SECTION TWO

# The Greater Yellowstone

**The Sphinx in the Lee Metcalf Wilderness.** Ryan Turner

# Yellowstone Grizzlies

## Expanding their Range and Security into the Future

By **Christopher Servheen**

**Grizzly bear on Swan Lake Flats.** Jim Peaco,NPS





The history of European explorers and grizzly bears started badly. Lewis and Clark tried to kill just about every grizzly they came upon. They commented on the ferocity of the grizzlies they encountered in their journals, apparently overlooking the fact that almost all the bears they encountered were ferocious because they shot and wounded them.

By 1885 the grizzly had been exterminated from the prairies, and populations in mountainous areas like Yellowstone continued to decline. By the 1930s and 1940s, the range and numbers of grizzlies in the lower 48 States were greatly reduced, and the remaining bears were largely confined to remote areas within and around the two National Parks in the Northern Rockies – Yellowstone and Glacier. By the 1950s, with little organized conservation effort or management directed at maintaining grizzly bears anywhere in their range, the Yellowstone grizzly bear population had been reduced in numbers and was restricted largely to within and close to the edge of Yellowstone National Park.

Garbage management in Yellowstone Park played a big role in changing the ecology and behavior of grizzlies. The Park had long implemented a policy to dump garbage from the concession hotels and lodges in open-pit dumps inside the Park. One of these dumps was even located in the middle of Hayden Valley with tons of garbage dumped there every day during the peak visitor season in July and August. The dumps were unfenced, allowing bears, ravens, coyotes, and other species access to garbage every day. Large numbers of grizzly bears could be found feeding in the open-pit garbage dumps inside the Park throughout the summer. The Park Service even erected bleachers at some dumps so tourists could come and watch bears eat garbage.

In the late 1960s and early 1970s the Park Service decided that making garbage available to wildlife inside National Parks was a poor way to manage such national treasures. The decision to close the dumps was controversial because some thought that the bears, having been conditioned to feed on human garbage every summer for decades, could not survive in the wild without access to this artificial food. As the dumps were phased out many of the garbage-eating bears did move into and spent more time in campgrounds and human settlements both inside and outside the Park, and many had to be destroyed for public safety reasons. These grizzly bear deaths related to the dump closures peaked between 1968 and 1974, with a total of 215 deaths both

inside (34%) and outside (66%) of Yellowstone Park. Concern about these deaths in Yellowstone and about grizzly population status throughout its remaining range prompted the 1975 listing of the grizzly bear as a threatened species in the lower 48 States under the Endangered Species Act. When the grizzly bear was listed in 1975, the population estimate in the Greater Yellowstone Area (GYA) was 136 to 312 individuals, with the actual number likely midway between these estimates.

The recovery effort for the Yellowstone grizzlies started 32 years ago in 1981. At that time, we thought the recovery of this population was uncertain. The best estimate was that there were perhaps as few as 30 adult female grizzlies in the entire ecosystem. Garbage had been secured inside Yellowstone Park but was still available in many areas on public land including Forest Service campgrounds. Outfitter camps were also a problem, with many attractants like camp foods, horse feed, and game meat easily available to bears. Interest in and commitment to the future of grizzlies by state and Federal agencies managing wildlife and habitat was inconsistent and in some cases minimal. There was a Grizzly Bear Recovery Plan, but few agencies had the interest or funding to begin implementing it. Cooperation and coordination between agencies regarding grizzlies was non-existent. It took the creation of the Interagency Grizzly Bear Committee in 1983, with a mandate to implement the Grizzly Bear Recovery Plan, to get recovery progress started. The mandate for the Interagency Grizzly Bear Committee came from a document signed by the governors of the states with grizzlies: Wyoming, Montana, Idaho, and Washington; and the Assistant Secretaries of Agriculture and Interior in Washington, DC. Grizzly recovery had now received high level attention, and coordinated recovery efforts began.

Today the grizzly population is 3 times the size it was when it was listed, and grizzlies occupy huge areas of the Yellowstone ecosystem where they were absent 30+ years ago. When the grizzly was listed in 1975, the extent of its range in the Yellowstone ecosystem was completely contained within the 9,200 square mile Yellowstone recovery zone, and even portions within the recovery zone were unoccupied. Today, the bears occupy more than 19,000 square miles in the Yellowstone ecosystem and continue to expand in numbers and range.

Grizzlies are common in Grand Teton National Park today, but were very rare for decades up to the late 1980s. Before 1990, they were occasionally seen only in the northern part of Grand Teton Park adjacent the Yellowstone Park boundary. Today grizzlies are common throughout Grand Teton. Bears have been documented all the way to the southern boundary and they are slowly expanding in number and range even further southward.

The recovery of the Yellowstone grizzlies was primarily due to coordinated implementation of four major efforts: 1) controlling mortality from all sources so more bears, particularly females, could mature to adulthood and have young; 2) increasing habitat security with closure of excessive numbers of motorized routes on public lands and relocation of domestic sheep grazing allotments out of public lands inside the recovery zone; 3) successful efforts to keep garbage away from bears by closing the remaining open pit dumps outside the Parks, placing bear-resistant garbage cans throughout the Parks and on Forest Service lands, and instituting food storage regulations in backcountry areas so that bears could no longer get into camp food, game meat, and horse feed; and 4) building public understanding and support for the needs of bears so that the people who live, work, and recreate in grizzly habitat did so in ways that minimized detrimental impacts on bears.

