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Cultural Resources and the *Exxon Valdez* Oil Spill: An Overview

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Abstract.—During 3 years of survey and monitoring after the 1989 *Exxon Valdez* oil spill, the number of known archaeological sites in the spill area along Prince William Sound and the Kenai Peninsula was more than doubled, reaching 609. Damage assessments revealed no contamination of the sites by oil, but considerable damage resulted from vandalism associated with cleanup activities and lesser amounts were caused by the cleanup process itself. Although the Exxon Corp. quickly addressed threats to cultural sites, timely field assessments were hindered by a shortage of funds for archaeological surveys and studies. Lessons learned from this Alaska experience can lead to better protection of cultural heritages elsewhere when future environmental emergencies occur.

The state of knowledge about human history in the northern Gulf of Alaska at the time of the *Exxon Valdez* oil spill was fragmentary at best. Except for excavations at a single site, no substantive archaeological work had been done in Prince William Sound since the 1930s. No serious large-scale inventory or testing had ever been conducted on the outer coast of the Kenai Peninsula. Kodiak Island and the Alaska Peninsula were the only known areas and data came from a small number of sites. Before the *Exxon Valdez* oil spill 283 sites were recorded in the tightly defined spill area on the inventory maintained by the state of Alaska Office of History and Archaeology. In the face of impending danger to sites, resource managers in the spill area were forced into the awkward position of protecting known archaeological sites while at the same time scrambling to locate undocumented sites. After three seasons of inventory and cleanup support activities, 326 new sites have been documented to raise the total of known sites in the spill area to 609.

Archaeologists were alarmed about potential damage to sites in the spill area because many sites had subsided into the intertidal zone during the 1964 earthquake. Those sites would be located in the path of the spreading oil slick. The primary concern was the effect of crude oil and cleanup procedures on the known sites; coupled with that was the concern that undocumented sites could unknowingly be destroyed during cleanup. The unsurveyed status of the area made the problem particularly disturbing.

The charge of protecting cultural resources during the spill and subsequent cleanup came from several authorities. Federal mandates included the Archaeological Resources Protection Act of 1979 (ARPA) and the National Historic Preservation Act of 1966 (NHPA). The Archaeological Resources Protection Act directs land-managing federal agencies to protect cultural sites on land that they manage. The National Historic Preservation Act directs federal agencies "undertaking actions," such as coordinating the spill cleanup, to consider the effects of their actions on cultural resources in consultation with the state historic preservation officer (SHPO). The U.S. Coast Guard (USCG) was the designated lead federal agency under the Section 106 project review process; the U.S. Forest Service, the primary federal land manager in Prince William Sound, advised the USCG on cultural resource matters. The Alaska Historic Preservation Act protects sites on state land, including the intertidal zone. The tidelands permit issued by the Department of Natural Resources directed state cultural resource consultation to the SHPO, who also serves as the chief of the state's history and archaeology programs. Thus, the cultural resource concerns of the state and federal agencies were combined into a single, coordinated program.

Close coordination between the Alaska SHPO, the USCG's federal on-scene coordinator, native representatives, federal representatives, and the Exxon Cultural Resource Program staff protected cultural resources during cleanup. Soon after the cleanup effort began, Exxon Corp. was informed of and recognized cultural resources as an important concern and included trained archaeologists in their beach assessment teams. A means for considering impacts on cultural resources was implemented early in Exxon Corp.'s response process (Mobley et al. 1990). During 1989 in Valdez, coordination occurred during cleanup planning between Exxon Corp. and a representative of the SHPO who reviewed Exxon Corp. archaeologists' reports for ad-

equacy, evaluated proposed cleanup methods for each beach segment for possible impacts to sites, and, when appropriate, recommended alternative, less disruptive cleanup methods to avoid or reduce damage to known sites. To assure the federal on-scene coordinator that the work-plan review process was in compliance with the NHPA, each work order included a cultural resource comment section signed by an SHPO representative. The operating assumption was that beach segment cleanup was paramount and that protective efforts emphasized avoiding or minimizing damage to sites.

During Interagency Shoreline Cleanup Committee (ISCC) meetings in Valdez, federal, state, and native representatives reviewed and discussed actions, such as the status of shoreline cleanup assessment team (SCAT) surveys, cleanup methods, resource protection, and monitoring. Agency and native participants provided comments to committee representatives of the federal on-scene coordinator. As the cleanup operations spread to the outer Kenai Peninsula coast and the Alaska Peninsula, similar processes were followed at operation centers in Seward, Homer, and Kodiak but with slight differences and varied success. Logistics problems, lack of adequate staffing, and poor or incomplete information regarding field operations and cleanup plans hindered satisfactory coverage of field operations. In Kodiak, for example, work orders for many segments were prepared and reviewed after cleanup had taken place. Agency and native corporation archaeologists monitored cleanup activities on a sporadic basis, but not all culturally sensitive areas were covered.

