the barge which created the spill) are quite similar to environments you have here; however, they are probably more exposed than many areas of Prince William Sound.

The oil had come a long way (several hundred kilometers) before landing on the island. The spill occurred during cold winter conditions and the oil tended to congeal and landed in cohesive mats. These mats or blobs of oil could be physically picked up, moved off site, and the beach would be virtually clean. When the oil landed on the rocks, it could be simply peeled off, and the rocks would be clean. If the mats were too large to move, we could break them up with an ax, and remove the pieces. After physically removing the oil, there would be no visible trace of oil on the surface except a wee bit of sheen.

That was the situation when the oil first hit the shore. If we missed the tide it came in on, the surf would mash the oil around and mix it with debris. However, we could still physically remove the oil/debris mats, and have a pretty clean beach. Approximately 450 metric tonnes of oil and debris were removed from the beaches, of that, about 10 percent was oil.



Approximately 180 kilometers of Canadian shoreline had some degree of contamination from this spill. However, only about 2 kilometers were heavily oiled in the aggregate. The mats usually stranded in the high intertidal zone. Most of the oil landed as patches between several centimeters and two meters in diameter. There were not any areas noted with thick, continuous oil cover. Very little contamination occurred in the lower or middle intertidal areas. However, it was inferred that some oil was deposited subtidally. In subtidal areas, the oil appeared to be deposited in the form of specks and droplets. I say that the subtidal depositions were inferred because we found crabs (which inhabit depths to 50 meters) with oil on their carapace. In fact, the crab fishery was closed because the contaminated crabs were not marketable. In some area, 100 percent of the crabs were oiled. By March, this number was reduced to between 4 to 16 percent.

As time progressed, we would see much smaller patches of oil and oil\debris hitting the shoreline. We continued to see this for about 1½ months following the spill. Most of these smaller patches could also be visually removed. However, just because the surface was clean did not mean that there was not some oil below the surface. We conducted some quantitative sediment sampling about every two months following the spill between January and September. It was evident that tidal pumping had drawn oil subsurface in some areas.

The clean-up policy was to be as thorough in removing the oil as possible, and clean the beaches quickly. In addition to physical removal of oil patches, other methods were also used in some locations. Logs contaminated with oil were usually bucked up and burnt. Petromesh was used to capture oil at some locations. At one site, some rocks and gravels were burnt in a reciprocating kiln to remove the oil, but this method had only limited success.

Most of the initial clean-up operation was completed by the end of January; however, some sites required subsequent clean-up of smaller deposits in March and April. By June, there was no oil showing up in our quantitative samples. In September, we found only three areas at which physical deposits of oil were evident. These deposits were small, approximately ½ meter diameter patches of oil\debris.

In summary, there was some impact on intertidal plants and animals from the spill. Both lethal and sublethal effects were noted. By June, the biological cycles were getting going, but there was virtually no oil left in the environment, and it was expected that any impacts occurring at that time would be trivial or insignificant at the population or community level in a regional ecological context.

The restoration of the shoreline and other intertidal habitats was limited to physical removal of oil. Once that was accomplished, we felt that the environment was restored to its original condition for all intents and purposes. Mind you there were some exceptions.

Factors that reduced the impact of this particular spill included the time of year it occurred, the distance the oil traveled before landing on the Canadian shoreline, the rapid clean-up program, and the exposure of contaminated areas to strong wave and tidal action. Because the spill occurred in the winter, air and water temperatures were cold; the oil tended to congeal and could be easily picked up. Plant and animal populations were low in the winter and metabolic rates are at there lowest. Most species were not in the breeding phase of their life cycle. Seabirds and other migratory animals were on their wintering



grounds, and not exposed to the immediate impacts of the spill. However, I do not want to minimize the impact overall resulting from the spill. Depending on which estimate you use, between 20,000 to 50,000 birds were killed. Coastal plant and animals were also impacted, particularly in the more heavily oiled areas.

The clean-up effort was rapid and thorough, and most of the oil was removed from the coast. The exposed location of the contamination on the coast obviously limited the impact where natural self-cleaning was at a maximum because of wave action. The organisms in these locations are also very hearty and adapted to extreme environments.

If anyone is interested learning more about this spill, they can write the Canadian government, Department of the Environment, in West Vancouver, British Columbia, and request the Regional Program Report 89-01, The Nestucca Oil Spill: Fate and Effects to May 31, 1989.

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ROBERT WEEDED, PH.D., NRDC

Restoring the earth is the project of the 21st century which will bring humanity together. It is the major cohering principal for the next 100 years. Hopefully, we may reach a balance between destruction and restoration at the end of this 100 years. As long as people use technology, are numerous, and demand resources, destruction of the environment is unavoidable. But this must be paired with inevitable restoration. As we have come to accept destruction as a part of the process of living, so we must also accept restoration.

Restoration is not a new idea (e.g., Restoring the Earth Foundation, Aldo Leopold). We must remember that we can't afford to focus our notion of restoration on money paid by violators of one kind of regulation or another. To do this would leave us hoping for law violators to support our favorite programs. Many interests would be partially, or even wholly dependent on these finances, including bureaucracies set up to administer these regulations. Restoration cannot be dependent upon disaster for its funding source.

We desperately need to keep the process of restoration simple. Otherwise we run the risk of a similar situation to that which happened recently to the Forest Service. They had invented a planning mechanism which incorporated nearly everything in the universe, and was supposed to give planners the answers to their questions. This planning mechanism was so complex that ultimately, the Forest Service itself could not identify one single person who could explain how the whole system functioned. Various people could identify the meanings of different sets and subsets, but no one knew the whole picture. This is obviously not a precedent which we want to follow.

We need to keep the mechanisms of restoration simple, and flexible. This allows for the admission of ignorance; we really don't know how to restore the earth. We run the risk of focusing on individual "popular" species without understanding how they fit into the whole.

Instead, restoration must focus on allowing nature the possibility to become. Nature is above all an adaptive and flexible mechanism. It is a nested set of mechanisms all of which are equally important to the ecosystem. The technology of restoration is at a rudimentary state -- we simply don't know. We must recognize our own ignorance and act accordingly.



DR. ARTHUR BUIKEMA

Professor of Zoology, Virginia Polytechnic Institute

Keynote Speaker #4

It seems clear that we can't talk about restoration until we know the damage. My first reaction when I heard about the spill, was a great knot in my stomach. That knot was because of fear. Fear because of lack of truth, or lack of knowledge. In the case of the spill, my first question was "what is the extent of the impact?" And I realized that with our lack of knowledge on the existing environment, it would be very difficult to determine how to restore it.

There has been a great deal of time lost in "finger-pointing", which really obfuscates the issue at the heart of the matter--the fact that clean-up needs to be done--restoration needs to be done. This initial "finger-pointing", seeking to lay blame, has created an area of invented realities--no communication, no trust exists in this situation. No one is willing to take a risk. Our fear has paralyzed us into finger-pointing and inaction.

In fact something can be done. We need to set realistic goals and expectations, and we need to take risks to achieve these goals.

In terms of restoration, environmental quality was not protected. This is evidence of misplaced societal values, and attests to ethical insensitivity and poor management. Legal definitions of land values are functional, although not particularly accurate. In fact, we have no good definition of what the land really is. Information on the restoration of ecology is lacking. Literally no standards for restoration exist because each locality is unique.