**In the Park's early years, bears became conditioned to and had no fear of humans, 1927.** NPS

**Free delivery service. Bears wait for fresh garbage at the Trout Creek dump, 1970.** NPS






**Tourist entertainment, 1929.** NPS

The dramatic recovery of the Yellowstone bears is due to close cooperation among state and federal agencies, careful management of the bears and their habitat, and careful and comprehensive science that is annually transformed into good management decisions by State, Federal, Tribal, and county partners. Robust population growth, cooperative management of mortality and habitat, widespread public support for grizzly bear recovery, and the development of a comprehensive Conservation Strategy brought the Yellowstone grizzly bear population to the point where delisting was appropriate and completed in 2007. Although the delisting was eventually overturned in court in 2009, based on the one issue of how declines in whitebark pine might affect grizzly bears, the grizzly population remains healthy, and efforts are underway to consider another proposal to delist this population.

To be sure that inbreeding is not a threat to the Yellowstone grizzly population, the agencies sought advice from non-agency university scientists. The research of these scientists at the University of Idaho revealed that the Yellowstone grizzly population is not presently threatened by genetic inbreeding problems and that its viability will not be affected by genetic factors in the foreseeable future for many decades, if at all. The agencies would like to see the Yellowstone ecosystem grizzly population eventually connected to the Northern Continual Divide grizzly population in northwest Montana. This will eventually result in genetic linkage across the continental divide from the Canadian border at Glacier National Park, to the southern end of the Wind River Range in Wyoming, a distance of over 500 miles. To achieve this vision for grizzlies and for many other wildlife species in the Northern Rockies, there is a cooperative effort underway by all the state and federal agencies managing grizzlies in the US and partner agencies in Canada to work together to improve wildlife movement opportunities across the northern Rockies landscape. This cooperative work involves improving the permeability of highways for bears and other wildlife; working with land management agencies to improve careful management in important linkage areas to maintain wildlife habitat security; and working in cooperation with county governments to assist them in private land development decisions within linkage areas to make these decisions more compatible with the needs of wildlife. This agency linkage work is in partnership with land conservation partners including the Nature Conservancy, Vital Ground, and the Trust for Public Lands. These partnerships work to make it economically attractive for private owners to keep their land in open space so that wildlife can successfully move through them within linkage zones. These efforts to maintain movement opportunities for bears and other wildlife are ongoing and will continue.

Interest in and commitment to the future of grizzlies by state and Federal agencies managing wildlife and habitat was inconsistent and in some cases minimal.

As of 2012, grizzlies have been documented half way between the Northern Continental Divide Ecosystem

grizzly population and the north end of the Yellowstone ecosystem, coming within 70 miles of the north end of the Yellowstone ecosystem. Adult male grizzly bears wearing GPS collars have regularly been documented to move more than 70 air miles, so the possibility of eventually seeing grizzlies move between these populations is very real. We can identify the origin ecosystem of every grizzly based on its genetic signature, and we carefully monitor the genetics of every bear captured or found dead in both the Yellowstone and the Northern Continental Divide Ecosystem. We expect to document movement between these ecosystems soon using this genetic monitoring.

The scientific basis for decisions on grizzlies in the Yellowstone ecosystem is built on the scientific publications of the Interagency Grizzly Bear Sturdy Team whose work over the past 39 years has made the Yellowstone grizzlies the most comprehensively studied bear population anywhere on earth. During this time the Study Team has produced 123 peer-reviewed scientific publications, 80 scientific reports, and 16 graduate student masters theses or Ph.D. dissertations on the Yellowstone grizzlies and their ecology and conservation. The Study Team is a cooperative team led by USGS and made up of scientists from the USFWS, NPS, USFS, the states of Wyoming, Montana, and Idaho, and university scientists. Advances in science applications and technology to study bears have progressed dramatically over the years. The initial use of radio collar technology on bears was pioneered by John and Frank Craighead in Yellowstone in the 1960s. This work involved use of radio collars that could occasionally be tracked from the ground or the air, if the bear did not move too far. This system allowed scientists to know where the bears were 2-3 times a week during the daylight hours, if they could be found. With the advent of GPS technology originally developed for the military and its application to wildlife research, we now can place collars on bears that record the bear's exact location every hour, 24 hours a day. This level of detail in tracking allows scientists to know movement patterns and behavioral responses of grizzlies to human activities with great precision.

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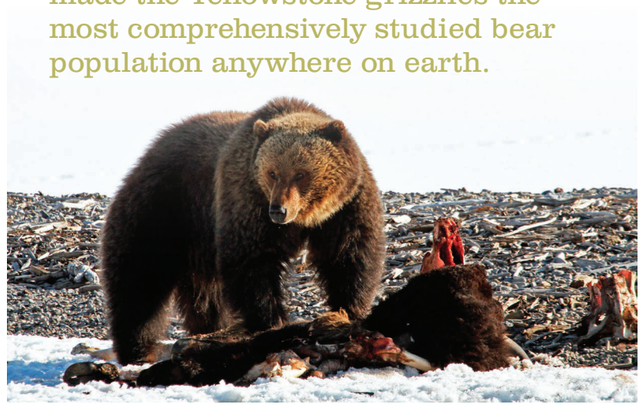

**Grizzly feeding on a kill.** NPS

To assure careful monitoring of the health of the Yellowstone grizzlies and their habitat, the Study Team annually monitors more than 70 bears with GPS collars and charts population trend, size, distribution, survival rates, any changes in genetic diversity, cub litter size, cub litter interval, as well as all mortalities by cause and location, and the age and sex of each dead bear. Several important habitat parameters are also monitored intensively, including: 1) the amount of secure habitat in each bear management unit; 2) road densities; 3) the number and type of developed sites on public lands; 4) the number and capacity of livestock allotments; 5) relative values of habitat quality; 6) the abundance of winter-killed ungulates; 7) the abundance of cutthroat trout and non-native lake trout; 8) whitebark pine cone production, presence of white pine blister rust fungus, presence of mountain pine beetles; and 9) grizzly bear use of army cutworm moths. These rigorous monitoring programs are designed to identify any threats to the long-term conservation of the grizzly population or its habitat and provide a sound scientific basis to respond to any changes or needs with adaptive management actions.





