THE DESTRUCTION OF DAMS ON THE KLAMATH RIVER AND SOME IMPLICATIONS FOR CULTURAL RESOURCE MANAGEMENT

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The construction of facilities by public and private entities can pose danger to the preservation of culturally irreplaceable resources. Both federal and state laws require such projects to be analyzed to determine what dangers may be created, and that appropriate actions may be taken to mitigate the damage and preserve the endangered heritage. What has resulted is the rise of the cultural resource management industry among archaeologists, and California has become the most active state in the Union for such activities. This paper discusses a potential aspect of cultural resource management that has not previously been reviewed very much: the status of cultural resources that are exposed by the removal of previously constructed dams. An effort pursued by the Yurok, Karuk, and Hoopa tribes in northwestern California has resulted in an agreement to remove four major dams built on the Klamath River nearly a century ago. It is very likely that the draining of the reservoirs will expose historic and prehistoric village locations. It is unknown whether those sites were destroyed by the creation of the reservoirs, or whether the sites gained some protection from the water cover and would be exposed to new damage by draining and subsequent erosion of the softened soil. The assessment of such damages and the identification for needed CRM responses could form a new arena for archaeology in California.

The archaeological approach called cultural resource management (CRM) has been a substantial part of the practice of archaeology in the United States since at least the 1960s, and especially so in California, where the combination of especially rigorous state laws with federal laws has led to the emergence of more work in CRM than anywhere else in the nation. The practices of CRM have evolved significantly over the past five decades. This paper looks at what could become an expansion of CRM, as well as archaeology more generally, into new areas.

One change that is on the horizon in environments in northern California and Oregon concerns the potential destruction of river dams built almost a century ago. A goal of this destruction is the restoration of riverine habitats and, especially, to restore native populations of anadromous fish, especially the king salmon, silver salmon, and steelhead trout. The draining of those reservoirs would bring into open air the locations of numbers of historic and prehistoric villages and other sites that were drowned when the reservoirs were first created.

Four dams are involved in this proposal. Three were created before the systematic practice of cultural resource management had begun, so real inventories of how many sites were drowned, where they were located, and what kinds of sites they were do not exist. Yet ethnohistoric records place a number of villages and some other sites in the areas that were inundated.

At the same time, we cannot tell in advance whether such sites were destroyed by the original creation of the reservoirs, or whether the water bodies and silt deposits actually protected the sites. Newly exposed sites might, in fact, be exposed to new damage as a result of the breaking down of the dams and the draining of the reservoirs.

CONSTRUCTION OF DAMS ON THE KLAMATH RIVER

Several dams were built across the Klamath River and some of its tributaries at various locations in the first third of the twentieth century. For example, in traditional Karuk territory, one was built near the village of Somes Bar. Another was built upstream from the town of Orleans. Another was built near the mouth of the Salmon River. A dam on the Trinity River was built in traditional Hoopa territory. The agreement involving the Yurok, Karuk, and Hoopa tribes with the federal government to plan the destruction of four dams on the Klamath River, however, actually involves dams outside their territories. Three of the dams (Iron Gate Dam and Copco Dams No. 1 and 2) are located well upriver, near the Oregon border, in traditional Shasta territory. The fourth, the J. C. Boyle Dam, is located on the Klamath River in southern Oregon, in traditional Klamath tribal territory. All four dams are currently owned by PacifiCorp. The Klamath Tribe partnered with the Yurok, Karuk, and Hoopa in pursuit of this agreement, but the early demise of the Shasta population meant that there was not a comparable Shasta tribal organization to participate. Thus the Yurok, Karuk, and Hoopa pursued the goal of river restoration, which would have a major impact in their areas, even though the dams involved did not lie in their own traditional territories. The agreement, signed in 2010, is not finalized, because some federal evaluations have not yet been completed, but if the agreement is fulfilled, dam destruction would be scheduled to begin in the year 2020 (Barnard 2011; Smith 2011). There are, however, reasonable probabilities that the dam destructions will not take place (cf. Joanne M. Mack, personal communication 2011).