Oil spills are not unique, and in fact, the probability of continuing major spills like with the Exxon Valdez, is very real. In 1984 there were 600,000 oil wells, 200,000 miles of oil pipeline, 700 offshore oil rigs, 700 tankers and 800 refineries around the world. Approximately 70 percent of all spills occur within coastal waters, or while oil is in transit. There has not been much change in the oil industry since 1984. All existing data on spills is site specific, which limits the amount of extrapolation, or even comparison, that is possible. There has been no long term monitoring of recovery data, no long term monitoring of restoration data, and yet we are in a situation where we must validate the long term choices we make in restoration, and we need to base these choices on something.

Several years ago in 1980, Exxon approached me and a colleague, and asked us to gather information available on spills, spill prevention etc. We soon discovered that there was very little existing information, and so we decided to hold a conference on the matter, bringing together scientists, biologists, and other interested professionals in the field.

What resulted from this conference is that we couldn't really come to any concrete conclusions except that:

- Spills will and do occur without warning; and
- The course of action in terms of cleanup must be immediate.

All other factors are indeterminate because of the amount of variables involved in each case. All impacts are a function of:

- How many perturbations occur per unit of time;
- How much oil was spilled;
- What kind of oil was spilled;
- The type and magnitude of the clean-up;
- How persistent is the oil;
- What type(s) of biological communities are affected;
- During what season did the spill occur;
- At what latitude did the spill occur;
- What were the weather conditions? (weathering rates);
- What type of removal and/or retention of oil occurred;
- What is the availability of new species to propagate;
- What are the successional processes of the ecosystem; and
- What type of sediment stability.

Restoration strategies are dependent upon all or many of these variables. It is therefore impossible to predict the needs of a particular spill beyond public input and local expertise.

The best mode of approach then, is spill prevention. We must develop policies and procedures to prevent spills, and have plans for immediate action/containment when spills do occur. It is impossible to fully control or contain spills.

The first step of action should be to use dispersants on the spill before it hits land. We know that dispersants are toxic, but this is an accepted level of toxicity. The potential damage to the shoreline and potential habitats impacted is of far greater magnitude than dealing with a more controlled area in which one could hopefully sink the oil, or do whatever is necessary to facilitate its degradation. These were all issues discussed at the conference. We didn't like the idea of using dispersants, it wasn't popular, but it was an alternative that was discussed because everyone wanted to avoid the problems that would occur on land when the oil hit.

Some clean-up may be necessary, and is often very destructive in and of itself, but to the greatest extent possible, the habitat should be left alone. The cleanup could do more damage than the oil to the environment. This is a toss-up, a judgement call, and a risk, but the environment should be left alone as much as possible. Restoration activities, since we really don't know what we're doing, could be doing more damage than good.

In light of cumulative effects, then, we must ask ourselves "is restoration really possible and/or needed?"



We must base restoration on data collection, chemical and physical data of each habitat, data which currently do not exist. We need to identify sensitive areas and habitats both in terms of chemistry and biology. Right now this baseline ecological data simply isn't there. We need to put money into developing this particular data base. We need to develop Environmental Impact Statements on oil transit lanes, where the majority of spills occur, which identify specific habitats which should and need to be preserved, not solely as a natural resource, but as potential colonies for species which may need to be restored because of an oil spill.

We must have enough data over a sufficient period of time to know what natural variability is, because we cannot possibly begin to know impacts without knowing the role of natural variability. Without background data all we can do is refer to various ecological studies, but since each system is unique, very little basis for comparison exists.

We could also use post-spill toxicological data. This information could be used to establish what has occurred within a species, or which species have been removed. It could be of value in trying to predict what would happen if a spill occurred in terms of relative sensitivity within a species, although our ability to extrapolate is not necessarily very good.

There are currently 60 different projects going on to collect data by 60 different state and federal agencies. What is the company that is responsible for the spill doing? How many studies do they have going on? Without cooperation, there is concern as to what impact these studies themselves could have on a particular environment. We need to establish this data base in a cooperative manner. For example, before putting in an offshore oil platform, baseline data collection must be gathered. But data gathering is often so disruptive to the habitat in and of itself, that in the end the studies no longer reflect viable communities.

In terms of restoration activities, and reestablishing species within an area, what's the impact of decolonizing one area to recolonize another? What is the effect of legal delays? (Both on the habitat, and on the availability of funds?) If no money is immediately available following the spill, it may not even be worth the effort to discuss restoration.

So far, we have discussed large spills, such as the one that occurred in Prince William Sound. But we also need to know the effects of the multiple small spills which occur quite frequently. For example, in colonial days, everyone kept their cows in the commons area, in the middle of the town. People had the attitude that just adding one more cow wouldn't make a difference. Ultimately it resulted in the destruction of the habitat. In a similar way, these multiple small spills which occur each year and are usually ignored by the media and the public, do have a cumulative impact and may contribute to the ultimate destruction of habitat. This needs to be taken into consideration and addressed.

There has been a general attitude of complacency in our society towards oil spills. We haven't proceeded with changes in either policy or public education; these are steps that also need to be taken.

We need to start taking risks in restoration techniques. Because we don't know enough now, we are uncertain as to how to proceed, but we must begin. We must take the initial risk. We have discussed and debated ideas including research, education, and



acquisition of habitat to prevent further environmental damage and to maintain biodiversity. We have looked at the possibility of acquiring habitats out of Alaska particularly for migratory birds, and the establishment of trust funds. We have also discussed the ramifications of impacts to social problems created by the temporary unemployment of subsistence peoples living in the affected area.

In summary, we live in a world of systems, within systems, within systems, or conversely systems within larger systems, ultimately encompassing the universe. Imagine a time piece with gears in a multi-dimensional plane such that it encompasses all sorts of reactions beyond our best comprehension; impact to one gear will affect the way others interact and ultimately function. Among these systems are the technological aspects for restoring and cleaning the habitat, and the technological aspects for restoring individual species and communities interacting on the chemical, physical and biological levels. On the next level of organization we have the local population working with the natural resources for subsistence, whether it's tourism, food, aesthetics, it's all one. We have the acquisition of equivalent resources to protect man's environment. The species of the aquatic and terrestrial environment come together and give unity to the local population. The changes which occur to the local population are to hunting, fishing, and timber rights; restricting development, restricting public use, habitat protection, prevention of spills, development of archaeological teams to protect cultural resources. Which leads to impacts on the larger picture of cultural and tribal subsistence. Impacts go beyond the immediate impact to the tribes, affecting the culture, the history, the spirituality of the people. It will impact the development of beliefs and values. We must enhance the value of natural resources through public education. In doing this, we have the opportunity to redevelop and restore an environmental ethic which goes beyond Prince William Sound and beyond the state of Alaska. We must see this first on the local, then national, then global perspective.

All of these pieces fit together in a holistic picture. It is our legal, moral and social responsibility to protect the legacy of our natural environment. We have an opportunity to address the pre-spill conditions. We don't want to go back to an already damaged environment, we have to go back further. We're in a position to begin to understand the declines in the fisheries that have been ongoing for a long period of time, for example.

During a time of recovery, someone must take a risk to affect change. The change won't occur quickly, but it can be done, it can happen. Because of the Valdez, the people of Alaska are in a position to break the cycle, to break the addiction to the degradation of a resource, and to try to take some risks to restore, or at least maintain that resource. It will not be easy, but Alaska is in a position to be the model for prevention of spills, the preparedness that goes along with containing and controlling those spills, the protection of the resource, and hopefully, also develop techniques for the restoration of those resources, at least to some level of function which society can accept. Optimistic? We can do it if we want to. I am a little pessimistic about the question "will we?" That will depend in part on funding, and that's entirely up to you.