We now use laboratory analysis of stable isotopes in the hair, tissue, and blood of bears to identify their assimilated diet in the Yellowstone ecosystem. Within the animal, metabolically active tissues (hair, blood components, etc.) in each bear incorporate stable isotopes that reflect the animals' diet during the period these tissues were growing. Thus, isotope ratios in the bear's hair provide a catalogue of the bear's assimilated diet during the hair's growth period. Since a bear sheds and grows new hair twice a year (hair is shed in late spring and also in the fall), hair collected in summer reflects what that bear ate in early to mid-summer while late fall hair reflects what the bear at that fall. Individual hairs can also be segmented into short lengths for analysis to assess differences in foods ingested during the 4-6 weeks of hair growth. The turnover rate of blood components allows for shorter-term estimates of assimilated diet. Blood plasma isotope levels reveal what the bear has eaten over the past 1-2 weeks, because plasma is renewed in the body every 1–2 weeks. In contrast, red blood cell isotope levels reveal what the bear has eaten over the past 2-3 months, because red blood cells are renewed in the body every 2-3 months. The chemical signatures of these stable isotopes allow careful understanding of the importance of certain foods to bears within and between years and in different parts of the ecosystem.

We know that Yellowstone bears are opportunistic omnivores, eating more than 157 plant species and 25 mammal species, as well as insects, birds, fish, and even amphibians and algae. The detailed scientific monitoring of the Yellowstone grizzlies and their habitats and their foods will continue under the direction and leadership of the Study Team. There is concern that there will be changes in the Yellowstone ecosystem as climate change continues, with resulting impacts on plant communities and bear foods. There is no doubt that change will happen as it has for the thousands of years that the Yellowstone grizzlies have been present. The key issue is not if change will occur, but how the bears will respond to these changes. Brown bears that we call grizzlies n the US and Canada, live throughout Asia and Europe as well as in North America in the widest range of habitats of any of the eight different species of bears worldwide. Brown bears/grizzlies are not specialized to any particular food but instead are an omnivorous generalist species adaptable to a wide range of environmental and food conditions. Continued successful conservation of Yellowstone grizzlies will require that we closely monitor the vital rates of the bears and relate any changes in survival and reproduction to any changes in their foods and to changing environmental variables. The Study Team will continue to closely monitor a wide suite of indices to assure that we know how the bears are responding to environmental change. The agencies have in place an adaptive management program that will incorporate the monitoring results of the Study Team into management changes as necessary. This adaptive management will allow state and federal management actions to change as necessary to meet the needs of the grizzlies in Yellowstone.

It has taken care and commitment over more than 32 years to recover the Yellowstone grizzlies. All of us have been entrusted with a great responsibility to assure the future of this magnificent icon of the wild places left in America. We will continue to care for the Yellowstone bears and their habitat so that our grandchildren can watch them in wonder in the special place that is the Yellowstone ecosystem.

The recovery of the Yellowstone area grizzly bears is one of the greatest success stories of the Endangered Species Act. We should all be proud of this success.

**Collared grizzly sow. John Good,** NPS

***Christopher Servheen*** *is the Grizzly Bear Recovery Coordinator for the US Fish and Wildlife Service. In addition to his FWS position, Servheen is an associate professor of wildlife conservation in UM's College of Forestry and Conservation, where he advises graduate students and teaches an international wildlife conservation class each spring.*

The Greater Yellowstone

# The Story Beneath Your Feet in the Firehole River

By **Esther Bowlin** and **Nancy Hinman**

**It doesn't get much better than this. Firehole River.** NPS

There. Just below that grassy island. The surface breaks into a widening ripple. No sound but the growing circle of water. The circle fades downstream. Just a couple more steps and the line will reach the spot. But AWOOSH…Your rod flies. Boots fly. Flies fly. That unexpected drop from the rock-hard stream bottom to an undercut sandy hole—how did it happen all so sudden?

The Firehole River system drains the southern side of the Yellowstone volcano. Along its banks are numerous well-known geysers and hot springs, including Old Faithful, Excelsior Geyser Crater, Morning Glory Pool, and Grand Prismatic. Most visitors are drawn to the Park by the famous and regular Old Faithful, the magnificent and abundant elk and bison, and the elusive wolves and bears. But for those whose passion is fooling a wily rainbow trout, the lure of flyfishing the rivers of Yellowstone is as close as it gets to the call of the Sirens.

The streambeds of tributaries to the Firehole River system, from its headwaters to Nez Perce Creek, are lined in many places with hard rock instead of gravel or rubble. The transitions are abrupt, and the water can deepen significantly, particularly on the downstream edge. In places, the streambed seems to disappear entirely, leaving wader-filling holes to swallow unwary fisherman.