The ostensible reasons for building the dams in the first place concerned the provision of more water for agriculture and communities, the development of hydroelectric power, and, during the Great Depression, to help provide employment. One consequence of dam construction, however, was the devastation of native populations of anadromous, or seasonally migratory, fish, especially the king salmon, the silver salmon, and the steelhead trout. These fish were economic foundations for Native American village life in the region, and in the historic period they subsequently fostered the emergence of economic opportunities through fish harvesting and sale. The Klamath River had been the home of the third largest population of anadromous fish among all the rivers on the Pacific Coast. The impairment of migration routes upriver by the construction of dams, however, has led to fish population declines of up to 99 percent, with some facing extinction, even though fish ladders had been provided in several cases to help allow for fish migrations. This loss made it economically impossible to sustain occupation of most Native American villages along the Klamath. It also led to the breakdown of most commercial fishing on the river, whether conducted by Native Americans or others.

The growth of sociopolitical unification and sophistication among many Native American groups has led, among other things, to many efforts to reverse environmental destruction and to restore traditional environments and resources (Bowden 2010). One of the many movements growing around the nation has involved efforts by the Yurok, Karuk, and Hupa communities to remove the dams on the Klamath River system and, as a result, to rebuild the populations of anadromous fish. As one example, in 2006 the Gathard Engineering Consulting firm in Seattle produced a report, sponsored by the Yurok tribe, to investigate the impact of dam construction and resulting sediment accumulation on the Klamath's riverine habitats. Based on both the political efforts of the tribes and the growing body of relevant evidence, negotiations have resulted in the signing of the Klamath Hydroelectric Settlement Agreement between the tribes and federal agencies last year to begin dam removals starting in the year 2020 (Peña 2010).

SOME IMPLICATIONS OF DAM REMOVAL FOR CULTURAL RESOURCE MANAGEMENT

If the agreements to take down the dams on the Klamath River remain in effect, they pose some new challenges for archaeology, in the arena of CRM. This is not the first time that existing dams will ever have been taken down, but the professional field of CRM does not have a lot of experience with the activities and consequences of dam removal. Thus the Klamath River situation presents several areas of important challenges.

One area of concern involves the existence of the remains of villages and other archaeologically significant sites beneath the waters of the current reservoirs. The riverside lands that now are covered by these reservoirs were never studied systematically by archaeologists, because those practices were not in place when the construction of those dams was undertaken. Some individual site excavations did take place near the reservoirs, such as Frank Leonhardy's work at the Iron Gate site along the Klamath River in Siskiyou County, California (Leonhardy 1967). Such studies can provide models for predicting what kinds of remains might have been drowned along nearby riverbank habitats. Riverine habitats in that part of northern California are among the less-studied parts of the state by archaeological research, however, to no small extent because a good deal of the riverine habitat had already been drowned under reservoirs and because there were no major research universities located nearby.

Some ethnography had been done in the region, however, prior to dam construction, so there are some ethnohistoric records of sites that previously existed in areas that were later inundated. In addition, archaeological studies done more recently of areas up or downstream from the reservoirs have established patterns of site distribution that likely apply to the reservoir areas as well, suggesting that a number of villages and other relevant sites, such as burial areas, ritual locations, extraction areas for raw materials, and special-function camp sites, likely occurred in areas that became inundated when the dams were built (e.g., Chartkoff and Chartkoff 1975). If so, the state and federal laws that apply to the protection of cultural resources should apply to such sites.

PRINCIPLES INVOLVED IN THE IMPACTS ON SITES FROM RESERVOIR INUNDATION AND DRAINING

Related to those issues are issues involved in the dynamics of site preservation or destruction that may be caused by the inundation of sites, or by the draining of the inundating waters off the sites and their new exposure to open air. The archaeological record on the fate of such sites and the mechanical consequences of inundation and draining is still quite sparse, so we do not have a strong base for predicting what happened to these sites when the reservoirs were first filled, or what will happen to them when the waters are drained away. There are not enough documented cases yet to show whether there is a standard consequence or whether the consequences are highly variable, much less what factors cause the consequences to occur as they do. This itself should become an important new area of research inquiry.

