Prehistoric Land-Use Patterns within the Yellowstone Lake Basin and Hayden Valley Region, Yellowstone National Park, Wyoming

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Abstract

Humans have inhabited the Yellowstone Lake area for at least the past 10,000 years. Archeological studies of the area are starting to provide a view of the prehistoric lifeways of these peoples. This paper summarizes the nature of this prehistoric use, including lithic raw material utilization, stone tool characterization, and food procurement practices. Changes in landform evolution during the late Pleistocene and early Holocene and their potential impact on prehistoric groups occupying the area are also discussed. Finally, the question of change versus stability is discussed in light of the prehistoric occupation of the area.

Introduction

This paper summarizes the archeological record of the Yellowstone Lake area; however, in order to place this record into its proper context, it is useful to provide some background information on the nature of Yellowstone archeology as a whole. Previous researchers have described the prehistoric occupation of Yellowstone National Park as poorly known (National Park Service 1993; Cannon, Crothers, and Pierce 1994; Cannon et al. 1997). This is partially true, as there are very few of the stratified, key "type" sites that are necessary for archeologists intent on building cultural chronologies or investigating changes in prehistoric life ways through time.

There are several reasons for this. First, the volcanic nature of much of Yellowstone has resulted in shallow, acidic soils. Both of these conditions adversely affect the preservation of prehistoric occupations. The acidic soils dissolve organic remains, which are most critical if one wants to know what animals prehistoric peoples were eating. This is particularly frustrating, because Yellowstone is the place people from across the world now come to view wildlife, and the archeological record is so poor in this respect.

The shallow soils that cover most of the Yellowstone Plateau are easily mixed by rodent burrowing, freeze–thaw cycles, and tree tip-ups, all of which disrupt the clarity of a buried prehistoric occupation. The volcanic rocks of Yellowstone and other geologic formations also lack the caves or rock shelters that provide the most ideal locations for the preservation of prehistoric artifacts and organic remains. More recently, the 125 or more years of artifact collecting by tourists and others has depleted the number of diagnostic artifacts that were once present. Wayne Replogle, a park naturalist who traced the Bannock Indian Trail

through northern Yellowstone, noted in his 1956 publication on the trail (1956: 71) that he found comparatively few projectile points, but that old-timers said that they used to be quite common and were also a common souvenir in the early days of the park. This points to the diminishment of the archeological resource by the 1950s; so consider the state of affairs 50 years later, when annual park visitation is in the millions, despite the efforts of the National Park Service to discourage collecting.

Another factor is the virtual lack within Yellowstone of large-scale archeological excavations, which provide the most detailed information on prehistoric lifeways. Most of the archeological work in Yellowstone has been cultural resource inventories and small-scale test excavations. The inventories provide data on surface artifact assemblages and an assessment as to the site's potential for buried artifactual remains. The test excavations are generally designed for evaluative purposes and typically do not expose enough of a buried cultural level to provide much more than an inkling as to a site's actual contents. As a result of these factors, of the nearly 700 prehistoric sites that have been recorded thus far, most provide only a minimal glimpse of the prehistoric occupation of Yellowstone.

As a consequence, researchers have generally had to borrow cultural chronologies from regions that neighbor Yellowstone. The chronologies developed for the Northwestern Plains by William Mulloy (1958) and, later, George Frison (1978, 1991) are most often cited, although B.O.K. Reeves is currently developing a chronology for Yellowstone (see, e.g., Shortt 2001). Briefly, the chronological periods utilized in this paper follow Frison (1991) and are listed here in years before present (BP): Paleoindian period (ca. 11,500–8,000 BP), Early Archaic period (ca. 8,000–5,000 BP), Middle Archaic period (ca. 5,000–3,000 BP), Late Archaic period (ca. 3,000–1,500 BP), and Late Prehistoric period (ca.1,500–500 BP). Much of this chronology is developed around changes through time in the styles of projectile points, as well as past climatic conditions.

It should be noted that, in some ways, the borrowing of chronologies is somewhat appropriate, since it is likely that most if not all of the prehistoric inhabitants probably occupied Yellowstone only on a seasonal basis, moving to the lower elevations outside Yellowstone in the winter. As a result, some of the archeological remains in the valleys of southwestern Montana, northeastern Idaho, and northwestern Wyoming were likely created by the same peoples that spent the summer months in Yellowstone. Therefore, the styles and ages of the artifacts deposited in these neighboring areas should have relevance to Yellowstone.

Obsidian Utilization

The ability to determine the source of obsidian through x-ray fluorescence and similar techniques, and its prevalence within the Greater Yellowstone Ecosystem, is, perhaps, the one saving grace of Yellowstone archeology. Obsidian Cliff, located about 20 miles to the northwest of Yellowstone Lake, was a major source of obsidian throughout prehistory. Its occurrence within Hopewell sites in Ohio about 2,000 years ago is one of the more dramatic instances of artifact dispersal within North American prehistory.

Table 1 lists the results of the obsidian source analyses for the Yellowstone Lake area, while Figure 1 illustrates the locations of the various sources. All of the obsidian source analyses reported in this paper were conducted by Richard Hughes of Geochemical Research Laboratory. Two things are evident in Table 1. First, as to be expected, Obsidian Cliff is the dominant source. The popularity of the Obsidian Cliff source for tools is evident in the huge amounts of debris generated through its quarrying. The Hayden Valley–Yellowstone River area, just to the north of Yellowstone Lake, ranges from about 13–24 miles from Obsidian Cliff and, as expected, has the highest percentage (86.3%). However, the North Shore of Yellowstone Lake and West Thumb are both about 25–30 miles from Obsidian Cliff, but West Thumb has only 55.6% Obsidian Cliff obsidian compared with the 80.0% for the North Shore sites. This would suggest that the movement of peoples was along the Yellowstone River, through the Hayden Valley, and on toward Yellowstone Lake. The lower percentage of Obsidian Cliff obsidian at the West Thumb sites suggests that the movement of peoples from the Obsidian Cliff source area was more indirect.

Second, Bear Gulch obsidian is the next most common source, constituting, in the West Thumb sites, one-third of the obsidian for which a source could be determined. The Bear Gulch source area is in the Centennial Mountains along the Idaho–Montana border. From the West Thumb area, the Bear Gulch and Teton Pass (in Jackson Hole) sources are both about 60–65 miles away (Figure 1), yet Bear Gulch obsidian is much more common (Table 1). This pattern is duplicated in the Jackson Hole area, where Bear Gulch is also more prevalent than Obsidian Cliff obsidian (Reeve 1989; Schoen, Thompson, and Pastor 1995; Schoen 1997). This seems to suggest that there was some sort of boundary or obstacle that prevented people from accessing the Jackson Hole sources directly through southern Yellowstone. Based on the determination of obsidian sources, the pattern of movement appears to have been from Jackson Hole northwestward into northeastern Idaho, and then back east toward Yellowstone, probably following the Madison River. The other possibility is through Pacific Creek to the upper

Table 1. Summary of obsidian source analyses in the Yellowstone Lake Area.

	Obsidian Cliff, Yellowstone	Bear Gulch, Idaho	Titon Pass, Wyo.	Packsaddle Creek, Idaho	Park Point, Yellowstone	Cougar Creek, Yellowstone	Unknown	Total
Hayden Valley–Yellowstone Riv.	95 (86.3%)	7 (6.4%)	1 (0.9%)	1 (0.9%)	1 (0.9%)		5 (4.5%)	110
North Shore–Yellowstone Lake	132 (80.0%)	8 (4.9%)	1 (0.6%)			2 (1.2%)	22 (13.2%)	165
West Thumb	15 (55.6%)	9 (33.3%)	1 (3.7%)	2 (7.4%)				27

Sources:
Hayden Valley–Yellowstone River: Sanders (1999, Appendix 2); Sanders (2000, Appendix 1); Sanders (2001, Appendix 2); Shortt (1999a, Appendix 2)
North Shore–Yellowstone Lake: Cannon et al. (1997, Table 60)
West Thumb: Johnson (2001, Figure 1)

Yellowstone River and then along Yellowstone Lake (Wright 1975; Crockett 1999). Either route is indirect and would result in the gradual falling-off or discarding of lithic materials that occurs as distance from the source increases.

Another possibility is that the limited amount of Teton Pass or other Jackson Hole obsidians reflects a low prehistoric presence within this particular area. Except for Jackson Lake and a few other areas (Wright 1975; Connor 1998), previous inventories (e.g., Wright 1975; Waitkus, Rosenberg, and Wolf 1998; Sanders and Holtman 2001; Sanders, Waitkus, and Holtman 2001) have documented unusually low prehistoric-site densities over much of the open, lower elevations of Jackson Hole. Wright (1975: 44, 88) suggests that these areas of low site density may represent areas of low ecological productivity with regard to hunting and gathering potential, and also suggests that the game numbers in Jackson Hole were unpredictable and unreliable. Given the lower productivity of areas and carrying capacity within Jackson Hole, fewer people could have been supported, resulting in proportionally fewer people traveling out of Jackson Hole and, consequently, fewer instances of deposition of Jackson Hole lithic materials in Yellowstone. Conversely, there would be less motivation or attraction to trav-

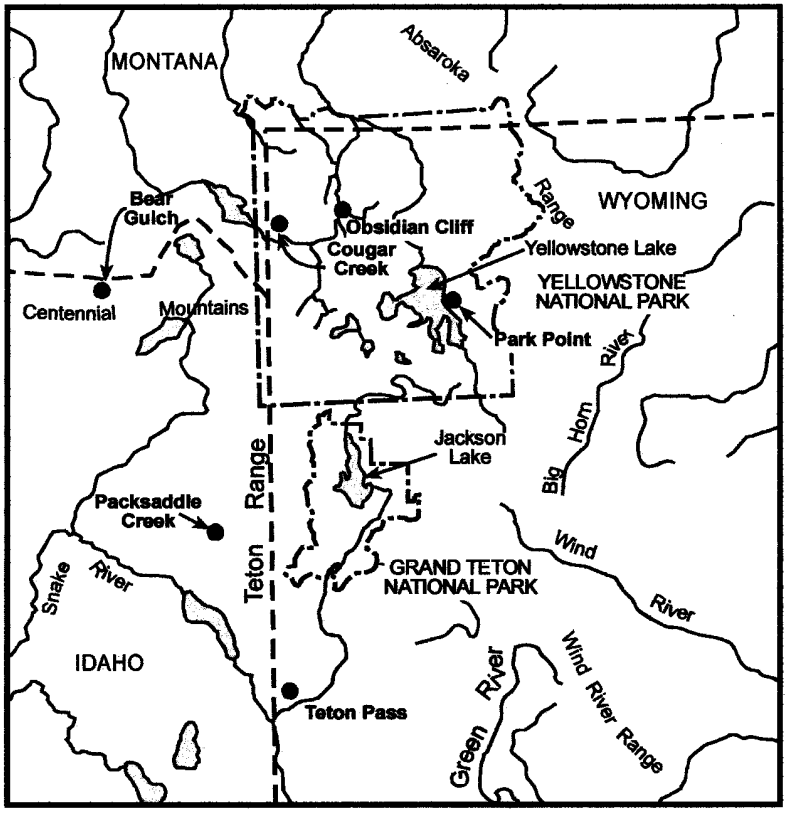

Figure 1. Map of obsidian source locations identified from archeological sites in the Yellowstone Lake area.

el into Jackson Hole, with fewer people depositing exotic lithic materials from outside areas (e.g., Yellowstone).

Subsistence Practices

Characterization of the foods eaten by prehistoric peoples is primarily based on inferences drawn from the recovery of faunal and floral remains from archeological sites. As noted previously, faunal remains are particularly scarce within Yellowstone. Within the Yellowstone Lake area, faunal remains have been recovered from only two sites, 48YE697, the Windy Bison site (Cannon et al. 1997) and 48YE545 (Sanders 2001; Table 2). Additional information has been gained from the analysis of blood residue on stone tools, which has identified a wider variety of animals that were likely hunted by prehistoric peoples. Curiously, no fish were identified, which would have been a rich resource. Although preservation of fish bones is a problem, fishing-related artifacts (e.g., net weights or sinker) have not been clearly identified (Taylor, Wood, and Hoffman 1964).

Bison were a primary food resource for Native Americans, as is evident by the number of bison kills that have been found throughout the Plains (see e.g., Frison 1991). No communal bison kill sites have been found within Yellowstone. The closest kill sites are north of Mammoth in Paradise Valley (Arthur 1966). The lack of communal kill sites is curious given the prevalence of bison within the park today, but, as noted earlier, the acidic soils are at least partially responsible. The excavations at the Windy Bison site indicated that only a single male bison had been killed and butchered. Cannon et al. (1997: 170) suggest that game animals were probably taken by small groups of hunters.

Besides faunal remains, inferences of hunting can be made because of the presence of projectile points. Test excavations of 20 sites in the Hayden

Table 2. Summary of prehistoric subsistence data in the Yellowstone Lake area.

	Species										
Area	Bovine	Bison	Elk	Deer/ Elk	Deer	Sheep	Bear	Felid/ Cat	Canid/ Dog	Rabbit	Vole
Blood Residue[1]											
North Shore				1	6	1	1	2	2	4	
West Thumb	1					1				1	
Faunal Remains											
North Shore[1]		58 (MNI= 1)	3 (MNI = 17)			1 (MNI = 1)					1 (MNI = 1)
LeHardys Rapids to Fishing Bridge[2]	7 Medium Sized Mammal Bones (Deer/Sheep/Pronghorn)										

[1] Cannon, Pierce, Stromberg, and MacMillan (1997: Table 56).
[2] Sanders (2001: Table 27)
MNI = minimum number of individuals

Valley–Yellowstone River area recovered 40 projectile points, or an average of two points per site (Sanders 2000, 2001). Similar work in the Lamar Valley of northeastern Yellowstone found only six projectile points in eight prehistoric sites (Sanders, Wolf, and Rogers 1997), while excavations at sites along the Mammoth-to-Norris highway in northwestern Yellowstone found seven points from nine prehistoric sites (Sanders 1998)—both areas exhibiting less than one point per site. This suggests that hunting activities played a larger role within the Hayden Valley–Yellowstone River area than in these other two investigated areas of Yellowstone, despite the fact that the Lamar Valley, especially, also traditionally holds large numbers of potential game animals (National Park Service 1997).

Much of the prehistoric diet was composed of plants—usually the seeds, roots, or tubers. Archeologically, sites associated with the procurement and processing of plant resources are often identified by the presence of groundstone implements used to grind seeds and other plant remains. However, groundstone implements are uncommon in the park. Within the Yellowstone Lake area, the most prominent site with groundstone is 48YE701 (Cannon et al. 1997), located on the north shore near Steamboat Point, and which is also near the Windy Bison site. Limited groundstone suggests that processing of plant resources was similarly limited, or else utilized a different technology that is not presently showing up archeologically. Blood residue analysis of the groundstone from 48YE701 suggests that these types of implements could also be used to process animal remains, not plant remains (Cannon et al. 1997: 179).

The other line of archeological evidence for prehistoric use of plants is from fire hearths. These are usually about 1 m in diameter and 20–30 cm deep and often filled with burned rocks. Macrofloral analysis of the hearth fill can often reveal charred plant remains, most often chenopodium-amaranth seeds. However, such features are also uncommon within Yellowstone, and have generally yielded few charred plant remains. The lack of such features is unusual since their other function is to provide heat—essential for survival within Yellowstone's cool climate.

The limited number of identified hearths may be due to their low archeological visibility within Yellowstone. As noted above, burned rocks are commonly associated with hearth features; however, the local volcanic rocks do not change colors or fracture differently when heated in fires. In essence, culturally heated volcanic rocks do not look any different than the natural ones, which prevents archeologists from detecting the presence of fire hearths at an archeological site.

Geomorphological Factors

A factor concerning the locations and patterns of archeological sites is changes in the landform through time. Within the Yellowstone Lake area, Kenneth Pierce and others (e.g., Hamilton and Bailey 1990; Pierce, Cannon, and Meyer 2001) have documented changes in the level of Yellowstone Lake during the past 10,000–12,000 years. Obviously, this would have limited some of the areas available for occupation, especially during the Paleoindian period. Recent

work within the Hayden Valley–Yellowstone River area (Sanders 1999, 2000, 2001) provides some additional details on the landform changes downstream from Yellowstone Lake.

In the late Pleistocene, after deglaciation, Alum Creek created a large outwash plain that was at least 5–10 m higher than the present level of the Yellowstone River. Alum Creek, and the Yellowstone River, started downcutting through the outwash plain sometime later. The starting date for this downcutting is not currently known, but was probably initiated by about 12,000 years ago, since a buried Paleoindian-age occupation was found in sediments overlying the outwash plains gravels at sites situated near the mouth of Alum Creek (Sanders 2000). Lower bracketing radiocarbon dates have been obtained from organic layers overlying fine alluvial sands, and indicate that 8,500 years ago in the Otter Creek area (a few miles north of the Hayden Valley), the Yellowstone River was approximately 1 m higher than it is at present, but had only cut down to within 2 m of the present river level in the Buffalo Ford area by 6,500 years ago (Sanders 2001: 159). Some of the reason for this may be due to the differential raising and lower of the Yellowstone caldera along a fault line that passes through LeHardy Rapids, just upstream from the Buffalo Ford area, as documented by Pierce, Cannon, and Meyer (2001).

The higher elevation of the Yellowstone River during the Paleoindian and Early Archaic periods indicates that such occupations should consequently be found on the higher terraces. Likewise, the lower terraces along the Yellowstone River would only have been available for occupation after the Early Archaic period. This appears to be the case in the Otter Creek–Chittenden Bridge area (just to the north of the Hayden Valley), where the first occupations at 48YE446 (Sanders 1999) and 48YE516 (Reeve 1984) are associated with the Middle

Table 3. Number of sites/components by area and period.

Chronological Period	Hayden Valley/ Yellowstone River	North Shore of Yellowstone Lake/ Pelican Creek	West Thumb	South Shore of Yellowstone Lake	Total
Paleoindian (ca. 11,500–8000 BP)	4 (23.5%)	7 (41.2%)	6 (35.3%)	0 (0%)	17
Early Archaic (ca. 8000–5000 BP)	2 (14.3%)	6 (42.9%)	5 (35.7%)	1 (7.1%)	14
Middle Archaic (ca. 5000–3000 BP)	8 (33.3%)	5 (20.8%)	9 (37.5%)	2 (8.3%)	24
Late Archaic (ca. 3000–1500 BP)	12 (38.7%)	10 (32.3%)	7 (22.6%)	2 (6.5%)	31
Late Prehistoric (ca. 1500–500 BP)	13 (41.9%)	9 (29.0%)	8 (25.8%)	1 (3.2%)	31
Multiple Components	10 (33.3%)	7 (23.3%)	10 (33.3%)	3 (10.0%)	30

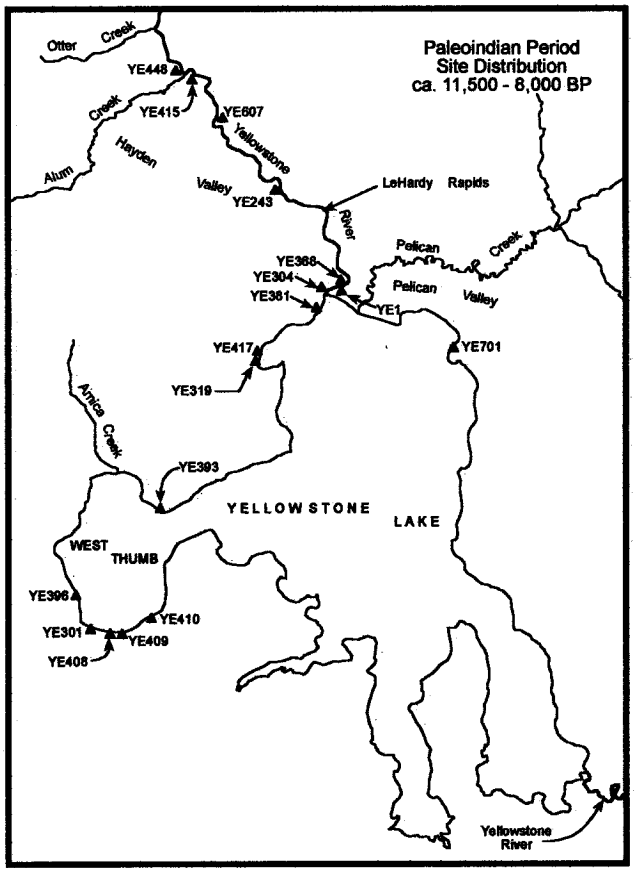

Figure 2. Paleoindian period site distribution in the Yellowstone Lake area.

Figure 3. Paleoindian artifacts from the Hayden Valley–Yellowstone River area. From left to right: fish-tailed point fragment from 48YE243, Scottsbluff point from 48YE448, and a spurred end scraper, also from 48YE448.

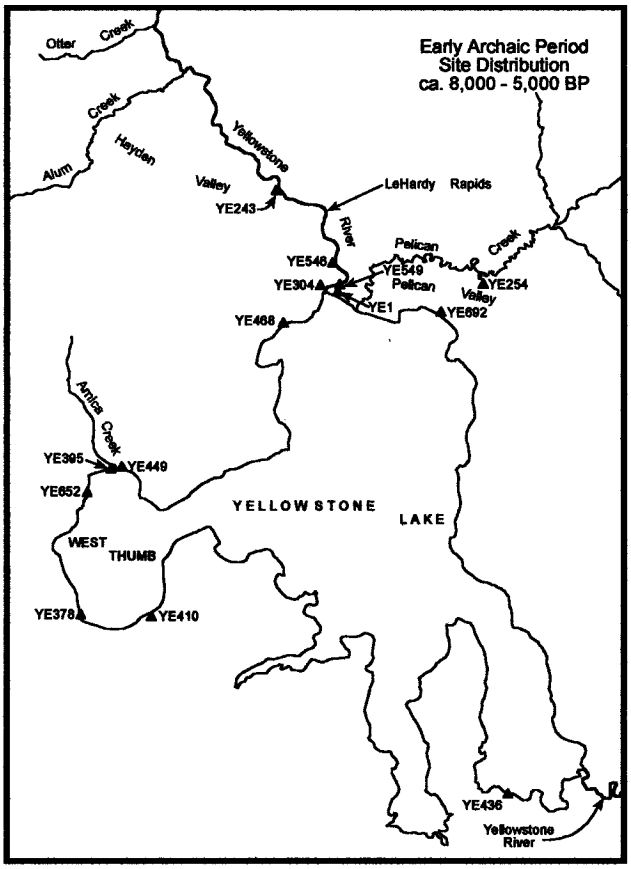

Figure 4. Early Archaic-period site distribution in the Yellowstone Lake area.

Archaic period (i.e., 5,000–3,000 years ago). The availability of the Yellowstone Lake shore for prehistoric occupation is much more complex (Pierce, Cannon, and Meyer 2001).

Prehistoric Land-Use Patterns

Investigations into the prehistoric use of the Yellowstone Lake area are based on the spatial distribution of those prehistoric sites containing chronologically diagnostic artifacts and/or radiocarbon dates. These data are summarized by area and chronological period in Table 3 from data presented in Table 4. The actual distribution of Paleoindian sites is presented in Figure 2. This figure shows that there are four sites in the Hayden Valley–Yellowstone River area, seven sites in the North Shore area (especially around the Fishing Bridge–Yellowstone Lake outlet), and six sites in the West Thumb area. Although it could be argued that some of this distribution may reflect areas that have received the most archeological investigations, it should be noted that most of these sites were initially

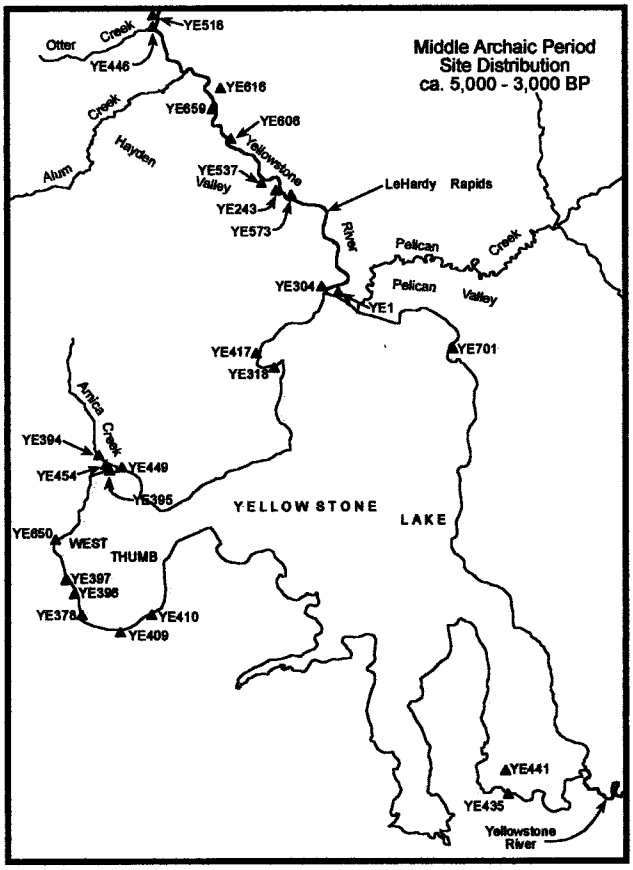

Figure 5. Middle Archaic-period site distribution in the Yellowstone Lake area.

recorded during first professional inventory of Yellowstone in 1958–1959.

One of the interesting aspects of the Paleoindian occupations is the presence of Cody Complex-style artifacts from this portion of Yellowstone, along with other stemmed or "fish-tailed" points (Figure 3). Cody knives and Scottsbluff points have been considered more "plains" adaptations, for example the Horner buffalo kill site near Cody, Wyoming, which incidentally contained the base of an obsidian Scottsbluff point thought to be from Yellowstone (Frison 1991: 66; Frison and Todd 1987: 275). The distinctive Cody Complex artifacts appear to illustrate the movement of peoples from plains or basins into mountainous areas, while the fish-tailed points appear to a part of a mountain–foothills-adapted complex that developed at around the same time.

The Early Archaic period shows a continuation of the use of the North Shore–Fishing Bridge and West Thumb areas (Figure 4). Within the West Thumb area, some of the focus has shifted to Arnica Creek, whose use may have been allowed due to a subsidence in lake levels. There appears to be less utilization of

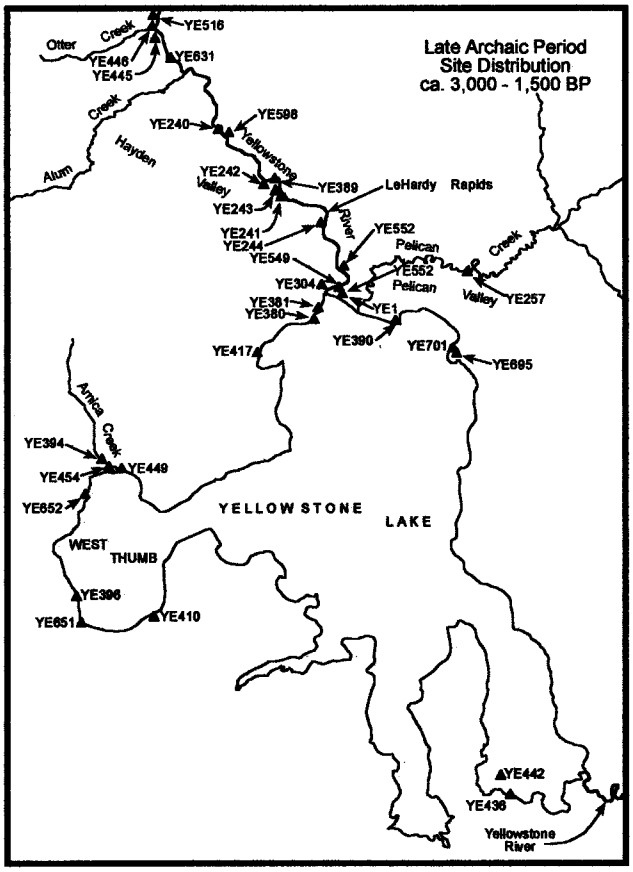

Figure 6. Late Archaic-period site distribution in the Yellowstone Lake area.

the Hayden Valley–Yellowstone River area during this period, but also the first apparent utilization of the South Shore of Yellowstone Lake.

The Middle Archaic period shows an overall increase in the number of components, with an apparent shift from the North Shore to both the West Thumb and Hayden Valley–Yellowstone River areas and additional components along the Southeast Arm of Yellowstone Lake (Figure 5). One of the latter occupations is located on the Molly Islands, indicating that the first use of watercraft occurred during this period. Within the Hayden Valley–Yellowstone River area, the increase in components may be partially due to the availability of new, lower landforms for occupation.

The Late Archaic period shows an increased use of the Hayden Valley–Yellowstone River and North Shore areas (Figure 6 and Table 3). The number of components slightly decreased in the West Thumb areas, while those along the South Shore remained the same. The Hayden Valley has the highest percentage (38.7%) of use (Table 3).