## What is this rock? How does it form? Why isn't it everywhere?

The solid platform of rock forms because of a combination of hydrologic, geochemical, and microbiological processes. The Firehole River drainage in Yellowstone National Park is fed by rain, snow, and hot springs. The hot spring water is rich in dissolved materials, particularly silicon oxide, which has the same composition as common window glass. When the hot-spring water mixes with river water, the dissolved silicon oxide can come out of solution in the form of opal, solid silica with

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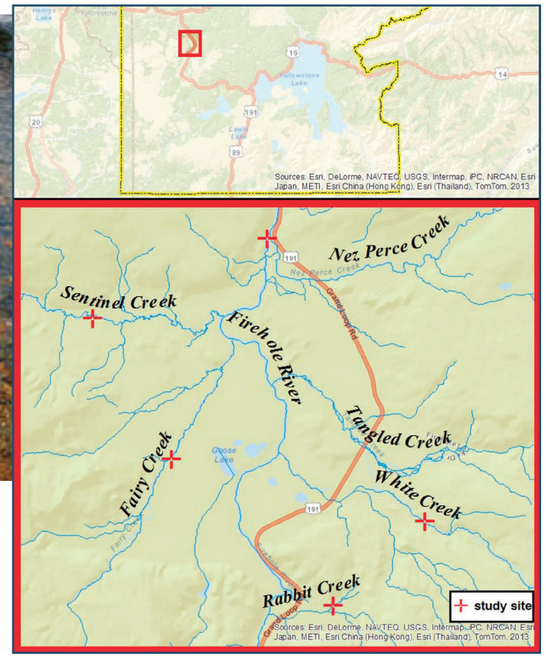
**A hot spring plunges into the Firehole River.** John Lambing

Armored streambed near Lone Star Geyser in the upper Firehole River.




Map of Yellowstone National Park and study sites

the same composition as precious opal, but a different structure; it is not particularly valuable. Opal formed in this way can armor the streambed, effectively isolating stream water from the groundwater below. The cement inhibits water exchange, which in turn may affect productivity, but it does not occur everywhere in the Firehole or its tributaries.

In order for this process to happen, water must be flowing into the streambed, a so-called "losing" stretch where the downward flow presses the opal into the pores between the sand and gravel grains instead of out into the stream where they would be washed away. Although we don't know exactly how the algae and microbes that line the armor affect opal deposition, we do know that the biota serves as a substrate on which the opal can accumulate.

One thing is clear. This particular type of streambed armor requires hot, silica-rich waters in order to form; it develops in unique environments like those found in the Yellowstone volcano. Generally, streambed armor first appears immediately downstream from a significant hot spring. Streambeds near large or densely clustered features have the most heavily armored reaches. Therefore, we would expect to find armor distributed along tributaries at least partly in relationship to hot springs and geysers.

In the past, these hardened surfaces were thought to be lava bedrock, and in some places along the Firehole itself, they are, while in others they are the opaline armor. But in the Firehole's tributaries, most hard surfaces you may encounter are the opaline armor.

From the banks of these streams, the armored sections are easily spotted, appearing as uneven, mottled black patches. The mottling derives from the chemical make-up of the armor and the presence of algal communities that live on the streambed. The armor itself is made of locally derived sediments, cemented by opal precipitated from stream water.

Not much is known about what causes natural opaline cement to line the streambeds of many of the Park's waterways. Graduate and undergraduate students from the University of Montana studied the distribution and properties of this cement in tributaries of the Firehole River. Jenny Demonge Esser showed that, in the lower stretch of Iron Spring Creek, which flows into the Firehole at Biscuit Basin, natural cement accumulates in large patches where hot spring water





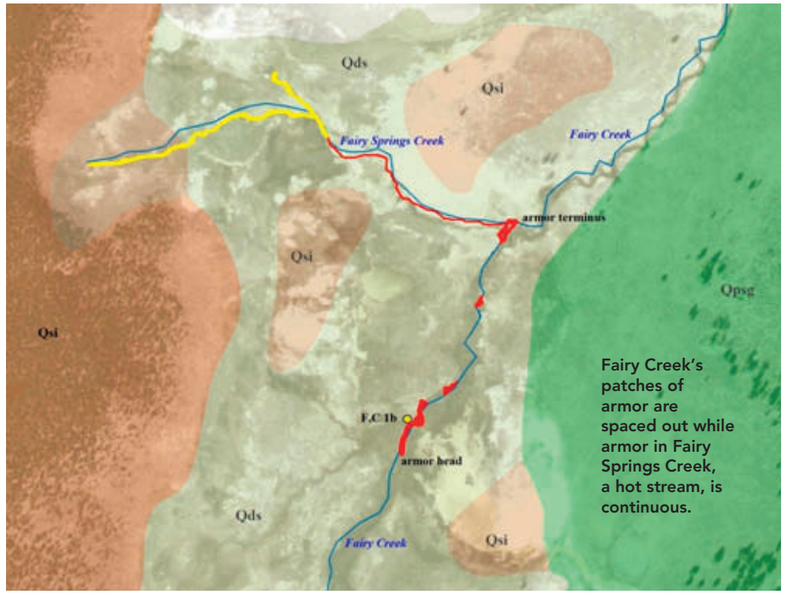
mixes with cold stream water. Matt Vitale studied a section of Rabbit Creek, an interesting hot creek that flows into the Firehole just above Midway Geyser Basin. There opal accumulates especially in sections where water flows from the stream downward to join groundwater. Sentinel Meadows, in the lower stretch of the Firehole River just above Nez Perce Creek, is where Matt Gibson showed that Sentinel Creek water interacts with groundwater and hot spring water in complex ways, leading to localized patches of armor. In each case, the accumulated opal affects water exchange and makes the substrate (material that makes up the streambed) hard instead of gravelly.

Before embarking on your next expedition to Yellowstone, take a look at the distribution and effects of armor in a couple areas where you might fish and compare it with a couple of other tributaries that are not open to fishing.