We need to learn substantially more about how site deposits are affected by inundation. Does coverage by water cause damaging erosion, or does slow inundation cause minimal damage, and what kind of impact occurs on which kinds of materials? If sites are destroyed by inundation, then draining the reservoirs will not cause further damage to what is already destroyed. In general, it could be suggested that the effects of water movement on sites being inundated may not be especially damaging, because when reservoirs have rising water, the speed

of water flow is quite slow compared to the flooding that can take place when a dam is broken and the reservoir is drained quickly.

If so, there is a good chance that sites may have survived reservoir inundation. Some organic materials in sites may break down anyway because of chemical reactions in an aquatic environment, but many materials, such as lithics and bone specimens, may be well preserved in aquatic environments. These are factors that can be studied at the laboratory level as well as in actual site settings, which would allow a stronger body of knowledge to be built up. It also will be important to separate the dynamics of stable reservoirs from those used in generating hydroelectric power, because the effects of water flow may be remarkably different in the two cases. These generalizations do not yet provide adequate predictive power, however, so focal research and observation is still very much needed.

The effects of inundation on site features also need to be better studied. Gentle flooding may have little or no damaging effects on rock features, for example, but many kinds of organic materials in such features may be lost. The effects of water motion by currents, even if gentle, may or may not have an impact on site remains, and this is a topic that needs more study. What effects flooding may have on chemical traces needs to be studied more as well. Such features as riverside bedrock mortars and grinding slabs would be expected to survive quite well, but traces of acorns and other parts of the diet are likely to have been lost, for example.

On a subsequent note, if the impact of the water is gentle due to slow rising, and sites are not destroyed, do they become damaged by motion in water currents, or do they get protected by the gentle deposition of sediments? Some cases have already generated observations, but a much larger and wider body of observation is needed in order to lead to the formation of accurate predictions, so that appropriate and effective CRM responses can be proposed and undertaken. For example, work recently done at Yosemite National Park has indicated that sediment derived from granite behaves very differently than sediment composed of silt (Emily Darko, personal communication 2011).

If sites do survive inundation, then we need to learn what effect the draining of the reservoir can have on those sites, both from the actions of the moving water as the reservoir drains, and from subsequent new exposure to air and sunlight. When reservoirs are deliberately drained, there can be control over the speed at which drainage takes place, so it is important to learn more about the effects of the speed of drainage on site remains. Because we do not yet have significant studies of the impact of reservoir formation and drainage on sites, the cases along the Klamath River need to be studied very carefully in order to gain such knowledge, in addition to trying as hard as possible to ensure the protection of the affected Klamath River sites. In Napa County, the artificial Lake Berryessa experienced an exposure of its shallow shoreline due to drought in the 1970s, resulting in the discovery of milling tools and core tools (True et al. 1979). How relevant the Berryessa case is to the Klamath River case is not yet known, but the accumulation of varied examples fosters the building of increasingly accurate predictive models.

CONCLUSION

In summary, the planned removal of the dams along the Klamath River poses two different but related challenges to California archaeology and cultural resource management. The first involves the protection of the cultural remains now inundated by these reservoirs, as those remains constitute irreplaceable elements of the heritage not only of the Yurok, Karuk, and Hoopa tribes, but for the archaeological record for California as a whole. In addition, the

proposed dam removals open areas of inquiry about the dynamics of reservoir formation and destruction that can apply to the archaeological record at a national and global level. Crucial principles still need to be learned about what processes are involved, so that the archaeological profession can respond more effectively and appropriately to such situations as they inevitably emerge again. We need to do whatever can be done to protect the surviving Klamath River sites currently within these reservoirs, and we need to add to the body of relevant knowledge in the community of archaeological science overall so that predictive power and the formation of appropriate policies can be advanced.

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