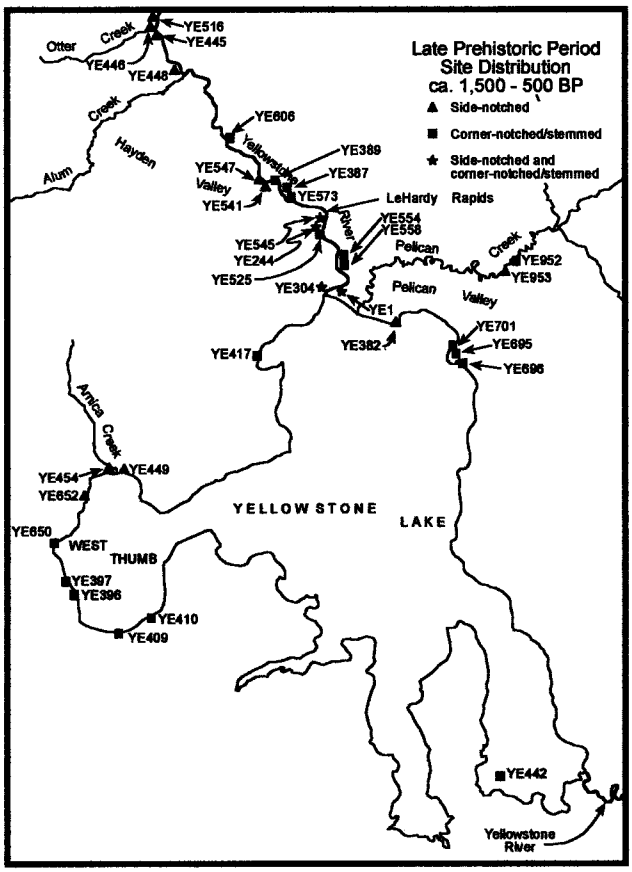

Figure 7. Late Prehistoric-period site distribution in the Yellowstone Lake area.

The Late Prehistoric period shows a slight increase in the use of the Hayden Valley–Yellowstone River and West Thumb, but slight decreases in the use of the North and South shores of Yellowstone Lake (Figure 7 and Table 3). One of the sites at Arnica Creek (48YE449) contained pottery, the only instance within Yellowstone (Taylor, Wood, and Hoffman 1964). Figure 6 also shows the distribution of two styles of Late Prehistoric-period projectile points: side-notched and corner-notched/stemmed points. The latter may be associated with the early portion of the Late Prehistoric period (i.e., Reeves' Tower Junction subphase). These sites appear to be more prevalent within the southern portion of the Hayden Valley area and throughout the shorelines of Yellowstone Lake. The side-notched points are more limited in distribution, although they co-occur at sites in the Fishing Bridge to LeHardys Rapids area along the Yellowstone River, and at Arnica Creek on the north side of West Thumb.

The shifts in occupations are summarized in Table 3, where it is evident that the North Shore has the highest percentages for the Paleoindian and Early

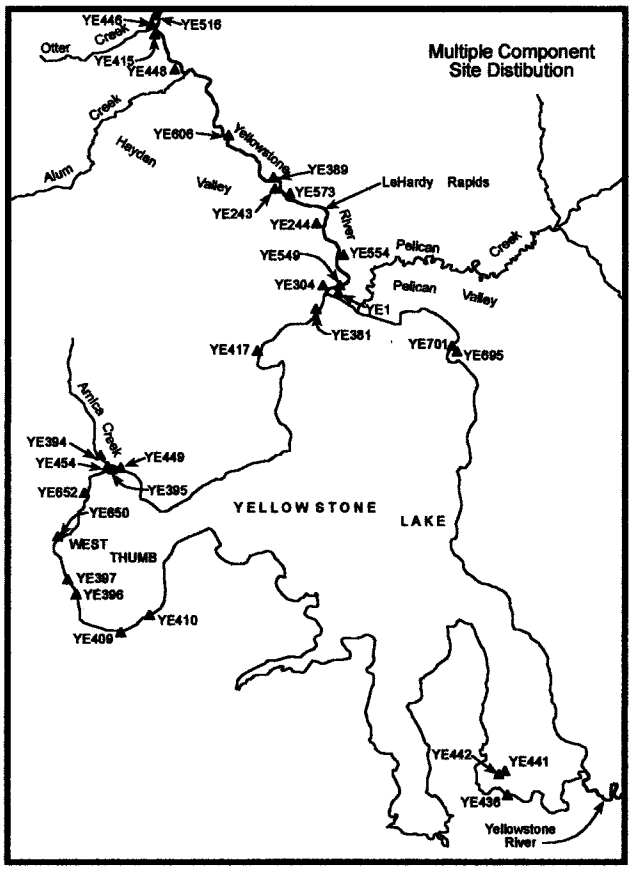

Figure 8. Multicomponent site distribution in the Yellowstone Lake area.

Archaic periods, while the Hayden Valley–Yellowstone River area has the highest percentage during the Late Archaic and Late Prehistoric periods. The pattern of use of the West Thumb also shows high percentages during the Paleoindian through the Middle Archaic periods, the latter exhibiting the highest percentage. The highest percentage for the South Shore area is also during the Middle Archaic period. However, the patterns exhibited in this latter area are based only upon sites recorded during 1958–1959. Additional inventories in this area would likely reveal additional prehistoric occupations, especially considering that the upper Yellowstone River Valley has been posited as a probable access route from Jackson Hole (Wright 1975; Crockett 1999)—as has the upper Wind River Valley.

Finally, the overall pattern in the use of the Yellowstone Lake area is depicted through the distribution of sites containing multiple components (Figure 8). Figure 8 shows that the multicomponent sites are concentrated in a small area of the South Shore of Yellowstone Lake, the west half of West Thumb, the North

Table 4. List of prehistoric sites and their general location and chronological periods.

Site	Area	Paleoindian	Early Archaic	Middle Archaic	Late Archaic	Late Prehistoric Side-notched	Late Prehistoric Corner-notched stemmed	References
4EYE240	Hayden Valley/ Yellowstone River				X			Sanders 2000
4EYE241	Hayden Valley/ Yellowstone River				X			Sanders 2001
47YE242	Hayden Valley/ Yellowstone River				X			Sanders 2000
4EYE243	Hayden Valley/ Yellowstone River	X	X	X	X	X		Sanders 2000
4EYE244	Hayden Valley/ Yellowstone River				X	X	X	Sanders 2000
4EYE387	Hayden Valley/ Yellowstone River						X	Mitchell 2001
4EYE389	Hayden Valley/ Yellowstone River				X		X	Shott 1999a
4EYE415	Hayden Valley/ Yellowstone River	X						Sanders 2000
4EYE445	Hayden Valley/ Yellowstone River				X	X		Sanders 2001 Shott 1999a
4EYE446	Hayden Valley/ Yellowstone River			X	X	X		Sanders 1999
4EYE448	Hayden Valley/ Yellowstone River	X				X		Sanders 2000
4EYE516	Hayden Valley/ Yellowstone River			X	X	X		Sanders 2000
4EYE525	Hayden Valley/ Yellowstone River						X	Sanders 2001
4EYE537	Hayden Valley/ Yellowstone River			X				Sanders 2000
4EYE545	Hayden Valley/ Yellowstone River					X	X	Sanders 2001
4EYE546	Hayden Valley/ Yellowstone River		X					Sanders 2001
4EYE547	Hayden Valley/ Yellowstone River					X		Sanders 2000
4EYE552	Hayden Valley/ Yellowstone River				X			Mitchell 2001
4EYE554	Hayden Valley/ Yellowstone River						X	Mitchell 2001
4EYE558	Hayden Valley/ Yellowstone River						X	Mitchell 2001
4EYE573	Hayden Valley/ Yellowstone River			X			X	Mitchell 2001
4EYE598	Hayden Valley/ Yellowstone River				X			Mitchell 2001
4EYE606	Hayden Valley/ Yellowstone River			X		X		Mitchell 2001
4EYE607	Hayden Valley/ Yellowstone River	X						Mitchell 2001

Table 4. Continued.

Site	Area	Paleoindian	Early Archaic	Middle Archaic	Late Archaic	Late Prehistoric Side-notched	Late Prehistoric Corner-notched stemmed	References
48YE616	Hayden Valley/ Yellowstone River			X				Mitchell 2001
48YE631	Hayden Valley/ Yellowstone River				X			Mitchell 2001
48YE659	Hayden Valley/ Yellowstone River			X				Sanders 2000
48YE1	North Shore	X	X	X	X	X	X	Taylor et al. 1964 Reese 1989 Cannon et al. 1997
48YE304	North Shore	X	X	X	X	X	X	Taylor et al. 1964 Reese 1989 Cannon et al. 1997
48YE318	North Shore			X				Taylor et al. 1964
48YE319	North Shore	X						Taylor et al. 1964
48YE368	North Shore	X						Taylor et al. 1964
48YE380	North Shore				X			Cannon et al. 1997
48YE381	North Shore	X			X			Taylor et al. 1964
48YE382	North Shore					X		Cannon et al. 1997
48YE390	North Shore				X			Taylor et al. 1964
48YE417	North Shore	X		X	X		X	Taylor et al. 1964 Sanders and Wedel 1997
48YE468	North Shore		X					Sanders and Wedel 1997
48YE549	North Shore		X		X			Mitchell 2001
48YE692	North Shore		X					Cannon et al. 1997
48YE695	North Shore				X		X	Cannon et al. 1997
48YE696	North Shore						X	Cannon et al. 1997
48YE701	North Shore	X		X	X		X	Cannon et al. 1997
48YE952	Pelican Valley						X	Shortt 2000
48YE953	Pelican Valley					X		Shortt 2000
48YE254	Pelican Valley		X					Shortt 1998b
48YE257	Pelican Valley				X			Shortt 1998b
48YE436	South Shore		X	X	X			Taylor et al. 1964
48YE441	South Shore			X				Taylor et al. 1964
48YE442	South Shore				X		X	Taylor et al. 1964
48YE301	West Thumb	X						Taylor et al. 1964
48YE378	West Thumb		X					Taylor et al. 1964
48YE393	West Thumb	X						Taylor et al. 1964 Cannon et al. 1996
48YE394	West Thumb			X	X			Cannon et al. 1996
48YE395	West Thumb		X	X				Taylor et al. 1964 Cannon et al. 1996

Table 4. Continued.

Site	Area	Paleoindian	Early Archaic	Middle Archaic	Late Archaic	Late Prehistoric Side-notched	Late Prehistoric Corner-notched stemmed	References
48YE395	West Thumb		X	X				Taylor et al. 1964 Cannon et al. 1996
48YE396	West Thumb	X		X	X		X	Taylor et al. 1964 Samuelsen 1983
48YE397	West Thumb			X			X	Samuelsen 1983 Cannon et al. 1996
48YE408	West Thumb	X						Cannon et al. 1996
48YE409	West Thumb	X		X			X	Taylor et al. 1964 Cannon et al. 1996
48YE410	West Thumb	X	X	X	X	X		Taylor et al. 1964 Cannon et al. 1996
48YE449/457	West Thumb		X	X	X	X		Taylor et al. 1964 Cannon et al. 1996
48YE454	West Thumb			X	X	X		Cannon et al. 1996
48YE650	West Thumb			X			X	Samuelsen 1983
48YE651	West Thumb				X			Samuelsen 1983
48YE652	West Thumb		X		X	X		Cannon et al. 1996

Cannon et al. 1997 = Cannon, Pierce, Stormber, and MacMillan 1997; Taylor et al. 1964 = Taylor, Wood, and Hoffman 1964; Cannon et al. 1996 = Cannon, Crothers, and Pierce 1996

Shore (especially around Fishing Bridge), and spread out along the Yellowstone River. Within the latter area, most of the sites border the Hayden Valley, with only one multicomponent site situated within it. This would suggest that the use of the Hayden Valley may have been as an extractive locale, where resources may have been procured and subsequently brought to campsites located at the valley margins.

The last question concerns evidence for stability versus change in the prehistoric use of the Yellowstone Lake area. Generally, there are few differences between the sites in this area, as they mostly consist of scatters of flakes and chipped stone tools, most of which were made from obsidian, primarily from the Obsidian Cliff source. These sites also contain relatively few fire hearths, groundstone implements, or floral or faunal remains. Although there appears to be some differences in the distribution of sites through time, the reasons for this remain elusive. However, most of the Paleoindian sites (n=10, 58.8%; Table 4) were reoccupied by later groups, suggesting that the characteristics that made these particular locales attractive for extractive activities and habitation during the Paleoindian period continued to be attractive in the later periods as well. At this time, it would appear that the limited variability in the archeological remains suggests that prehistoric use of the Yellowstone Lake area has been one of consistency (i.e., stability).

References

Arthur, G.W. 1966. *An Archaeological Survey of the Upper Yellowstone River Drainage, Montana*. Agricultural Economics Research Report no. 26. Bozeman, Mont.: Department of Agricultural Economics and Rural Sociology, Montana Agricultural Experiment Station.

Cannon, K.P., G.M. Crothers, and K.L. Pierce. 1994. Archeological investigations along the Fishing Bridge Peninsula, Yellowstone National Park, Wyoming: The archeology, geology, and paleoenvironment. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, Yellowstone National Park, Wyoming.)

———. 1996. Archeological Investigations along the Arnica Creek to Little Thumb Creek section of the Grand Loop Road, Yellowstone National Park, Wyoming. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Cannon, K.P., K.L. Pierce, P. Stormberg, and M.V. MacMillan. 1997. Results of archeological and paleoenvironmental investigations along the north shore of Yellowstone Lake, Yellowstone National Park, Wyoming: 1990–1994. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, Yellowstone National Park, Wyoming.)

Connor, M.A. 1998. Final report on the Jackson Lake Archaeological Project, Grand Teton National Park, Wyoming. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Crockett, S. 1999. The prehistoric peoples of Jackson Hole. In *A Place Called Jackson Hole*. J. Daugherty, ed. Moose, Wyo.: Grand Teton National Park, 21–41.

Frison, G.C. 1978. *Prehistoric Hunters of the High Plains.* New York: Academic Press.

———. 1991. *Prehistoric Hunters of the High Plains.* 2nd edition. San Diego: Academic Press.

Frison, G.C., and L.C. Todd, eds. 1987. *The Horner Site: The Type Site of the Cody Cultural Complex.* New York.: Academic Press.

Hamilton, W.L., and A.L. Bailey. 1990. Holocene deformation history of the Yellowstone caldera at Yellowstone Lake inferred from abandoned shorelines and sediments. Yellowstone Physical Science Laboratory, Division of Research, Report 90-3. Yellowstone National Park, Wyo.: National Park Service.

Johnson, A. 2001. Where does your obsidian come from? *The Buffalo Chip* (January-February), 4–5. (Resource management newsletter, Yellowstone National Park, Wyoming.)

Mitchell, D. 2001. Personal communication relating to results of a cultural resource inventory along the east side of the Yellowstone River from Fishing Bridge to Canyon. Life ways of Canada, Ltd., Calgary, Alberta.

Mulloy, William T. 1958. A preliminary historical outline for the Northwestern Plains. *University of Wyoming Publications* 22:1, 1–235.

National Park Service. 1993. Archeological treatment plan for Yellowstone federal highway projects, Yellowstone National Park, Wyoming: prehistoric sites. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

———. 1997. *Yellowstone's Northern Range: Complexity & Change in a Wildland Ecosystem.* Mammoth, Wyo.: Yellowstone National Park.

Pierce, K.L., K.P. Cannon, and G.A. Meyer. 2001. "Heavy breathing" of [inflation and deflation cycles in] the Yellowstone caldera based on Yellowstone Lake and river changes in post-glacial time. Paper presented at "Yellowstone Lake: Hotbed of Chaos

or Reservoir of Resilience?", Sixth Biennial Conference on the Greater Yellowstone Ecosystem, 8–10 October 2001, Mammoth Hot Springs, Yellowstone National Park, Wyoming.

Reeve, S.A. 1984. The Chittenden Bridge site (48YE516) and the paleoecology of the Yellowstone National Park. Draft report by the Department of Anthropology, State University of New York at Albany. Lincoln, Neb.: Midwest Archeological Center.

———. 1989. Prehistoric settlement at the Yellowstone Lake outlet, Yellowstone National Park. Report by the Jefferson Patterson Park and Museum, Maryland Division of Historical and Cultural Programs. Lincoln, Neb.: Midwest Archeological Center.

Replogle, W.F. 1956. *Yellowstone's Bannock Indian Trails.* Yellowstone Interpretive Series no. 6. Yellowstone National Park, Wyo.: Yellowstone Library and Museum Association.

Samuelson, A.E. 1983. Archeological investigations in the Grant Village-West Thumb Area of Yellowstone National Park, Wyoming. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Sanders, P.H. 1998. The 1997 archaeological investigation of nine prehistoric sites in the northern portion of Yellowstone National Park, Wyoming, Projects 254E, 254F, and 785F. Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

———. 1999. The 1998 archaeological inventory of the west side of the Canyon to Lake Junction Highway and National Register testing of site 48YE446, Yellowstone National Park, Wyoming, Project 785H. Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

———. 2000. Archaeological test excavations of 12 sites along the Canyon to Lake Junction Highway, Yellowstone National Park, Wyoming, Project 785I. Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

———. 2001. Archaeological test excavations of eight prehistoric sites along the Canyon to Lake Junction Highway, and additional recording at Historic Sites 48YE23 and 48YE155, Yellowstone National Park, Wyoming, Project 254H. Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Sanders, P.H., and P. Holtman. 2001. A class III cultural resource inventory of the Lost Creek Ranch, prescribed fire fuel treatment project area, Grand Teton National Park, Teton County, Wyoming. Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, Grand Teton National Park, Moose, Wyoming.)

Sanders, P.H., B.R. Waitkus, and P. Holtman. 2001. A class III cultural resource inventory of the RKO Road, prescribed fire fuel treatment project area, Grand Teton National Park, Teton County, Wyoming. Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, Grand Teton National Park, Moose, Wyoming.)

Sanders, P.H., and D.L. Wedel. 1997. The 1996 cultural resource inventory of the Bridge Bay to Lake Junction Road, Yellowstone National Park, Wyoming, Project 785D (254H). Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Sanders, P.H., D. Wolf, and M. Rogers. 1997. The 1996 archaeological investigation of eight prehistoric sites along the Northeast Entrance Road, Yellowstone National Park,

Project 785E. Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Schoen, J.R. 1997. High altitude site locations in the Bridger, Gros Ventre and Teton Wilderness. Paper presented at the Third Biennial Rocky Mountain Anthropological Conference, Bozeman, Montana.

Schoen, J.R., K. Thompson, and J. Pastor. 1995. Obsidian studies in the Green River Basin: the exotics versus the locals. Paper presented at the Second Biennial Rocky Mountain Anthropological Conference, Steamboat Springs, Colorado.

Shortt, M.W. 1999a. Yellowstone National Park FHWA archaeological site inventory—east side of the Canyon to Fishing Bridge segment of the Grand Loop Road: 1998 field season final report. Unpublished report. Bozeman, Mont.: Montana State University, Museum of the Rockies. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

———. 1999b. Yellowstone National Park trails relocation archaeological site inventory: 1998 field season final report. Unpublished report. Bozeman, Mont.: Montana State University, Museum of the Rockies. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

———. 2000. Yellowstone National Park trails relocation archaeological site inventory: 1999 field season final report. Unpublished report. Bozeman, Mont.: Montana State University, Museum of the Rockies. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

———. 2001. Museum of the Rockies archaeological research in the canyons of the Yellowstone. *Yellowstone Science* 9:2, 16–20.

Taylor, D.C., K. Wood, and J.J. Hoffman. 1964. Preliminary archaeological investigations in Yellowstone National Park. Unpublished report. Bozeman, Mont.: Montana State University. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Waitkus, B.R., R. Rosenberg, and D. Wolf. 1998. Class III cultural resource inventory of Highway 287 in Teton County from the Teton Park boundary to the Togwotee Pass area, in Fremont County east to the Shoshone National Forest Boundary, Wyoming Department of Transportation Project PREB 030-1(8). Unpublished report. Laramie, Wyo.: Office of the Wyoming State Archaeologist. (On file, Wyoming Department of Transportation, Cheyenne, Wyoming.)

Wright, G.A. 1975. A preliminary report on the archaeology of the Jackson Hole Country, Wyoming. Unpublished report. Albany: State University of New York at Albany. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

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The Osprey Beach Locality: A Cody Complex Occupation on the South Shore of West Thumb

Mack William Shortt

In early August 2000, a group of Wichita State archeology students under the direction of Donald Blakeslee recovered four diagnostic stone tools from a beach on the shore of West Thumb. While the entire area yielded a variety of artifacts, these particular specimens were typical of an Early Precontact-period (Paleoindian) archeological unit known as the Cody Complex. Of particular interest was the knowledge that Cody components at archeological sites elsewhere have provided radiocarbon dates of ca. 10,000 and 8,000 radiocarbon years before the present (RCYBP) (Stanford 1999: 321, Table 7). Clearly, these artifacts were much older than the other archeological materials found by Blakeslee's crew at the time. The portion of the beach where the specimens were found was ultimately named the Osprey Beach Locality. To date, Osprey Beach is the oldest, best-preserved Precontact site in Yellowstone National Park. As such, its study will provide an excellent opportunity to gather information about the lifeways of Yellowstone's early human occupants.

The Cody Complex was first defined in 1951 at the Horner site, a bison kill located to the east of Yellowstone National Park near Cody, Wyoming (e.g., Frison and Todd 1987; Frison 1991). Horner subsequently became the type site for the Cody Complex because of the occurrence of diagnostic Eden and Scottsbluff projectile points and specialized, bifacially flaked tools referred to as Cody knives. Radiocarbon dates from Horner range from approximately 9,300 to 8,700 RCYBP (Frison and Todd 1987: 98; Frison and Bonnichsen 1996: 313). Since then, the Cody Complex has become a relatively well documented cultural entity identified on the Northwestern Plains and in adjacent Central and Northern Rocky Mountain basins (e.g., Stanford 1999: 321, Figure 34). The typical Cody site consists of Scottsbluff and/or Eden projectile points and Cody knives, with radiocarbon dates approximating 9,000 RCYBP.

In the archeological literature, Cody represents "classic" Early Native American plains bison hunters, who were different from contemporaneous peoples who inhabited the foothills and mountains. This impression is, for the most part, founded upon a focus on the excavation of Cody bison kill sites and their associated processing and campsite areas. Indeed, sites such as Finley in the Green River basin (Moss et al. 1953; Haspel and Frison 1987), Carter/Kerr-McGee in the Powder River basin (Frison 1984), and the Frasca (Fulgham and Stanford 1982) and Jurgens (Wheat 1979) sites in northeastern Colorado are all interpreted as large-scale bison procurement operations.

Other sites with Cody components include, as examples, Hell Gap in eastern Wyoming (Irwin-Williams et al. 1973), Medicine Lodge Creek in northern

Wyoming (Frison 1991), and Claypool (Dick and Mountain 1960; Stanford and Albanese 1975) in eastern Colorado. The MacHaffie site (Forbis and Sperry 1952; Knudson 1983) and Mammoth Meadow (Bonnichsen et al. 1992) in southwestern Montana are examples of Cody lithic workshops or areas where stone tools were manufactured. In the current study area around Yellowstone Lake, Cody artifacts have been found at Fishing Bridge (Cannon et al. 1997: 345, Table 65) and near the mouth of Solution Creek on the shore of West Thumb (Cannon, Crothers, and Pierce 1996).

After the initial recovery of Cody artifacts by the Wichita State crew, a field crew from the Museum of the Rockies returned to Osprey Beach to further site investigations. Initially, we wished to relocate the exact positions of the Wichita State surface artifacts. Then, we wanted to address questions pertaining to the geologic associations of the materials and erosional processes that had exposed the artifacts on the beach surface. In addition, it was anticipated that a small assessment-oriented excavation would result in the recovery of artifacts similar to those recovered from the beach.

The initial field program, conducted during mid-August 2000 (after the departure of the Wichita State crew), involved a pedestrian reconnaissance of the entire beach area in the vicinity of the Wichita State finds. In this undertaking, the Museum crew recovered a number of Precontact lithic artifacts, including a third Cody knife. Like the specimens collected by the Wichita State crew, this artifact was not in situ, but instead had been eroded out of its primary context onto the beach below the bluffs.

At the terminus of the surface survey, the Museum crew then established a series of 1 x 1-m test excavation units on the heavily eroded edge of the bluff top directly above the Cody knife findspot. This particular portion of the shore of West Thumb is characterized by a high bluff that today rises 6.75 m above the datum at Bridge Bay which, in 1985, was 2,356 m (7,731 ft) above sea level.

The field testing program at Osprey Beach resulted in the completion of 8.5 contiguous 1 x 1-m units excavated to an average depth of 85 cm below the surface. In profile, the test excavations revealed a simple stratigraphic sequence consisting of a surficial dark brown sandy silt overlying a thick deposit of gray–brown sand, the latter of which persisted to an average depth of about 70 cm below the surface. The basal deposits reached by excavation consisted of coarse gray–brown sandy pea gravel.

With regard to cultural stratigraphy, Precontact archeological materials were recovered from almost all levels in the excavation, although there was a general tendency for artifacts to occur from 30 to 70 cm below the surface in the thick deposit of gray–brown silty sand. Artifact types included a limited quantity of lithic debris and a variety of stone tools. Of 62 waste flakes recovered, nearly one-half (n = 28) were small obsidian waste flakes that had resulted from manufacturing tools. Other lithic material types represented in the sample of debris included opalized wood, volcanic tuff, various colors and grades of chert, and a single piece of Knife River flint, the sources of which are located in western North Dakota. Unfortunately, zooarcheological (animal bone) specimens that

might provide direct evidence of food consumption were not recovered.

Tool types recovered from the excavation included three biface fragments, one fragmentary Cody knife, one sandstone shaft abrader, one pumice hide abrader, and a single projectile point. All were recovered in direct spatial association with quantities of stone flakes 30 to 60 cm below the ground surface.

The Cody knives found both on the beach surface below the test units and during excavation represent two lithic material types: vitreous dark green (Absaroka volcanic?) chert (Figure 1) and obsidian (Figure 2). The source of the obsidian specimens was determined to be the Obsidian Cliff Plateau, which is located in north-central Yellowstone National Park. Generally, the finely made dark green chert specimens are, in subjective terms, in better condition than their obsidian counterparts. One obsidian specimen had been snapped during use and the other appears to have been resharpened so often that the artifact had nearly lost its asymmetric form. It seems that the inhabitants of the site were less concerned with curating obsidian knives than with maintaining the integrity of the green chert specimens. This phenomenon is undoubtedly related to unlimited quantities of readily available Obsidian Cliff Plateau volcanic glass (see Davis, Aaberg, and Johnson 1992; Davis, Aaberg, and Schmitt 1995) versus more "exotic" green chert likely derived from sources to the east of Yellowstone National Park. The Cody knives from Osprey Beach are similar to specimens recovered at Horner (Frison and Todd 1987: 221, Figure 6.15) and other sites (Stanford 1999: 320, Figure 33).

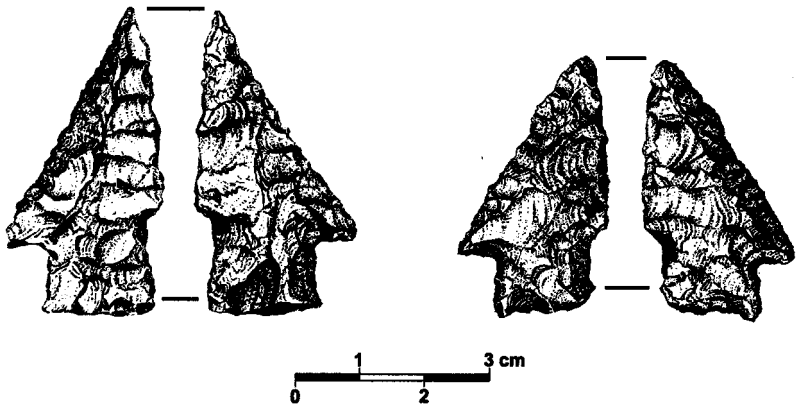

Figure 1. Osprey Beach Locality chert Cody knives.

The sandstone shaft abrader found at Osprey Beach is significant in light of the fact that similar artifacts are rare at other Cody Complex sites. Other shaft abraders of similar age have been recovered only at the MacHaffie site near Helena, Montana, at the Claypool site, and at the Jurgens site. In overall form, the Osprey Beach specimen is roughly rectangular, with a broad U-shaped transverse cross-section that continues over the length of the artifact (Figure 3). The main tool face exhibits a wide, relatively deep groove caused by the grinding and

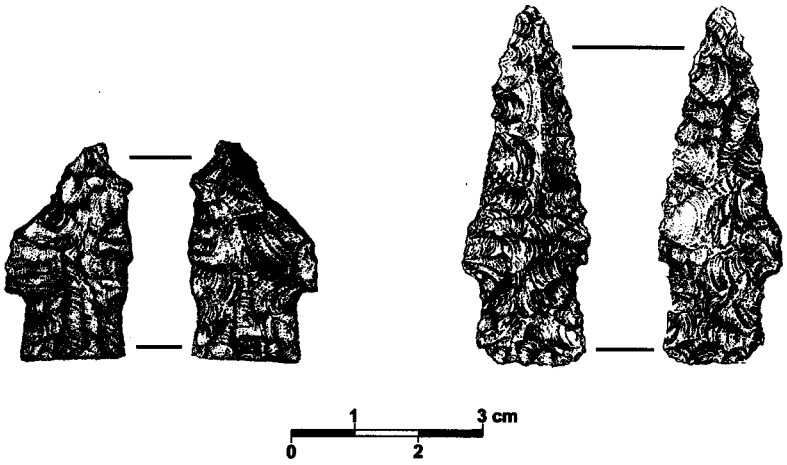

Figure 2. Osprey Beach Locality obsidian Cody knives.

smoothing of what were likely wooden shafts to which the stone artifacts were attached. Indeed, it was this heavy use that resulted in the U-shape. Close examination of the U-shaped interior, however, revealed narrower, incised grooves probably related to the actual abrading or sharpening of pointed shafts. The reverse face, rather than exhibiting a wide U-shape, exhibits four relatively narrow grooves that do not extend over the entire length of the artifact. These features are interpreted as the result of sharpening the pointed ends of shafts rather than the actual grinding of the main shaft itself.