## Lower Firehole River

Near the confluence of the Firehole River with Nez Perce Creek, the long-since-gone Marshall Hotel was one of the stop-over points on the stagecoach tourist route. Today, a well-worn trail leads from Fountain Flats Drive to the Firehole River near the site of this old hotel. Fish rise in riffles throughout this stretch, and the riverbed itself gives some indication of what to tie on your line. From this area upstream to Ojo Caliente, the riverbed is gravelly and vegetated, but here, the opal is rapidly cementing gravel and other objects into the streambed. This stretch of the Firehole River has three types of cement: opal, opal with iron and manganese, and opal with iron. The answers to questions of why there are three types and what controls their distribution are a mystery. But the presence of three types of cement suggest that conditions may have changed over time in the river.

The fish in this section live the high life, growing faster than their upstream counterparts. There is some evidence that this may be because the water is warmer, promoting an all-you-can-eat buffet of trout food. USGS researchers found no empties when they examined the stomach contents of fish from this reach. Instead, stomachs were mainly full of true flies, mayflies, and snails. Yes, although their nutritional value is questionable, fish eat those pesky mud snails in these warmer waters. (We shouldn't really be telling you this; now you will know what to try!). We speculate that this stretch supports more surface feeding than cooler reaches farther upstream, possibly because the warmer waters induce more frequent hatches of aquatic insects. Interestingly, there seems to be no relationship between the abundance of food and the contents of fish stomachs—true flies and snails dominate stomach contents, although caddis flies are the most abundant food. Maybe the true flies and snails just taste better.




Fairy Creek's patches of armor are spaced out while armor in Fairy Springs Creek, a hot stream, is continuous.

## Fairy Creek

Fairy Creek is a cold water stream that enters the Firehole River just below Ojo Caliente. Most of Fairy

Creek is lined with silt and gravel, but sporadic sections of cemented and disjointed armor are found in its main stem. The armor is made of black minerals and glass that are cemented together with white opal and covered with black opal. Armor lines the streambed either continuously for a short section or may also be found coating piles of rubble. Both Fairy Creek and its hot tributary, Fairy Springs Creek, have active or extinct hot springs along their banks. In fact, Fairy Spring Creek, also lined with armor, originates from a group of hot springs called Fairy Springs. Sections of armor observed several meters upstream from the confluence with Fairy Springs contained large disjointed blocks with thick algae like that observed in the Firehole. The same pattern of consolidated and unconsolidated armor and thick cyanobacterial mats were observed in the thermal tributary to Fairy Creek. Cyanobacteria are found in many ecosystems around the world, including oceans, lakes, and rivers, but they are probably best known in stagnant bird baths and hot-spring runoff channels; they like environments others would find inhospitable. They harvest light for energy and fix carbon dioxide, but they should not be confused with plants or algae, which are structurally different.

A sample collected from the cemented streambed of Fairy Creek was chemically analyzed to determine its composition and compare it with armor found in other tributaries. The armor has a high concentration of aluminum, which is usually reported as an oxide, as are all major chemicals that make up the minerals in rock. (The "oxide" percentages are a hold-over from days long ago when analyzing a rock was a lengthy and painstaking process that involved reformulating the rock into oxides and weighing them. Fortunately, analytical techniques have improved since then!) Because the cement that forms the armor is made of silicon oxide, the other elements in the sample show that the armor is made of local rock fragments that are cemented together. Those rocks have aluminum, iron, sodium, potassium, calcium, and a little magnesium in them; these elements are organized into minerals, such as feldspars and quartz. And we use the quantities of these other elements to tell us something about how much of the armor is opal cement and how much is original rock fragments.

## Rabbit Creek

Rabbit Creek is a hot stream that enters the Firehole River at the Fairy Creek trailhead above Midway Geyser Basin. Named not for the abundance of rabbits along its banks (we have never seen any), but for the way in which elevated sluices whisk some portion of the flow quickly past slower portions of the stream.


Armored streambed (red) extends the entire length of Rabbit Creek, from near the source of the creek to its confluence with the Firehole River. Near the headwaters (yellow), the armor is blocky rather than continuous.





Colorful, luxurious cyanobacterial mats choke Rabbit Creek.

Literally, the stream hops over itself like a game of leapfrog.

Rabbit Creek's streambed is solid all the way to its confluence with the Firehole River. The water in these sections, as in the armored sections of Iron Spring and Sentinel Creeks, is perched above groundwater. The armor is white with a thin dark coating and, in many places over that is a luxurious mat of cyanobacteria. The mats are colorful and appear to choke the stream in many places, particularly where it widens out in cascades and multiple channels.

The armor in Rabbit Creek has more iron in it than the armor elsewhere in the Firehole drainage. The acidic hot springs at its headwaters are the likely culprits. "Tomato Soup" is one such spring. The red color of the hot spring's thick "soup" reflects the chemical make-up of the underlying bedrock, which dissolves in the acidic fluids that migrate through it. As a consequence, some of the springs in Rabbit Creek have a little higher iron count, which eventually makes its way into the stream. As stream water leaks through the streambed to groundwater, the iron is removed, taking opal with it. So even though it looks somewhat similar to the armor in Fairy Creek, it is ever so slightly different.

You can't fish in Rabbit Creek. The water is too hot—any fish in the stream would be cooked within 20 minutes! But Rabbit Creek has been instrumental in helping us to understand how, why, and where streambed armor forms.

The Lower Firehole River, Fairy Creek and Rabbit Creek illustrate the different solid bed linings found in streams in Yellowstone. While you are out fishing, wherever you see the solid, black rock lining the bed of the Firehole, you can be sure that stretch of river bed would lose water to the ground were it not for the armor. Because conditions change, the boundaries between losing and gaining stretches can change rapidly. Remember that these changes produce the drop-offs in the streambed that you want to avoid. So watch your step and enjoy the fishing.