## ROBERT M. THORNE

Archaeological sites are a legacy passed on for the use of succeeding generations. The content of these sites provide the basis for interpretations about past lifeways and the environment in which these human activities occurred. Archaeological sites are non-renewable resources, and we have both a legal and moral responsibility to use and manage them in a wise and judicious manner. The fact that archaeological sites are an important aspect of the environment \has been recognized by the Congress on several occasions. That body and a number of the various states have formally acknowledged the worth of archaeological sites through both legislation, regulation, and Executive Order. When archaeological site destruction is either in progress or is imminent, we now have the statutory ability to counter these adverse effects. Almost every piece of federal enabling legislation indicates that the preferred mitigation choice is preservation 0 if not of the site, of the materials that the site contains.

American archaeologists credit Thomas Jefferson with the first scientific study of prehistoric North American cultures because of his mound excavations that were completed in 1784. Many people do not realize that archaeological site stabilization and preservation projects have almost as long a history - the Ohio Land Company began mound and earthworks stabilization efforts in 1788. These initial preservation efforts were not completed by archaeologists but by interested concerned citizens.

Site preservation and stabilization is possible in many instances and frequently can embody techniques that are compatible with the surrounding natural environment. In fact, a properly designed archaeological site stabilization project can serve to enhance and provided habitats for a variety of species, both plant and animal.

The techniques that are used to stabilize archaeological sites are highly variable and must be selected on a site specific basis. Some are standard engineering designs and include such techniques as riprap, various forms of prefabricated gabions, levees, dikes, and retaining walls. Some techniques that can be employed rely on the use of synthetic products such as filter cloths and fabrics or natural products that are designed to accomplish the same purposes of their synthetic counterparts. These synthetic materials tend to have a finite life-span and often cannot be viewed as a permanent solution. The former techniques are frequently spoken of as a hard approach to the solution of a site loss problem.

At the other end of the spectrum is the soft approach. Soft techniques generally rely on the use of vegetation or a combination of one of the hard approaches and vegetation and this is referred to as a biotechnical approach. The technical aspect is used in conjunction with and as an ail to the vegetation. Simply put, a selected hard technique is put into place to hold things together until the vegetation cover is mature enough to do its job. Whenever possible, the biotechnical or a purely floral approach is preferred because it fits better with the surrounding environment. Environmental compatibility is an integral part of archaeological site stabilization and prior experience has shown that sites can be stabilized while enhancing other aspects of the environment. In some settings, the best approach to site stabilization is to duplicate healing processes that occur naturally.

In some cases of site stabilization cost considerations became the determining factor in the selection of a way to protect a specific site. Generally speaking, standard engineering



procedures have the highest initial cost and require regular maintenance which must also be factored in. The biotechnical approach or the use of vegetation without mechanical aids can be the least expensive in the long term, even though the initial cost may appear high because vegetation efforts tend to be labor intensive. Once established, however, vegetation stabilization should require little in the way of maintenance. Some of the initial cost of a vegetation project is offset in calculating the cost: benefit ratio. When archaeological sites are stabilized through the use of naturally occurring vegetation, it is difficult to assign a monetary value to the advantages that will accrue to the various forms of wildlife that benefit from the improved environment.

While the stabilization and protection of archaeological sites is my primary concern, I do believe that a multidisciplinary approach is the best. Project design must include input that will speak to the interests of the biotic community, erosion specialist must have their say as must hydrologists and land managers and planners. After all, these latter individuals or agencies will ultimately be responsible for the continuing management of these resources.

Finally, all sites are not suitable for stabilization, and excavation is the appropriate mitigation approach. When excavation, analysis, and report preparation is completed, the results of the recovery efforts should be made available to the public. This can be accomplished through the preparation of reports written in laymans terms, through video presentation, or through museum displays. Excavation is an ultimately destructive form of mitigation and must be considered only after all potential stabilization options have been rejected.

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## RICK STEINER

The restoration effort presents us with a spectacular opportunity to "do the right thing" as Spike Lee would say. We need to involve the rural people in this restoration, and the people of Prince William Sound, and it looks like we're moving in the right direction.

The Prince William Sound spill really punctuated 30 to 40 years of cumulative environmental degradation in the Sound. We now have a chance to restore the region, not just to its pre-spill condition, but hopefully to its condition 20 or 30 years ago.

In doing this we are faced with the challenge and the opportunity to change some of the institutions - social, political and economic - which precipitated the spill. This goes beyond Alaska to issues such as energy consumption on a national and international level, population increases and the like. These are issues which we will eventually have to address, otherwise we're really just squirting water on top of the flames in an effort to put out the fire.

I'd like to throw out a few ideas, just briefly, and focus on one of those. We've heard of:

- The acquisition of timber rights;
- The "do nothing" approach;
- establishing wildlife and/or environmental trust fund(s);
- A research endowment (possible through ADF&G);
- Salmon and bird rehabilitation;
- Mariculture development;
- Control of high seas intercept fisheries;
- Natural resource scholarship funds for high school students;
- Permit buy-back programs for native communities and villages;
- Environmental education classes, regionally and nationally;
- Energy Conservation;
- Ecotourism; and
- Seafood market rehabilitation.

And moving a little further out in the spectrum:

- Day care assistance;
- Establishing native art and music foundations; and
- Establishing recycling programs.

The challenge is to "keep our eyes on the prize", and by that I mean that we need to focus first on Prince William Sound and the impacted environment. The process of restoration is of paramount importance, and I think it would be a good idea to include scientific peer reviews of all proposals. We could also have a political review body, composed of citizens, similar to a Community Advisory Committee. The important issue we're faced with is where to spend the money from restoration? I think most of it should stay in the area immediately impacted by the oil.



There have also been legislative proposals as far as land acquisition goes. Jeff Parker is an attorney for the Alaska Sport Fisheries Association, and he recently wrote some proposed legislation which could financially benefit private property owners who sold their land rights. There are three major aspects to this legislation:

- It would provide habitat conservation tax credits;
- It would allow script bidding; and
- It addresses the "debt for nature" swap that is now occurring in some third world countries.

Habitat conservation via the purchase of timber rights is a valuable use of restoration funds. The basic theoretical concept behind this idea is that we have to prevent further damage before we can move on to restoration in the true sense. We need to allow the land to heal, and protecting it through purchase is a good way to do that. We have seen support for this idea from private timber owners, and that's encouraging. If we can extract a promise from the Forest Service that they too would protect their lands from further degradation through timbering. I think protecting the land by purchasing the timber rights would be a biological, economical and psychological solution.

First, the biologic perspective. Timbering often causes siltation and can clog or degrade aquatic habitats, particularly spawning habitat, which can obviously affect salmon. We have heard that many wildlife species are dependent, at least partially, on old growth forests. We also need to maintain biodiversity. Purchasing the land would protect all of the above.

Secondly, in terms of economic value, if we look at a one hundred year period, I think we would see that one of the highest sources of economic revenue is the scenic and touristic value of the land. This too would be maintained through a land purchase.

Lastly, the psychological value. This is an aspect of restoration that seems sometimes to have been overlooked. When you mention that this is an area which will be addressed by restoration to Cordova residents, you can literally hear a sigh of relief. Relief that this problem is acknowledged and will be addressed. It is emotionally significant not only to impacts sustained in the region, but in the state and nation as well. It's almost like atonement for our sins. In the greater picture, we all have a sense of identification with Prince William Sound, and the restoration process gives us the opportunity to rectify the damage that has been done.