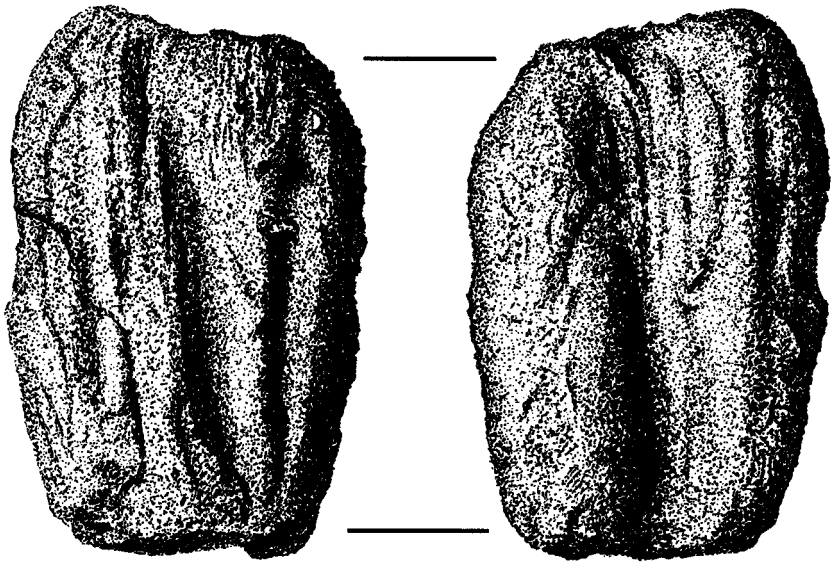

Figure 3. Osprey Beach Locality sandstone shaft abrader.

The test excavation program at Osprey Beach also resulted in the recovery of a split pumice cobble, 7.8 cm long, that had likely been utilized as an abrading type of implement (Figure 4). One aspect is relatively flat with rough, unmodified surfaces, while the opposite exhibits an undulating surface with smoothed, polished facets. Portions of the artifact's lateral margins also appear to have been worn smooth. While additional microscopic analyses are needed to verify the use-wear pattern on this specimen, it is clear that the cobble was transported into the site by Precontact native people. References to the use of such artifacts occur in the ethnographic literature. Denig, for example, in reference to the Assiniboine in 1854, describes rubbing a heated hide "with a pumice stone or porous bone..." (Dyck 1977: 159).

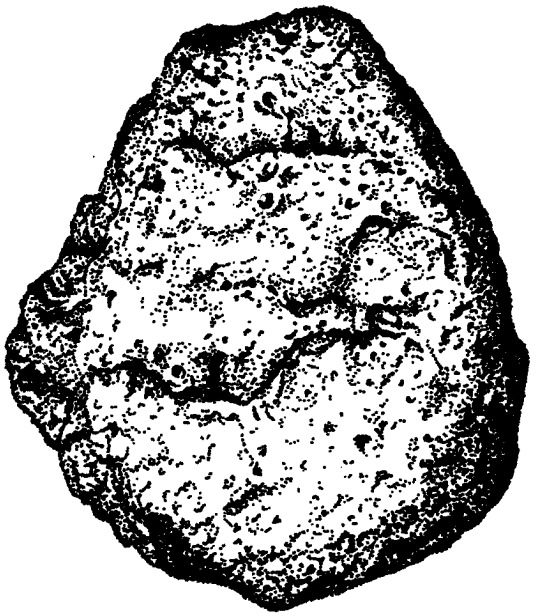

Figure 4. Osprey Beach Locality pumice hide abrader.

The projectile points recovered by Donald Blakeslee and the Museum of the Rockies are, for the most part, consistent with styles recovered at other Cody sites (e.g., Frison 1991; Stanford 1999). The beach finds included the midsection of an Eden point and the base of what appears to be a Scottsbluff point. Both styles conform to specimens in Cody assemblages at, for example, the Horner, Carter/Kerr-McGee, and Finley sites.

The projectile point recovered during excavation, however, differs morphologically from Scottsbluff and Eden, the hallmarks of the Cody Complex. Instead, this artifact is characterized by a convex base, excurvate lateral margins, a slightly narrowing stem, incipient shoulders, and a parallel-oblique flaking pattern typical of post-Cody Complex projectiles (Figure 5). The Osprey Beach-

excavated specimen closely resembles forms from the Lookingbill site in northwestern Wyoming (Frison 1991: 75, Figure 2.37). While most parallel-oblique lanceolate projectiles succeed the Cody Complex in later assemblages (ca. 9,000 to 8,500 RCYBP; e.g., Frison 1991), archeological research at Barton Gulch (Alder Complex) in southwestern Montana (Davis et al. 1989: 7-8) and Medicine Lodge Creek in the Bighorn Basin (Frison 1997: 93), for example, demonstrated that lanceolate projectiles, often exhibiting parallel-oblique flaking, occur in assemblages that are roughly contemporaneous with or older than Cody. As such, we suggest that the projectile point data from Osprey Beach indicate a mixture of peoples or members of different cultural groups probably coalescing seasonally.

When were Precontact Native American people at Osprey Beach and what activities took place there? What was the local landscape like? Ken Pierce of the U.S. Geological Survey, during a visit to the site in the summer of 2000, recovered a piece of charcoal for radiocarbon analysis from a locality several meters east of the Museum of the Rockies test excavation units. It was recovered from the lowest part of the artifact-bearing stratum, slightly lower than the main Cody Complex. A conventional radiocarbon age of 9,360 ± 60 years before present was subsequently obtained (Beta-148567). Given the relative stratigraphic position of the charcoal, one can surmise that occupation of the site by Cody peoples may have been slightly later. However, tree tip-ups, rodent burrowing, and other natural site formation processes had likely, to some extent, mixed the archeological deposits in the past.

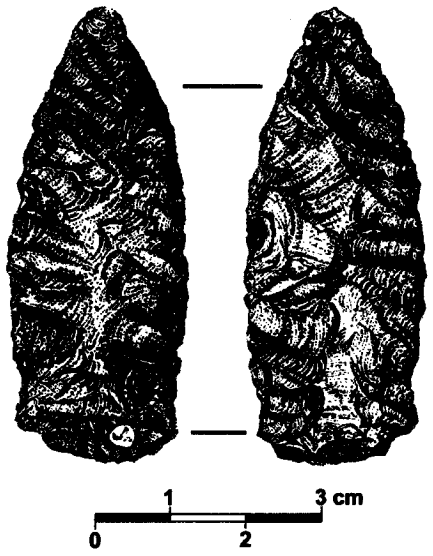

Figure 5. Osprey Beach Locality projectile point.

In terms of geomorphologic history, Pierce has suggested that, after the formation of a paleo-shoreline which is dated to ca. 10,500 years ago, the level of Yellowstone Lake lowered and retreated to the north. A shoreline of similar age was identified on the Fishing Bridge peninsula (Cannon et al. 1997: 357, Figure 8) where Cody artifacts were also found. Immediately following the lake recession, Precontact Native American peoples occupied the bench adjacent to the lake at Osprey Beach (the level of which was several meters higher than today), eventually abandoning some artifacts. Pierce suggests that, after site abandonment, aeolian sands blew into the area and eventually buried the archeological deposits.

Upon completion of the field program during the summer of 2000, eight of the Cody tools were submitted for blood residue analysis, a test that seeks to identify species of origin for blood proteins extant on some artifacts. The results, derived through crossover immunoelectrophoresis analyses, were surprising. The stem of one of the green chert Cody knives provided a positive reaction to rabbit antiserum. Whether this is related to the consumption of rabbit by site inhabitants or to the use of rabbit tissue for hafting is unknown, although both are strong possibilities. Second, the blade of the broken obsidian Cody knife yielded a positive reaction to dog antiserum. As such, any canid could be represented. The third test, undertaken on the parallel-obliquely flaked projectile point, provided a positive reaction to deer antiserum.

Finally, and perhaps what is the most interesting, the Cody knife collected from the surface of the beach below our excavation units provided two positive test results: rabbit on the stem and Rocky Mountain bighorn sheep on the blade. It is interesting to note that bison, the hallmark of the Cody Complex (e.g., Frison 1991), was conspicuously absent in the small sample of artifacts tested from Osprey Beach. As an aside, however, a Cody knife previously recovered from a site located near Solution Creek had tested positive to bison antiserum (Cannon, Crothers, and Pierce 1996: 149, Table 25). In addition, a Cody stemmed projectile point collected from Fishing Bridge in 1992 tested positive to rabbit antiserum (Cannon, Crothers, and Pierce 1994: 359, Figure 56e).

Some archeologists have suggested that, about 10,000 years ago, an ecological boundary separated plains-oriented, bison-hunting cultural groups from other contemporaneous Precontact cultural groups that occupied adjacent foothill and mountain regions. It is suggested that cultural groups in the latter were adapted to hunting and gathering in environs where more diverse faunal and floral species could be exploited (e.g., Frison 1992: 337; Frison 1997: 99). It is further suggested that, by Cody Complex times, the dichotomy between the ecological zones was breaking down (Frison 1992: 339; Frison and Bonnichsen 1996: 314; Frison 1997: 100).

The variety of mammalian species represented by blood residues on Osprey Beach artifacts indicate that a more diverse economy typified the Cody Complex adaptation around Yellowstone Lake than on the plains and intermountain basins to the east and southeast. Indeed, the Osprey Beach data suggest that the foothills-mountain/plains cultural dichotomy suggested by some researchers was in fact breaking down by the time of the Osprey Beach occupation. That Osprey Beach yielded relatively large numbers of Cody Complex artifacts suggests that Cody peoples were adapted to not only the plains and intermountain basins as bison hunters, but also to upland and mountain environs around Yellowstone Lake where a more diverse faunal resource base was exploited.

In sum, the archeological program at Osprey Beach has demonstrated that, by at least 9,360 ± 60 RCYBP, Precontact Native American peoples were traveling into the heart of Yellowstone country to exploit local game populations. While in the area around the lake, people utilized obsidian from the Obsidian Cliff Plateau to manufacture projectile points and specialized bifaces. Other non-local cherts

were also used by Osprey Beach peoples.

With regard to daily activities at Osprey Beach, the tool types collected by the Museum of the Rockies are suggestive of a variety of tasks, from projectile point and biface manufacture to the production of wooden shafts and, possibly, the preparation of animal hides. The use of the area was likely seasonal and limited to the spring to fall time of the year. The projectile point sample represents not only Cody peoples, but also other contemporaneous groups traveling from the plains and intermountain basins and foothills to Yellowstone—a seasonal subsistence and settlement pattern that continued throughout the Precontact Period.

Finally, plans for future research at the Osprey Beach locality include additional evaluative excavation to determine the horizontal extent of the site and to mitigate the negative effects of continual landform erosion. Not only will an additional field program stabilize this ancient and highly significant site, but it will also contribute to a better understanding of Yellowstone's distant cultural past. This, we believe, can only enhance the Yellowstone National Park experience for its employees and visitors.

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References

Bonnichsen, R., M. Beaty, M.D. Turner, J.C. Turner, and D. Douglas. 1992. Paleoindian lithic procurement at the South Fork of Everson Creek, southwestern Montana: a preliminary statement. In *Ice Age Hunters of the Rockies.* D.J. Stanford and J.S. Day, eds. Niwot, Colo.: Denver Museum of Natural History and University Press of Colorado, 285–321.

Cannon, K.P., G.M. Crothers, and K.L. Pierce. 1994. Archeological investigations along the Fishing Bridge Peninsula, Yellowstone National Park, Wyoming: The archeology, geology, and paleoenvironment. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, Yellowstone National Park, Wyoming.)

———. 1996. Archeological investigations along the Arnica Creek to Little Thumb Creek section of the Grand Loop Road, Yellowstone National Park, Wyoming. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, National Park Service, Rocky Mountain Region, Denver, Colorado.)

Cannon, K.P., K.L. Pierce, P. Stormberg, and M.V. MacMillan. 1997. Results of archeological and paleoenvironmental investigations along the north shore of Yellowstone Lake, Yellowstone National Park, Wyoming: 1990–1994. Unpublished report. Lincoln, Neb.: Midwest Archeological Center. (On file, Yellowstone National Park, Wyoming.)

Davis, L.B., S.A. Aaberg, and A.M. Johnson. 1992. Archaeological fieldwork at Yellowstone's Obsidian Cliff. *Park Science* 12:2, 26–27.

Davis, L.B., S.A. Aaberg, and J.G. Schmitt. 1995. *The Obsidian Cliff Plateau Prehistoric Lithic Source, Yellowstone National Park, Wyoming.* Selections from the Division of Cultural Resources no. 6. Denver: Rocky Mountain Region, National Park Service.

Davis, L.B., S.A. Aaberg, W.P. Eckerle, J.W. Fisher, Jr., and S.T. Greiser. 1989. Montane Paleoindian occupation of the Barton Gulch Site, Ruby Valley, southwestern Montana. *Current Research in the Pleistocene* 6, 7–9.

Dick, H.W., and B. Mountain. 1960. The Claypool Site: A Cody Complex site in northeastern Colorado. *American Antiquity* 26:2, 223–235.

Dyck, I.G. 1977. *The Harder Site: A Middle Period Bison Hunter's Campsite in the Northern Great Plains.* National Museum of Man Mercury Series, Paper no. 67. Ottawa, Ont.: National Museums of Canada.

Forbis, R.G., and J.D. Sperry. 1952. An Early Man site in Montana. *American Antiquity* 18, 127–137.

Frison, G.C. 1984. The Carter/Kerr-McGee Paleoindian Site: cultural resource management and archaeological research. *American Antiquity* 49, 288–314.

———. 1991. *Prehistoric Hunters of the High Plains.* 2nd ed. New York: Academic Press.

———. 1992. The foothills-mountains and the open plains: the dichotomy in Paleoindian subsistence strategies between two ecosystems. In *Ice Age Hunters of the Rockies.* D.J. Stanford and J.S. Day, eds. Niwot, Colo.: Denver Museum of Natural History and University Press of Colorado, 323–342.

———. 1997. The Foothill-Mountain Late Paleoindian and Early Plains Archaic chronology and subsistence. In *Changing Perspectives of the Archaic on the Northwest Plains and Rocky Mountains.* M.L. Larson and J.E. Francis, eds. Vermillion, So. Dak.: University of South Dakota Press, 85–104.

Frison, G.C., and R. Bonnichsen. 1996. The Pleistocene-Holocene transition on the Plains and Rocky Mountains of North America. In *Humans at the End of the Ice Age: The Archaeology of the Pleistocene–Holocene Transition.* L.G. Straus, B.V. Eriksen, J.M. Erlandson, and D.R. Yesner, eds. New York: Plenum Press, 303–318.

Frison, G.C., and L.C. Todd, eds. 1987. *The Horner Site: The Type Site of the Cody Cultural Complex.* New York: Academic Press.

Fulgham, T., and D.J. Stanford. 1982. The Frasca Site: a preliminary report. *Southwestern Lore* 48, 1–9.

Haspel, H., and G.C. Frison. 1987. The Finley Site bison bone. In *The Horner Site: The Type Site of the Cody Cultural Complex.* G.C. Frison and L.C. Todd, eds. New York: Academic Press, 475–491.

Irwin-Williams, C., H.T. Irwin, G. Agogino, and C.V. Haynes, Jr. 1973. Hell Gap: Paleo-Indian occupation on the High Plains. *Plains Anthropologist* 18, 40–53.

Knudson, R. 1983. *Organizational Variability in Late Paleo-Indian Assemblages.* Reports of Investigations no. 60. Pullman, Wash.: Laboratory of Anthropology, Washington State University.

Moss, J.H., K. Bryan, G.W. Holmes, L. Satterthwaite Jr., H.P. Hansen, C.B. Schultz, and W.D. Frankforter. 1953. *Early Man in the Eden Valley.* Museum Monographs no. 6.

Philadelphia: University of Pennsylvania.
Stanford, D.J. 1999. Paleoindian archaeology and Late Pleistocene environments in the Plains and southwestern United States. In *Ice Age Peoples of North America: Environments, Origins, and Adaptations of the First Americans.* R. Bonnichsen and K.L. Turnmire, eds. Corvallis, Ore.: Center for the Study of the First Americans, 281–339.
Stanford, D.J., and J. Albanese. 1975. Preliminary results of the Smithsonian Institution excavation at the Claypool Site, Washington County, Colorado. *Southwestern Lore* 41, 22–28.
Wheat, J.B. 1979. The Jurgens Site. *Plains Anthropologist*, Memoir no. 15.

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Yellowstone Lake as Seen by Artists

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Abstract

The title of the Sixth Biennial Scientific Conference on the Greater Yellowstone Ecosystem rhetorically asks, "Yellowstone Lake: Hotbed of Chaos or Reservoir of Resilience?" Although geologists know that Yellowstone Lake was the focal point of an ancient cataclysmic volcanic eruption, the subsequent evolution of the caldera into a landscape of quiescent sublimity is the immediate reality apparent to human visitors. The igneous prehistory of the lake region, coupled with its guardian cordon of volcanic peaks even older, set the stage for a revelation. For here, out of nearly unimaginable chaos, nature has reconfigured itself into a land of resplendent harmony. From lake's verge the human eye is allowed to encompass an inland sea set upon the apex of an immense plateau, and the universal response is a declaration of transformative beauty. Artists have long sought to distill the ethereal essence of Yellowstone Lake, and thereby have played a role in establishing it as one of the brighter jewels in the crown called Yellowstone.

This paper shall attempt to analyze the historical role played by key visual artists of Yellowstone Lake in the development of the park. Specifically, what influence was wielded by Yellowstone's first two prominent artists, Thomas Moran and William Henry Jackson, in the park's formative years? Secondly, a brief examination of the written record left by park visitors will demonstrate that their characteristic emotional response to the lake was the template for artists. As a species, we share in common a reverence for the grand vista of earth, water, and sky made so accessible from the environs of Yellowstone Lake. Lastly, this paper will record the personal impressions made by Yellowstone Lake upon this author during his numerous photographic forays about the periphery of this noble body of water. That Yellowstone Lake has always becalmed its viewers with the vast scale of its geographical expanse and frequently excited them with its intriguing interplay of water against land along its endless shoreline, are propositions that appear well-founded. That this array of natural forces should beckon and challenge the visual artist seems self-evident.

Influence of Moran, Jackson, and Other Artists

Thomas Moran. Yellowstone Lake, being the largest single feature on the plateau, was well known to the fur trappers and gold prospectors who penetrated this wilderness highland prior to the discovery expeditions which commenced in 1869. Since artistic talent was not a prerequisite for trapping and prospecting, however, these men left no artwork commemorating their peregrinations. The first attempts by Euroamericans to delineate artistic impressions of Yellowstone

onto paper were executed by Private Charles Moore and Henry Trumbull—military and civilian members, respectively, of the 1870 Washburn Expedition. Their primitive pencil sketches, while lacking textural finesse and depth perception, remain valuable primary documentation. Unfortunately, none of the extant Moore or Trumbull sketches housed in the Yellowstone National Park archives depict Yellowstone Lake. This gap in the pictorial record is as notable as it is regrettable, for surely these two men made sketches of the lake during their twelve-day near-circumlocution of it. Three diaries in the party lauded the beauty of the lake and noted that all members of the party were enthralled by the force of its character.

The first published image of Yellowstone Lake was, nonetheless, a derivative of the 1870 Washburn Expedition. A member of this party, Nathaniel P. Langford, wrote the first major article on Yellowstone to receive national distribution. Entitled "The Wonders of Yellowstone," it was published in the May and June, 1871, issues of *Scribner's Monthly.* Being an important illustrated periodical of its day, the magazine's editors charged Thomas Moran, a talented and well-trained artist on their staff, to rework the Moore and Trumbull sketches into higher-quality images. Moran rendered the original pencil drawings into black and white washes on paper, and then skilled engravers transposed Moran's pictures into reproducible engravings. Thus, the American public was given "On Guard on Yellowstone Lake," a 7 x 9-cm image of a man on night guard reposing on the bank of Yellowstone Lake with a poorly constructed log raft plus sail in the background. Although this engraving does not bear Thomas Moran's "T.M." signature and does bear the engraver's initials "F.S.," circumstantial evidence points to the hand of Moran. While the title of this image bears the lake's name, its subjugation to the background hardly does justice to the lake's manifest importance. The world would have to wait eight months.

The task of improving upon the Moore and Trumbull Yellowstone sketches must have stimulated Moran, for a year later he readily accepted an invitation to accompany Ferdinand Hayden's 1871 government-sponsored survey of Yellowstone as a guest artist; the official survey artist was Henry Wood Elliott. Moran's expenses were paid by the railroad financier Jay Cooke in the form of a $500 loan—to be paid black by Yellowstone artwork. Also accompanying the entourage was the survey's official photographer, William Henry Jackson, a man whose medium and mentality were sufficiently compatible with those of Moran's to make them mutually supportive artists. Their collaborative efforts in Yellowstone were symbiotic. Moran, using his well-honed sense of composition, assisted Jackson in the selection of camera positions. In return, Jackson gave Moran photographs that would serve as vital field sketches for later studio paintings (augmenting the painter's own fieldwork). Indeed, Moran recounts in his diary that when the expedition was encamped upon Yellowstone Lake, he "sketched but little but worked hard with the photographer selecting points to be taken etc." This professional and personal affinity between Yellowstone's two primary artists was forged upon their coincidental union in 1871 and lasted until Moran's death in 1926. Each benefited, as did the nation.

When Hayden returned to Washington, D.C., in the autumn of 1871, he petitioned Congress to pass a bill establishing the Yellowstone region as America's first national park. Not only did Hayden employ the oral and written word in this campaign, he adduced the powerful visual testimony of Moran's watercolors and Jackson's photographs as proof of Yellowstone's astounding reality. Enough circumstantial evidence exists to ascertain that the public presentation of Yellowstone art, as rendered by Moran and Jackson, was an important factor in the founding and early promotion of Yellowstone National Park, although modern scholars deplore the paucity of documentation for this assertion. Since the scope of this paper is limited to the art of Yellowstone Lake, scrutiny will be focused upon the images of the lake by Moran and Jackson.

Because the background appearance of Yellowstone Lake in Moran's 1871 engraving "On Guard on Yellowstone Lake" is so inconsequential and is an injustice to the lake's undeniable glory, the honor of the first published artworks to fairly portray Yellowstone Lake for a national audience belongs to the two Moran engravings in Ferdinand Hayden's article "The Wonders of the West II, More About the Yellowstone," which appeared in the February 1872 issue of *Scribner's Monthly* on pages 392 and 394. The first image, measuring 6x6 cm and entitled "The First Boat on Yellowstone Lake," depicts the Anna, a 12-ft dinghy which transported Elliot, the survey's official artist, to the newly christened Stevenson Island. The second image, measuring an elongated 5x12 cm and entitled "Yellowstone Lake," depicts a handsome view of the lake from a northerly shoreline toward the mountains which ring it to the south and east (Figure 1). Moran's mastery of compositional complexity, tonal contrast, and visual drama are amply displayed in all eleven expertly printed images in Hayden's article. This panoramic lake engraving begins with foreground vegetation, follows mounted riders down to an extending sand spit, conveys the viewer to an island, extends one's eye to distant mountain serrations, and concludes with a sunset sky punc-

*Figure 1. This engraving by Thomas Moran was the first published image (*Scribner's Monthly, *February, 1872) to fairly depict Yellowstone Lake.*

tuated by a formation of migrating waterfowl.

At last the public had an image to match Hayden's words, which he published soon thereafter in his 1872 *Preliminary Report of the United States Geological Survey of Montana and Adjacent Territories:*

> On the 28th of July we arrived at the lake, and pitched our camp on the northwest shore, in a beautiful grassy meadow or opening among the dense pines. The lake lay before us, a vast sheet of quiet water, of a most delicate ultramarine hue, one of the most beautiful scenes I have ever beheld. The entire party were filled with enthusiasm. The great object of all our labors had been reached, and we were amply paid for all our toils. Such a vision is worth a lifetime, and only one of such marvelous beauty will ever greet human eyes.

The same two Moran engravings were reproduced in Hayden's 1872 report at a lesser technical quality and size.

Moran's talents for rendering Yellowstone Lake were again pressed into service for the art journal *Aldine,* a large folio magazine (29 x 42 cm) which was published between 1869 and 1879. The journal took pride in producing the finest wood engravings of the day, including a total of thirty-nine by Moran, and fervently stoked American enthusiasm for western landscape imagery. The April 1873 issue presented a laudatory piece entitle "The Yellowstone Region," and was illustrated with five outstanding Moran engravings. The author of the article states, "But we must not forget the brightest jewel of this wonderful park—the Yellowstone Lake," and praises Moran's illustrations for their ability to "open to us a world as wild as the one we see in dreams,—a strange and beautiful wonderland." The second view in the article, "Yellowstone Lake," is a masterful panorama measuring 9 x 23 cm; it improves upon his *Scribner's* image by being larger and with more contrast, including a forest fire plume "moved" to the Promontory for heightened dramatic effect (Figure 2). This latter stratagem illustrates Moran's admitted use of artistic license: he often united in one picture disparate but realistic elements not conjoined in nature.

Figure 2. Thomas Moran idealized and rearranged nature (like moving a forest fire to the lake's edge) in order to delineate greater truths about Yellowstone. Engraving appeared in Aldine, *April, 1873.*

A year after he returned from the 1871 Hayden expedition, Moran agreed to execute a series of sixteen watercolors for the British industrialist William Blackmoore, who had accompanied Hayden in 1872 on his second surveying expedition to Yellowstone. Among the set, now owned by the Thomas Gilcrease Institute of Tulsa, Oklahoma, is "Yellowstone Lake with Hot Springs." This panoramic-proportioned watercolor primarily focuses upon the prismatic thermal features of Thumb Geyser Basin. The serene lake and the stately Absaroka Mountains which rim it are coolly rendered in sunset purple and mauve as an attractive complement to the brilliant yellows, whites, and oranges of the thermal formations. To those evening loiterers on the western shore of Yellowstone Lake, this sunset coloration upon the waters and peaks will ring true. These watercolors were displayed at Goupil's Gallery in New York before their shipment to England.

For Moran's finest delineation of Yellowstone Lake, however, we must turn to a tripartite project by Hayden, Louis Prang, and the artist himself. Within one year of Moran's return to the East Coast, he accepted a commission to paint a set of watercolors for vibrant chromolithographic reproduction by Prang, America's most skilled lithographer. In today's world, saturated with color reproduction, it is hard to contemplate the enormous cultural change set loose in mid-nineteenth century by this technology that made color imagery available for wide audiences. Hayden was enlisted to write the supportive text. *The Yellowstone National Park, and the Mountain Regions of Portions of Idaho, Nevada, Colorado and Utah* (1876) presented fifteen vividly colored images of the American West. One thousand copies of the edition were produced, selling for $60.00 each. At last a general audience could appreciate the artistic wonders of the Yellowstone region inclusive of its most crucial parameter—color. As Hayden opined in his preface:

> All representations of landscape scenery must necessarily lose the greater part of their charm when deprived of color; but of any representation in black and white of the scenery of the Yellowstone it may truly be said that it is like Hamlet with the part of Hamlet omitted, for the wealth of color in which nature has clothed the mountains and the springs of that region constitute one of the most wonderful elements of their beauty.

The fifth plate of the Prang chromolithographs is entitled "Yellowstone Lake, Yellowstone National Park" (Figure 3). Into it Moran poured all of his classical, thematic artifices: depth perception by near, intermediate, and distant subject matter; opulent color contrast between ochre highlights and marine blue and burnt umber darks; a Turneresque atmosphere convulsed by a thunderstorm whose virga intersects an arching rainbow; and the animation of flocks of birds on near waters and in distant sky. As a statement of Edenic wildness and spacious reach to near-infinity, this view looking far into the Southeast Arm of Yellowstone Lake could hardly be surpassed.

The foregoing chromolithograph of Yellowstone Lake illustrates Moran's standard artistic practices. During his 1871 journey through Yellowstone, he executed quick watercolor field sketches, first employing pencil to establish con-

Figure 3. Perhaps the finest artistic depiction of Yellowstone Lake is this 1876, full-color chromolithograph by Thomas Moran.

tours, and then overlaying these outlines with broad, brilliant washes to record coloristic effects. Back in his studio in Newark, New Jersey, he would refer to Jackson's photographs for accuracy of detail when composing a more refined and elegant artwork. Moran, under the strong influence of the English critic John Ruskin and the famous British painter J.M.W. Turner, sought not an exact replication of the thing in nature, but a conveyance of its mood and impression upon the human spirit. Moran praised Turner when he wrote that Turner "sacrificed the literal truth of the parts to the higher truth of the whole." Speaking of himself, Moran wrote:

> I place no value upon literal transcriptions of Nature. My general scope is not realistic; all my tendencies are toward idealization. Of course, all art must come through Nature: I do not mean to depreciate nature or naturalism, but I believe that a place as a place, has no value itself for the artist only so far as it furnished the material from which to construct a picture. Topography in art is valueless.…[W]hile I desire to tell truly of Nature, I did not wish to realize the scene literally, but to preserve and to convey its true impression.

In Moran's lake painting the view seems to be from the northeast shore looking southward up the Southeast Arm, with Colter Peak in the left background, while incorporating foreground elements from a Jackson photograph. Yet, the Absaroka Mountains, which lie to the south of the lake in Moran's picture, actually reside to the east; nor can one look south and see a rainbow (because the sun must be at a low altitude behind the observer to the north, which does not happen in Yellowstone). Yet these are quibbles, for all adventurers familiar with Yellowstone Lake will recognize these natural elements, and accept with full

consent their synthesis by Moran into an organic, idealized whole.

William Henry Jackson. At Moran's side on the 1871 Hayden survey was the preeminent frontier photographer William Henry Jackson. As previously mentioned, these two men forged an informal partnership that abetted their goal of visually recording the Yellowstone region, each in his own medium. The Hayden party's route, encircling Yellowstone Lake counterclockwise from Thumb to the outlet, gave Jackson ample opportunity to photograph the lake from numerous points.