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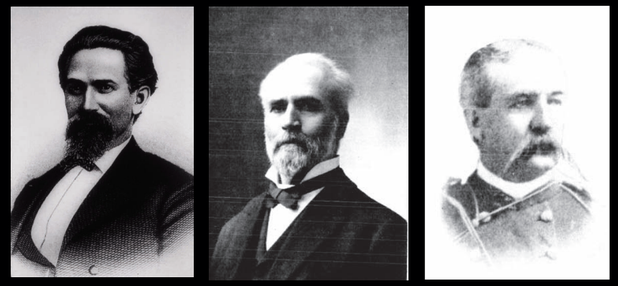
***Esther Bowlin*** *received her BS from UM and an MS from the University of Denver.*



# EXPLORING YELLOWSTONE

# FIRST EXPLORATIONS

Part two of three

**Introduction by Rick Graetz**

**Compilation of diaries and reports by Aubrey L. Haines**

## WASHBURN-LANGFORD-DOANE EXPEDITION

## Three explorations to the Yellowstone Country in the period Autumn 1869 through Summer 1871 led directly to the creation of Yellowstone National Park.

"We trace the creation of the park from the Folsom-Cook expedition of 1869 to the Washburn expedition of 1870, and thence to the Hayden expedition of 1871, Not to one of these expeditions more than to another do we owe the legislation (March 1, 1872) which set apart this 'pleasuring-ground for the benefit and enjoyment of the people.'" (Nathaniel P. Langford, YNP's initial superintendent, who served without pay from 1872-1877 to help preserve the area as a national asset).

Stories from these journeys are many and fill volumes. Aubrey L. Haines, Yellowstone's historian from 1959 until 1969, took the wealth of information available through numerous sources, and compiled them in one chapter of what this writer considers to be the definitive books on Yellowstone's past: *The Yellowstone Story—Volumes One and Two—Revised Editions,* which were published through the University Press of Colorado for the Yellowstone Association. Permission has been granted for use of the writings.

Our issue of last spring, exclusively focused on the Greater Yellowstone, carried the details of the 1869 FCP effort. To view that article, here is the link to the publication: http://issuu.com/um_crown_gye/docs/greateryellowstone-spring2013

In 1870, Henry D. Washburn, a former major general in the Union army who used his influence to obtain the post of surveyor general for Montana, was enthused by the reports from the FCP Expedition of the previous autumn and drew up plans for a late summer exploration of Yellowstone.

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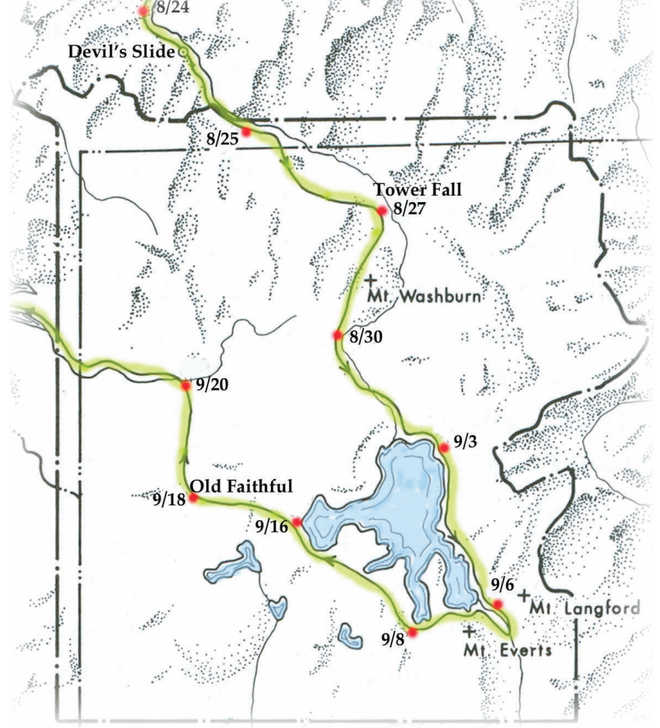
***Note: For the most part, the words that begin with the next paragraph appear as Haines wrote them in 1977.***




Nathaniel Langford arrived at Helena on July 27, 1870. He indicates that the previously vague proposal to explore the Yellowstone region in the autumn of 1870 "took definite shape" about the first of August.

> An amusing feature of the identity of my name with the Park was that my friends, with a play upon my initials, frequently addressed letters to me in the following style:


On August 22, the expedition departed from Bozeman's Fort Ellis. The party consisted of nineteen persons: in addition to the packers and cooks, there was the leader, Henry D. Washburn, a former major general in the Union army who used his influence to obtain the post of surveyor general for Montana Territory; Nathaniel P. Langford, then enjoying some notice as the "late Governor of Montana" (though that was never official); Samuel T. Hauser, president of the First National Bank of Helena; Warren C. Gillette, a merchant of the firm King & Gillette; Benjamin F.

THE START.
Prickly Pear Valley.

Stickney of the mining and freighting firm of Plant, Stickney & Ellis; Truman C. Everts, former assessor of internal revenue for Montana Territory, and Walter Trumbull, his assistant; Cornelius Hedges, a struggling young partner of the law firm of Lawrence & Hedges and a correspondent for the Helena Herald; and Jacob W. Smith, late of the Montana Hide & Fur Co. A military escort from the Second Cavalry under Second Lieutenant Gustavus C. Doane, who became a frontier officer par excellence, completed the party.

The route followed was the same the Folsom party had used the previous year; the first night camp was on Trail Creek...During the second day, the party passed from Trail Creek into today's Paradise Valley to the Bottler ranch.