In 1990 and 1991 the cleanup review process changed to involve a more active consultative role for federal archaeologists and native representatives. Also, Exxon cultural resource personnel became involved earlier in the summer cleanup planning process. Because there was no longer an emergency, there was more time to conduct surveys and review work orders in advance of field operations. Each successive cleanup season's review procedures benefited from the prior years' experience and the cumulative data collected (Betts et al. 1991; Haggerty et al. 1991). Monitoring by agency and native archaeologists also became more consistent during the second through fourth years of cleanup.

Determining injury and assessing damage to cultural resources as a result of the *Exxon Valdez* oil spill has been difficult. Unlike the clear legal authorities that protect cultural resources during oil spill response activities, the laws and regulations directing studies to determine injury and assess damage do not address cultural resources as clearly. Arguments and delays characterized exchanges between attorneys and resource managers on this issue. No cultural resource damage assessment studies were funded by the Trustees the first year of the spill, although at least one agency, the National Park Service, conducted prespill resource survey assessments in the outer Kenai Peninsula coast and the Alaska Peninsula before the oil moved into those areas.

Agency concerns about the effect of crude oil contamination on the radiocarbon dating process prompted a laboratory study initiated during 1990. The contract was funded by the state of Alaska and administered by the U.S. Forest Service's Alaska Region. Radiocarbon dating involves measuring the amount of disintegration by radioactive carbon to its nonradioactive isotopes. The dating method provides the most widely used, reliable means of estimating age. However, uncontrolled addition of carbon, such as from crude oil, to samples can seriously skew the age estimates and make the method unusable. The contractor for the radiocarbon study concluded that significant effect would occur, but that sample cleaning partially reduced the error (Mifflin and Associates 1991). One consequence of that finding was that the additional sample-cleaning steps are likely to increase costs of research on spill area sites. Testing the conclusion about radiocarbon dating on specific sites was the next step of injury assessment. Unfortunately, the radiocarbon study was not funded until 18 months after the spill, and follow-up field studies were delayed yet another year, although damage assessment study funds were requested during 1989 by the panel of archaeologists advising the Trustees' staff.

With funds provided by the state and the U.S. Forest Service, the contractor—State University of New York (SUNY) at Binghamton—began fieldwork near the end of the 1991 field season. The initial scope of the 1991 project was reduced when Trustee representatives decreased available funding. The project was aimed at testing a series of sites for injury, surveying to check the adequacy of the Exxon archaeological surveys, checking several soil chemicals for alteration by oiling, and testing a model developed to predict site locations. Testing radiocarbon dates was a basic part of the project.

The SUNY investigators found that the major direct impact of the *Exxon Valdez* spill on archaeological sites was confined to waterborne oil washing over intertidal archaeological deposits (RFSUNY 1993). This conclusion is partially at variance with Jesperson and Griffin's (1992) findings, which

traced impacts to site disturbance by vandals. The SUNY team also concluded that presence of oil residue in site sediments resulted in the need for increased radiocarbon processing and thus higher research cost in the spill area. Human damage (vandalism) to sites investigated by the team could not conclusively be attributed to the oil spill or to related cleanup activities; this problem also was found in some instances during Jesperson and Griffin's (1992) study. Finally, the SUNY investigators concluded that sites in the spill area still retain good research potential and should be studied.

Delays and uncertainty in awarding the damage assessment contract during 1990 and 1991 prompted the state to begin a much smaller and more tightly focused study in May 1991 to assure that some damage assessment data were collected (Reger et al. 1992). The state study followed up on the conclusions of the earlier radiocarbon study by checking selected intertidal sites. Agency files were screened to select beach segments with sites that suffered oiling and had the best possibility of producing artifacts for comparison with existing dated collections. Alternative methods of dating archaeological remains were contrasted with radiocarbon estimates to check for injuries from oil contamination. The study was designed to complement the larger multiagency study, and Reger et al. (1992) concluded that no injury from oiling could be detected, particularly with regard to radiocarbon dating of the sites studied.