Unlike that which is produced with facile modern cameras, photography with the nineteenth-century view camera was a cumbersome and complex process. The bulk and weight of a wooden camera, a portable darkroom with chemicals, and fragile glass negative plates, required the services of a trusty mule (disposition not always guaranteed). After unpacking, the photographer would first erect his camera upon a tripod. The task of carefully focusing the inverted image upon the ground glass at the rear of the camera, while the operator hovered under a hot, opaque darkcloth as he wrestled with the upside-down image, was laborious. Because wet-plate technology was yet to be invented—and then superseded by dry-plate technology (not to mention flexible and unbreakable celluloid film)—the photographer had to set up a darkroom tent, prepare the chemicals, coat the glass plate, and then quickly repair to the camera before the plate dried. Furthermore, film speed was so slow—on the order of many seconds—that the motion of water, steam, smoke and animals would be registered as a blur. After exposure, the glass negative had to be developed in the portable darkroom, and thereafter carefully transported hundreds of miles back to a studio for the production of a positive print. A final impediment was the orthochromatic sensitivity of film emulsion in the 1870s, which caused atmospheric blue to overexpose and hence yield a blank white sky devoid of the fascinating interplay of cloud against sky so often visible above Yellowstone Lake. When the plethora of technical challenges are considered, Jackson's trove of three hundred images from the 1871 Yellowstone expedition is rightly seen as a monumental achievement.

This discussion of Jackson's photographs of Yellowstone Lake will be restricted to those readily available to the public. In Aubrey L. Haines' tome *The Yellowstone Story*, Volume 1 (1977), three 1871 Jackson photographs are reproduced on pages 143 and 147. The first, "A Camp of the Hayden Survey Party on Yellowstone Lake, 1871," is a well-composed view of their camp on the east side of the lake. Next, "The Anna, First Boat on Yellowstone Lake, 1871," is the source of the wood engraving of the same in *Scribner's Monthly,* February 1872. Lastly, "The Hayden Survey Camp on Mary Bay, August 19, 1871," is an artful overview of what they called "earthquake camp" in remembrance of a tremor that perceptibly shook them the night of August 22, 1871 (Figure 4). All these images typified the artistic convention of placing human beings in the scene to establish scale in an alien landscape, and to perhaps suggest that the human presence in this Eden was the natural progression of our destiny.

Other 1871 Jackson images of the lake country worthy of note include "Peale

Figure 4. This 1871 panoramic view of "Earthquake Camp" on Mary Bay is a fine example of photographer William Henry Jackson's sense of composition.

Overlooking Yellowstone Lake and Promontory Point," which is reproduced in *Yellowstone and the Great West,* edited by Marlene D. Merrill, 1999, page 160. "Yellowstone Lake, Looking South from Where the River Leaves It," reproduced in *William Henry Jackson and the Transformation of the American West* by Peter B. Hales, 1988, page 107, is a panoramic view looking southeastward, with a conspicuously blank white sky. "Mary Bay, Yellowstone Lake," reproduced in *Yellowstone Science,* Volume 8, Number 1, Winter 2000, page 8, presents the chastely beautiful, elongated curve of this northern indent. Lastly, a person may view, at the Horace Albright Visitor Center at Mammoth, Yellowstone National Park, an original 1871 Jackson albumen print of Yellowstone Lake form the northeast shore looking southward—which was Moran's inspiration for his grand chromolithograph of the lake. Jackson's albumen print amply demonstrates that a vintage print created by the hand of the photographer is immeasurably superior to a modern book reproduction—especially when the former is matted and framed. These Jackson photographs, while unquestionably imbued with a documentary component, may be classified as works of art when seen in the original. Jackson exhibited great skill in selecting views with compositional merit and textural detail, and demonstrated complete mastery of the technical aspects of his medium. Indeed, scores of Jackson images were copied by engravers of the 1870s and 1880s for wide distribution in popular magazines, illustrated newspapers, and scientific reports. For two decades significant numbers of mass-circulated Yellowstone images were derivatives of his outstanding photographs.

The paintings of Moran and the photographs of Jackson set the standard for all artists to follow. The work of each artist complemented the other, with the former emphasizing the resplendent colorations and mythic views to be found

throughout Yellowstone, while the latter utilized the pencil-sharp eye of the camera to etch a crystalline record of Yellowstone's truth that none could dispute. They each saw the lake and sought to return to civilization with their proof of what nature had wrought—one of the most sublime spectacles in the American West. Moran and Jackson would agree, however, that the reality always remained beyond transcription, and must be experienced for the fullest realization.

Other artists. As noted above, Henry Wood Elliott, a contemporary of Moran and Jackson, was the official artist of the 1871 Hayden Survey. This was Elliott's third summer as Hayden's paid artist, and his benefactor complimented him in his 1870 report: "[T]he artist, Elliott, worked with untiring zeal, and his sketches and sections have never been surpassed for clearness or beauty." Elliott made numerous pen-and-ink sketches, plus pencil sections, of the Yellowstone scenery through which the party traversed and many of these informative, if crude, sketches illustrated Hayden's 1871 report. Hayden informs us in his "Letter to the Secretary" that "Messrs. Elliott and [Campbell] Carrington surveyed and sketched its [Yellowstone Lake's] shore-lines from the water in a boat." However, when Hayden presented his report to the public, Moran's two engravings—not Elliott's—comprised the Yellowstone Lake illustrations. This subtle elbowing of Elliott to the side by the publication of Moran's lake images suggest that Hayden felt the latter's artwork was superior.

One fine watercolor image of the lake by Elliott has survived: "Yellowstone Lake," 25 x 50 cm, completed in 1871; it is reproduced in *The Rocky Mountains: A Vision for Artists in the Nineteenth Century* by Patricia Trenton and Peter Hassrick, 1983, p. 188. This finely detailed watercolor is claimed by Trenton and Hassrick to have been painted on the spot, but that is unlikely because of the exigencies of survey work. A more plausible scenario is that Elliott painted it later, with a copy of Jackson's photograph no. 268—which it closely resembles—and his own geographical sketches close at hand. One manipulation in this picture bears mentioning: the clouds are backwards. Because the Absaroka peaks, Southeast Arm, Flat Mountain, and Mount Sheridan are correctly rendered on the distant horizon, there is no doubt that the view is southward. Yet, the high-altitude cirrus "mares'tales" are drifting from the southeast, a full ninety degrees off their obligatory course from the southwest. If Moran can move rainbows, can Elliott move clouds? Elliott's lake painting is the quintessential classical view of untrammeled nature awaiting the appreciation of Western Man. This well-executed image of Yellowstone Lake demonstrates Elliott's finer talent, and contrasts markedly with the draughtsman style that he utilized when rendering topographic and geologic scenes.

Four other photographers of Yellowstone Lake deserve to be mentioned. The first one is actually a null set, for August F. Thrasher, a contemporary of Jackson, regrettably left no extant images. He actually photographed the lake in 1871, while participating in the first tourist excursion of Yellowstone. His cohort Rossiter Raymond recalled in his 1880 autobiography *Camp and Cabin* that "Thrasher was wild with enthusiasm about the views to be obtained from every point around the lake; and it took the whole company to tear him away from each

successive promontory. By judiciously indulging him on occasions of peculiar importance, however, we succeeded in bringing him to the outlet…"

The second and third photographers, the father and son dynasty of F. Jay Haynes and Jack E. Haynes, probably sold more images of Yellowstone Lake than anyone because of their long tenure as owners of the most popular photo concession in the park. They mass-marketed a number of lake images as color postcards, such as "Yellowstone Lake and Mt. Sheridan," and "Yellowstone Lake and Colter Peak" (Figure 5), as well as larger, framable reproductions of the same. Not surprisingly, these views are "picture postcard perfect." Is it too unkind to say that the artistic quality of their lake views bears no relationship to the number sold? The fourth artist worthy of mention is America's foremost black-and-white landscape photographer, Ansel Adams. In 1941 and 1942 Adams was employed by the U.S. Department of Interior to photograph the western national parks for a mural project at the department's new museum in Washington, D. C. His three Yellowstone Lake images, first reproduced in *The Mural Project* by Peter Wright and John Armor (1989), are the epic land, water, and sky photographs for which he is justly famous. Adams' photograph "The Fishing Cone, Yellowstone Lake" illustrates a photographer's need to incorporate other objects in a lake view (Figure 6).

Figure 5. "Yellowstone Lake and Colter Peak" was a 1934 black-and-white image by Jack E. Haynes that was colorized and reproduced endlessly as a postcard.

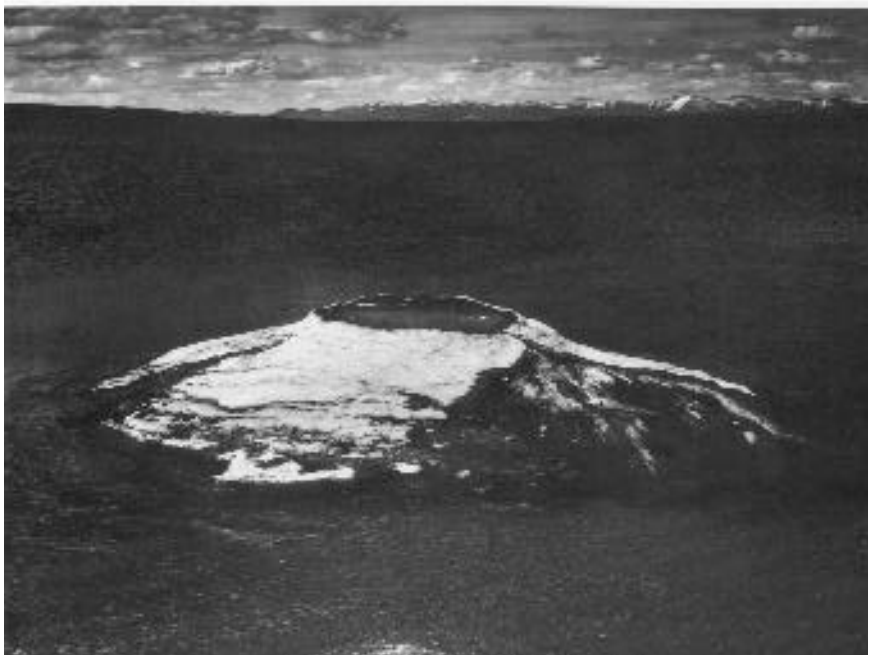

Figure 6. Ansel Adam's 1941 "The Fishing Cone, Yellowstone Lake" illustrates a photog - rapher's need to incorporate other objects into the monotony of vast water scene.

Common Emotional Response

Artists who portray Yellowstone Lake in their chosen medium are responding to emotional tides which pull at the psyche of all human beings when confronted with sizeable bodies of water. Who among us is immune to wonder when first embracing the expansive view of an inland sea surrounded by soaring mountain peaks—especially after traversing a forest? Who among us cannot be mesmerized by the unceasing play of wave against sandy beach or rocky point? Who among us can ignore the intricately patterned and ever-changing motion of cloud against sky when the heavenly vault is presented so fully above water's horizon? Who among us is not enthralled when strong winds pour forth from unobstructed miles to whip water into frenzied, frightening motion? And who among us is incurious at the detritus, organic or inorganic, found afoot when walking along a shoreline? These emotional drivers common to all humanity are the motive forces to which artists respond, and not unreasonably so—for water is our lifeblood. If talent could be purchased for a halfpence, would not we all be artists of Yellowstone Lake?

Essayist Loren Eiseley once observed, "If there is magic on this planet, it is contained in water." Surely the waters of Yellowstone Lake possess this magic, for almost every diarist and travel writer who has submitted himself to the pleasures and vagaries of this inland sea speaks of its power in superlatives. The lake's allure draws visitors to its shores with irresistible magnetic force. Its many facets

elicit imaginative comparisons and analogies, in order to give those who have not experienced it some relative semblance of its character. Words dissolve into word paintings as writers tax their vocabulary. Yellowstone Lake becomes the largest, highest, most sublime mountain lake in America, with jeweled shores rimmed by gloried, snow-clad mountains, and beset by magnificent storms. With utmost regret pleasure seekers leave this locale, remember it dearly, and perhaps find it eclipsed only by the incomparable Grand Canyon of the Yellowstone. Indeed, tour operators during the first half-century of the park's existence carefully orchestrated the route of their clients from the geyser basins to the lake, and thence to the denouement, the Grand Canyon.

The enumeration and quotation of the many well-written and heartfelt descriptions of Yellowstone Lake penned by its legion of lovers would be too lengthy for this paper. Various authors have adulated Yellowstone Lake as "a great sapphire," "a lake among lakes," "a scene of transcendent beauty," "the glory of the Park," and "without doubt the most wonderful and beautiful body of water in the world," to excerpt but a few of their key phrases. The one deemed this author's favorite will be reproduced, realizing that its grandiloquent literary style is out of vogue. Yet, its power of suasion remains. Wrote Calvin C. Clawson in his newspaper *The New North-West* on 27 January 1872:

> Thus for the greater part of two days we watched anxiously from every point and through every opening for the first glimpse of the great and wonderful lake. We were at last rewarded for all the troubles and dangers of the journey, when, from a high hill, on which was an open space in the timber, we looked down upon and out over the grand and beautiful water, clear as glass of finest finish, lying calm and still as death in the evening sun. The like of
>
> YELLOWSTONE LAKE
>
> has not yet come under the eye or within the knowledge of civilized man. The curious and marvelous sights that encircle it; the wondrous beauty of the mighty peaks that overshadow it as they stand arrayed in gorgeously painted garments of red and purple and yellow, like gigantic sentinels guarding the precious treasure entrusted to their care and keeping; its romantic shores, fringed with forests of richest green, which the frosts of winter or the heats of summer cannot fade; the unequaled beauty of its outline—all unite to enveil it in an unnatural, indescribable appearance; unlike any other spot or place seen or heard of—as if not of this world—something spiritual, beyond the reach of pen or tongue. The eye must behold the glory thereof to believe;
>
> And even then,
> Doubting, looks again.

Personal Observations on Photographing the Lake

I have been photographing Yellowstone National Park with an 8 x 10-inch field view camera since 1990, exposing over 3,000 images. On numerous occasions, including a five-day circumnavigation by canoe of the Southeast Arm, I have brought my equipment and energies to bear upon the task of recording the multifaceted aspects of Yellowstone Lake.

With Yellowstone Lake's undeniable beauty apparent from every vantage point, one would think that successful photography of the lake's charms would be an easy process. However, the achievement of a high-quality, fine-art, black-

and-white photograph remains an elusive goal, one whose attainment requires substantial labor, constant experimentation, and a measure of luck. That rare print of brilliant excellence sits atop a pyramid of massive effort and countless failures of vision. Every image focused upon the ground glass contains the potential of being that great picture, yet victory is seldom attained.

What are the challenges that face a large-format photographer as he stalks the lake? Weather is one crucial and contentious factor which aids and bedevils the view camera photographer, whose craft requires a substantial investment of time for set-up, focusing, exposure, record-keeping, and packing up. Special qualities of light and cloud may vanish in the twenty-minute period needed to prepare the camera for the click of the shutter. Thus, optimum conditions must either be anticipated, or, more usually, waited for patiently. Clouds, shadows, and sunbeams are vital ingredients in a waterscape, but they are most capricious and uncontrollable. Furthermore, the atmospheric effects of violent rain storms over the lake are fascinating to witness, but a positive hindrance to the view camera operator, for wind shakes the camera unacceptably and blows dust into the film holders, while rain ruins sheet film and cannot be allowed to soak the camera's wooden body or leather bellows.

Another challenge facing the black-and-white landscape photographer as he or she contemplates the lake is the need for contrast. Since the vastness of water is often a featureless monotone, the photographer searches for tonal contrast by including textured clouds, pebbly beaches, rocky points, arching shorelines, contorted driftwood, treed headlands, and breaking waves. The skillful photographer attempts to unite some of these elements into a dynamic whole.

Because the lake is a panoramic phenomenon, the photographer is tempted to retreat from its shoreline to gain a broader perspective. As the photographer recedes from the lake to nearby elevated buttes or mountains (such as Lake Butte, Elephant Back Mountain, Jones Pass, Langford Cairn, or the Promontory), a greater breadth of view is obtained, but at a price. Such panoramic vistas excite the eye and mind, and are truly memorable, but attendant atmospheric haze borne of moisture or particulate matter can degrade the picture's detail and contrast. This attenuation can lead to unattractive muddy gray tones, as distant islands, shores, and ridges fade into semi-obscurity. The high and grand view challenges the photographer's skill and medium.

This photographer has engaged Yellowstone Lake at four locales: Pumice Point, Storm Point, the mouth of Cub Creek, and the Southeast Arm. Pumice Point (a road stop) was photographed on a chill, autumnal day, and remains vivid for its austere and dark ambience. Storm Point (a short day hike) is a dramatic lunge of rock against water, where the full force of southwesterly gales is spent. From its eminence I was able to photograph the white volcanic strata that wave action has so masterfully sculpted along Yellowstone Lake's north shore (Figure 7). Incidentally, the embankment of rocks shown in the background of this scene is marbled with the most striking swirls of blue, indigo, maroon, and violet colors I have ever witnessed in nature. At the mouth of Cub Creek (a short day hike), nature has strewn about a speckled, pebbly beach the refuse of its never-ceasing

Figure 7. Storm Point and the northeast shoreline offer needed contrast to the lake's transparent waters in this 1996 view camera photograph by the author.

war against the east bank—undercut and toppled trees, bleached driftwood, and detached boulders of all dimensions. Close-up views of this debris can be most artistic. Lastly, the Southeast Arm (a multi-day canoe adventure) afforded this photographer a lengthy opportunity to experience and record the lake in its many wilderness moods. Morning calms, afternoon thunderstorms, high-elevation overviews from Langford Cairn and the Promontory are a few of the photogenic scenes witnessed. Every place and every hour on Yellowstone Lake was a unique glimpse into a grand beauty and fierce power on a scale seldom realized in our mundane lives. Recording these images in my mind was easy; upon my film, harder.

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Yellowstone Sand Verbena (Abronia ammophila): A Yellowstone Lake Endemic

Jennifer J. Whipple

Abstract

Yellowstone sand verbena, *Abronia ammophila* Greene, is restricted to stabilized sand sites that principally lie just above the maximum splash zone along the shoreline of Yellowstone Lake. A 1998 survey of the entire population found little more than 8,000 plants, most of which were seedlings. A summation of current knowledge regarding the life history of the species is presented, though many aspects still require further elucidation. Historical collections suggest that this species was more widely distributed around the lake in the early years after the park's establishment. The high level of human activity on the beaches, especially along the northern shoreline of the lake, may have resulted in the extirpation of the sand verbena from significant portions of its original range. The long-term survival of Yellowstone sand verbena is in doubt if the remaining sites are adversely affected. Strategies will be presented to help insure the continued survival of this unique endemic.

Introduction

Yellowstone National Park is known for the spectacular abundance of geysers and other geothermal phenomena and also as one of the premier places to see wildlife in the temperate zone. An overlooked and underappreciated component of the ecosystem on the Yellowstone Plateau is an endemic wildflower, Yellowstone sand verbena, *Abronia ammophila* Greene (Figure 1). According to park records, prior to this study the sand verbena was known to occur only along the northern shoreline of Yellowstone Lake. Yellowstone sand verbena is restricted to stabilized sandy sites that lie primarily just above the maximum splash zone along the shoreline of the lake.

Frank Tweedy in 1885 was the first Euroamerican to collect the sand verbena, at the mouth of Pelican Creek along the north shoreline of Yellowstone Lake. This specimen was originally identified as *Abronia villosa* (Tweedy 1886), a common purple-flowered species of the American southwest. Subsequently, Per Axel Rydberg looked at Tweedy's specimen and decided that the material from Yellowstone was sufficiently different to justify recognition as a unique species (Rydberg 1900) and named it *Abronia arenaria*. Archibald Menzies, though, had previously used this name for one of the maritime sand verbenas that occurs in sand dunes along the west coast of North America. E.L. Greene resolved the resulting problem by proposing the name *Abronia ammophila* (Greene 1900) for the Yellowstone species.

Figure 1. Abronia ammophila *in bloom.*

Treatments of the Yellowstone flora in the first half of the twentieth century continued to recognize the sand verbena as *A. ammophila* (Coulter and Nelson 1909; Conard 1928; McDougall and Baggley 1936, 1956). More recently, Yellowstone sand verbena was included within the widespread western species *A. fragrans* Nutt. ex Hook. by C. Leo Hitchcock and Arthur Cronquist in Vascular Plants of the Pacific Northwest (Hitchcock et al. 1964), which Despain then followed (Despain 1975). The monograph on *Abronia* by Galloway (Galloway 1975) reevaluated the Yellowstone material and resurrected *A. ammophila* as a unique species. Galloway included within his interpretation of *A. ammophila* material from Yellowstone National Park and also from sandy hills near Big Piney, Sublette County, Wyoming. Subsequent investigations have revealed that the specimens reported from Sublette County are now believed to be *A. mellifera* (Marriott 1993; Fertig et al. 1995; L.A. Galloway, personal communication). *A. ammophila* is now recognized to be a highly restricted endemic of Yellowstone National Park.

Even though Yellowstone sand verbena was described as an annual in the only recent monograph of the genus (Galloway 1975), the plants are clearly perennial, with a substantial taproot that can be more than 0.5 m in length in large individuals. The taproot is often vertically oriented and not highly branched. The prostrate plants are spread on the sand, rarely rising more than a couple of inches from the surface. Sticky glands are present everywhere on the plants except on

parts of the corolla, causing the plants to be covered in sand. The white flowers are in head-like arrangements of up to 20 separate flowers subtended by membranous bracts. During the bright sun of mid-day the flowers usually close, reopening again in the evening. Examination of the plants during the early 1990s revealed that flowering begins by the middle of June, and the plants continue blooming well into September until a killing frost occurs. The flowers may be sensitive to light levels, opening when light levels decrease, such as under heavy thunderclouds and in the evening, but the controlling mechanisms appear to be more complex since observations are confusing. Possible different hypotheses include responses to temperature or temperature change, wind speed, time of day, cloud cover, or a complex interaction of several factors.

Apparently the plants are pollinated by insects. Moths have been observed visiting flowers, but whether pollination is occurring is unknown. Observations of the plants revealed that fruits were first observed on 15 July in 1998. However, unlike many of its associated native species, *Abronia* continues to flower vigorously long after setting fruit. Seed set is sporadic, with many flowers not developing mature seeds. The flowers of several *Abronia* species do not appear to self-pollinate (Tillett 1967; L.A. Galloway, personal communication). Perhaps the extended blooming season for Yellowstone sand verbena is in part due to the very erratic presence of pollinators.

Seed dispersal may be facilitated by the sticky surface of the anthocarps. Some fruits accumulate in depressions in the sand where the wind has deposited them. The widely dispersed locations occupied by the sand verbena suggest that there is some effective method of seed dispersal, perhaps on the feet of gulls or waterfowl. Seed longevity in the seed bank is unknown.

One of the continual difficulties in determining the distribution of an unusual plant such as *A. ammophila* is the dilemma inherent in trying to determine the original distribution of the species. The most valuable records are old herbarium sheets that can be examined and found to be the species in question. Yellowstone National Park was the scene of a phenomenal amount of collecting during the last part of the nineteenth century as botanists flocked to see the new national park and the wonders that were being preserved. As a result, herbariums literally all over the world have material from Yellowstone National Park. The advent of the Worldwide Web and the efforts to make specimen data available in computer databases will eventually make it possible to search for *A. ammophila* specimens at many institutions. Meanwhile, locating specimens is difficult due to the time and expense involved with searching widespread collections.

The historical distribution of *A. ammophila* is uncertain, but clearly the species was more widely distributed in the past along the shoreline of Yellowstone Lake. Apparently, plants were present in the vicinity of the Fishing Bridge Museum in the 1920s. H.S. Conard made a collection of Yellowstone sand verbena on 23 June 1926 from “near Fishing Bridge Camp; Lake.” The Fishing Bridge campground was located at that time in the vicinity of what is now the current parking area near the Fishing Bridge Museum (Haynes 1928; Figure 2). Conard also mentions the habitat as being sandy dune. There are sandy dune

deposits stretching from near the outlet of the Yellowstone River to the mouth of Pelican Creek. Aven Nelson collected extensively in 1899 throughout Yellowstone National Park, including near the Lake Hotel on Yellowstone Lake. On 23 August, he collected Yellowstone sand verbena from "[o]n the sandy banks, near lake Hotel" (Nelson 1899). The closest extensive sand banks to the Lake Hotel would be the shoreline in the vicinity of the current Fishing Bridge development. Leo A. Galloway visited the west side of the mouth of Pelican Creek on 28 August 1968. In his field notes, he states that he was a quarter of a mile west of the mouth of Pelican Creek, where there were numerous small plants in the vicinity (L.A. Galloway, personal communication).

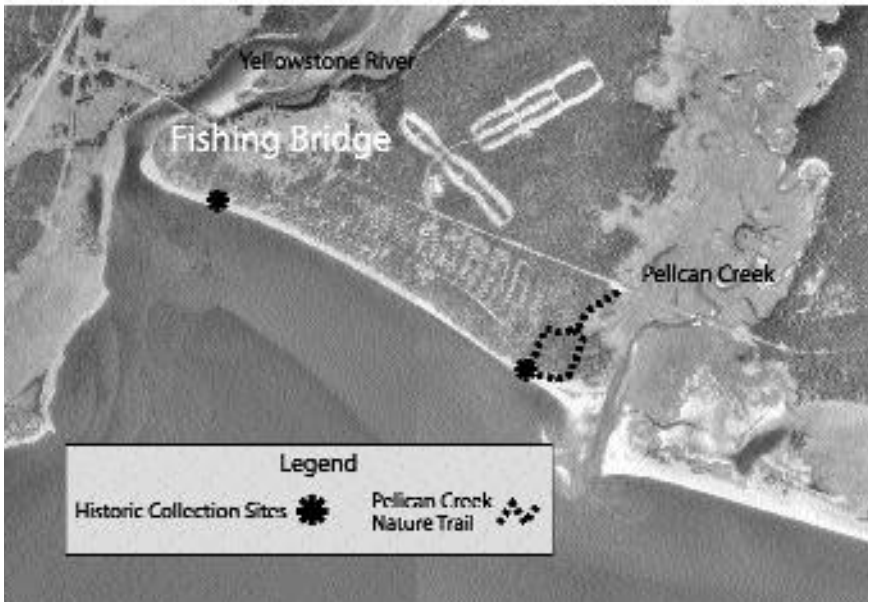

Figure 2. Map of known historical locations of Yellowstone sand verbena along the north shore of Yellowstone Lake.

Surveys during the early 1990s along the north shoreline of Yellowstone Lake revealed that there are no plants present from the mouth of Pelican Creek west to the outlet of the Yellowstone River. This area appears to represent good habitat for Yellowstone sand verbena, as documented by the historic collections of Nelson and Conard. Further east, Mary Bay may also at one time have supported a population of *A. ammophila*. No herbarium collections are known from this stretch of beach, but the habitat appears to be very similar to the occupied area from Storm Point to the east side of the mouth of Pelican Creek. Currently, the east entrance road is directly on top of the area that would be occupied by the sand verbena if it were present in the area. The construction of the road in the 1930s may have extirpated plants.

The Wyoming Natural Diversity Database maintains a list of plant species of

special concern for the state (Fertig and Beauvais 1999). *A. ammophila* is listed as a state endemic with a high conservation priority. The global and state ranks of the plant are G1/S1. This rank means that Yellowstone sand verbena is "critically imperiled," either because of "extreme rarity," which is defined as being known "from 5 or fewer extant occurrences or very few remaining individuals," or because "some factor of [the] species' life history makes it vulnerable to extinction" (Fertig and Beauvais 1999).

Yellowstone sand verbena was classified as a category 2 candidate for listing under the Endangered Species Act in the 30 September 1993 notice of review (U.S. Fish and Wildlife Service 1993). Category 2 includes those taxa for which information now in the possession of the U.S. Fish and Wildlife Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which sufficient data on biological vulnerability and threat are not currently available to support such a listing (U.S. Fish and Wildlife Service 1993). This category was eliminated by the U.S. Fish and Wildlife Service in 1996.

Yellowstone sand verbena does not have any official status under the Endangered Species Act at this time. Nonetheless, this endemic restricted to the shoreline of Yellowstone Lake certainly qualifies as a rare species that must be carefully managed. The limited distribution and relatively small number of plants increases the danger that the species could undergo a significant decline that could lead to its global imperilment, and necessitate its listing as either endangered or threatened under the Endangered Species Act.

With increasing evidence suggesting that at least part of the habitat had been adversely impacted, and the realization that *A. ammophila* was a highly restricted endemic within Yellowstone National Park, it became apparent that more information about the current status and distribution of the species was needed. A study was therefore initiated in 1998 to (1) survey all of the likely habitat along the shorelines of the major lakes within Yellowstone National Park for additional populations, (2) establish a permanent grid system at all known locations, and (3) count all individuals present.

Methods

Survey. Yellowstone Lake, as the site of the only known population, was the primary focus for the shoreline survey. All of the lake's 144 miles of shoreline, including Stevenson, Dot, Frank, and Peale islands, the two Molly Islands, and the unnamed island in the southwest corner of the South Arm, were systematically searched by foot, power boat, and canoe for *A. ammophila*. All locations where sand occurs were carefully investigated for the presence of sand verbena. The shorelines of Heart, Delusion, Duck, Riddle, Lewis, and Shoshone lakes were also searched by foot, canoe, or both. In total, 200 miles of shoreline were surveyed. Additional backcountry areas have been investigated opportunistically at scattered locations around Yellowstone Park.

The Shoshone Lake shoreline was surveyed by foot and canoe in July 1995. Yellowstone Lake and its islands, and Lewis, Delusion, Duck, and Riddle lakes were searched from mid-June to mid-September 1998. Several promising areas

of habitat on Yellowstone Lake were rechecked later in that summer, in case plants were late in emerging from the sand. The Heart Lake survey was conducted in August 1999. *Abronia*-occupied sites and areas of potential habitat were marked on U.S. Geological Survey 7.5-minute topographic quad maps. These sites were then mapped, using a Trimble Pro-XR global positioning system (GPS) unit that had meter to submeter accuracy with differential correction, and entered into the Yellowstone National Park Geographic Information System (GIS) database.