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## ALLEN SMITH

We are faced with the problem of how to deal with restoration. We can see the obvious visible effects of the spill, dead wildlife keep washing up. (I believe there was a bald eagle found just the other day.) We have heard reports that nine out of ten herring eggs are abnormal. In short, the damage begun one year ago by the oil spill in Prince William Sound is still continuing.

The highest estimates point to a 5 percent oil recovery to date. Obviously, this means that 95 percent of the oil spilled remains in the environment in some form. The damage has not yet been fully manifested. Researchers tell us that if the oil has settled into the muds and sediments, we could be looking at 30-40 year impacts.

In order to fully understand restoration, we must fully understand the lost resources, and this we cannot do for some time to come. We cannot know the requirements without the damage assessment process. We must protect the lands and the waters, because we know that this type of spill could easily happen again. This spill happened to be on the list of the year's 100 worst spills, but that's 100 worst out of 10,000 oil spills which occurred last year. Unfortunately, last year was not an unusual year in numbers of total oil spills.

We therefore need to protect our investment in a restoration strategy. We have defined three strategies:

- restoration of damaged resources;
- replacement of damaged resources; and
- acquisition of equivalent resources

In Prince William Sound, enough oil remains in the environment to impede the restoration process. It is impossible to even begin until the area is clean. Once this is done, we can begin with the ecosystem approach, that is replacing native grasses, shrubs, and trees and restoring marshes and estuaries.

Second, where whole populations of species have been destroyed by the oil spill we can move on to the reintroduction of native species, the fish and the birds. But we should be very cautious. This is an area which demands very specific information from the bioassessment process to approach correctly. We need information out of the damage assessment process for restoration to begin.

The third area, acquisition, really tries to address what happens after you've tried to restore and replace the natural resources, and you're unsuccessful. Ironically, it is here that the best opportunities for the Gulf of Alaska may well exist in replacing the damaged or destroyed natural resources. Acquisition of equivalent property should become a very high priority to fill the void created by the damaged natural resources. There are many suitable conservation lands of value.

National Parks, refugees and National Forest lands could be approached in the same manner, i.e., where willing sellers exist for equivalent natural resources lost in the oil spill. This presents an opportunity to use trust funds from the spill for significant conservation



purposes. Land exchanges are a possibility, as is the purchase of development rights, timber rights, leases and lease-backs, creation of tax incentives, habitat tax credits, reverse knolls, reacquisition of Bristol Bay oil leases, option purchases, wilderness designations, areas of critical environmental concern and other designations which will force the land managers to pay much more day to day attention to how these lands are actually being managed.

In summary all three areas of habitat restoration strategy should be planned at the same time. This will enable us to take advantage of all opportunities for restoration in the replacement of damaged resources as well as the acquisition of equivalent resources.

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## CHARLES NASH, GENERAL MANAGER, TIMBER TRAINING COMPANY

I'm here today because of our company's timber holdings within Prince William Sound, and our existing proposal to log our purchased timber on Montague Island. To give you some background on my company, we are wholly a subsidiary of KONCOR Forest Products, and we own timber within the Sound. The Timber Training Company is native owned and was established as a joint venture by four village corporations, the Yukatat Quan, the Kodiak natives, the Uzinki, and the Chuniga village corporation. We've been around since 1977, and are a timber management company. Most of our shareholders are fishermen and timber owners. We've received several awards for excellence in our field.

We own timber on Knight Island and Patton Bay on Montague Island. This we purchased from the Chugach corporation in a major financial investment three years ago. We are now working on acquiring permits and moving ahead on the timbering.

We have recently been approached by various interests and asked if our land was for sale, and if it were, whether or not we would sell it. The answer is yes, I think we would be open to that idea. But a purchase would definitely have to be at fair market value, because we have a responsibility to our shareholders.

As far as our plans for timbering at Patton Bay are concerned, we plan for a temporary access road from Cloud Harbour to Patton Bay, and that's currently in the permitting process. This road would be temporary, but one of its benefits for the Alaska Department of Fish and Game is that it would provide access to 27 different habitat areas. These include stream blockages as a result of the 1964 earthquake. Most of these could be cleared of debris and would provide habitat for anadromous fish.

As far as the Company is concerned, we, like everyone else, were a victim of the oil spill. The Patton Bay timber sale is really unrelated. It's been put on hold for one reason or another for the last three years, and at this point, we would just like to start moving ahead, and getting a return on our investment. If anyone has any specific questions, I'd be glad to answer them later.



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## DOUGLAS MILLER NATIONAL WILDLIFE FEDERATION

We have come here to examine restoration questions and we have looked at them in three different ways:

- Restoration of damaged habitat;
- Replacement of damaged habitat; and
- Acquisition of equivalent habitat.

We know the abstract, but are here to discuss the specifics of implementation, which we don't know. First of all, the information gathered on the damage needs to be openly shared. It has been gathered by several sources, the state, Exxon, and various local interests. Everyone needs to have access to that information, because one of the main problems we are facing is that no one has had a comparable experience.

We have heard several people address different aspects of the issues which we are facing. Yesterday Bob (Robert Adler) addressed the issues in a legal context. John Teal gave us an overview of his experience with spills, and cautioned us that you can do too much, and there may be cases where it's best just to leave the environment alone. We've also heard concerns on subsistence and commercial fisheries. There has not been enough sharing of information. It was also mentioned that we need to address the whole biological picture and its interrelations, and not just focus on a few "high profile" species like the sea otters, or the bald eagles.

One of the major questions we're left with is where will the money for restoration come from? In August, the National Wildlife Federation, the Natural Resources Defense Council and the Wildlife Federation of Alaska filed a joint suit in the Superior Court of Alaska against Exxon Aleyeska to establish a trust of up to one billion dollars which would go towards restoration. The monies would be managed as a foundation or trust, and would support studies by experts appointed by the court on both the short and long term effects of the spill, as well as addressing continuing impacts. We need to look at the restoration and replacement of these natural resources. Where that's not possible, we need to look at the possibility of acquisition of fish and wildlife and other biota lost due to the spill; a replacement of ecosystem productivity. Also the removal or containment of the oil is still an issue which needs to be addressed. The acquisition of additional natural land to compensate for the loss of the natural resource in the Sound is also something which has been brought up. The outcome of this litigation, now before the courts, will set a precedent for how we should proceed.

We have a plan, we've certainly learned a lot from the spill, now what we need is to work out the details of the plan. In closing, I'd just like to relate a story that somewhat parallels our current situation with the restoration process. The story is attributed to Will Rogers, who, unfortunately had been dead for about four years when this supposedly took place. Apparently there was a big cocktail party in Washington D.C. around 1939, just before our involvement in the war. A lot of big-wigs were assembled there, cocktail parties being where a lot of issues are settled in D.C. One of the issues which the senators were discussing was the problems we were facing with the Wolf pack, the German submarines patrolling the Atlantic. What were we going to do about the German submarines patrolling the shipping lanes? It just so happened that Will Rogers was at this party, and he overheard

the conversation. He was generally known to have an answer for almost everything, so one of the senators leaned over to him and asked "Mr. Rogers, what would you do?" and he responded "Well, it's really very simple, all you need to do is drain the Atlantic, then the submarines will be stranded and you can fly over them and bomb them." Well, the senator scratched his head for a moment, and then asked "But Mr. Rogers, how do you propose to drain the Atlantic?" to which Rogers replied "I gave you the plan, it's up to you to work out the details." I think that pretty well summarizes where we are at this stage of the restoration process.