Another approach to assessing injuries to archaeological sites by spill-related activities was a compilation of information in agency and Exxon Corp. documentation. Field notes from various parties, monitoring reports, and shoreline cleanup assessment team reports were examined to determine kinds and degrees of impacts. This method of investigation was used partly because of the need for a more timely idea of impacts and partly to assess the adequacy of the documentation process. Although results of the document study provided only a rough idea of injuries, it was very useful in estimating injuries resulting from cleanup and attendant vandalism. Seventy-one percent of the 35 archaeological sites analyzed were injured because of oil spill response activities (such as cleanup, staging areas, and pedestrian traffic) and from vandalism (Jesperson and Griffin 1992). Valuable insights were gained into the types and detail of documentation needed from site identification surveys and monitoring. It is necessary for documentation of oiling on beaches associated with sites to specify the location of oil relative to the site so that cleanup activities and damage assessment studies can be more precisely designed. Also, subsurface testing of sites is necessary to determine whether and what protection is needed with beach-disturbing cleanup activities. For instance, if the exact distance of oiled debris from the limits of a site is known, specific constraints might be formulated that could easily be followed by the cleanup crew, which would be more effective than leaving decisions, at the time of cleanup, to an archaeological monitor with no real authority. The documents study provided most of the data used for assessing damage. Although hampered by documentation that was uneven in coverage and detail, the study allowed a rough estimate of damage to be made in time to be included in the oil spill restoration process, which started before the field studies were begun.

Assessment of monetary values for restitution followed the documents study. Findings of the state- and multiagency funded studies also provided data useful in determining levels of damage. A method of assessing damage based on procedures of the Archaeological Protection Act was used to provide a monetary estimate. The method of producing a valuation assessment based on an analysis of injury and determining the restoration required has been repeatedly used in other cases in the United States and provided very conservative cost estimates. The most clearly injured sites were assessed for damages, whereas the less adequately documented sites were deleted from the process. The 35 sites considered had sustained damage from vandalism or cleanup-related activities rather than from oiling.

Several useful observations about archaeology and the oil spill are possible based on damage assessment studies. The most important conclusion was that the sites generally were not directly affected by the spill. The most extensive damage resulted from vandalism, resulting from increased, widespread knowledge about sites. That knowledge increased because of expanded population and activity levels during cleanup. Another source of impact was directly from cleanup activities. Impact from cleanup was kept low because of the cleanup work-plan review process and the use of alternative cleanup techniques, but impacts did occur. Although the Exxon cultural resource program and agency cooperation was generally effective in keeping impacts small, lapses in control of cleanup procedures did happen. Most lapses occurred because of failure to communicate restrictions, such as at the Perevalnie Passage site, in which cleanup crews shoveled the oiled intertidal site, including artifacts, into bags for disposal. Occasional problems with

control over local workers by Exxon Corp. or USCG also led to concern about unsupervised access to sites and unintentional damage to the remains.

Some aspects of the cultural resource program did not work well and must be improved. Lack of field assessment studies for the first 2 years after the spill squandered opportunities for collection of important injury data. Information collected by archaeologists and other monitors early in the cleanup phase could have included the data needed to protect the resource and answered important questions about potential injury. Also learned from the experience of the *Exxon Valdez* oil spill is the need for basic inventories of archaeological and historic sites, response plans tailored to protecting the cultural resources present, improved monitoring, and damage assessment studies begun in the first year. Inventory and planning are long-term projects that are typically difficult to fund. Improved monitoring requires analysis of existing studies and listing the information required during future emergencies. Consistent application of protective policies and procedures over the area of the spill needs to be addressed. Laws and regulations governing spill response, damage assessment, and restoration need to be revised to more clearly address cultural resources.

One positive aspect of the *Exxon Valdez* oil spill cleanup program is the demonstrated efficiency in preventing increased injury through active cooperation of the parties concerned with cultural resources. Even though serious questions existed regarding administrative authority over certain lands impacted by the spill and cleanup program, by adopting a reasonable and cooperative attitude toward each other, unnecessary delays and additional work were largely avoided. Selection of several acceptable cleanup methods in given situations allowed cleanup crews to complete their tasks more rapidly and minimize harm to sites. The cultural resource awareness training that was provided to cleanup workers and monitoring personnel also contributed to the understanding of agency concerns and made seemingly useless constraints understandable.

Finally, one of the important reasons the cultural resource program was successful was the early recognition by Exxon Corp. and the federal on-scene coordinator of their responsibilities and Exxon's recruitment of well qualified and committed archaeologists. Most archaeologists hired for survey or monitoring were selected for their experience in the spill area or in similar nearby environments. Their experience level enabled quick recognition of sites and artifacts not known in the area before the spill.

The outcome of future spills or similar emergencies will be improved if the lessons learned during the aftermath of the *Exxon Valdez* oil spill are applied. The importance of site location information in a project area and the need of a plan to deal with emergencies has been demonstrated. Inventory and planning will minimize injuries to cultural resources in future emergencies and will also reduce costs. Equally important is the need for revision of the laws and regulations governing response, damage assessment, and restoration processes so as to clearly address cultural resources as a class of resource needing protection, vulnerable to injury, and eligible for restoration consideration.

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