Census. Fieldwork for the census data was conducted during July and August 1998. A baseline of permanent points was established at all the sand verbena sites, with additional reference points placed outside of the baseline to aid in relocating the baseline if any points are lost through time (Whipple 1999). A list of all permanent reference points placed at the occupied sites, each point's UTM (Universal Transverse Mercator coordinate) as determined by GPS, bearings ahead (to the next point on the baseline), bearings to landmarks, and physical location description were documented. All permanent reference points were mapped using a Trimble Pro-XR GPS unit.

A grid of 1-m^2 cells was used to census the areas occupied by *Abronia.* A meter-tape was stretched between baseline points and a series of 1-m-wide rows perpendicular to the baseline was created with another meter-tape and string attached to survey stakes. A 1-m^2 quadrat was placed in a row and moved down a meter at a time, counting *Abronia* plants within each 1-m^2 plot. Each plot was denoted by its position in meters along the baseline and the number of meters north or south of the baseline. The position north or south of the baseline was denoted by letters. Areas between major groups of *Abronia* were subdivided into rows perpendicular to the baseline and several meters wide. The sections were searched and any isolated plants found were given a plot designation, using their distance along and from the baseline. The tape and string row boundaries were leapfrogged over each other so there were no gaps in coverage. Sites with only a few Yellowstone sand verbena plants were censused in a similar manner, though the orientation of the baseline could differ.

All rows and plots containing *Abronia* were photographed using 35-mm cameras with both color slide (Kodachrome 64) and black-and-white film. Horizontal format was used for individual plot photos and vertical format for rows. All photos were taken facing south, except that long rows were photographed from both the north and south ends. Photographs were taken from a position 1 to 2 m beyond the near edge of the subject plot or row, which was centered in the frame.

Yellowstone sand verbena plants were censused with four size/demography classes that were selected and defined on the basis of field observations. The classes are: recruit (<5 cm diameter, basal leaves only, no stem branching, no flowering); medium (<5 cm diameter, branching present, flowering or not); large (>5 cm but <30 cm diameter); and very large (>30 cm diameter).

Some of the larger plants have a mat-like morphology. Examination of *A. ammophila* exposed in a wave-cut slope found that stem branches can spread at least a decimeter in different directions from the top of the root, which may be

buried several decimeters deep in the sand. Since excavating most or all of a plant was not appropriate, determination of an individual was not always possible because impacts to the plants needed to be kept to a minimum. When determination of an individual was problematic, the most likely number of plants in a mat or clump was recorded followed by the maximum possible number, e.g., a plant that appeared to be one but could have been as many as three was recorded as 1(3). Final tallies therefore include a "most probable" total and a "maximum possible" total.

Plants were tallied in the plot in which they were rooted. Few plants fell directly on plot boundaries, but those that did were counted in the plot closest to the beginning (point 0) of the baseline. Dead plants were also tallied. A few *Abronia* were nearly dead and desiccated with a tiny amount of green tissue remaining; these were tallied as "dying."

Results

Survey. The field survey found three previously unknown *A. ammophila* sites on the shoreline of Yellowstone Lake: at Rock Point; at the unmarked fishing access near Pumice Point; and one isolated plant on the east shore of the South Arm of Yellowstone Lake (Figure 3). No *Abronia* was found on any of the islands in Yellowstone Lake or at any of the other large lakes. The four known Yellowstone sand verbena sites are all located on loose, unconsolidated sand with minimal fines, gravel, and organic matter. Three of the four sites are on beach sand, just outside the maximum wave zone. The exception is the Pumice Point site, which is located on black sand that is significantly above the current lake level. This sand may have weathered in situ from rhyolite, but probably represents a residual sand accumulation from a former lake level. Several of the occupied areas, notably Rock Point, Storm Point, and a small group on the north shore, occur in horseshoe-shaped, sandy depressions that are slightly bowl-like in cross-section.

A. ammophila is found as high as approximately 10 m elevation above the high-water line and as far inland as roughly 60 m, although it mostly occurs within 40 m of the shoreline. The species generally occurs above the high-water mark, but in the north shore site some plants were found on and below a sand slope cut by the unusually high water level of Yellowstone Lake of 1997. No plants were found in any location that appears to be regularly inundated.

Yellowstone sand verbena favors open, sunny sites with widely spaced vegetation. Common associates include *Phacelia hastata* Dougl. ex Lehm., *Rumex venosus* Pursh, *Polemonium pulcherrimum* Hook., and *Lupinus argenteus* Pursh. Other species that often occur in the vicinity include *Haplopappus macronema* Gray var. *linearis* (Rydb.) Dorn, *Aster integrifolius* Nutt., *Chaenactis douglasii* (Hook.) H. & A., and *Polygonum douglasii* Greene.

Census. In all, 8,326 *Abronia* plants (a maximum of 9,680, if some mats are greater than one plant) were found among all the sites. In addition, 41 dying and 68 dead plants were also counted. A total of 7,978 live plants (9,316 maximum) were found at the north shore site; 325 live plants (339 maximum) at the Rock

Figure 3. Map of Yellowstone Lake showing the location of all current Yellowstone sand verbena sites.

Point site; 22 plants (24 maximum) at the Pumice Point site; and one plant along the shore of the South Arm (Table 1).

The north shore population was 18% recruit size, 27% medium, 45% large, and 10% very large. Percentages are based on the "most probable" totals. The recruitment class made up a disproportionate share of most of the small, isolated subpopulations within the north shore population: 33% of the 166 plants near 400 m on the baseline, and 79% of the 82 plants near 575 m. Some of the seedlings seen were tiny, with only one or two leaves and less than 1 mm diameter. It is possible that the field personnel overlooked some seedlings and that the recruit class may have constituted a larger proportion of the north shore population than indicated.

Rock Point had the same percentage of plants in the recruit category, 18%, but the other size classes differed from the north shore site, with 49% of plants in the medium class, 29% in the large, and 3% in the very large. Many of the medium-

Table 1. Yellowstone sand verbena population count for all sites with the number of individuals followed by the maximum possible number if a large mat is composed of more than one individual. The four size classes are: recruit (<5 cm diameter, basal leaves only, no stem branching, no flowering); medium (<5 cm diameter, branching present, flowering or not); large (>5 cm but <30 cm diameter); and very large (>30 cm diameter).

	Recruit	Medium	Large	Very Large	Total
North Shore	1,448	2,183	3,573	774	7,978
		(2,287)	(4,329)	(1,252)	(9,316)
Rock Point	59	161	96	9	325
		(168)	(103)	(9)	(339)
Pumice Point	3	4	14	1	22
			(16)	(1)	(24)
South Arm	0	0	1	0	1
			(1)		(1)
Total	1,510	2,348	3,684	784	8,326
		(2,459)	(4,449)	(1,262)	(9,680)

sized Rock Point plants appeared later in the summer in an area that had been devoid of *Abronia* when first visited in June. The small number of plants at Pumice Point yielded 14% in the recruitment class, 18% in the medium, 64% in the large, and 5% in the very large. The lone plant along the shore of the South Arm was in the large size class.

In 1998, the total population of Yellowstone sand verbena was composed of 18% recruitment size, 28% medium, 44% large, and 9% very large. Percentages are based on the "most probable" totals. Fifteen percent of the north shore plants, mostly large and very large but also a few mediums, were recorded as possibly more than one plant. If "maximum possible" totals are used, the percentages in the large and very large size classes increase slightly and those in the recruit and medium classes decrease slightly. No assumption of age of the individuals can be made at this time, except for the recruitment class, which apparently were all first-year seedlings.

The north shore site had less than 1% dead or dying plants. No dead or dying plants were found at Pumice Point or the South Arm. Notably, the Rock Point site had 12% dead and 31% dying *Abronia,* apparently due at least in part to a herd of elk trampling the area.

Discussion

A casual survey of the north shore population in 1994 yielded a population estimate of approximately 1,000 individuals. At that time there were relatively few plants that were small, with most forming obvious mats, though no attempt was made to count different size classes. No young seedlings were observed. In contrast, by 1997 it was obvious that there were many more plants along the north shore, with young plants forming a conspicuous component. Apparently,

the conditions during the intervening time had been highly conducive for new plant establishment. The size classes of the plants censused in 1998 reflect the large recruitment event that had recently occurred. Most of the plants present in the early 1990s were apparently in the largest size class, which in 1998 numbered approximately 784 individuals, with a maximum of 1,252 individuals (Table 1). Since the census in 1998, the summers have been relatively dry, with drought conditions occurring during 2000 and 2001. The total number of extant sand verbena individuals can be presumed to have dropped significantly, and many of the plants in the recruit and medium size classes have probably died from water stress. Possibly, the number of plants present on the lakeshore at this time could more closely resemble the number present in the early 1990s than in the complete count of the population in 1998.

The restriction of the sand verbena at all sites to a zone of relatively open vegetation suggests that this species may not be capable of competing adequately in areas that are more highly vegetated. This tendency is obvious when one examines the distribution of plants around the lakeshore. Typically, the plants occur in a relatively constrained zone between the area influenced by wave action and the densely vegetated region inland. Some natural disturbance may be necessary to prevent the establishment of dense vegetation that would then preclude sand verbena.

The record high lake levels of 1996 and 1997 (Farnes 2000) eroded the southern edge of the stabilized sand along the north shore, washing out part of the occupied habitat. Perhaps dynamic changes in lake levels, such as occurred with these high levels and the correspondingly low levels observed in 2001, may be important to the persistence of the sand verbena since the increase in erosion and fluctuation in water level reopens or creates new habitat. Since the lake level has varied tremendously during the last several thousand years (Meyer and Locke 1986; Cannon, Pierce, and Crothers 1995), Yellowstone sand verbena must be capable of moving with the changing lake levels to be able to persist along the lakeshore. Global warming may cause a change in the climate of the Greater Yellowstone area, thereby affecting the lake levels in the future, so the plant's ability to respond to change will continue to be important.

Another component that affects *A. ammophila* is the presence of thermal activity in the immediate vicinity of some of the plants along the north shore. The largest subpopulation on the north shore is adjacent to a small thermal barren. The center of the thermal area is unvegetated, but a sandy mound to the northwest hosts the most dense concentration of Yellowstone sand verbena known to exist, as well as some of the largest individuals. Many of the plants in this area are on ground with a slight thermal influence. Most of the associated species drop out as the ground temperature becomes hotter, leading to an area where the sand verbenas dominate the vegetation. The possibility exists that the warmth associated with thermal sites along the lakeshore has enabled sand verbena to persist during periods when the climate was perhaps not as conducive for the survival of this species, or that the thermal habitat provided sites where sand verbena was at a competitive advantage over other species that thrive on cooler sand.

Elucidating questions about the evolution and current population biology of *A. ammophila* requires further investigation of many facets of the plants. The relationship of Yellowstone sand verbena to other sand verbenas is unknown. DNA analysis is needed to ascertain relationships among the sand verbenas of the northern Rockies. This information might clarify whether the sand verbena is a recent immigrant into the park, and thus closely related to other taxa or perhaps not actually distinct, or whether the sand verbena has been evolving in Yellowstone for an extended period of time.

Yellowstone sand verbena appears to have a relatively poor seed set (L.A. Galloway, personal communication). Investigation into who are the pollinators and what other constraints are affecting the pollination ecology of this species is needed. Corollary questions involving population dynamics that warrant further investigation include what conditions are advantageous to recruitment, the longevity of plants, and the presence and effects of herbivory.

In order to maintain a healthy population of Yellowstone sand verbena, the park must protect all known sites. The South Arm site and the Rock Point site are easily accessible only by boat and due to low levels of boating use on Yellowstone Lake do not need any special management attention at this time. There is the possibility that the single individual present at the South Arm site represents the lone survivor of a more extensive group of individuals that was washed out during the high lake levels of 1996 and 1997. The relatively dry summer weather in the succeeding years may be preventing new seedling establishment. An alternative hypothesis is that one individual grew from a single dispersed seed and is persisting, but due to a lack of pollinators there has been no viable seed production so the population is not increasing.

The Rock Point site, which prior to 1998 was unknown to the National Park Service, was perhaps first located by Loran C. Anderson, who visited Sand Point on 30 June 1958 and collected *Abronia ammophila* (Allyson Davis, collection manager, Intermountain Herbarium, personal communication). The information on specimen #1241 (UTC #95348) reads: “Frequent in moist sand of Sand point, southeast neck of the West Thumb of Yellowstone Lake, Yellowstone National Park.” There was no Yellowstone sand verbena at Sand Point in 1998, but it is possible that the collector was actually at Rock Point and only had available a park brochure or other map that didn’t include both names. An alternative hypothesis is that the sand verbena formerly did occur on Sand Point, since the area appears able to support the taxon but was flooded and eroded out during 1996 and 1997. Under the later scenario, Yellowstone sand verbena would be expected to eventually recolonize Sand Point if lake levels remain low.

The Pumice Point fishing access should continue to be left unmarked by signs in order to keep the visitation and use of the picnic tables at current levels. This subpopulation is currently declining, with only one plant visible in 2001, in contrast to 22 in 1998. The sand at this site is elevated above the shoreline, with rocky substrate preventing the roots of the plants from intercepting the water table associated with the lake level. The decline appears to be natural, caused by the drought conditions during the summers of 2000 and 2001. This site may be

ephemeral and an artifact of the wet years in the mid-1990s.

Currently, there is a low level of visitor use within the area occupied by the north shore population. It may become necessary to place signs at the east end of this site adjacent to Storm Point asking people to stay on the Storm Point trail. At this time there is no need to close the area as long as visitor use within the area stays low, though this action should be considered if use and corresponding plant loss increase on the east end of the occupied habitat on the north shore.

The lakeshore from the outlet of the Yellowstone River to the mouth of Pelican Creek was formerly occupied by *A. ammophila*. Due to the high levels of visitor use in the area near the Fishing Bridge development, it is not practical to attempt reintroduction in that area. As late as 1968, sand verbena was still present a quarter of a mile west of Pelican Creek in the vicinity of the Pelican Creek Nature Trail (L.A. Galloway, personal communication). The presence of this nature trail has probably contributed significantly to, if not caused, the extirpation of sand verbena from this portion of the shoreline. Since the closure of the Fishing Bridge Campground in 1989, there has presumably been a decrease in visitor use on the eastern portion of the beach away from the Fishing Bridge Visitor Center. If the Pelican Creek Nature Trail was removed, it is very likely that Yellowstone sand verbena might be able to re-establish near Pelican Creek. Without removal of the trail, the disturbance of the sand is expected to continue at a level that would preclude the possibility of natural reestablishment or successful reintroduction of sand verbena. Currently, the Pelican Creek Nature Trail is in need of some repair. Consideration should be given to removing or relocating the trail to another area that is less sensitive environmentally, rather than repairing it. Of the areas that were historically occupied by Yellowstone sand verbena, this is the only place where recolonization or reintroduction is likely to succeed, especially if the beach is closed to public access.

Yellowstone sand verbena has been extirpated from a significant portion of its original range along the shoreline of the lake due largely to human influences. The north shore site is the key to the survival of this Yellowstone endemic, as it is the location of 96% of the species' entire population. The presence of three additional sites is interesting, but doesn't change the reality that the continued survival of *A. ammophila* is coupled to the survival of the plants on the north shore.

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References

Cannon, K.P., K.L. Pierce, and G.M. Crothers. 1995. Caldera unrest, lake levels, and

archeology: the view from Yellowstone Lake. *Park Science* 15:3, 28–31.
Conard, H.S. 1928. Flora of Yellowstone National Park (tabulation). Unpublished report. (On file at Yellowstone National Park, Wyoming.)
Coulter, J.M., and A. Nelson. 1909. *New Manual of Botany of the Central Rocky Mountains (Vascular Plants).* New York: American Book Company.
Despain, D.G. 1975. *Field Key to the Flora of Yellowstone National Park.* Yellowstone National Park, Wyo.: Yellowstone Library and Museum Association.
Farnes, P.E. 2000. Effects of the 1988 Yellowstone fires on the 1997 Yellowstone River peak flow. Unpublished report. (On file at Yellowstone National Park, Wyoming.)
Fertig, W., and G. Beauvais. 1999. *Wyoming Plant and Animal Species of Special Concern.* Laramie, Wyo.: Wyoming Natural Diversity Database.
Fertig, W., C. Refsdal, and J. Whipple. 1995. *Wyoming Rare Plant Field Guide.* Cheyenne, Wyo.: Wyoming Rare Plant Technical Committee.
Galloway, L.A. 1975. Systematics of the North American desert species of *Abronia* and Tripterocalyx (Nyctaginaceae). *Brittonia* 27:4, 328–347.
Greene, E.L. 1900. Corrections in Nomenclature-III. *Pittonia* 4, 224–226.
Haynes, J.E. 1928. *Haynes New Guide and Motorist's Complete Road Log of Yellowstone National Park.* 39th ed. Yellowstone National Park, Wyo.: Haynes Picture Shops.
Hitchcock, D.L., A. Cronquist, M. Ownbey, and J.W. Thompson. 1964. *Vascular Plants of the Pacific Northwest. Part 2: Salicaceae to Saxifragaceae.* Seattle: University of Washington Press.
Marriot, H.J. 1993. Status report for *Abronia ammophila* (Tweedy's sand verbena), Sublette County, Wyoming. Unpublished report prepared for the Bureau of Land Management Rock Springs District by the Wyoming Public Lands Program of The Nature Conservancy.
McDougall, W.B., and H.A. Baggley. 1936. *Plants of Yellowstone National Park.* Washington, D.C.: U.S. Government Printing Office.
———. 1956. *The Plants of Yellowstone National Park.* 2nd ed. Yellowstone National Park, Wyoming: Yellowstone Library and Museum Association.
Meyer, G.A., and W.W. Locke. 1986. Origin and deformation of Holocene shoreline terraces, Yellowstone Lake, Wyoming. *Geology* 14, 699–702.
Nelson, A. 1899. Collection book, year 1899, nos. 6203–6943. Unpublished collection notes. (On file at Rocky Mountain Herbarium. Laramie, Wyoming.)
Rydberg, P.A. 1900. Catalogue of the flora of Montana and the Yellowstone National Park. *Memoirs of the New York Botanical Garden* 1.
Tillett, S.S. 1967. The maritime species of *Abronia* (Nyctaginaceae). *Brittonia* 19, 299–327.
Tweedy, F. 1886. *Flora of the Yellowstone National Park.* Washington, D.C.: Published by the author.
U.S. Fish and Wildlife Service. 1993. Plant taxa for listing as endangered or threatened species; notice of review. *Federal Register* 50 CFR Part 17 58(188), 51144-51190 (30 September).
Whipple, J. 1999. Survey and Assessment of Yellowstone (WY) sand verbena (*Abronia ammophila*) project #97-073-031 final report to National Fish and Wildlife Foundation. Unpublished report. (On file at Yellowstone National Park, Wyoming.)

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Native Americans, the Earliest Interpreters: What is Known About Their Legends and Stories of Yellowstone National Park and the Complexities of Interpreting Them

Lee H. Whittlesey

The thermal wonders of the Park did not frighten the native peoples of the region. Euro-Americans originated this idea and it must be dispelled before we can understand the true nature of Yellowstone's human past.
—Joseph Weixelman, "The Power to Evoke Wonder" (1992)

What did the Indians say about Yellowstone? They must have told stories about its strange wonders, but what were those stories? Historians have long wondered. Answers have been slow to appear.

Native Americans probably had many more tales, legends, and myths about the Yellowstone country than the few we currently know of, but thanks to Peter Nabokov and Larry Loendorf, we now know more than ever before about some of those early Yellowstone stories. Prior to the emergence of their manuscript "American Indians and Yellowstone National Park: A Documentary Overview," historians trusted only one Indian legend relating to Yellowstone; that is, they knew of only one that appeared to be genuinely Indian rather than "white" (the Ralph Dixey story discussed below). Moreover, before the Nabokov book appeared, only small, unsatisfying tidbits of Yellowstone information were known to us in general about the Sheepeaters, Shoshones, Crows, Bannocks, Blackfeet, Flatheads, Kiowas, Arapahoes, Nez Perce, Assinboines, Northern Cheyennes, Gros Ventres, Sioux, and other tribes who inhabited the upper Yellowstone country and its edges at various times prior to 1870. But now, because of that book, we know more than ever before about how these tribes related to Yellowstone.

There seems to have been an effort by early whites in Yellowstone National Park to make the place "safe" for park visitors, not only by physically removing Indians from the park and circulating the rumor that "Indians feared the geyser regions," but also by attempting to completely segregate the place in culture from its former Indian inhabitants, including their legends and myths. If historians cannot conclusively prove that whites conspired to do this, many of us who have spent years studying Yellowstone's literature certainly cannot escape the overarching feeling that something like that happened. Superintendent P.W. Norris's 1870s statements that "these primitive savages" feared the geyser regions are well known. Even as early as 1895, historian Hiram Chittenden could not find much about what Indians thought about Yellowstone nor about what they told

whites of it. "It is a singular fact in the history of the Yellowstone National Park," wrote Chittenden, "that no knowledge of that country seems to have been derived from the Indians.…Their deep silence concerning it is therefore no less remarkable than mysterious" (Chittenden 1895: 8, 99).

One wonders whether Chittenden (like so many later writers) simply could not find information about Yellowstone Indians, or whether the Indians would not talk to him because of religion (we know that many tribes considered Yellowstone sacred) or because of other reasons (see the following paragraph), or whether he purposely fostered this thinking for motives of his own. At this late date it is difficult to point fingers at our "white" forebears and accuse them of such conspiracies, but that belief must figure at least a modicum into the fact that until American Indians and Yellowstone was written, we knew less about Indians in Yellowstone than about Indians anywhere else in the American West.

It now turns out that there may be a fascinating reason after all for Chittenden's comment concerning Indians' "deep silence" about Yellowstone. I searched for this information for nearly thirty years and only recently found it in a rare book that came to the park via the massive collections of Jack and Susan Davis of Bozeman, Montana. The source is a man named John Hamilcar Hollister who visited Yellowstone in 1883 with the well-known Rufus Hatch party. Hollister published an account of that trip in 1912, and in it he told the now disreputable story of Indians fearing the park's geyser regions. But following that story, Hollister stated that his attempts to find Indian legends about Yellowstone had been unsuccessful. He, like me many years later, wondered why he could not find such Indian legends of Yellowstone. He then made the following statement that appears in no other known place in Yellowstone literature:

> …there are but few [published] Indian legends which refer to this purposely [!] unknown land. Of these I have found but one [other than for the Indians-fearing-the-geysers story], and that is this—that no white man should ever be told of this inferno, lest he should enter that [Yellowstone] region and form a league with the devils, and by their aid come forth and destroy all Indians. Hence the trappers, who were the first white men to enter these western lands, learned little or nothing [about Yellowstone] from that source [Indians] (Hollister 1912: 145).

This is a fascinating assertion that we can prove neither absolutely true nor absolutely false. Hollister does not tell us whence he obtained this supposed legend of Yellowstone, but the fact that he apparently heard it in 1883, very early in the park's history when hundreds of pre-1872 Indians were still living, gives me great pause. I believe that we must consider this story as possibly true until such time that we get good information debunking it. In light of all that we know about how fervently some Indian tribes believed in the park as a sacred place, the idea of not revealing it to whites makes total sense. Of course we have no idea exactly which tribes Hollister referred to, and, again, we do not know whence he obtained the legend. If true, the Hollister rendering of this Native American story represents a very large and possibly final piece of a long, incomplete puzzle relat-

ing to Yellowstone, i.e., the fact that some tribes may have kept the place a secret and why they did it.

The idea that at least some Indians (we do not yet know which tribes might have had such a policy or how many such tribes there were) might have kept the existence of Yellowstone a secret for religious reasons squares well with both known native proclivities for not telling certain things to white men and with Chittenden's 1895 perception of a deep Indian silence about Yellowstone. It also begins to explain why historians Nabokov and Loendorf, Aubrey Haines, Joseph Weixelman, I, and others have all had a fair amount of difficulty finding good numbers of literature connections between Indians and Yellowstone. Finally, it explains why we have so few known Indian legends about a place that must have generated dozens or hundreds of such legends among ancient natives. Thus, we now must, in my opinion, begin asking our Native American friends whether there is anything in their oral traditions to confirm this, and hope that one or more of them will tell us whether they indeed kept the place secret on purpose. Considering how we white people have spoken "with forked tongue" in the past, I certainly would not blame them if they would not tell us.

One final point with regard to Hollister. A critic has suggested that Hollister's use of the word "devils" here might somehow negate his statement because it might show that the Indian(s) he talked to were "Christianized." Here is why I believe Hollister's statement is not negated by that.

Christianization and the accompanying linguistic translations about it back and forth from Indians to whites and vice versa were (and are) very complicated things. And white men were notoriously poor at understanding Indian religion, whether it had been "Christianized" or not. Note that historian Colin Calloway says many white men tended to dismiss Indian religion as "devil worship" (Calloway 1997: 68). Thus, just because Hollister used the term "devil" does not mean we should jump to conclusions about what he meant or what the Indian(s) he spoke to meant. For all we know, Hollister simply mistranslated what the Indian(s) told him into "white-man vernacular."

Secondly, Indians did not always "buy into" Christianization. In this case, if they did not buy into it, then their comments to Hollister were probably still based upon their intact native religion. Even if their buy-in to Christianity was partly complete, they still might have been using a religion that involved pieces of their original religion and hence their statement on the taboo might still have made it through Hollister to us as a true statement.

Indians' buy-in to Christianity ran the gamut from "not at all" to "partly" to "completely." That is a point Calloway makes over and over again in his chapter on religion entitled "A World of Dreams and Bibles." His chapter discusses the complex interplay between Indian religion and Christian religion in the new world. Calloway mentions instance after instance wherein Indians simply played along with white Friars and Fathers (merely mouthing their words and phrases in order to placate them, or remaining silent, which the Fathers often incorrectly took to mean tacit agreement) before returning to their old ways of religion. In many other cases, Indians simply took pieces of the white man's religion and

incorporated them into an already-established native religion. That often meant that the native religion was essentially left intact with only a few baubles-and-bangles-and-crucifixes thrown into the mix. A few attempts by whites at Christianization undoubtedly worked, wherein Indians were mostly or totally converted, but we cannot assume that this was the general rule, as many white people have assumed.

We now move to other known Indian legends about Yellowstone. For many years, Yellowstone historian emeritus Aubrey Haines believed that only one Indian legend relating to Yellowstone was genuine. It is a tale of the origin of the Snake and Yellowstone rivers, apparently truly handed down in Shoshone and Bannock families and published in Ella Clark's *Indian Legends of the Northern Rockies* (Haines 1982; Clark 1966: 174–177). Other than for this story, there was, until the production of American Indians and Yellowstone, little reliable information or documentation on legends, myths, or other folklore that may have been communicated by Indians about the present Yellowstone National Park. Even after the emergence of the Nabokov and Loendorf's book, the "Coyote" Yellowstone stories that have been bandied about by both Indian and popular "white" writers remain controversial in that historians disagree as to which are genuine and which are made up by whites.

And, too, we now know that there are a great number of other so-called Indian stories that can be totally dismissed as tales made up by whites to explain what Indians "should have thought" about Yellowstone. Again, the most common example of such misinformation is that Indians "feared the geyser regions as inhabited by evil spirits." Virtually all of the stories included in Mary Earle Hardy's *Little Ta-Wish: Indian Legends from Geyserland* (1913) and La Verne Fitzgerald's *Blackfeather: Trapper Jim's Fables of Sheepeater Indians in Yellowstone* (1937) are, in the opinion of this historian, "white baloney," that is, faked Indian tales. At the least, if they are real, there is no documentation to prove it.

With all of that as background, we now begin looking at Indian legends in the Yellowstone country by examining the known Indian names for the place. Nabokov and Loendorf, after years of looking at the ethnological, anthropological, archeological, and historical literature and interviewing dozens of tribal members, have concluded that certain Indian tribes did have names for the upper Yellowstone country. Most of those names referred to the park's hot springs and geysers. The Crow Indians called Yellowstone "land of the burning ground" or "land of vapors" while the Blackfeet called it "many smoke." The Flatheads called it "smoke from the ground." The Kiowas called it "the place of hot water." Only the Bannocks had a name that did not call to mind the park's thermal regions: "buffalo country." Additionally, the Crows specifically called the Yellowstone geysers "Bide-Mahpe," meaning "sacred or powerful water."

As for the stories themselves that might have been told about Yellowstone by the Indians, the Ralph Dixey story is thought to be genuine. It is a tale concerning the origin of the Snake and Yellowstone rivers and long known to have been handed down in the Shoshone tribe (both Ralph Dixey and his Bannock wife stat-

ed that this story was handed down in both of their families). The story begins with "long ago there was no river in this part of the country. No Snake River ran through the land." A man came from the south who was always sticking his nose into everything. He traveled north past the Tetons and went up onto a mountain in what is now called Yellowstone. There he found an old lady with a basket of fish. Hungry, he asked her to boil some fish for him. She offered to make him food but warned him not to bother her basket. He did not listen, stepped on the edge of the basket, and spilled its water and fish. The water spread all over. The man ran fast, ahead of the water, trying to stop it. He piled up rocks to hold the water back, but the water broke his dam and rushed on. That is where the Upper Falls is today. The man ran on ahead of the water and again built a dam of rocks, but it did not hold the water back either. That is where the Lower Falls is today. The water kept on rushing and formed the Yellowstone River. The man then ran to the opposite side of the fish basket and followed its waters downstream, building several dams of rocks, but the water would not be stopped. Those broken dams are the site of American Falls and Shoshone Falls today on the Snake River. The big fish basket that the man tipped over is Yellowstone Lake while the old woman with the fish was Mother Earth. The man himself was Ezeppa or Coyote (Clark 1966: 191–193).

Until recently this Dixey story was arguably the only known, genuine (truly known to have been told by Indians) Native American story about Yellowstone National Park. But there is now new evidence (per Nabokov and Loendorf) not only as to the fact that Indians told stories about Yellowstone but also as to what some of those stories were. In particular we now have several "new" (actually old) stories known to have been told by the Crow tribe.