> "Jake Smith has sent the first demoralizing shot into the camp by announcing that he doesn't think there is any necessity for standing guard. Jake is the only one of our party who shows some sign of baldness, and he probably thinks that his own scalp is not worth the taking by the Indians."

The third camp was below present Yankee Jim Canyon and, on the next day, buffeted by an Icelandic gale, the expedition was soon in motion toward the mouth of Yankee Jim Canyon. The Indian trailway winding through the slide-rock was so rough they had to dismount and lead their horses. Above the canyon the trail was better, with the "marks of Indian tent poles [travois] distinct," and that primitive trace led around the base of Cinnabar Mountain, past the brick-red, upended stratum of rock they appropriately named the Devil's Slide, to an overnight camp at the mouth of the Gardner River.

Eventually the party reached the vicinity of today's Tower Creek and Tower Falls and on the twenty-seventh decided they should layover a day.

Washburn, acting upon David Folsom's suggestion that he should seek a route on the west side of the Yellowstone River (in order to avoid that tedious detour up the Lamar River and across the Mirror Plateau made by the 1869 party), rode southward up a succession of ridges which eventually led him onto a lofty summit from which he could see Lake Yellowstone and form some idea of the intervening terrain. The

JAKE SMITH,
GUARDING THE CAMP
FROM HOSTILE INDIAN ATTACK.
"REQUIESCAT IN PACE."

**Private Moore, 1870.** NPS





**Devil's slide.** Rick and Susie Graetz

of Mount Washburn was reached, whereupon that aboriginal track sidled westward around the peak toward a prominent gap (later named Dunraven Pass) and descended the Sulphur Creek drainage to reach the vicinity of the Yellowstone Falls.

Where the trail started its detour of the central peak, a party peeled off for a climb to the summit... the view opening from that windswept mountaintop is a magnificent panorama, which was accurately typified by Doane when he prefaced...it was "beyond all adequate description." Indeed, where does one begin? With the raw cleft of the Grand Canyon at the mountain's very feet? With the silvery expanse of Yellowstone Lake southward in the middle distance? Or somewhere in the mountains that circumscribe the gaze in all directions but the southwest?

information Washburn brought back to camp that afternoon was so encouraging it was unanimously decided to apply his name to the peak he had ascended.

> "we named "The Devil's Hoof," from its supposed similarity to the proverbial foot of his Satanic majesty. The height of this rock from its base is about fifty feet."

Breaking camp on the twenty-ninth, the expedition moved southward along the route picked by Washburn the day before. They were following an ancient Indian trail which ascended the long ridge until the final rise

DEVIL'S HOOF.

Lower Falls and the Grand Canyon of the Yellowstone.
Rick and Susie Graetz

**In Langford's words.** "The immense cañon or gorge of rocks through which the river descends, perhaps more than the falls, is calculated to fill the observer with feelings of mingled awe and terror. The colors of the rock are variegated with yellow, gray and brown, and the action of the water in its rapid passage down the sides of the cañon has worn the fragments of shale into countless capricious forms. Jets of steam issue from the sides of the cañon at frequent intervals, marking the presence of thermal springs and active volcanic forces."

That evening, Washburn, Doane, and Hedges followed the drainage down a mile to a hot spring basin they called Hell-Broth Springs. From that basin, which is now known as the Washburn Hot Springs, reconnaissance continued down the little stream to the point where it plunged over the canyon wall to the river hidden in the depths below.

A short march the following day, they found a suitable campsite just above the canyon.

The last day of August was given over entirely to an examination of waterfalls and their work. Langford measured both falls of the Yellowstone





using the same method as the Folsom party in 1869—a weighted cord—obtaining an identical 115 feet for the upper, and a more nearly correct 320 feet for the lower.

Hauser and Stickney found a place two and one-half miles below the Lower Falls where they were able to descend into the canyon. That scramble not only allowed them to measure its width and depth by triangulation (the chasm was 1,300 feet across and the river was 1,050 feet below the rim) but also led them to a slender ribbon of water cascading 1,500 feet from the east rim. Hauser called it Silver Thread Fall, the Silver Cord Cascade of current maps.

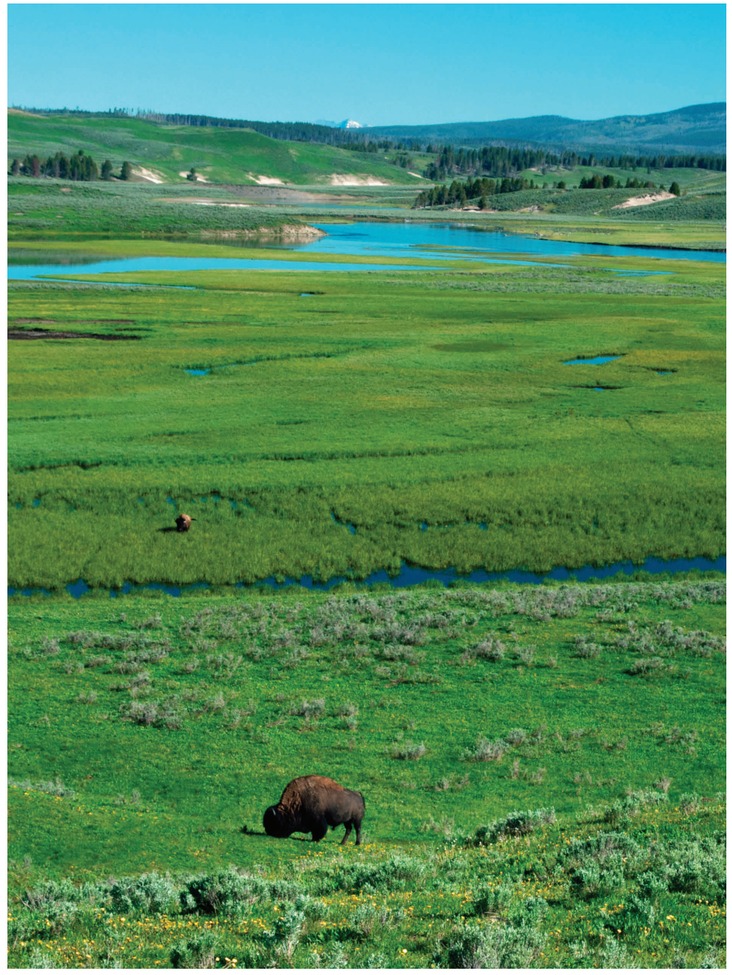
The expedition moved southward from the camp on Cascade Creek on September 1 and passed over Alum Creek into the open, rolling grasslands of Hayden Valley. Midway across that bottomland, which is a relic of a larger, primordial Lake Yellowstone, they came to a group of low hills exhibiting thermal activity upon their western flank.