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## MARTIN MCALLISTER

The legal basis for restoration of cultural resources is provided by federal law. The Archeological Resource Protection Act (ARPA) of 1979 was created for this purpose. ARPA is the principal federal law which protects sites from unauthorized damage. The uniform regulations of 1984 established a basic approach for the repair of damaged sites, and it is this approach upon which I will focus.

First of all, the archeological and commercial value of the damaged sites must be assessed. There is a well established legal track record which we can follow as a model for developing procedures for sites damaged by oil spills and the clean-up associated with them. The examples which I have are hypothetical and simplistic, but they do serve as the basic outline for a general approach.

The first step should be to reconstruct the resource. To try to return the resource to its prior condition is desirable, but usually difficult, if not impossible. This is because of several factors:

- the prior condition of the resource may not be known;
- there may be too much damage to allow restoration; and
- the cost of restoration may just be too high.

The second step is stabilization of the resource. It goes hand in hand with the third step which involves ground contour reconstruction and surface stabilization. Both of steps one and two are measures to prevent further loss due to the event which caused the initial damage. It is obvious here, that surface materials can never be replaced exactly as they were.

The fourth step is the research that is necessary for the identification of the reconstruction or stabilization. If not done properly, this research can actually add to the damage already done. This step also serves to identify pre-damage conditions of the site, as nearly as possible.

The fifth step of the process is another form of stabilization and involves setting up physical barriers, such as fencing and signing.

The sixth step is the examination and analysis of the resource. It is possible that removal of the resources could be recommended at this stage, if stabilization cannot prevent the loss of the resources. For example, with extensive sub-surface oil saturation, the only option to prevent complete loss of the resources is removal.

The archaeological value of a resource is not directly applicable to the actual restoration. Archaeological value is appraised in terms of cost retrieval. The basic costs are:

- Preparation of the research design (formulating a scope of work);
- Field Work;
- Laboratory analysis; and
- Preparation of technical reports of findings.

The seventh step of the process involves the reinterment of human skeletal remains in accordance with tribal custom.

The eighth step involves preparing comprehensive reports of all the reconstruction, stabilization, recovery, and reinterment action. All of these steps need to be fully documented.

Those are the eight steps for restoration identified in the Archeological Resources Preservation Act of 1979.

In closing, I'd like to say that ARPA focuses on restoration and repair, archaeologic value, and commercial value. ARPA identifies commercial value as the "fair market value of the resource". Since there isn't an absolute scale or value, it would be more accurate to say that the value is the "average market value." This is relevant in that it is partially mitigatable by purchasing Alaskan collections of artifacts based on a credible appraisal of materials lost or damaged, or to be purchased.



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LEE HARDING

Environment Canada

Panel #1 - Coastal Habitat

I came here today to share my experience with a spill that occurred primarily along the west coast of Vancouver Island. We thought it was quite a bad spill when it first hit the coast. There was a lot of oil and it was widely distributed. The spill originated from a barge located off Grays Harbor, Washington, and dumped about 850 metric tonnes of Bunker C oil into the water. Approximately 50 to 100 metric tonnes were estimated to have landed along the Canadian shoreline. The spill occurred on December 23, 1988. It first hit Vancouver Island on December 31, 1988, and had reached some small islands just north of Vancouver Island by mid-January. Most of the oil had dissipated by that time.

Most of the oil landed along the outer, exposed headlands and islands, and did not go into the sheltered estuaries or the long, deep fjords to any appreciable extent. A few sheltered areas were impacted; however, most of the oil landed on the sharp rocky outer coast, which is exposed to heavy wave action. Approximately 350 locations were known to have been contaminated by oil along Vancouver Island.

The outer coast of Vancouver Island is an area of immense scenic beauty and contains a wealth of natural resources. The area contains important fish and shellfish resources, marine mammal haul out and feeding areas, migration routes, and shorebird feeding and nesting sites. Two units of the Pacific Rim National Park, several Ecological Reserves, important native harvest areas, and many salmon and shellfish mariculture operations are also located along the west coast.

The environments impacted by the Nestucca spill (the Nestucca was the barge which created the spill) are quite similar to environments you have here; however, they are probably more exposed than many areas of Prince William Sound.

The oil had come a long way (several hundred kilometers) before landing on the island. The spill occurred during cold winter conditions and the oil tended to congeal and landed in cohesive mats. These mats or blobs of oil could be physically picked up, moved off site, and the beach would be virtually clean. When the oil landed on the rocks, it could be simply peeled off, and the rocks would be clean. If the mats were too large to move, we could break them up with an ax, and remove the pieces. After physically removing the oil, there would be no visible trace of oil on the surface except a wee bit of sheen.

That was the situation when the oil first hit the shore. If we missed the tide it came in on, the surf would mash the oil around and mix it with debris. However, we could still physically remove the oil\debris mats, and have a pretty clean beach. Approximately 450 metric tonnes of oil and debris were removed from the beaches, of that, about 10 percent was oil.



Approximately 180 kilometers of Canadian shoreline had some degree of contamination from this spill. However, only about 2 kilometers were heavily oiled in the aggregate. The mats usually stranded in the high intertidal zone. Most of the oil landed as patches between several centimeters and two meters in diameter. There were not any areas noted with thick, continuous oil cover. Very little contamination occurred in the lower or middle intertidal areas. However, it was inferred that some oil was deposited subtidally. In subtidal areas, the oil appeared to be deposited in the form of specks and droplets. I say that the subtidal depositions were inferred because we found crabs (which inhabit depths to 50 meters) with oil on their carapace. In fact, the crab fishery was closed because the contaminated crabs were not marketable. In some area, 100 percent of the crabs were oiled. By March, this number was reduced to between 4 to 16 percent.

As time progressed, we would see much smaller patches of oil and oil\debris hitting the shoreline. We continued to see this for about 1½ months following the spill. Most of these smaller patches could also be visually removed. However, just because the surface was clean did not mean that there was not some oil below the surface. We conducted some quantitative sediment sampling about every two months following the spill between January and September. It was evident that tidal pumping had drawn oil subsurface in some areas.

The clean-up policy was to be as thorough in removing the oil as possible, and clean the beaches quickly. In addition to physical removal of oil patches, other methods were also used in some locations. Logs contaminated with oil were usually bucked up and burnt. Petromesh was used to capture oil at some locations. At one site, some rocks and gravels were burnt in a reciprocating kiln to remove the oil, but this method had only limited success.

Most of the initial clean-up operation was completed by the end of January; however, some sites required subsequent clean-up of smaller deposits in March and April. By June, there was no oil showing up in our quantitative samples. In September, we found only three areas at which physical deposits of oil were evident. These deposits were small, approximately ½ meter diameter patches of oil\debris.

In summary, there was some impact on intertidal plants and animals from the spill. Both lethal and sublethal effects were noted. By June, the biological cycles were getting going, but there was virtually no oil left in the environment, and it was expected that any impacts occurring at that time would be trivial or insignificant at the population or community level in a regional ecological context.

The restoration of the shoreline and other intertidal habitats was limited to physical removal of oil. Once that was accomplished, we felt that the environment was restored to its original condition for all intents and purposes. Mind you there were some exceptions.