A Crow narrative from a man named Sharp Horn, who passed it down to his son who passed it to his grandsons, concerns the mythic deeds of a character named "Old Woman's Grandchild" and how at least two of Yellowstone's geysers were supposedly created. This Crow said that in one of the thermal regions of the park, Old Woman's Grandchild fought many beasts and turned them into mountains and hills after he killed them. A large buffalo bull that he killed was turned into a geyser formation that continued to blow out hot air. Near it he placed a mountain lion, also a geyser formation blowing hot air, in order to keep the buffalo bull from coming back to life (Nabokov and Loendorf 1999: 107).

Another mythic tale, told by the Crow and associated with the park, concerns Yellowstone Lake and what happened to the dinosaurs. A thunderbird grabbed a Crow Indian by his hair and took him to "Overlook Mountain," on the southeast side of Yellowstone Lake, and placed him in a nest there. The thunderbird told the Crow that he wanted him to help him fight the giant water beast that lived in Yellowstone Lake and which ate the thunderbird's young. The Crow built a large fire and heated many rocks and boiled much water. When the beast came out of the lake and climbed up the mountainside, the Indian pitched hot rocks and hot water into its mouth. Steam came out of the monster's mouth and it tumbled down the mountainside and into the lake. Supposedly this was the last "dinosaur," and steam vents around Yellowstone Lake may be remnants of this

event, a myth from Crow history (Nabokov and Loendorf 1999: 107–109).

Of course, as Paul Schullery pointed out to me when we discussed this subject, the very idea of dinosaurs and Indian tales generates numerous immediate questions. Is this tale perhaps younger than other such Indian tales? Is it only as aged as the old nineteenth-century white guys who first discovered dinosaur fossils? Or did Indians themselves find dinosaur fossils and generate stories about them long before the nineteenth-century white guys found the "terrible lizards"? Did Indians perhaps have contact with the nineteenth-century white-guy dinosaur hunters and merely generate the story after talking to them? Or is this story just pure "Native American baloney," a faked Indian tale? There are no easy answers to these questions.

From Hunts-to-Die, a Crow Indian born about 1838, we have it that his tribe believed there were spirits in Yellowstone geyser areas who were benevolent and helpful rather than malevolent and dangerous. This tends to correct what is perhaps the worst piece of supposed Indian information about Yellowstone—-the long-surviving but incorrect notion that Indians feared the geyser regions. Even though this piece of white baloney has been thoroughly discredited by Weixelman, Haines, and Nabokov and Loendorf, we can look for it to continue to appear in the shallow, unresearched, and thoughtless writings of popular journalists for years to come. It belongs in the same class of malarkey as the notion that "Yellowstone Park was once called Colter's Hell" (Nabokov and Loendorf 1999: 83; Mattes 1949).

The incorrect notion that Indians feared the geyser regions seems to have originated in Euroamerican literature from a note that William Clark added to his notes after 1809 when he returned to St. Louis. It is not known whence Clark obtained this information, but here is the relevant quote (complete with misspellings and incorrect syntax and punctuation):

> At the head of this [Yellowstone] river the nativs give an account that there is frequently herd a loud noise, like Thunder, which makes the earth Tremble, they State that they seldom go there because their children Cannot sleep—-and Conceive it possessed of spirits, who were averse that men Should be near them (Haines, 1974: 4).

Unexpectedly, the Kiowa tribe is now known to have oral traditions associated with the upper Yellowstone country. The Kiowas, who eventually settled in western Oklahoma, were earlier located in the present Crow country near the headwaters of the Yellowstone River. Lewis and Clark found them below there in 1805 "in seventy tents," somewhat near the Yellowstone Valley. One of their descendants, N. Scott Momaday, has written that around the time of the Revolutionary War the Kiowas migrated from a place near the "headwaters of the Yellowstone River." In this earlier history they were friends and trading partners with the Crows, but nevertheless it was an unexpected surprise for Nabokov and Loendorf to find that the Kiowas had traditions associated with present Yellowstone National Park (Nabokov and Loendorf 1999: 93–96).

Nabokov and Loendorf found what so far may be the most important piece of

Indian "interpretation" associated with present Yellowstone National Park. It is the legend told by the Kiowas about their origins in the present park. It concerns a man whose name no Kiowa remembers but who "was one of the greatest Kiowas who ever lived." The Kiowa informant called him "Kahn Hayn" for the purposes of the story. He said that when Doh Ki, the Kiowa equivalent of the Great Spirit, put people on earth he had no homeland for Kiowas, so he promised them a homeland if they could make the difficult sojourn through a barren and desolate volcanic land where clouds of steam shot from holes and fissures in the ground. Doh Ki called all of the Kiowas around one particularly disturbing steaming pool, a deep caldron of boiling water that surged and smashed against jagged rock walls and made fearsome sounds as if a great beast were just below the surface. Most of the Kiowas ran away, but a few remained, including Kahn Hayn. Doh Ki then pointed to the fearsome pool and said that the land there would belong to the tribe of any man who would dive down into it. While some of the Kiowas did not want this hot land, Kahn Hayn knew that Doh Ki was a benevolent spirit whose rewards were always good and lasting, so he decided to take Doh Ki's test. He dove into the boiling pool and was immediately panic-stricken. He burned and ached and thrashed and lost consciousness. Suddenly he felt himself being lifted from the water by the hands of many Kiowas who were yelling excited, victory cries. As he looked about he saw that Doh Ki had vanished and that the landscape was no longer barren and desolate. Instead it was covered with rich forests, lush meadows, cascading streams, and large animals. This spot in the present Yellowstone National Park was now the most beautiful and abundant of all places on the earth, and it became the homeland of the Kiowas.

The Kiowas today have a name for the place where these mythic events supposedly occurred. It is at the Dragon's Mouth Spring near Mud Volcano in the park, and the Kiowas call it "Tung Sa'u Dah" which means "the place of hot water" (Nabokov and Loendorf 1999: 97–100).

Historians have long argued about whether Ella Clark's tales of Yellowstone in her book *Indian Legends of the Northern Rockies* (1966) are genuine tales passed down by Native Americans or whether Clark made them up herself, either partially or fully, by being careless in how she translated the stories, by failing to tell us enough about who her Indian sources were, or both. Haines and I take the side that we should not always trust Clark, an English teacher with little or no training in history or anthropology. We believe that she was primarily interested in the stories themselves and not in whether they were truly Indian rather than made up by whites, in whether they had been genuinely passed down orally through Indian history, or in how carefully she translated them.

On the other hand, Nabokov and Loendorf take a more charitable view of Clark's book. As anthropologists, they see in her stories a thread of consistency to other parts of Native American folklore (especially, they say, that of the Blackfeet and Flathead) and they tout that connection as evidence that Clark's stories may be genuine Indian tales (Nabokov and Loendorf 1999: 129–132).

But of course one can argue that anyone who has spent a small amount of time reading Indian legends and myths can easily make up new ones in the same vein as the genuine ones that they have just read. I could certainly do it easily, and, in my opinion, this would be the very type of thing an English teacher or journalist might be tempted to do in "doctoring" Indian stories that did not otherwise quite "work" for them. Because Clark talked to a lot of Indians and produced three books on Indian legends in the Northwest, I have no doubt that some if not many of her stories are indeed genuine. But she did such a poor job of telling us where they came from that I remain suspicious of some of them.

As it turns out, however, probably the best known of Clark's Yellowstone legends may well be a genuine Flathead tale. It is the one that she calls "Coyote's prophesy concerning Yellowstone Park," and according to her, it goes like this:

> In generations to come this place around here will be a treasure of the people. They will be proud of it and of all the curious things in it—-flint rocks, hot springs, and cold springs. People will be proud of this spot. Springs will bubble out, and steam will shoot out. Hot springs and cold springs will be side by side. Hot water will fly into the air, in this place and that place. No one knows how long this will continue. And voices will be heard here, in different languages, in the generations to come (Clark 1966: 103).

As one might expect, less-discerning writers, especially journalists, have glommed onto this story like flies to a carcass. They have not been able to resist it, in the apparent belief that surely the story contains some kind of ancient Indian wisdom about Yellowstone that accords with the later "good" judgments of whites about the place, and which must thus somehow give dramatic credence to those judgments. I remain suspicious of the story, because it sounds fake and because Clark did such a poor job of documenting it. It is exactly the type of contrived-sounding piece that white writers would make up as a faked Indian legend. It is written too slickly and has too much perfectly balanced drama in it to ring true as a real Indian legend (which generally are neither slick nor perfectly balanced). The prediction about the pride of future generations sounds European. The business about future voices in different languages seems beyond the reach of the normal Indian legend.

But, again, the story may well be genuine. Clark claims (1966: 79) that most of her Flathead stories came from Pierre Pichette or Bon Whealdon. Pichette was a completely trustworthy source, because he was a blind Indian who spent at least fifty years of his life becoming an authority on the traditions and culture of his people. Clark would have us believe either that Pichette told this story to her from one handed down to him by elders in the summer of 1953 (the year before he died), or else that Bon Whealdon told it to her. Whealdon came to Montana's Flathead reservation in 1907, and he too spent many years gathering information on the Flathead culture. Unfortunately, Clark not only does not tell us exactly from where she got the story or when, but her citation (1966: 366, 376) lists only an article by herself, "How Coyote Became a Sachem," as the source. Worse, the story does not appear in a pamphlet by Pichette found and cited by Nabokov and

Loendorf. Thus, while I am suspicious of this Yellowstone legend, if it truly came from Pichette or Whealdon, it must be a genuine Flathead story rather than a piece of white baloney.

Another of Clark's stories, "Defiance at Yellowstone Falls" (1966: 361–362), is a fascinating mystery. It is the supposed Crow legend of thirteen Crow braves and five Crow women taking a raft over Lower Falls to their deaths in a suicide story that Clark says originated because the Crows wanted to escape the U.S. Army. She attributes it to Charles M. Skinner's *Myths and Legends of Our Lands* (1896), and indeed a look at that book reveals that Clark merely rewrote Skinner's "A Yellowstone Tragedy" (Skinner 1903: 204–206).

We do not know whence Skinner got the story, but he may have gotten it from Charles Sunderlee. Sunderlee's version appeared many years earlier in a purported news story in a Helena, Montana, newspaper *(Helena Daily Herald,* May 18, 1870) under the headline "A Thrilling Event on the Yellowstone" (Kearns 1940). There, Sunderlee listed the five members of his party and claims that they witnessed the event above Lower Falls on April 2, 1870. Suspiciously, none of the five men he mentioned appeared in the 1870 Montana census. Haines dismissed the Sunderlee story as fiction inspired by Clark's Crow Indian legend (Haines 1974: 40–41; 1977: 339n49).

At first I thought that Sunderlee's newspaper story might have inspired a fake (white) Indian legend that Skinner and Clark passed on. After all, there is no hint of U.S. Army soldiers chasing Crows in the upper Yellowstone country in 1870, as Skinner and Clark say, and in fact Sunderlee says nothing about soldiers being present. And, too, Sunderlee's story is 26 years older than the first known appearance of the legend (some of its details seem at least partially convincing as a news story). But later I found that it was not that simple.

Two present-day Crow experts know nothing about this supposed legend. When I ran the story past Burton Pretty-on-Top, the current chairperson for the Crow Tribal Cultural Committee at Hardin, Montana, he told me that it sounded like "hogwash" to him. "Crow people do not kill themselves," he said to me. He also stated that he knew of no Crow historians nor "tribal elders" that had ever passed this story on in oral history as a Crow legend, at least to him. While he was not familiar with Clark's book, he stated that he had read numerous comparable works by white authors, and he stated that all too often he would have to "put these books down without finishing them" because they were filled with so much bad information. I also spoke to Tim McCleary, head of General Studies at Little Bighorn College, Hardin, Montana, and a Crow expert. He too was suspicious of the Clark "legend," but cautioned me about how easy it was to be wrong about such things, regardless of which side one is on. He had read the Clark version of the legend but had never heard it in any other form (meaning from Crow elders or otherwise in Crow oral history). He agreed with Pretty-on-Top's assessment of Crows generally not committing suicide, and expanded on that, saying that those beliefs were based in Crow religion. McCleary says that the Crow belief was and is that if one commits suicide, one's spirit will remain on earth rather than ascending to some promised land, so they do not generally com-

mit suicide. McCleary was also suspicious of the idea of Crow Indians being on rafts or boats, because "they tend to avoid boats and water and getting onto water" (Pretty-on-Top 2000; McCleary 2000)

But even with all of this evidence for the proposition that Clark's "Defiance" legend is false, Haines points out that Clark got a number of her Indian stories from military man Lt. James A. Bradley. A look at Bradley's long Crow discussions makes it clear that Bradley did get a lot of stories, legends, and general information during the period 1871–1877 from Little Face and numerous other Crows (Haines 2000; Bradley 1917: 197–250). If Clark truly got the story from Bradley (and one of his stories bears some resemblance to it) rather than pirating it strictly from Skinner, then perhaps the Crows do (or did) have such a suicide legend even though certain Crow experts have never heard it. All in all, I do not know what to think about this convoluted mess.

These problems with both Clark's "Defiance at Yellowstone Falls" and her "Coyote's prophesy concerning Yellowstone Park" point up the difficulty of determining whether or not some reputed Indian legends are truly Indian. They also point up how easy it is for any of us to get confused when white baloney, known or suspected, enters the picture. For those of us who do not always trust the vagaries of oral tradition (was the story passed down correctly by one person and was it remembered/retrieved correctly by another, especially over many generations?), having to worry about white baloney adds one more complex and troubling wrinkle to the equation.

And these problems also point up the reasons why all researchers, including those who talk to Indians simply to write down their stories, must be meticulous in documenting their sources. We must be certain that we ask the tribal person conveying the story to us (1) from whom he heard the story and (2) whether others in his tribe have also heard it. These two questions are important because they give us clues as to both the antiquity of the story and how widespread it is (or was) within the tribe. For example, I am a lot more willing to believe Joe Medicine Crow's story if he tells me that he heard it from his 100-year-old grandmother than if he tells me he isn't quite certain from whom he heard it but only that he remembers hearing it. And, too, I am a lot more willing to believe that the story is truly established within the tribe if I also hear from several other tribal members that they heard it from their forebears.

Finally, we should end by making one thing perfectly clear even if some of this is murky. While Indians appear not to have feared the Yellowstone geyser regions, we know that many tribes revered them. Revere and fear are two different things, reverence referring to beliefs in something sacred. There is much evidence put forth by Weixelman, Haines, and Nabokov and Loendorf that a number of tribes considered the Yellowstone country sacred and used it as a vision-questing, prayer-making, and gift-bequeathing place, and there is much other material in their writings that disproves the theory that Indians feared Yellowstone.

These few known Indian stories then, and probably dozens or even hundreds of others that are now lost to us or perhaps still in the oral traditions, were among

the first known attempts to interpret the strange Wonderland country at the head of the Yellowstone River.

[Ed. note: This paper represents the first chapter, with title and text somewhat modified, from the author's upcoming book *Yellowstone's Horse-and-Buggy Tour Guides: Interpreting the Grand Old Park, 1872–1920,* which is as yet unpublished.]

References

Allen, C., and A. Pinkham. 2001. Personal communication to author from Allen and Pinkham, Nez Perce elders, 27–28 August, at Nez Perce symposium in Yellowstone.

Bradley, Lt. J. 1917. Bradley Manuscript F. *Contributions to the Historical Society of Montana* 8, 197–250.

Calloway, C.G. 1997. *New Worlds for All: Indians, Europeans, and the Remaking of Early America.* Baltimore, Md.: Johns Hopkins University Press.

Chittenden, H. 1895. *The Yellowstone National Park.* Cincinnati, Oh.: Robert Clarke Company.

Clark, E. 1966. *Indian Legends of the Northern Rockies.* Norman, Okla.: University of Oklahoma Press.

Fitzgerald, L.V. 1937. *Blackfeather: Trapper Jim's Fables of Sheepeater Indians in Yellowstone.* Caldwell, Id.: Caxton Printers.

Haines, A.L. 1974. *Yellowstone National Park: Its Exploration and Establishment.* Washington, D.C.: U.S. Government Printing Office.

———. 1977 [1996]. *The Yellowstone Story.* Boulder, Colo.: University of Colorado Press.

———. 1982. Letter to author, 9 July. (In author's files.)

———. 2000. Letter to author, 14 March. (In Yellowstone National Park history files.)

Hardy, M.E. 1913. *Little Ta-Wish: Indian Legends from Geyserland.* Chicago: Rand McNally.

Hollister, J.H. 1912. *Memories of Eighty Years: Autosketches, Random Notes, and Reminiscences.* Chicago: N.p.

Kearns, W.E. 1940. Historical items on Yellowstone from earliest Helena Heralds. *Yellowstone Nature Notes* 17:3/4 (March-April).

Mattes, M. 1949. Behind the legend of Colter's Hell. *Mississippi Valley Historical Review* 36 (September), 251–282.

McCleary, T. 2000. Personal communication to author, February.

Nabokov, P., and L. Loendorf. 1999. American Indians and Yellowstone National Park: a documentary overview as "Restoring a Presence." Unpublished draft manuscript. Yellowstone National Park, Wyo.: Yellowstone National Park Research Library.

Pretty-on-Top, B. 2000. Personal communication to author, February.

Skinner, C.M. 1896. *Myths and Legends of Our Lands.* Philadelphia: J.B. Lippincott.

Weixelman, J. 1992. The power to evoke wonder: Native Americans and the geysers of Yellowstone National Park. Master's thesis, Montana State University, Bozeman.

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Conservationists and the Battles to Keep Dams Out of Yellowstone: Hetch Hetchy Overturned

Michael J. Yochim

Abstract

Between 1919 and 1938 irrigation interests in Idaho, Montana, and Wyoming repeatedly tried to construct reservoirs in Yellowstone National Park by damming several large park lakes and Bechler Meadows. Conservationists of the time joined forces with Horace Albright and Steven Mather of the National Park Service to oppose the dams. Ultimately successful in all their efforts, their key victory came in 1923 when they defeated an attempt to dam Yellowstone Lake. This victory reversed the loss of protected status for national parks that had occurred just ten years earlier at Hetch Hetchy Valley in Yosemite National Park. By chronicling the protracted conflict over dams in Yellowstone, I illustrate that the conservationists (including Mather and Albright) reestablished the fundamental preservation policy of the national parks and empowered the newly created National Park Service to carry out its mission of park protection. This effort was the key battle in proving national parks and wilderness to be inviolate to industrial, exploitive uses. Conservationists both defined and tested the inviolate policy in Yellowstone; their battles in Dinosaur National Monument and the Grand Canyon cemented it into place.

Introduction

Far off, there lies a lovely lake
Which rests in beauty, there to take
Swift pictures of the changing sky,
Ethereal blues, and clouds piled high.

When black the sky, when fall the rains,
When blow fierce winds, her face remains
Still beautiful, but agitate,
Nor mirrors back their troubled state.

Within a park this treasure lies, —
Such region ne'er did man devise —
The hand of Mighty God, alone,
Could form the Park of Yellowstone.

Deep gashes score its rugged face,
Where mighty rivers fall and race,

Where upflung pinnacles stand high,
With aeries crowned, whence eagles fly.

From some deep caldron, does it seem,
Come boiling springs that hiss and steam,
And Sullen mouths pit bubbling mud
Like o'erfed cattle retching cud.

There splendid geysers fling in air
Their plumes of mist — a sight most rare —
And terraced springs lip o'er the rocks
Enrobing them with crystal frocks.

Forever thus inviolate
May this our heritage of State
Untroubled lie, our Country's trust,
Protected from men's greed and lust,

Lest they the lesson fail to learn,
That though they struggle, pray and yearn,
God's wasted gifts come not again;
Men's follies — these, alas, remain!

Remain to rob the future ones
Who follow us, our daughters, sons.
They share with us, not ours alone,
Is beautiful Lake Yellowstone.

Molest it not, nor seek to bind
Its water, lest we find
'Tis not the Lake, alone, that can
Be dammed, — but soul of ruthless Man!

—Anna Elizabeth Phelps, "Yellowstone Lake" (1938)

Yellowstone's southwest corner is called "Cascade Corner" because it contains twenty-five well-known and seventy-two lesser-known waterfalls (Rubinstein, Whittlesey, and Stevens 2000). It was highly contested terrain in the 1920s and 1930s. Irrigators from Idaho, to which state the local rivers drain, attempted to dam the Bechler River and its tributaries at several different times in order to store water for summer irrigation. Not to miss having its piece of the pie, Montana irrigators proposed the same thing on Yellowstone Lake. Both groups tried numerous times and in different ways to accomplish their goals, but neither group ever succeeded. Park administrators and conservationists nationwide rose to the defense of the park, defeating the irrigators time and again.

The battle pitted farmers struggling for economic survival against conservationists attempting to uphold the integrity of national parks. Local agricultural interests took on powerful national preservation interests. Gifford Pinchot's utilitarian conservation dominated public lands policy during this era, but in this case the preservationists won out and Yellowstone's waters were not impounded.

Coming hard on the heels of the Hetch Hetchy controversy in California (see Cohen 1988), many conservationists grasped the parallel in this battle. Unlike Hetch Hetchy, however, the park protectors won, establishing the policy that national parks were and are inviolate to industrial, exploitive uses. This policy, as with most such policies, would be tested time and again, both in Yellowstone and in other parks, such as Dinosaur National Monument in Utah in the 1950s. While the policy continues to be tested today, it was the dam battle of Yellowstone that reversed the Hetch Hetchy precedent, thereby illustrating that parks are to be preserved inviolate.

This story will relate the conflict between reclamationists and conservationists over dams in Yellowstone from 1915 to 1938. I will examine the motives of both sides and the methods they used to further their ends. Finally, I will conclude with a discussion of the significance of this "battle" in national park conservation history. Because the conservationist victory was so important in national park history, I will focus primarily on their efforts to prevent the dams, while attempting to present the irrigators' perspective.

The First Round of Dam Proposals: "Hands Off the National Parks!"

Background. In much of Idaho and western Montana, geography challenges agriculture. Areas that receive adequate annual precipitation for agriculture are generally too high and cold to support it, while areas warm enough for agriculture do not generally receive sufficient rainfall. Farmers have typically solved this problem by irrigating their cropland with water from the moist mountains. In the early part of the twentieth century, natural river flows provided enough irrigation water during most summer seasons, but in extreme droughts even large rivers such as the Snake were completely dewatered by irrigators (Fiege 1999). At such times, the irrigation channels ran dry, leading to the failure of the farmers' crops. The summer of 1919 was one such summer; farmers in Idaho lost over $10 million in failed crops.

To solve such problems, irrigators throughout the West began damming the region's rivers in the early 1900s to store the excess spring runoff for later summer use. In this way, they provided themselves with a form of natural insurance against the inevitable drought. Drawn upon in all years, the reservoirs were especially important during times of drought. Reservoirs such as the Jackson Lake Reservoir in Wyoming (upstream on the Snake River) were built during this period.

Beginning in 1915, farmers in eastern Idaho's Fremont and Madison counties began to search for a reservoir site to provide themselves with more reliable irrigation. They formed the North Fork Reservoir Company to pursue the reservoir, and focused on a potential dam site on the Falls River in Yellowstone's Cascade

Corner (Berlin 1915; Colonel of Cavalry 1915; Hillman 1916; Martin 1917; Albright 1985; Bartlett 1985; Fiege 1999). The U.S. Geological Survey had identified this potential site in its planning for the Jackson Lake Reservoir in 1902-1903 (U.S. Geological Survey 1904: Plate 34). When the drought of 1919 struck, the farmers increased their agitation for the reservoir. In their favor was the political climate of the era, which favored reclamation, and the Hetch Hetchy precedent, which made damming in national parks possible. Against them, however, were zealous leaders of the recently established National Park Service (NPS) and its growing group of supporters in the conservation community. The stage was set for controversy.

The battle: three major threats. Under the auspices of the Fremont–Madison Reservoir Company (evidently descended from the North Fork Reservoir Company), the farmers approached Secretary of the Interior Franklin K. Lane to receive permission to build two dams in the Bechler region (the second dam on Mountain Ash Creek, a tributary to the Falls River). They also persuaded Senator John Frost Nugent and Representative Addison Smith of Idaho to introduce bills into Congress in early 1920 enabling the Bechler dams. On 6 April, the Senate passed Nugent's bill, S. 3895, with little opposition, but the House version (H.R. 12466) stalled (Lovin 2000). The farmers also proposed damming Yellowstone Lake and diverting its waters under the Continental Divide via a tunnel they would construct, but this proposal was never introduced into Congress *(Livingston* [Montana] *Enterprise,* 7 December 1919; McMillen 1920).

With missionary zeal the farmers promoted the Falls River project. They were Pinchot's yeoman farmer, extending American society throughout the interior West. They noted that

> Idaho is dependent entirely on the development of its agricultural resources by irrigation for further growth and prosperity. This development can only progress by the conservation of our water resources through the construction of storage reservoirs....[The Falls River reservoir] will be entirely devoted to the creation of happy farm life and prosperity....At a time when the world is largely filled with unrest, due to Bolsheviki activities in Russia and elsewhere,…it is well to remember that the owners of farm property and the people who are tilling their own soil are not Bolsheviki but really constitute our most loyal and patriotic American citizens (Fremont-Madison Reservoir Company 1920).

Agriculture, and thus reclamation, were the cornerstones of the great society all Americans wanted.

The Falls River project was only the first of three substantial reclamation threats to the integrity of Yellowstone that surfaced in 1920, as farmers throughout the region attempted to conserve the region's water with dams in Yellowstone. The second major threat arose from the discussions of a Livingston, Montana, group called the "Yellowstone Irrigation Association." This group formed in December 1919 to promote the construction of a dam at Fishing Bridge, the outlet of Yellowstone Lake. The stored water could then be sent down

the Yellowstone River to irrigate farmland in the lower Yellowstone valley. Senator Tom Walsh of Montana formalized this proposal with a bill he introduced on 7 December 1920 *(Livingston Enterprise,* 7 December 1919). This group later tried to unite Idaho, Oregon, Washington, Montana, Wyoming, and Utah in a collective reclamation raid on the national parks ([Mather] 1920; *Northern Wyoming Herald,* 28 July 1920; Ise 1979). The interstate coalition, however, was weak at best, and so the Irrigation Association focused its efforts on the Yellowstone Lake dam.

Like the Idaho farmers, the Montana irrigators envisioned a better society in the Yellowstone Valley if the Yellowstone Lake dam were built. They felt it would both reduce the damaging floods wrought by the Yellowstone River and also provide enough water to irrigate up to a million acres. Promoters believed the dam and consequent agricultural development would thereby stimulate development of the region's cities; the population of Livingston, for example, was forecast to reach 50,000 *(Livingston Enterprise,* 19 March 1920). Utilitarian conservation ideas are evident in their rhetoric:

> The volume of flow in the Yellowstone river is twenty-six times as much during the flood period in the spring as it is during the irrigation season in the late summer.…The river becomes a veritable torrent. This enormous volume of water runs to waste. Not only is there a waste of water and energy but the raging torrent does a damage that runs into the hundreds of thousands, even millions of dollars (Yellowstone Irrigation Association 1921).

The third significant threat came from Congress' passage of the Water Power Act on 10 June 1920. This act created the Federal Water Power Commission, which promoted irrigation and hydroelectric development on federal lands, *including the national parks.* While not as immediate a threat to Yellowstone's integrity, the act posed a broader threat to the National Park System in general, because it gave this commission blanket authority to impound waters in the parks without congressional approval. Reclamationists saw the act in another light, as one would expect: they believed that "the greatest beauty in the world is the beauty of use;" and "[i]f the United States is to compete with Europe in foreign trade it must at least have cheap power for industrial use" *(Electrical World* 1920).

By the end of 1920, Yellowstone was facing a three-pronged attack on its integrity. Should any of the three proposals pass, Yellowstone would cease to exist as a pristine national park. Because Yellowstone was the gem in the crown of the National Park System, a weakening of its protection would probably lead to the fall of the entire system. What happened in Yellowstone, then, was key to the future of wilderness preservation in the United States. The reclamation threat, while supported by well-meaning people, did indeed have far-reaching implications.

Conservationist response. NPS and its conservationist supporters, then, were faced with an attack that threatened to make Hetch Hetchy commonplace throughout the National Park System. Park supporters responded in 1919 and

1920 with an aggressive campaign to protect national park integrity. They began with immediate action to stymie dam surveying efforts in the parks, then followed that by publicizing the threats to the parks in the popular and conservation press and urging readers to write in defense of the parks. Political and civic actions rounded out their repertoire of defensive actions. The odds were long, though, given the reclamation fervor of the day. Still, if they could not defend Yellowstone's integrity, what would remain of the national parks?

Secretary of the Interior Lane favored reclamation, and was thus sympathetic to the proposal of the Fremont–Madison Reservoir Company. He ordered NPS Director Stephen Mather not only to allow a reclamation survey of the area but also to follow that with a report *favoring* the project. There is evidence to suggest that Mather did not originally oppose the dams. In a letter to him, J. Horace McFarland of the American Civic Association stated: "I view with deep regret and great alarm the fact that you have formally consented to the passage of the bill,…and have apparently advised the Secretary of the Interior to interpose no objection to it" (McFarland 1920b; *Livingston Enterprise*, 28 May 1920). Regardless of whether this is true, it is clear from his following actions that Mather strenuously opposed the dams. As director of the country's newest public conservation agency, he was not about to endorse another such Hetch Hetchy degradation of the National Park System. So, he initially dragged his feet on the report, then lost the order directing him to do it, then determined to resign if he indeed had to submit it (Bartlett 1985). The report he finally did submit was adverse to reclamation, stating:

> I can not submit at this time anything but an adverse report on this project, and urge upon you as strongly as I can the necessity for taking no favorable action upon it. Should I take any other view, as I see it, I would be violating the obligations imposed upon me as Director of the National Park Service, which is to so administer Yellowstone Park that it be preserved in its natural state unimpaired for future generations (Mather 1920b).

Lane was intent upon surveying Yellowstone's reclamation possibilities, however. On 28 July 1919, he directed that a permit be given to I.B. Perrine of Twin Falls, Idaho, to make a preliminary reclamation survey of the Falls River Basin and all four of the park's large lakes. Acting NPS Director Arno Cammerer telegrammed this information to Horace Albright, the superintendent of Yellowstone, who responded in a telegram:

> Any or all of these projects will ruin absolutely Yellowstone Park for public use. Hetch Hetchy project in Yosemite [is] insignificant in comparison. Public condemnation of these projects will be a thousand times more vitriolic.…Fall River Basin might well be surveyed but am sure construction [of] dam will cause wiping out our biggest moose herd (Cammerer 1919; see also Albright 1919).

A few days later, Lane carried through with his directions, granting the permit to Perrine, who was thus headed to Yellowstone for his survey. To warn Albright, J.J. Cotter of the Interior Department sent an encoded telegram stating:

"Unvouched seamanship sardachate toponym to perrine to subacute preliminary venge in fistful." Decoded, the message meant, "Secretary of the Interior has given authority [to Perrine] to make preliminary surveys in Yellowstone Park" (Cotter 1919). Alerted by the telegram, Albright scrambled to stymie Perrine. Because it was late in the tourist season, he sent the horses that Perrine would need for his survey to winter pasture early, and directed the boat company to put up its boats for winter storage (Albright 1985; Bartlett 1985). These actions kept Perrine from fully surveying the park, but he was still able to survey the Falls River Basin and Yellowstone Lake, and recommended both for impoundment (Bickel [n.d.]). Even though Albright was able to partially deflect the irrigators' onslaught, they had obtained enough information for their needs, and the threat persisted.

To help protect the parks against such threats, Mather had helped form the National Parks Association (NPA; today's National Parks Conservation Association) in 1919. Led by Robert Sterling Yard, the young organization jumped into the dam fray the following year. Yard editorialized against the dams in his organization's journal and issued a special magazine whose lead article was entitled "Hands Off the National Parks" ([Yard] 1920a). He consistently urged association members and the public "to the defense" ([Yard] 1920b). Realizing that his small circulation was inadequate for the size of this challenge, he pulled together a network of "more than 12,000 clubs and associations throughout the United States, representing paid memberships of nearly four million people in opposition to the dams" (Yard 1922a). The Appalachian Mountain Club, Sierra Club, Mazamas, and Mountaineers assisted him in setting up regional organizations to address the issue in Boston, Chicago, San Francisco, Portland, and Seattle. Yard's network of groups was impressive and diverse:

> By Christmas [1920], the organizations actively at work included business associations of various kinds, chambers of commerce, teachers'clubs and federations, shooting and fishing clubs, manufacturers' associations, patriotic leagues, automobile associations, travel and outing clubs, universities, bar associations, nature study clubs, political clubs and all the greater scientific associations in the land (Yard 1922a).

Yard also networked with the country's women's organizations, specifically thanking them twice in the *National Parks Bulletin* for their strong stance against the dams ([Yard] 1920c; [Yard] 1921a; see also McMillen 1920). The number of cooperating associations bears witness to the gravity of this threat upon the idea of the national park.

Some of Yard's most active allies were the conservation groups in existence at the time. For example, the Audubon Societies of America sent out 25,000 circulars calling for letters in opposition to the dams and soliciting donations, which they used as a "National Parks Defense Fund" *(Bird Lore* 1921b). Yard was successful in uniting virtually all the country's conservation groups in opposition to the dams, including the Sierra Club (Sierra Club 1920), Boone and Crockett Club *(Livingston Enterprise,* 12 December 1920), and National Geographic Society

([Yard] 1921a). Of all the groups, though, his, the NPA, was most consistent in its defense of Yellowstone and was arguably the leader of the conservationist battle against the dams (Miles 1995).

Yard and Mather knew that the national parks were David battling the reclamation Goliath. They had to reach as wide an audience as possible, so they also published defenses of Yellowstone in popular or civic magazines. Both men were well connected with the leading conservationists of the day, such as George Bird Grinnell, Emerson Hough, McFarland, and the editor of *The Outlook,* a popular magazine similar in style to *The Nation* or *The Independent.* The editor (who remains unidentified, his or her name not being given on the masthead) closely supported Yard in opposing the dams and was clearly the opposition leader in the popular press.

Together, the American conservationists worked against the dams throughout 1920 and 1921. They frequently reported on the congressional progress of the dams and urged readers to write their representatives in opposition (see *National Parks Association Bulletin,* no. 10, 25 June 1920; no. 11, 30 September 1920; no. 13, 20 November 1920; no. 14, 22 December 1920; no. 15, 10 February 1921; nos. 16 and 17, both 20 March 1920; and no. 19, 23 May 1921; see also *The Outlook,* 7 July 1920, 28 July 1920, 8 September 1920, 6 October 1920, and 12 January 1921). Reclamationists were busy, too, promoting the dams. Five key issues emerged in the rhetoric, with the reclamationists and conservationists at loggerheads. An examination of these themes follows.

Major theme 1: dangerous precedent. Conservationists deplored the fact that if these dams were permitted, they would set a dangerous precedent, opening all national parks for commercial exploitation. McFarland, president of the American Civic Association, was the first to see this threat. In an article in *The Independent* on 8 May 1920 he called Smith's bill "the entering wedge of commercialism" (McFarland 1920c). Yard picked up on this fear shortly thereafter, and repeatedly articulated it: "One thing we certainly know, and that is that *the granting of even one irrigation privilege in any national park will mark the beginning of a swift end; within five years thereafter all our national parks will be controlled by local irrigationists, and complete commercialization inevitably will follow"* ([Yard] 1920d: 6; emphasis in original). He strongly felt that this was a nationally significant threat, stating: "[The Walsh bill] constitutes the most insidious and dangerous blow ever aimed at American Conservation, because it seems to ask for so little while really demanding the entire National Parks System, for if Congress grants Senator Walsh his way with Yellowstone it cannot refuse to grant others their way with other national parks" ([Yard] 1921b: 1). Mather agreed with Yard and McFarland, stating that "one misstep is fatal" ([Mather] 1920: 34)

The Hetch Hetchy precedent was indeed a welcome mat for the irrigationists. In its literature promoting the dam on Yellowstone Lake, the Yellowstone Irrigation Association noted that "[t]here is already a dam in Yosemite park, by congressional permission." Although the association went on to argue that Hetch Hetchy was not a precedent, they clearly knew about it—and were promoting the

same idea in Yellowstone (Yellowstone Irrigation Association 1921). Downplaying the similarity did not remove the threat.

Conservationists were quick to grasp the Hetch Hetchy parallel, and knew the Yellowstone attacks were key to overturning its precedent. *The Outlook's* editor was the first to articulate the parallel in an article entitled "Another Hetch Hetchy," published 7 July 1920. Evidently, the editor felt that the Hetch Hetchy story was so well known that he did not include explanation of it or of its parallel to Yellowstone in that article *(The Outlook* 1920a). McFarland made the parallel more explicit in *The Outlook* three weeks later, but seemed to downplay Hetch Hetchy's significance, perhaps out of fear it would be repeated. For example, he felt that the Yellowstone dam situation was more significant than Hetch Hetchy because the dams on Yellowstone Lake would ruin a key feature of Yellowstone, where the dam at Hetch Hetchy did not impair Yosemite's key feature, the valley. Further, he felt that the fact that few people would benefit from damming Yellowstone, as opposed to the great numbers of San Franciscans who benefited from damming Hetch Hetchy, made the Yellowstone dams all the more egregious (McFarland 1920d). Further evidence that conservationists saw, and feared, the parallel is the fact that they referred to Hetch Hetchy only two more times through 1938—in Mather's annual report for 1920 and in an article by Hough in *The Saturday Evening Post* the same year ([Mather] 1920; Hough 1920).

Fear of a dangerous precedent was a very common theme articulated in the literature at that time. Table 1 summarizes other authors and journals that mentioned it in some way.

Major theme 2: populism. Irrigators felt they needed the dams to build democratic society in the West—the same thing Easterners had already done. When they encountered opposition to their dam proposals, they felt as though the Easterners were intruding into someone else's business, as if wealthy elites were dictating how they should be allowed to run their lives. "I am getting a little tired," said Major Fred Reed, managing director of the Idaho Reclamation Association, "of having everything that the West tries to do, opposed by those super-men of the East, who stand with their heads in the clouds, agitating against the constructive development of the West..." ([Reed] 1920: 7). This was a common perception at the time, particularly repeated in the *Livingston Enterprise:*

> Montana shall never build up manufacturing industries in Yellowstone National park if George Byrd [sic] Grinnell, professional conservationist and writer of New York, can prevent. That Montana capital is getting ready to exploit Yellowstone park and turn it into one vast factory in [is] Grinnell's latest nightmare.…Mr. Grinnell should stick to his legitimate field *(Livingston Enterprise,* 11 May 1920; see also *Livingston Enterprise,* 4 June 1920, and *Boise Statesman,* 26 April 1920).

Yet, the national parks are national property, so the conservationists justifiably felt the dams intruded upon public property. The populism argument—that few would profit at the expense of the many—was articulated especially by *The*

Outlook. The few to profit were the irrigationists, who clearly stood to gain by damming Yellowstone waters. The many to lose were the citizens of the United States, who owned Yellowstone and would lose its resources under water. Writing in *The Outlook*, McFarland characterized irrigationists as a thoughtless minority:

> That their claims and desires are as wholly selfish as that of any others who would take the public property for private benefit is also obvious.…[I]t will cost more money if these men must pay, as other irrigation farmers now pay, for developing their own sources of water. They desire, to put it plainly, to profit at the public expense…(McFarland 1920d: 578).

The Outlook found the fact that some dam proposals called for government financing of the dams to be particularly galling: "It is bad to have natural resources, which belong to the people, taken by private interests; it is worse to have these resources used for exploiting the people who really own them; it is unbearable to require the people to pay for building the plants to be used in the exploitation" *(The Outlook* 1920b: 68). The magazine's editor continued questioning these "anti-Progressive" dams into the next year (Waugh 1921).

The populist argument took other tacks as well. Mather, for example, in his report to Lane, noted that other reservoir sites were available (such as Henry's Lake on the upper North Fork of the Snake River), but would involve the pur-

Table 1. Other authors and journals that argued against the precedent of damming in national parks.

Author/Journal	Relevant Quote
Joseph Bird Grinnell (1920).	"There is now before Congress a bill that alarms all conservationists because it threatens the integrity of the Yellowstone, our most important national park, and if it should pass would establish a precedent for commercial demands on other national parks all over the country."
Field and Stream (1920, n.p.).	"Let us, the people, create our own precedent right here, with this 'beneficent' bill. Let us demand that Congress declares itself by soundly defeating this sneaking beginning of a great conspiracy to destroy the glory of our national parks, …"
Robert Sterling Yard (1920, 208).	"The irrigation attack is centered on Yellowstone Park, but its success will furnish precedent for a score or more of projects already organized to seize the waters of other national parks."
Emerson Hough (1920, 95).	"It was only the prompt objection of Secretary Payne that kept irrigation dams out of Yellowstone Park. The other parks would have been merely a matter of detail. It would have been Hetch-Hetchy everywhere."
William E. Colby and William Frederic Bade (1920, n.p.).	"Lose no time in writing to the three men … who represent you in the Senate and the House, … that Congress establish the policy of holding our parks inviolate against all commercial exploitation."
Bird Lore (1921a, 65).	"Already other commercial interests are looking forward to repeating the benefit from the precedent they expect to be set by Congress in passing [the Smith Bill]."
Colorado Mountain Club (1920, n.p.).	"Such legislation is vicious in itself and would create a precedent dangerous, insidious, and utterly at variance with the interests of the whole people…"

chase of private lands. He felt that the irrigationists were pursuing the Yellowstone sites because they were less expensive, and wondered: "Are we justified in allowing the use of national park lands just because they belong to the government and could be developed with less expense?" (Mather 1920b). Other authors who used such populist arguments against the dams included Hough in "Pawning the Heirlooms," a very influential *Saturday Evening Post* article, and T. Gilbert Pearson of the Audubon Society (Hough 1920; [Pearson] 1921; see also *American Forestry* 1920).

Major theme 3: landscape character. Irrigators believed that their dams would not threaten, but would rather enhance, park resources. The Bechler dam "will result in replacing what is now mostly an unattractive swamp with a mountain lake" (Swendson 1920: 6). The swamp had "no value or scenic beauty, but [was] infested with flies and mosquitoes during the summer months." Besides eliminating the swamp and its pests, the reservoir and its attendant roads would provide greater access to this area of the park, thereby reducing the fire danger (Bickel 1920: 8). In a similar manner, the Yellowstone Lake dam would enhance the park by replacing Fishing Bridge, a "rickety old pile structure," with "[a] permanent, artistic bridge." Further, the topography surrounding Yellowstone Lake was steep, meaning few banks of mud would be created and few trees drowned through inundation (Yellowstone Irrigation Association 1921).

As one would expect, conservationists felt differently. They thought nature was beautiful in its intact condition. For them, extolling the virtues of the threatened areas was another successful argument, though they found themselves scrambling to determine just what the virtues of the Bechler region were, as it was not well known (almost fifty years after the park was created!). To answer the question, William C. Gregg, a New Jersey member of the NPA, explored the area in 1920 and again in 1921. He was very impressed at the waterfalls in the Bechler region, stating "those areas of the park contain divine beauties of which the men who fixed the limits of the park had no knowledge whatever.…[We] found more falls and cascades than in all the known parts of the park put together" (Gregg 1921: 469). Likewise, he claimed that the "Bechler Valley is the widest, most level and most beautiful in the Yellowstone National Park" (Gregg 1920: 83). His findings were widely reported in the press at the time ([Mather] 1921).

Besides its beauties, the Falls River basin was important for wildlife, particularly for moose. As with most wildlife, moose populations were reduced throughout the West at this time, with the Bechler region remaining a stronghold for them. Conservationists noted the obvious implications of the Bechler dams for moose: "If Congress passes [the Smith] bill, Congress will sign the death warrant of one of America's noblest wild animals…the famous Yellowstone moose" *(Field and Stream* 1920; see also Hough 1920; Mather 1920a).

Yellowstone Lake's virtues were easier to promote, as the lake was well known. Dams there would flood important resources overlooked by the irrigators, such as the white pelican rookery on the Molly Islands and geothermal features such as the Fishing Cone at West Thumb. Mather and Albright estimated

that a 25-foot dam on Yellowstone Lake (the average of the various proposals) would flood about 9,000 acres, much of that in the low-lying Pelican and upper Yellowstone river valleys. In flooding them, "several thousand acres of the finest feeding grounds for elk, deer, and other game would be made worthless" ([Mather] 1920: 26; see also *The Outlook* 1920c; Mather 1920a; Hough 1920; [Yard] 1921b). George Shiras III (for whom the Shiras subspecies of moose found in the northern Rockies is named) publicized the resources of the remoter portions of Yellowstone Lake in *Forest and Stream* in February 1921. He noted: "By raising the Lake to the proposed level, all the sand beaches, coves, and all the islands…would be obliterated, while the water would cover the lower delta of the Yellowstone for a number of miles," thereby destroying important waterfowl and moose habitat (Shiras 1921).

Conservationists such as Gregg frequently used emotive and quasi-religious language to describe the area, thereby conferring such values on the place and stimulating public response. Gregg's description of the "divine beauties" of the Bechler region is one example, as is Hough's descriptions of Yellowstone as a place made by God, an "heirloom," and a place "sacred, never to be parted with" (Hough 1920: 12). Yard used such imagery as well, stating that "the essential quality distinguishing National Parks…is their condition of untouched Nature, their status as museums of the original American wilderness…" ([Yard] 1920b: 2). Conservationists consistently used such language to describe Yellowstone, giving it a sacredness that made the proposals to exploit it all the more offensive.

Major theme 4: reservoir characteristics. Reservoirs are ugly when drawn down, exposing bare mud along the shores. Irrigators were aware of this problem, and tried to minimize the "virtual" impact of that mud. For example, Idaho's Commissioner of Reclamation, Warren G. Swendsen, stated that "it is true, upon certain years of extreme drouth, [reservoir water] will be drawn out for irrigation uses, or partly so, at least during the period of perhaps two or three months" (Swendsen 1920). Swendsen's use of qualifiers befits his governmental position. Others felt that some sacrifice in beauty was necessary to build the good society: "Beauty is only skin deep; but usefulness combined with beauty is a wonderful combination and a blessing to those who have this, and a joy to all" (Bickel 1920). Note the theme of utilitarianism here, a theme far more common in reclamationist literature than that of natural sacredness. Irrigators believed in what they were doing, failing to see how dams could threaten the national park idea.

The conservationists found the muddy banks of a reservoir an easy weak spot to attack. Facilitating their dam opposition was the presence of Jackson Lake just south of the park, a handy example of what an irrigation impoundment would do to Yellowstone's natural scenery. The U.S. Reclamation Service (now Bureau of Reclamation) had raised the level of the natural Jackson Lake with a dam in 1907 (expanding it further in 1911 and 1916), but failed to log the inundated trees at that time. Consequently, there were "dead trees everywhere about its boundaries [that] pollute the water and kill the fish" ([Mather] 1920: 23). Further, as irrigators gradually drained the lake to its natural level every summer, they exposed a bathtub ring of mud around it. Conservationists found this deplorable; for exam-

ple, *The Outlook* noted that "the gradual drawing down of [Yellowstone Lake's] water ... will almost certainly leave those shores slimy, marshy, and depressing, just as the same process has utterly ruined the once notable beauty of Jackson Lake…" *(The Outlook* 1920c: 255; see also McFarland 1920d; [Mather] 1920).

Major theme 5: factual problems. In their zeal to see the dams built, proponents may have exaggerated their benefits. For example, they felt that both the Yellowstone Lake and Bechler sites were the only or best sites available, when in fact there were other potential sites downstream (Swendsen 1920; Yellowstone Irrigation Association 1921).

Conservationists were quick to note the factual problems evident in the promoters' proposals. In his "Pawning the Heirlooms" article, Hough noted several problems. First, a dam on Yellowstone Lake would do little to control the floods plaguing the lower Yellowstone River valley, because many large tributaries joined the Yellowstone downstream of the lake and upstream of the suffering communities. Next, he pointed out an obvious dam site at Yankee Jim Canyon, about fifteen miles north of the park. This site would more effectively control floods, and would not inundate park land (recall that conservationists such as Mather made the same point regarding the Falls River Basin dam). Finally, he speculated that a dam on Yellowstone Lake "would disarrange and probably sometimes wipe out both falls of the Yellowstone River; would ruin the Grand Canyon some or all the time, leaving it the pathway of a mill-pond creek" (Hough 1920: 98).

In testimony at a congressional hearing on the Walsh proposal (see below), George Goodwin, chief engineer of NPS, concisely articulated the same points. Additionally, he noted that the additional six feet of water storage that Walsh's dam would produce was only adequate to irrigate 20% of the acreage claimed by Walsh ([Yard] 1921b; see also Mather 1920c). In the end, none of the dam sites downstream were ever used.

Initial controversy resolved. Going into 1921, then, reclamationists had the upper hand, merely because theirs was the cause célèbre throughout the West. Although conservationist strength was growing, Yellowstone's integrity was uncertain at best, and doubtful at worst. National parks faced the gloomy potential of destruction.

Yet, the tide turned. As 1921 unfolded, Congress made decisions on the various dam proposals—all in favor of Yellowstone preservation. The conservationists' advocacy against the dams had its desired effect: public opinion turned against the various dam proposals. In February 1921, both the Smith and the Walsh bills met their fate. The Smith Bill was the first to die when it was not brought to a vote in the House before the session closed. Although Smith reintroduced it the following year, it did not go anywhere.

The Walsh bill was the next to see action. Hearings on it were scheduled for the start of the next congressional session, but when five members of the Yellowstone Irrigation Association arrived in Washington, Walsh held a surprise hearing on Washington's Birthday, and did not invite any dam opponents. It goes without saying that testimony at that hearing was favorable to the dams, using the

same flood control and irrigation arguments. Walsh did hold a hearing for the opponents, but tried to catch them off guard by holding it earlier than planned (on 28 February 1921; Haines 1996). This actually turned out to be somewhat providential, since Albright was then present in Washington. Four nights before the second hearing, he met with several other prominent conservationists such as Frederick Law Olmsted, Yard, and George Goodwin, to work on their responses. They broke up about midnight and went home (Albright 1921).

At the hearing, Albright spoke as expected, repeating many of the themes already discussed, such as deploring the submergence of valuable park resources. Olmsted spoke in opposition to the removal of management authority from NPS (Olmsted 1921). McFarland, Yard, and the new Secretary of the Interior, John Payne (who was more of a park defender than his predecessor Lane was) argued that the dam would open all national parks to exploitive commercialism: "when once you establish the principle that you can encroach on a national park for irrigation or water power, you commence a process which will end only in the entire commercialization of them all" ([Yard] 1921c: 3; see also [Yard] 1921b). Goodwin pointed up the factual problems inherent in the proposal. The conservationist testimony, especially Goodwin's, "made such a shambles of the arguments of the promoters that the Walsh bill was not reported" out of committee (Ise 1979: 313). At least for now, the conservationists had won.

Walsh, however, was not so easily defeated, for he reintroduced his bill in 1922, and got the support of (another) new Secretary of the Interior, Albert Fall. Fall was initially ambivalent about the dam, but eventually stated the "Yellowstone dam will be built" ([Yard] 1922: 1). Walsh needed to get an identical bill introduced into the House, but the August 1922 election in Montana defeated his plans when Scott Leavitt, a conservationist opposed to the dams, was elected. Timing, again, was key—and fortunate (for the conservationists, anyway): Fall's involvement in the Teapot Dome scandal broke about the same time as the election. Anyone associated with him, such as Leavitt's opponent, did poorly (Ise 1979; Haines 1996). Further, Senator John Kendrick of Wyoming came out in opposition to the dam at about the same time. Leavitt's election and Kendrick's opposition combined to kill Walsh's bill for the time being, and the conservationists won again *(Billings* [Montana] *Gazette*, 15 September 1922).

The Water Power Bill's threat was addressed last. Upon learning of the new authority, Mather protested to Secretary of the Interior Payne. He in turn protested to President Woodrow Wilson, who unfortunately felt compelled to sign the act or risk losing support of several western states in the upcoming election. He did, however, exact a pledge from the bill's sponsors to amend the bill in the next congressional session to exclude the national parks (Miles 1995).

Yard, knowing that pressure for that amendment would be key to its actual passage, galvanized support among his allies nationwide. Probably due to that pressure, Senators Walsh of Montana and Wesley Jones of Washington, two of the bill's sponsors, kept their promise on 3 March 1921 (U.S. Congress, Senate 1921: S4554). They were reluctant to do so, but probably acted in response to public pressure, as Yard indicated in an article announcing Wilson's signature to

the amendment: "The campaign's greatest achievement…was…the impression made upon Congress of the people's determination to hold their national parks and monuments in complete conservation" ([Yard] 1921c: 1; see also Shankland 1970). With the passage of this amendment, the third of the major reclamation threats to Yellowstone passed away—all three defeats occurring within two months!

Conservationists attributed their victories to their publicity campaign. Albright claimed that "the 'Pawning the Heirlooms'article and Mr. Gregg's article have absolutely stopped the irrigation legislation.…Several Wyoming papers have republished the 'Heirlooms' story." He also felt the publicity turned *local* sentiment against the dams: "[E]qually important, [the articles] have served to align Wyoming against all schemes of every kind that threaten commercialism of Yellowstone Park; they have split sentiment in Montana in such a way that all of thinking people have come over to our side; and they have established large doubts in the minds of lots of people in Idaho" (Albright 1920).

Acting NPS Director Cammerer credited publicity of a different sort. He felt that by publishing their proposals, the irrigators led to their own undoing, because the public was horrified to see just what they proposed to do to the park (Cammerer 1923). Finally, letters written by thousands of Americans to their representatives must certainly have swayed those politicians *(Christian Science Monitor* 1921). Conservationists drew upon a national audience, while the irrigators' audience was only regional; the larger national audience made the conservationists successful—and would continue to do so in the years ahead.

Inviolate policy is established. As time would tell, defeating these three threats turned the tide in favor of protection. For example, when Congressman Smith reintroduced his Falls River proposal in 1923, Albright stated: "I am not very much afraid of this Fall River Basin project any more" (Albright 1923). Likewise, Mather felt that in amending the Water Power Act, "Congress placed itself on record, upholding the inviolability of the national parks" ([Mather] 1921: 22; see also [Mather] 1924: 5). Dam proposals would surface time and again through 1937, but after the 1921 victories, these proposals went nowhere. Conservationists drew no more parallels with Hetch Hetchy in the next fifteen years, suggesting the emergence of a new, important policy of park security. Hetch Hetchy's precedent was overturned, replaced by a new policy of inviolability. National parks were secure.

The opening address of the 1923 summer tourist season in Yellowstone provides further evidence that the tide had indeed turned. There, John Wesley Hill spoke for President Harding and (still another) new Secretary of the Interior, Hubert Work, and announced, "it is at last the established policy of the Government that our national parks must and shall forever be maintained in absolute, unimpaired form, not only for the present, but for all time to come" ([Yard] 1923a: 2; Haines 1996). Hill's speech was widely reported as policy-setting. For example, NPA celebrated the fact that President Harding thus became the "first President to announce publicly a general Administration policy of absolute, uncompromising conservation for the National Parks System and every

one of its component units" (Irrigation Scrapbook, 1921–1928).

Harding himself visited Yellowstone later that summer, where he stated that "commercialism will never be tolerated here so long as I have the power to prevent it." In August 1923 President Coolidge announced that he would maintain his predecessor's policies, Harding having died shortly after visiting Yellowstone ([Yard] 1923b: 1; Albright 1985). The amendment to the Water Power Bill, the defeat of the Walsh and Smith bills, and Hill's speech collectively established the inviolate policy; from here on out, all battles were a defense of it, rather than the more daunting battle of establishing policy in the first place.

Reaffirming the Policy: "Keep the Looters Out!"

Now that conservationists had established important policy, they had to defend it. Droughts were inevitable, and irrigation was essential for agriculture in the area. Consequently, reclamationists were persistent, which gave the conservationists ample opportunity to uphold the new policy. Senator Walsh soon provided the first challenge to the policy when he introduced two more bills to dam the outlet of Yellowstone Lake in December 1923. With respect to the first of these bills, Yard noted that Walsh had "changed the ugly word 'dam' to the pretty word 'weir,' which means dam" ([Yard] 1924a: 6). The other bill would have appropriated $10,000 for a reclamation survey of Yellowstone Lake. Walsh could not raise that money in Montana itself, so his bill directed Congress to finance the survey (Ise 1979). Secretary Work, though, reported adversely on the bills the following spring, stating:

> [A]bsolute preservation should be the unwavering policy of Yellowstone administration, for inestimably valuable and precious as this great park now is to the Nation, it will prove of increasingly greater value with each passing year as the common heritage of coming generations.…Any plan for the commercial exploitation of the park must therefore, in my opinion, by the very nature of its aims and purposes, immediately be foredoomed to failure, and I therefore can not recommend favorable consideration of the pending measure (Work 1924).

Work's letter effectively killed the two bills. Senator Walsh was not to be heard from again, although the idea of damming Yellowstone Lake persisted.

Compared with earlier dam proposals, Walsh's last two bills garnered little opposition, perhaps because Work was so staunchly protective of the parks, or perhaps due to the strength of the policy established in 1921. Still, the NPA remained opposed to the Walsh bills, as did *The Outlook,* which published one article restating their former position: "Hands Off the National Parks!" *(The Outlook* 1923: 357). Women's clubs continued to be active in opposing the dams. For example, the General Federation of Women's Clubs declared for "defending national parks, maintaining their standards and perfecting protective laws…until Congress definitely recognizes the National Parks System as a beneficent national institution whose conservation and highest standards must by no means be imperiled, but maintained for the Nation's benefit for all time" ([Yard] 1924b: 5).

Conservationists enjoyed a reprieve for a couple of years, but in 1926

Representative Addison Smith of Idaho concocted another plan to build dams in Cascade Corner. Smith could see the futility, after the conservationist victory in proving national parks inviolate, of attempting to build his dam *within* the park. He reasoned, then, that if he could not build Idaho's dam in the park, why not cut that land out of the park? Eliminating Bechler Meadows from Yellowstone was precisely the proposal he made in 1926 (he had circulated the idea as early as 1921; see Smith 1921; Little 1921; *Boise Idaho Statesman*, 10 August 1921). Further, to make the excision palatable to his opponents, he offered a carrot in exchange for the 12,000 acres of Bechler: the addition to the park of the 64,000-acre Fremont Game Reserve, which was just west of the park and north of Bechler. Smith linked this proposal to a bill regarding other boundary changes for Yellowstone that was circulating at the same time, and threw his support behind the addition of another 200,000 acres to Yellowstone, the Yellowstone River headwaters area, on the park's southeast side. President Coolidge, perhaps too tempted by the prospect of adding the spectacular headwaters area to Yellowstone, endorsed the measure (Lovin 2000). Smith's proposal was very popular in southeast Idaho, where 1,500 people stacked a hearing in favor of the Bechler dam in 1926 *(Boise Idaho Capital News,* 19 August 1926).