Factors that reduced the impact of this particular spill included the time of year it occurred, the distance the oil traveled before landing on the Canadian shoreline, the rapid clean-up program, and the exposure of contaminated areas to strong wave and tidal action. Because the spill occurred in the winter, air and water temperatures were cold; the oil tended to congeal and could be easily picked up. Plant and animal populations were low in the winter and metabolic rates are at there lowest. Most species were not in the breeding phase of their life cycle. Seabirds and other migratory animals were on their wintering



grounds, and not exposed to the immediate impacts of the spill. However, I do not want to minimize the impact overall resulting from the spill. Depending on which estimate you use, between 20,000 to 50,000 birds were killed. Coastal plant and animals were also impacted, particularly in the more heavily oiled areas.

The clean-up effort was rapid and thorough, and most of the oil was removed from the coast. The exposed location of the contamination on the coast obviously limited the impact where natural self-cleaning was at a maximum because of wave action. The organisms in these locations are also very hearty and adapted to extreme environments.

If anyone is interested learning more about this spill, they can write the Canadian government, Department of the Environment, in West Vancouver, British Columbia, and request the Regional Program Report 89-01, The Nestucca Oil Spill: Fate and Effects to May 31, 1989.

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**PAUL GLEESON, PH.D., NATIONAL PARK SERVICE**

The Gulf of Alaska is one of the richest natural habitats for coastal life. At one time, it was home to what was probably one of the largest Eskimo populations in the world. Estimates of this coastal population range from fifteen to twenty thousand people. These people were hunters, fishermen, and gatherers of intertidal resources. This is their cultural heritage.

Over ten thousand cultural and archeological sites exist in this area. Most of them are little known for a variety of reasons. There is very little access to most of the sites, and no money has been allotted to study the sites. No documentation exists for these sites, many of which are hundreds, and sometimes thousands of years old.

These sites are vulnerable to glaciation, to changes in the sea level, to earthquakes, and now to damage caused by oil spills. It came as a surprise to most people how exploited this area was as a result of the oil spill, from Prince William Sound, down through the Kodiak area. Many artifacts on beaches are now oiled, and altered as a result. This may alter the record of these non-renewable resources. The possible impacts are several:

- We currently date many artifacts through radiocarbon -- with the chemical balance of the artifacts altered as a result of the spill, accurate carbon dating may no longer be possible;
- The physical covering of the oil has altered, and possibly hidden "trails" or surface indications which may have been helpful to archeological studies;
- The chemical alteration of the artifacts affects how we understand them;
- The change in vegetative patterns could lead to accelerated erosion, further exposing artifacts; and
- The clean-up itself disturbs the sites, and also exposes the sites to looting.

Many of these sites have been protected, but only by rudimentary surveys and documentation. "Combat archeology" if you will. No comprehensive plan for cultural resources exists. In the context of the clean-up itself, there really hasn't been a plan of operation. We have been playing catch-up with clean-up operations, just trying to protect the resources, let alone document them properly.

To date, the cultural resources have suffered unknown injuries. Thorough documentation of area sites is set to begin in the summer of 1990. Our plan is to treat the spill as a large undertaking. We will try to inventory as many sites as possible in the path of the oil. We will also try to establish a fund for future archeological work to work with continued samples.

This is a new area of interest for CERCLA and the Clean Water Act. With respect to protecting cultural resources, their purpose is to develop approaches to restoration which are both appropriate and reasonable. Restoration must rely on a credible injury assessment, without which it is impossible to determine the extent of the damage, or the nature of the



injury. Our first step then, will be to gather this solid knowledge, upon which we can base our restoration plan.

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## CLIFFORD EAMES

Unlike many people here, I'm not an expert on oil spills. I haven't worked closely on spills, rather my interest lies in land use management, specifically in Prince William Sound. I would like to concentrate on some of the ways by which we can protect our natural resources which are similar or related to the injured resources.

In general, land use designations in Prince William Sound are almost entirely multiple use designations. Most of the land affected by the spill was coastal land. Had these lands been designated State Park and State Park Wilderness, National Park and Wildlife Refuge, they might have had better protection. We need to strengthen these designations. Strengthening land use regulations is not just a restoring tool -- it provides strong preservation for the resources and should have been granted long ago. The coastal resources of Prince William Sound are equally deserving of protection as that granted to the Kinai Park fjords, the Kodiak National Wildlife Refuge and the Kachemak Bay State Wilderness area. In southeast Alaska we have Admiralty Island and Misty Fjords National Parks, Glacier Bay and wilderness overlays, and the Tongass National Forest and Wilderness.

Taking advantage of the exceptional state and national awareness of the natural resources damaged because of the oil spill is not a cynical maneuver -- it is a rectification of a serious oversight. Multiple use management is not adequate to protect uses within the Sound. That all allowed uses are potentially or actually compatible is sheer fiction. For example, we all know that coal mining is not compatible with wildlife refuges, tourism or recreational uses. We need to decide whether we're willing to sacrifice a certain portion of our lands to incompatible use activities. We often end up making an economic or a political choice, without thinking of the wildlife or recreation management decision. The end result is that we are left with de facto zones separating incompatible activities -- almost always established on multiple use lands. Zoning is deferred until later in the planning stage, or worse, the proposal of an incompatible activity requires an ad hoc decision because no effective zoning is in place.

Multiple use management is incapable of protecting the exceptional fish and wildlife, scenic, recreation and tourist uses of Prince William Sound from uses that are encroaching. There are a number of uses for appropriate lands within the Sound, such as designation as a state or federal wilderness, a park, national monument, or refuge. Whatever the designation, it must still allow people to live and recreate in the Sound. We shouldn't reject wilderness designations in the Sound as being incompatible with use by people. Especially in southeast Alaska, many people support additional wilderness designations as a way to protect their personal means of making a living and maintaining quality of life in the area.

Another way to protect the area through land management is by seeking economic alternatives which are less environmentally destructive and more sustainable than traditional modes. We can reduce our demands on natural resources by redefining success to include other satisfactions and values besides the accumulation of the greatest amount of money and the greatest amount of material goods.

We can make quality of life an important factor in all of our land use decisions. Which in many cases means that we will decide not to undertake major activities which would have a substantial adverse impact on the natural environment. We need to recognize



that quality of life brings people to and keeps people in the state. People will sacrifice higher salary and wages for a higher quality of life. People will save money not having to travel as far to recreate in lands, if they are living in recreational areas.

We need to search and identify alternative sustainable and appropriately scaled means of economic development - including fully recognizing that subsistence is an economy. There should be less reliance on world class or gross economic product, and more focus on high quality sustainable jobs that require less capital, have less of an impact on the environment, and allow those who want to live and remain in rural communities to do so. Some of this is happening already, notably work done by Elston Lawson with the Department of Community and Regional Affairs. But in general, the percentage of state or university economic development budget devoted to this type of work is minuscule. We need to redirect these funds.

In terms of state owned lands, the amount of state owned uplands is relatively small, even though many upland areas are in choice locations. The amount of state owned tidelands on the other hand, is extensive. Their use is critical to many resource development activities - both economic and non-economic uses. The state will have a major role in determining the future of Prince William Sound.

The existing management scheme is not adequate. Good work has been done, but the plan doesn't guarantee environmentally sound management. Plans are changeable, -- they must be -- but they rarely, especially at the state level, are changed to provide more resource protection. Proposed changes to authorize economic development projects will rarely not be adopted when the option arises, even over the objection of popular opinion.

Most plans, including the Prince William Sound Plan, rely heavily on guidelines and therefore postpone many decisions, including some of the most important ones. The end result is that we are left without the benefit of predictability, which is the major benefit of planning. Plans seem to work well for many minor decisions, but where they could really have substantial impact on greater decisions they are likely to be much less useful. Only legislative designations can more permanently protect natural resources from short term temptations and pressures and provide the necessary predictability.