Conservationists did not appreciate the compromise, however. Both NPA and *The Outlook* launched vigorous attacks against the proposal in 1926 and 1927. They recycled many arguments from their successful campaigns earlier in the decade. NPA used its strongest language to date to describe the inviolability of national parks, stating: "A National Park…should be as sacred as a temple" (van Dyke 1926: 8). Both organizations published descriptions of the Bechler area: an article by Horace Albright in the *National Parks Bulletin* (Albright 1926; see also Albright 1928) and one by Eleanor Marshall Thurman, extension secretary of the American Civic Association, in *The Outlook.* Thurman eloquently concluded her article by stating that "In my six days [in the park] I saw no other section which offered such facilities for the man or woman or family seeking to spend a few days of quiet and peace away from the honk and fumes of automobiles, the noise and smoke of trains, and the hue and cry of the typical tourist" (Thurman 1926: 435). The groups again compared the proposed reservoirs to Jackson Lake's "low-water horror of muck," "deprecated desolation," ([Yard] 1927: 17) and "gaunt skeletons of timber and its ugly mud shores" (Thurman 1926: 434; see also *The Outlook* 1926b). They also questioned whether it was "good national policy to establish a precedent for cutting large areas out of national parks to serve local purposes" ([Yard] 1927: 17; see also Albright 1928), and answered: "Before ever Idaho was a State this land was reserved for the people of the Nation. No State has a right to it. No special interest has any business there. Americans, keep the looters out" *(The Outlook* 1926a: 229).

Of the two magazines, *The Outlook* staged the more novel campaign against what it called "The Yellowstone Grab." In three different issues, the editor poked fun at, or criticized, Idaho's residents. In the first article, the editor compared Idaho's per capita wealth and automobile ownership to that of other U.S. residents, finding figures "that [do] not make Idaho look impoverished." The editor

then wondered why "Idaho wants to take land that belongs to the American people…and put it to making more money for the people of two of her counties" *(The Outlook* 1926a: 229–230). In the second article, the editors suggested that irrigation proponents might be blinded to the area's beauty by their agricultural needs: water for their sugar beets. The editors then rhetorically asked, "What is beauty to a beet?" *(The Outlook* 1926c: 301). In the final article, they offered basic lessons in American geography to teach Idahoans that Yellowstone belongs to the nation, not Idaho, and wondered: "[C]annot somebody provide a fund for sending Idaho editors to school to relearn their geography?" *(The Outlook* 1926d: 394). In these three articles and throughout its yearlong campaign, *The Outlook* consistently cried "Hands Off!" to "the looters," and "invite[d] the co-operation of public and press in its campaign for the maintenance of the integrity of Yellowstone National Park" *(The Outlook* 1926a: 230). Specifically, they called upon the public to write their congresspersons *(The Outlook* 1926e: 554).

The matter festered for a number of years, finally ending up before the Yellowstone National Park Boundary Commission, which Congress established in February 1929 to render judgment on all the boundary revisions. The commission spent two weeks examining the contested areas, and held hearings on the matter in Cody and Jackson in 1929 (Lovin 2000). As Albright forecast, opposition to the Bechler excision ran strong in Wyoming; those present at the hearings were nearly united "against giving Bechler Meadows over to any commercial or irrigation project" (Albright 1926: 6). Some sportsmen's groups such as the Wyoming division of the Izaak Walton League and the Montana Sportsmen's Association opposed the project as well (Lovin 2000).

The commission delighted the conservationists in 1930 by ruling against the irrigationists, listing two primary factual reasons. First, "[t]he Bechler River meadows are of scenic charm and afford an engaging foreground to natural features of unusual interest,…[including] the beautiful falls of Dunanda, Silver Scarf, and Ouzel.…This region with its setting and surroundings forms a worthwhile part of the Yellowstone Park." Second, "there is an available site on the Teton River, outside of the Yellowstone National Park, which in [the committee's] judgment proves to be more economical and serviceable to the local irrigation interest than the proposed Bechler River site." Perhaps the strongest statement was the commission's conclusion: "Therefore, in the absence of a demonstrated public necessity, the commission finds that it is unnecessary and undesirable to break into the integrity of the Yellowstone National Park by the elimination of the Bechler River meadows from its boundaries" (Yellowstone National Park Boundary Commission 1931: 9). Once again, the inviolate policy was upheld: taking bites from national parks for commercial purposes was not appropriate. Irrigators would have to find another site for their dams.

Interestingly, the commission also endorsed the construction of a road from Idaho through Bechler Meadows and Canyon to Old Faithful to make the area more accessible to the public, and the addition of the Yellowstone River headwaters–Thorofare region to the park (Yellowstone National Park Boundary Commission 1931). The Bechler road was never built, and Wyoming sportsmen

defeated the headwaters proposal because they did not want to lose valuable hunting territory. In the end, the failure to add the headwaters area to Yellowstone ironically resulted in greater protection for it, because NPS would have constructed a road over Two Ocean Pass and up the east side of Yellowstone Lake to make the area accessible to the public (Haines 1996). By retaining that area in the Teton National Forest, the area was kept in its wilderness condition.

For the next four years, dam proposals involving both the Bechler region and the park's large lakes continued to circulate. There may have been collusion between the three local states in a project to dam Yellowstone Lake, sending some reserved water downstream to Montana while diverting the rest through a tunnel bored under the Continental Divide to the Snake River and thence to Wyoming and Idaho. All of these plans, however, failed when the three-state triumvirate fell apart in the early 1930s (Haines 1996). These plans received little overt attention from conservationists, perhaps because Secretary of the Interior Harold Ickes strongly opposed all of them (Bartlett 1985).

Clearly, conservationists were generally successful throughout this period in upholding national park integrity. The final round of the "war" began in 1937 when Congress approved the Colorado-Big Thompson project, which involved the construction of a tunnel under Rocky Mountain National Park to bring west slope water to the dry Front Range cities (Bartlett 1985). Rocky's integrity seemed violated, even though the tunnel did not mar the surface of any portion of the park. Whether it violated Rocky's integrity or not, the tunnel project soon woke the sleeping reclamation giant outside Yellowstone and inaugurated the final dam battle. Idaho's irrigationists reasoned that if it was acceptable to tunnel under Rocky Mountain, what could be wrong with damming Yellowstone Lake and tunneling its water over to the Snake River? Idaho Senator James P. Pope and Representative Compton I. White introduced bills into Congress in 1937 to effect precisely such a project (Yard 1938).

Once again, NPA swung into action, despite enduring the greatest financial stress of its history (Miles 1995). The venerable Robert Sterling Yard editorialized against the project in 1938. Seasoned by his previous efforts to defend Yellowstone, Yard saw the many parallels with the dam battles of the early 1920s. For example, he noted that the Idaho irrigationists again called their proposed dam a "weir," echoing Senator Walsh's moniker. He suspected that Walsh "shivers in his grave, for he wanted those waters for Montana!" He echoed himself and John Payne in stating: "'When once you establish the principle that you can encroach on a National Park for irrigation or water power, you commence a process which will end only in the commercialization of them all.'" As expected, Yard called for vigorous defense against the irrigation bills (Yard 1938: 11).

Again, many different organizations passed measures in opposition to the dams, including the Sierra Club (Chapman 1938), *Nature Magazine* (1938), the American Association for the Advancement of Science (Cammerer 1938b), the Prairie Club (Lehman 1938), the Emergency Conservation Committee (Edge 1938), the Izaak Walton League (Cammerer 1938a), and The Wilderness Society (The Wilderness Society 1938). As with the previous battles, they used many of

the same arguments. *Nature Magazine,* for example, recycled the precedent argument, stating: "Give them an acre and they'll soon have a whole watershed" *(Nature Magazine* 1938: 426).

President Franklin D. Roosevelt visited Yellowstone in 1937 and promised to oppose any reclamation dams involving Yellowstone Lake. Realizing already the economic value that an intact Yellowstone Park possessed, the Wyoming State Planning Board advised against the dams in 1937 (Greenburg 1937). Even the Secretary of the Swedish Government Committee on Planning for Recreation, Professor L.G. Rommell, opposed the dam: "If commercial interests should be allowed to encroach upon Yellowstone Lake, this would mean far more than despoliation of a place.…It would be a terrific blow to the entire National Park idea which could not fail to have its repercussions throughout the world" (National Park Service 1938: 4).

Given the level of opposition to this proposal and the record of conservationist successes in the previous two decades, it comes as little surprise that Idaho's proposals were defeated. Both bills died in their respective committees on Irrigation and Reclamation in 1938 ([Yard] 1938a; [Yard] 1938b; Bartlett 1985). With them died the last serious proposal to dam any of Yellowstone's waters.

Interestingly, a compromise of sorts had been struck for the Idaho irrigators three years before. The Bureau of Reclamation agreed to add two dams to the Minidoka project, one of them the Grassy Lake Dam at the head of Cascade Creek, a tributary to the Falls River (Haines 1996). The Grassy Lake Dam is only about one hundred yards from Yellowstone's south boundary. The reservoir is much smaller than the Bechler reservoir would have been, but does serve the needs of Idaho's irrigators in dry years. Still, the fact that Idaho's irrigators jumped on the irrigation bandwagon in 1938 with their proposal to impound Yellowstone Lake speaks to their devotion to reclamation—or to the resiliency of dinosaurs.

In Montana's case, the Yellowstone River never was dammed, although the Bureau of Reclamation proposed a large dam just upstream from Livingston at the Allenspur dam site in 1972. As with the dams in Yellowstone Park, citizen opposition and testimony stopped this dam, preserving the Yellowstone as the nation's longest remaining free-flowing river outside of Alaska (Wilkinson 1992).

Conclusion

After nearly two decades of fighting, the war seemed to be over. Through it, conservationists established, tested, and interpreted a new policy for the national parks: that they are inviolate, inappropriate as places for commercial exploitation. In winning every battle and the full war, conservationists overturned the defeat at Hetch Hetchy. In so doing, they proved both themselves (as conservation groups) and the nascent NPS capable of adequately protecting their charges. At least in the parks, *preservation* prevailed over *conservation.*

Why did the conservationists win at Yellowstone when they had lost just a few years earlier at Yosemite? There are several likely reasons. By the time of the

Yellowstone battle, NPS existed and was able to act aggressively to defend the park. This, the first major attack to national park integrity faced by NPS, gave it the opportunity to prove that it was not to be pushed around as the new kid on the block. In successfully defending Yellowstone, NPS proved itself an agency capable of protecting its parks. Hetch Hetchy, in contrast, was in part victim of administrative neglect: while the Army did an admirable job protecting Yosemite, they were not as zealous a protector of it as the NPS administrators were in Yellowstone.

Furthermore, Yellowstone benefited in another way from the unique position of its battle in time: not only was there now a National Park Service, but there was also a National Parks Association. This private group of individuals was expressly devoted to preservation of the national parks, and acted repeatedly to defend Yellowstone. It is true that Yosemite had its Sierra Club, but the Club at that time was primarily an outing association, not as much a conservation group. Indeed, the Hetch Hetchy issue deeply divided the Sierra Club; while it responded in defense of the park, its defense was not as vigorous as that of NPA with Yellowstone. NPA had no such division; it cut its teeth on the Yellowstone dam battle, galvanized conservationists nationwide in support of preservation, and stuck to its cause tenaciously.

Additionally, the balance of people who stood to profit versus those who stood to lose from the two dams had shifted. All the residents of San Francisco stood to benefit from the Hetch Hetchy Dam, whereas a relative few irrigators stood to benefit from the Yellowstone dams. Only a few people knew Hetch Hetchy well enough to sense the aesthetic loss of damming it; by contrast, almost all visitors to Yellowstone stood to lose in the damming of Yellowstone Lake. The Montana and Idaho irrigators were unable to overcome this sensitive weakness, whereas San Francisco derived strength from its large numbers.

Finally, and perhaps most important, there was no formal policy at the time of Hetch Hetchy against dams in national parks. As this article has detailed, the Yellowstone dam battle established that policy by 1923. But, the Yellowstone dam battle would probably not have been won without Hetch Hetchy. In a way, the country needed a Hetch Hetchy somewhere in the national parks to illustrate what did not belong in them, to demonstrate that national parks should be inviolate. It may be easier to actually see what is wrong in a park than to imagine it; Yosemite provided the illustration of what not to do in Yellowstone.

Given the popularity of utilitarian conservation in the time between the two presidents Roosevelt, it is somewhat surprising that reclamation was stopped in Yellowstone. The fact that this strong public policy was stopped speaks to Yellowstone's strength as a preservation icon, to the zeal of those defending the park, and to the popularity of the national park idea. Although the irrigators had the best of motives in mind, their desires were irreconcilable with the preservation of Yellowstone. Moreover, their attacks on the park affirmed and cemented its preservation; few would think of tampering with Yellowstone in the future.

The policy was broadened to all national parks with the Echo Park controversy in Dinosaur National Monument in the 1950s, and with the Grand Canyon

dam controversy in the 1960s. In both of these battles, the Bureau of Reclamation proposed placing large dams in the national parks, but was prevented from doing so by conservationists. David Brower, leader of the Sierra Club, was a leading figure in both of these latter efforts, effectively leading conservationists on nationwide campaigns against the dams. As with the later rounds of dam proposals in Yellowstone, these two battles reaffirmed that national parks are inviolate.

Conservationists established a very strong principle with Yellowstone. Indeed, it is one that they defended perhaps too vigorously in future years, when the question of including Jackson Lake in Grand Teton National Park came up in the 1930s. After using it for years as an example of ugly commercialism, conservationists were hard put to support its inclusion in the proposed park. Believing that any industrial use did not belong in national parks, and nervous about opening the door to the irrigators again, organizations such as NPA and the Wilderness Society opposed its inclusion, into the late 1940s (The Wilderness Society 1938; Righter 1982). Clearly, they had good reason to uphold the policy. However, it can be argued that all policies need exceptions—wisely chosen ones, of course. The magnificence of the Tetons perhaps justified such; certainly the ticky-tack commercialism already present there in the 1940s did. Eventually, conservationists made that exception with Jackson Lake, in such a way that more cries for national park reclamation did not appear. They were able to have their cake and eat it too.

It seems as though each generation of Americans must relearn the important lesson of national park inviolability. In 1991, the Clear Rock Resources Company of Sheridan, Wyoming, proposed still another dam at Fishing Bridge: an eleven-foot dam that would have raised the level of Yellowstone Lake by five feet. As the reclamationists did sixty years earlier, Clear Rock promoted the dam's benefits, suggesting that its low profile "will make [it] nearly invisible to traffic crossing Fishing Bridge" and that it "would have a stabilizing influence on lake levels with potential benefits for the lake shore environment…" (Barker 1991). In response, NPS, thanks to the strong policy established earlier, was able to quash this threat with only one letter two weeks later (Ponce 1991). Still, this surprising proposal does bear truth to what Yard wrote in 1938 at the conclusion of the final dam battle: "[T]he threat has been staved off, [but] for as long as the waters of Yellowstone Lake are kept inviolate they will be a continual challenge to irrigationists.…The fight for Yellowstone will be a continuous affair" ([Yard] 1938a). National parks are secure, but only as long as they are defended.

Epilogue

After two hours of hiking in the rain across Bechler Meadows in Yellowstone, my friend Dave and I arrive at the fern-covered mouth of Bechler Canyon. The flat meadows offer glimpses of the Tetons through the clouds to the south. Now, though, the trail gradually begins to climb up the canyon through an open forest of huge spruce and fir trees. Right at the mouth of the canyon we see Ouzel Falls, the first of many we would pass the next two days.

We hike on through intermittent showers, crossing narrow log bridges, eating huckleberries, and stopping for breaks at Colonnade, Iris, and the recently renamed Albright Falls. In another three miles we finally arrive at our campsite, known as Three River Junction, for the three forks of the Bechler River that come together there: the Phillips, Gregg, and Ferris forks. That evening we carry our cook stove a mile farther upstream to the hotpot on the Ferris Fork, eating supper between bouts of soaking. The hot springs warming this fork are so large that we choose our desired water temperature by walking up or downstream. After the long day, we relax well into the evening, returning to our tent after dark (and stumbling over roots when the batteries in our only flashlight fails on the way back). The next day we follow the Ferris Fork farther upstream to another four waterfalls, then retrace our steps and hike out to our car in sunshine. We pass many hikers and fishers en route, as well as several moose. The last hike of my first summer in Yellowstone, I would be lured back to this marvelous—and undammed—corner of Yellowstone many more times.

References

Albright, H.M (as told to R. Cahn). 1985. *The Birth of the National Park Service: The Founding Years, 1913-33.* Salt Lake City, Ut.: Howe Brothers.

———. 1919. Night message to Director[,] National Parks, July 30. Box L-57, File "Irrigation Projects No. 1, July 1919-May 31, 1920 (Fall River Basin)," Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1920. Letter to George Horace Lorimer, editor, *The Saturday Evening Post* (4 December). Box L-57, File "Irrigation Projects No. II., June 1, 1920-Dec. 31, 1920." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1921. Memorand[a] for the Files re Yellowstone Lake dam—Walsh Bill No. 4529, Feb. 23 and Feb. 24. Box L-57, File "Irrigation Projects No. III, Jan. 3, 1921 to April 30, 1921." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1923. Letter to Mr. J. Horace McFarland, Pres., American Civil [sic] Association, June 15. Box L-19, File "Irrigation Yellowstone Lake F.Y. 1923–1924." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1926. Yellowstone's chief describes Bechler Basin. *National Parks Association Bulletin* (December), 6–7.

———. 1928. The Bechler River. *Field and Stream* (January).

American Forestry. 1920. The grave peril of the national parks. 1 December.

Barker, T. 1991. Letter to National Park Service, Attn.: Bernadette, Aug. 13. On file. Yellowstone National Park, Wyo.: Yellowstone Center for Resources.

Bartlett, R.A. 1985. *Yellowstone: A Wilderness Besieged.* Tucson, Ariz.: University of Arizona Press.

Berlin, A.E. 1915. Letter to U.S. General Land Office, Nov. 7. Box D-46, File "480—Waters and Sanitation." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Bickel, P.S.A. n.d. Letter to Franklin K. Lane. Box L-57, File "Irrigation Projects No. 1, July 1919–May 31, 1920 (Fall River Basin)." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1920. What the Fall River bill means. *The New West Magazine* (8 November).

Bird Lore. 1921a. Our national parks in great danger. January–February, 64–65.

———. 1921b. Report on the national parks situation. March–April, 111–112.

Cammerer, A. 1919. Telegram to Superintendent Albright, July 29. Box L-57, File "Irrigation Projects No. 1, July 1919–May 31, 1920 (Fall River Basin)," Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1923. Letter to Mr. Albright, May 26. Box L-19, File "Irrigation Yellowstone Lake, F.Y. 1923 & 1924." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1938a. Letter to S.B. Locke, Conservation Director of the Izaak Walton League of America, March 17. Box D-77, File "Lakes, 1936–1939." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1938b. Letter to the Secretary, Jan. 12. Box D-77, File "Irrigation Proposals, 1937–38." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Chapman, O.L. 1938. Letter to William F. Colby, Secretary, Sierra Club, January 25. Box D-77, File "Lakes, 1936–1939." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Christian Science Monitor. 1921. Bechler River Basin. (February 5.)

Cohen, M. 1988. *The History of the Sierra Club, 1892–1970.* San Francisco: Sierra Club Books.

Colby, W.E., and W.F. Bade. 1920. Fellow member of the Sierra Club. Sierra (10 November). As found in "Irrigation & Dam Proposals Scrapbook 1920–1921." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Colonel of Cavalry. 1915. Letter to Secretary of the Interior, Dec. 1. Box D-46, File "480—Waters and Sanitation." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Colorado Mountain Club. 1920. Resolutions unanimously passed by the Board of Directors of the Colorado Mountain Club. *Trail and Timberline* (December), unpaginated.

Cotter, J.J. 1919. Telegram to Horace M. Albright, July 31. Box L-57, File "Irrigation Projects No. 1, July 1919–May 31, 1920 (Fall River Basin)." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Edge, R. 1938. Letter to Conservationist, May 12. Box MSC-64, File "Rates, Routes, Schedules & Facilities 1-4-1937 to 12-16-1938." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Electrical World. 1920. The beauty of use. 18 December.

Fiege, M. 1999. *Irrigated Eden: The Making of an Agricultural Landscape in the American West.* Seattle, Wash.: University of Washington Press.

Field and Stream. 1920. The rape of the Yellowstone. June.

Fremont–Madison Reservoir Company. 1920 [?]. Reasons why Falls River Meadows Reservoir Site should be Granted. Copy of brochure. Box L-57, File "Irrigation Projects No. 1, July 1919–May 31, 1920 (Fall River Basin)." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Greenburg, D.W. 1937. Report entitled "Study of Proposed Damming of Yellowstone Lake," submitted to Hon. Leslie A. Miller, Governor of State of Wyoming, December. Box D-225, File "660-05.4 Proposed Damming of Yellowstone Lake." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Gregg, W.C. 1921. The cascade corner of Yellowstone Park. *The Outlook* (23 November), 469–476.

———. 1920. Cornering Cascades. *The Saturday Evening Post* 193 (20 November), 11+.
Grinnell, J.B. 1920. Speak up quickly for the Yellowstone, urges veteran naturalist. *Literary Digest*, June 5, 90, 92, 93.
Haines, A.L. 1996. *The Yellowstone Story.* 2 vols. Rev. ed. Niwot, Colo.: University Press of Colorado.
Hillman, M. 1916. Letter to Col. Lloyd Brett, April 6. Box D-46, File "480—Waters and Sanitation." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
Hough, E. 1920. Pawning the heirlooms. *The Saturday Evening Post* 193 (25 September), 12+.
Irrigation Scrapbook, 1921–1928. (This scrapbook contains numerous Associated Press articles, from newspapers nationwide, covering Professor Hill's 1923 speech in Yellowstone.) Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
Ise, J. 1979 [1961]. Our National Park Policy. New York: Arno Press. Reprint ed. [Baltimore: Johns Hopkins University Press for Resources for the Future, 1961.]
Lehman, M.C. 1938. Letter to Hon. James Hamilton Lewis, March 11. Box D-77, File "Lakes, 1936–1939." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
Little, R.G. 1921. Letter to Horace Albright, June 18. Box L-57, File "Irrigation Projects (Fall River Basin), June 1920-October 1921." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
Lovin, H.T. 2000. Fighting over the Cascade Corner of Yellowstone National Park, 1919–1935. *Annals of Wyoming* 72 (Spring), 14–29.
Martin, D.G. 1917. Letter to Chester A. Lindsley, July 30. Box D-46, File "480—Waters and Sanitation." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
[Mather, S.]. 1920. *Annual Report of Director of National Park Service, 1920.* Washington, D.C.: U.S. Government Printing Office.
———. 1921. *Annual Report of Director of National Park Service.* Washington, D.C.: U.S. Government Printing Office.
———. 1924. *Annual Report of Director of National Park Service.* Washington, D.C.: U.S. Government Printing Office.
Mather, S. 1920a. Do you want to lose your parks? *The Independent* (18 November), 220–223.
———. 1920b. Letter to Mr. Secretary, Jan. 31. Box L-57, File "Irrigation Projects No. 1, July 1919–May 31, 1920 (Fall River Basin)." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
———. 1920c. Letter to William Bade of the Sierra Club, July 29. Box L-57, File "Irrigation Projects No. II, June 1, 1920–Dec. 31, 1920." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
McFarland, J.H. 1920a. Exploiting the Yellowstone. Is it necessary—or merely cheaper? *The Outlook* (6 October), 255–257.
———. 1920b. Letter to Mr. Mather, April 12. Box L-57, File "Irrigation Projects No. 1, July 1919–May 31, 1920 (Fall River Basin). Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.
———. 1920c. Primrose by the river's brim. *The Independent* (8 May).
———. 1920d. The Yellowstone Park question. *The Outlook* (28 July), 578.
McMillen, H.C. 1920. Would put dams in Yellowstone Park. *New York Evening Post* (9 September).

Miles, J.C. 1995. *Guardians of the Parks.* Washington, D.C.: Taylor & Francis.

National Park Service. 1938. Statement on Diversion Proposal Affecting Yellowstone Lake…Box D-225, File "Water Systems, Vol. 1, November 1935 to December, 1947." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Nature Magazine. 1938. Yellowstone dam project. August–September, 426.

Olmsted, F.L. 1921. Fundamental objections to the Walsh bill. *National Municipal Review* (May), 270–271.

The Outlook. 1920a. Another Hetch Hetchy. *The Outlook* (7 July), 448.

———. 1920b. Are Special interests trying to exploit the Yellowstone Park? *The Outlook* (8 September), 68.

———. 1920c. Exploiting the Yellowstone. Is it necessary—or merely cheaper? *The Outlook* (6 October), 255–257.

———. 1923. Guard Yellowstone Park. *The Outlook* (11 July), 357.

———. 1926a. To the looters of Yellowstone Park, hands off! *The Outlook* (20 October), 229–230.

———. 1926b. To the looters of Yellowstone Park, hands off! *The Outlook* (10 November), 333–334.

———. 1926c. The Yellowstone grab: beauty and the beet. *The Outlook* (3 November), 300–301.

———. 1926d. The Yellowstone grab: a lesson in geography. *The Outlook* (24 November), 393–394.

———. 1926e. The Yellowstone grab: a letter to our readers. *The Outlook* (29 December), 553–554.

[Pearson, T.G.]. 1921. Our national parks in great danger. *Bird Lore* (January–February), 64–65.

Phelps, A.E. 1938. Yellowstone Lake. Poem presented to the Life Conservation meeting at New York City, 7 April. Box D-77, File "Lakes, 1936-1939." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives. [Emphasis in original.]

Ponce, S.L. 1991. Letter to Tom Barker, August 28. On file. Yellowstone National Park, Wyo.: Yellowstone Center for Resources.

[Reed, Maj. F.R.]. 1920. "Desecrating" Yellowstone Park. *The New West Magazine* (November), 7–8.

Righter, R.W. 1982. *Crucible for Conservation: The Struggle for Grand Teton National Park.* Boulder, Colo.: Colorado Associated University Press.

Rubinstein, P., L.H. Whittlesey, and M. Stevens. 2000. *The Guide to Yellowstone Waterfalls and their Discovery.* Englewood, Colo.: Westcliffe.

Shankland, R. 1970. *Steve Mather of the National Parks.* New York: Alfred A. Knopf.

Shiras, G. III. 1921. The proposed Yellowstone dam. *Forest and Stream* (February).

Sierra Club. 1920. Fellow member of the Sierra Club. (Letter to members.) Sierra (10 November).

Smith A.T. 1921. Letter to Hon. Stephen T. Mather, March 15. Box L-57, File "Irrigation Projects (Fall River Basin), June 1920–October 1921." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Swendsen, W.G. 1920. "Preserving" the heirloom. *The New West Magazine* (November), 5–6.

Thurman, E.M. 1926. A coveted corner. *The Outlook* (1 December), 433–435.

U.S. Congress, Senate. 1921. An act to amend an act entitled "An Act to Create a Federal Power Commission...." 66th Cong., S. 4554, 3 March.

U.S. Geological Survey. 1904. *Second Annual Report of the Reclamation Service.* Washington, D.C.: U.S. Government Printing Office.

van Dyke, H. 1926. The outdoor university of the United States. *National Parks Association Bulletin* (July), 8.

Waugh, F.A. 1921. The market price on landscape. *The Outlook* (16 March), 428–429.

The Wilderness Society. 1938. Yellowstone in grave danger. *Wilderness News* (15 May), 1–2.

Wilkinson, C.F. 1992. *Crossing the Next Meridian: Land, Water, and the Future of the West.* Washington, D.C.: Island Press.

Work, H. 1924. Letter to Hon. Charles L. McNary, Chairman, Committee on Irrigation and Reclamation, U.S. Senate, May 23. Box L-19, File "Irrigation Yellowstone Lake F.Y. 1923–1924." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Yard, R.S. 1920. The national parks'peril. *The Nation* (21 August), 208–209.

———. 1922a. Letter to Editor, *Philadelphia Public Ledger,* May 23. Box L-19, File "Irrigation General 1920–1922." Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

———. 1922b. Snatching our public parks from private spoilers. *Philadelphia Public Ledger* (23 July).

———. 1938. New tricks to grab Yellowstone. *National Parks Association Bulletin* (June), 11–12.

[Yard, R.S.]. 1920a. *The Nation's Parks* (Summer) 1.

———. 1920b. The water power bill and the national parks. *National Parks Association Bulletin* (25 June), 1–2.

———. 1920c. Women rally to the defense. *National Parks Association Bulletin* (20 November), 1.

———. 1920d. The work before us. *National Parks Association Bulletin* (30 September), 6.

———. 1921a. National protest against the Walsh bill. *National Parks Association Bulletin* (20 March), 1–2.

———. 1921b. Now to defeat the dangerous Walsh bill. *National Parks Association Bulletin* (23 May), 1–4.

———. 1921c. One substantial victory for national parks. *National Parks Association Bulletin* (20 March), 1–4.

———. 1922. Montana votes for Yellowstone protection. *National Parks Association Bulletin* (28 November), 1–2.

———. 1923a. Harding and Work to protect national parks. *National Parks Association Bulletin* (6 July), 1–2.

———. 1923b. Time has come to settle national parks status. *National Parks Association Bulletin* (9 October), 1.

———. 1924a. Walsh strikes twice at Yellowstone's heart. *National Parks Association Bulletin* (21 January), 6–7.

———. 1924b. Yellowstone dam survey resented at home. *National Parks Association Bulletin* (31 March), 5–6.

———. 1927. Two Idaho counties vs. the United States. *National Parks Association Bulletin* (February), 17–18.

———. 1938a. The fight for Yellowstone. *National Parks Association Bulletin* (December), 25.

———. 1938b. Save the Yellowstone. *National Parks Association Bulletin* (June), 9–10.

Yellowstone Irrigation Association. 1921 (?). The Lake Yellowstone Project: what is it?

why is it? Copy of brochure. “Irrigation and Dam Problems 1920–1921” scrapbook. Yellowstone National Park, Wyo: Yellowstone National Park Research Library and Archives.

Yellowstone National Park Boundary Commission. 1931. *Message from the President Transmitting the Final Report of the Yellowstone National Park Boundary Commission....* Washington, D.C.: Government Printing Office. 71st Cong., 3rd Sess., House Document 710, 9.

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