House Bill 320 would establish the Alaska Coastal Biological Recovery Area. The benefits of such a designation would apply to most oil affected areas, not just Prince William Sound. It would also give the Alaska Department of Fish and Game a major role in decisions affecting lands and waters. Unfortunately, it appears to be stalled in the house, but it still provides hope.

The State Wilderness Act would benefit statewide lands which need protection, including State Marine Parks which are now threatened because of their inclusion into a State Park system whose mission has become fuzzy and a magnet for commercial resort projects. Such projects should be private, built on private lands, many of which are available on the coast.

The state should be a good neighbor to adjacent federal land managers. For example, the proposals for the collection of glacier ice could be relatively benign depending on their location, timing and magnitude, but is it really necessary for glaciers to be used as

a source of exotic ice for trendy summer tourist cocktail drinkers? I obviously don't think so.

Beyond Prince William Sound, we need to complete the proposed agreement between the state and the Seldovia Native Association. Putting Katchimak Bay State Park back together again would benefit the Seldovia Native Association and demonstrate that resource protection is important enough for Alaskans that we're willing to devote state monies to it.

Finally, we need to support substantial efforts to explore the possibility of purchasing lands from willing sellers. I stress that this must be done carefully because of the possible ramifications which Steve Colt and Edgar Blatchford discussed, but it remains a viable option and should be looked into.



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STEVE COLT, SPEAKING FOR LEE GORSUCH, (ISER)

I would like to make several points here, and try, as much as possible, to avoid saying what's already been said.

First of all, everyone's been talking about how we're going to spend all of this restoration money, and I think it's very important that we keep in mind that after all, this is our money -- not Exxon's. It is we, the taxpayers, who are footing the bill here, because for Exxon, the cost is deductible. What this means is that we're looking at a social question. Because we choose to consume oil, we're paying the price for the consequences.

The question of acquisition of equivalent lands has been fully discussed previously, and I won't reiterate it here, except to say that we need to be restoring opportunity, i.e. for the users, the sub-users, the tourism and recreation industries dependent upon the Sound for their livelihood.

We've also discussed physic restoration, what an economist would call "damaged existence value." That is, the need to feel grief and loss -- this addresses the human need. There are several aspects of this which I would like to address.

First of all, we need to talk about keeping the restoration within Alaska itself. We've discussed purchasing lands outside of Alaska for migratory species -- this is going too far. Let's stay within the state, keep it simple. It is the psychic image of Alaska which we must restore first.

We've also talked about changing the statewide energy policy, putting more money and attention into these programs. This too, is too far away from the oil spill. Such bureaucratic revisions should not come from restoration monies.

Let's also not have restoration monies shoulder the burden of overuse of timber rights, or a new recycling plant. These are important issues, to be sure, but we need to stay away from more rules and regulations in the immediate future.

We also need to be wary of using subsidies as a means of restoration -- it is too easy to become dependent on such subsidies, and it would dilute the restoration effort as a whole.

Lastly, we cannot forget the complex ramifications of simple ideas like buying timber rights when those rights are part of a much larger economic and social system. To tamper with something like this could remove an entire web of economic opportunity in the area, and that is something that we need to be very cautious and wary of.

On the positive side, we need to start by using the funds to get more limited entry permits into the hands of local residents. We could even establish a permit buy-out program of some sort. Also, we should consider a rough cut allocation of funds. This is something Mr. Gorsuch and I discussed when preparing for this conference. The breakdown could be something like this: one third of the funds should go towards direct mitigation and restoration of species and resources; one third of the funds to the restoration of opportunities (e.g., habitat, riparian uplands, economic opportunities); and one third of the

funds should go into an environmental trust fund to be held as a hedge against uncertainty as to where conservation/preservation should occur, but this allocation should be limited to the state of Alaska.



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ROGER CLARK, PH.D.

We are now at the decision making point in the restoration process. There are no easy solutions, and the solutions of themselves sometimes carry risks, and other complications. When I think of the oil spill, the first image that leaps to mind is that of the oiled loon lying dead on the beach. I can see beyond this, I can look objectively at the situation, but it's very difficult.

One of the key issues which we need to address is our notion of expectations, because it is these expectations which will determine whether or not we succeed. Our expectations determine our ability for overall restoration.

It is imperative in the planning process that we keep the roles of the public, the experts, and the bureaucrats in mind. And I don't use the term "bureaucrats" in a pejorative sense, because they are the keepers of the process, and the agents of the public. I am not going to give you any answers here, but I should provide you with a lot of questions.

First of all, we need to keep personal biases in mind. My background in the Forest Service is in integration. I have a multi-disciplinary degree, and this is what I've been studying and lecturing on for the last 20 years. I have focused primarily on recreation issues, but have a holistic approach to natural resources and how they should be used and valued. So now you know my bias.

For me, the issue of why I was going to be here today really crystallized when I was speaking to a colleague recently, and he expressed his concern that he wasn't sure what good the symposium would do, because it would be "so political." Well, he's right. When the ship broke apart on the reef, it really did become a political issue. So how do technological questions fit in with the political aspect? How do they fit in with the judgments we make on trying to resolve the event? I think it's key to understand that the spill was a political issue; it is equally a technical and social issue. We need to bear that in mind, and not let it cloud our responsibility for who we are, and where we're coming from.

This is a problem of communication. Yesterday was a classic example. We had all kinds of problems with definition. Everyone defined the spill in his or her own terms. There was literally no common definition or language. This is the basic responsibility of the planning team. The issues need to be presented in such a way that the public can easily understand. We need to ask all the questions and demand all the answers. We need to focus on points of agreement, not just disagreement. Let's look at the consensus, listen to everyone, but remember to trust no one. No one can understand the whole picture, and we can't rely on anyone to have our special interest in mind, or represent it accurately. So again, if we have clear expectations, they will be the key to both the planning process and restoration.

Another pet peeve I have is all the constant in-fighting between agencies, state, federal and regional. There's a game being played here, a game on the cultural, political, and social value level. A game of natural resource management. This in-fighting is counter-productive. It gets in the way of finding solutions to the problem, and it has to stop. It's very difficult to break out of this. We can't hold individuals responsible because in and of themselves they have no control of the situation -- they are just a part of a broken process.



So listen to people's point of view. It will depend on their background, and all backgrounds are relevant, and important, and useful.

There are several conditions which are necessary for implementing an effective restoration process. We need a clear and comprehensive definition of what the process is, and what it is not; a definition of goals to be achieved. We need this in images and pictures -- something people can understand. This too is very difficult, but it is also key, because our desired future must be visualized. We have to be able to describe in clear terms and images both existing conditions, and our vision for the future. We must have clearly stated assumptions. We must have unambiguous multiple value objectives, and a joint approach which takes the whole picture into account. To do this we need collaboration in defining these future conditions. This collaboration needs to extend from defining, to achieving and executing the whole picture. We must have aggressive monitoring and evaluation from today on. The planning process has to be in a position to incorporate new information, to be responsive to this information, and not get locked into the "process". Research must shed its myopia and begin to focus on broad interdisciplinary questions -- we must form a dialogue. We need demonstrations to test what works, and what doesn't, and we have to learn from this. The process must be open, visible, and traceable. Our approaches must be integrative and deal with primary objectives. Analysis must go beyond the economy and deal with social and cultural values. In terms of on-site action, we must maintain a sensitivity to all values and how one action affects another.

In terms of public participation, we have seen in the Forest Service, that commenting by the public is not sufficient. It is necessary, but there must be more to it. We need to seek a cross-section of values -- both from locally affected communities, and from the state and national level -- to be addressed by the planners. They are the keepers of the process, and are not making their own value judgments.

I have a book here by Julia Wandaleck, which I would recommend to all of you. It is entitled Public Lands - Conflict and Resolution. Let me read you a paragraph of it. "Planning arguably poses a critical and incredible complex problem to which there are no technically correct solutions. At no point does the planning process acknowledge that the problems to be addressed are mutual problems shared by the Forest Service and all groups with a stake in management. As a result, at no point does the process provide for mutual efforts toward developing solutions for these problems. Whereas the agency outwardly tries to build trust, cooperation and faith, the process used undermines their hopes by eroding all three. Whereas the planners promise the opportunities to reach consensus, the process provide no forum. Whereas individuals and groups involved keep raising what they feel are the underlying issues to be grappled with in developing the plans, the process encourages them to adopt positions, and pursue adversarial avenues in hopes of indirectly satisfying their concerns." The point of her book is that the process creates adversarial relationships, and I'll just go over her closing points: "The process' demise is rooted in the overriding attention given to the final planning document rather than the process of planning. The document is the means to get it done, the process is the key to the whole credibility of what we do in the future. The reforms to the process must build on five objectives:

- to build trust;
- to encourage broad understanding;
- to incorporate value differences;



- to provide opportunities for joint fact finding; and
- to encourage collaboration and cooperation.

The planning process is not, in and of itself, malicious. It has simply gotten lost within its own system.

In order to improve this process, we have to supply the public with good information. Which begs the question "from where does the public get its information?" -- from the press. If any of you read the article in the paper today which summarized yesterday's symposium, you know that anyone who read that article would fail a test which we might have prepared based on our understanding of what the speakers were saying yesterday. The article focused on "secrecy masking oil spill studies." I don't think any of us here would have summarized it that way -- it's incomplete information. We need to provide the public information based on which they can make good decisions and judgments. But is this solely the responsibility of the media? The opportunity exists for the agencies to participate in public education. This is something the planning team needs to look into.

We need to focus on integration, on systems approaches. We have heard talk of "holistic" approaches, but most of the speakers who discussed this were talking about the "holistic" natural environment, i.e., not just focusing efforts on one high profile species, but taking the whole natural system into account. That's true, but there's more to it. We need to deal with the full range, including social, cultural, economic, political and legal concerns. We cannot deal with these issues one at a time. Although we are tempted to break them out in an effort to simplify and understand them, it is wrong to do so. Some values may take precedence, but we can only see that within the context of the whole picture. We should try to stay away from convenient boundaries, such as trying to determine where the "uplands" begin -- where do they end? Such thinking misses the point. We absolutely need to be clear in the definitions we use.

So far, the speakers here at the symposium have only begun to touch on all these issues. It will be the job of the planning team to pull of these ideas together. There are lots of experts here, all representing their one small part of reality. We need each and every one of these experts. We must listen to, and hear their concerns. We have no good model to tie together all of these concerns, and yet, a model to tie together these concerns will be fundamental in any success in restoring the complex values lost not only within the confines of the Sound, but in the state, regional and national values. People must be considered as a part of the ecosystem, not apart from the ecosystem. Any attempt to deal with the biological and physical resources in the absence of trying to understand the values used by the people will fail.

There are no absolutes. It is a judgmental problem. There is a role for the experts, a role for the bureaucrats, and a role for the public. The public must speak for the collective and individual values it holds for how the landscape should be restored and recovered. Rational scientific decision making will not work -- it has failed in forestry and in minimizing development impacts because we haven't recognized the sociopolitical reality which supercedes it all. It is the job of the planning team to facilitate the process; to make sure that these values are captured and put into the planning process. And I stress again the need for integrative approaches throughout, with partnership between experts, planners, and communities.

In closing, I'd like to recommend one more book for the planning team. Get yourselves a copy of Murphy's Laws, because it's the only guarantee you'll get in the planning process.



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## EDGAR BLATCHFORD

The Chugach Alaska Corporation is a native profit corporation organized in 1971, as one of 13 profit corporations created by Congress. These corporations were created in fulfillment of land settlements. Chugach is the 11th largest of these corporations with approximately 2000 people (3000 with shareholders).

These corporations were formed by Congress to bring natives into the mainstream, and to reap some of the benefits of western civilization. This area is the historic melting pot of many different peoples, the Eskimo, the Aleuts, and the Indians.

From 1971 to 1983, the region was under federal designation. Chugach spent money trying to receive land. We were near the brink of bankruptcy several times, and had spent nearly all of our entitlement. Much of this was spent working or fighting environmental organizations and federal agencies. Finally, some friends of natives in Washington D.C. lobbied the federal government to negotiate a land settlement.

When the oil spilled in the Sound, Chugach was on the scene quickly. We were shocked and disappointed that we had not been informed of the spill immediately after it happened. As you know, the spill occurred on Bly reef, just off Bly Island, which is owned by our shareholders, and maintained for subsistence purposes only.

There are 378,000 acres of land in the Prince William Sound, 600,000 acres including the villages, which Chugach owns. Most of our people come from fishing backgrounds, which for a long time was the only economy in the area.

Immediately after the spill, the Chugach board met in special session because we were worried about the rediscovery of the region, of Chugach Alaska, and the Chugach people. We were worried about what all of the attention from the media and the environmental community would mean for the Chugach people. Especially because our cultural sites had for the most part been considered secret. This is a very remote area, and there's not much access. Most of the sites are known only to the elders, or the village peoples. Now these sites have been exposed to the threat of vandalism. The Chugach people just don't have the financial resources to monitor the clean-up activity.

Yet Chugach has a moral and social obligation to the shareholders and their descendants to protect their cultural heritage. So we are really caught between a rock and a hard place. Our long range business plans had already been implemented when the spill occurred. We were asked to take the lead on clean-up, and we did so, although we did not have the financial resources to cover all this work. We did the best we could, although it wasn't up to the best standards of what the Chugach board would have wanted. I think we did a good job.

But now we are worried, because a lot of our cultural and historical burial sites, long considered confidential, have become exposed to the media, and the environmental and academic communities. They could now become public, and the remains could be removed and sent to Universities around the country for study and exhibit.

Chugach Alaska has a cultural resource officer whose major objective is to preserve our cultural heritage, and to promote the heritage of the region. We also have the Chugach Heritage Foundation which also serves to promote this purpose. We have to live with the international attention that was focused on Prince William Sound as a result of the spill. We will work with the academic community regarding the study of our heritage. We intend to play a major role in that.

We have established the North Pacific Rim and the Heritage Foundation, and expect these foundations and Chugach to play a major role in the treatment of cultural heritage sites. The Chugach board has developed a comprehensive plan to protect cultural and historical sites. The plan is still under review by the board, and so is not yet available to the public, but it will be soon.

It must be remembered, as we look into the 21st century, that Chugach Alaska is a small corporation, organized for profit, but with a moral and social responsibility to its shareholders and their descendants, to protect its cultural history. We, the Chugach people, have seen much change over the past 300 years. We have seen the sea otter hunters come and go. We have seen the copper miners come and go. We have seen the gold miners come and go. We have seen the whalers come and go. And now we have seen the oil spill workers come and go. But the Chugach people will remain. So we ask you to work with us.

When we consider Chugach, realize that there are a lot of pressures, pressures of government, of state, of shareholders, and village councils. We look forward to working with people in the academic community and the environmental community. But we ask that you remember that we are going to be here.