In the meantime, the pack train had gone on four miles to a camping place near a group of such remarkable thermal features that the party again laid over for a day. There, in a slate-colored pool nearly two hundred feet across, they found their first true geyser, and it was the murky violence of its eruptions, which once flung water thirty-five to forty feet high at six-hour intervals, that led to its name, Mud Geyser.

While the pack train was crossing the Yellowstone at what would later be known as the Nez Perce ford, the main party moved up the east bank of the Yellowstone River, having a "plain trail" as far as Pelican Creek. There they became lost in fallen timber and floundered through two muddy crossings of the creek before they reached the shore of Yellowstone Lake near where the Folsom party had camped the year before.

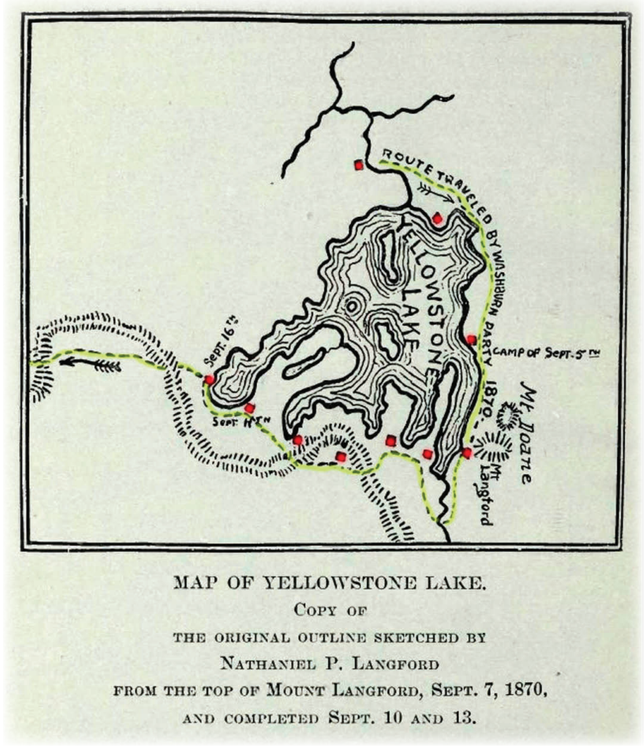
September 4 was spent as individual preference dictated. General Washburn undertook a reconnaissance southward along the lakeshore in the hope of finding a trail around the east side of the lake.

**Langford** - "In the clear light of the setting sun, we can see the three Tetons in a southwesterly direction."



**The Hayden Valley.** Rick and Susie Graetz

On September 5, the main party worked their way along the east shore of Yellowstone Lake, sometimes following the beach and sometimes passing through the forest on convenient game trails, to a campsite in the vicinity of present Park Point.




MAP OF YELLOWSTONE LAKE.
COPY OF
THE ORIGINAL OUTLINE SKETCHED BY
NATHANIEL P. LANGFORD
FROM THE TOP OF MOUNT LANGFORD, SEPT. 7, 1870,
AND COMPLETED SEPT. 10 AND 13.

**Yellowstone Lake.** NPS

On the following day, the route lay mostly through the forest, and progress was greatly impeded by fallen timber. A difficult day, lightened only by a cursory examination of the fumarole area Doane named Brimstone Basin, ended in disappointment among the swamps where the upper Yellowstone River enters the lake.

On the seventh, the pack train waited at Beaver Dam Creek until General Washburn found a route around the swamp. While the party was so employed, Langford and Doane ascended a nearby peak to get a better view of the region south of the lake...The view from that lofty and exposed place was another of those unforgettable panoramas of scenic grandeur. Westward, and more than one-half mile below them, lay the estuarial swamps from which they had ascended: a crazy-quilt of bright green grass and dull red willow brush irregularly broken by watercourses and dappled with sloughs and ponds.

Their gaze returned along the succession of rugged summits that blocked the whole eastern horizon from south to north. But it was the northwest quarter that was of greatest interest to them, for there laid the great, blue lake they hoped to pass around. From the exposed summit where they stood, the plan of the lake was at last revealed, and Langford proceeded to sketch its details as well as he could by eye alone. Meanwhile, General Washburn had found a suitable ford over the upper Yellowstone River above its estuary and pushed on to a campsite in a meadow on the lakeshore southwest of the Molly Islands.

September 8 developed into a "terrible day for men and horses." The trees were thick and the ground strewn with fallen trunks, requiring the men to dismount often to assist the packhorses or pick a better way. Night found the party encamped on Grouse Creek a mile from the South Arm, the distance traveled a mere four miles airline.

The route followed from the camp on Grouse Creek was as difficult as the preceding day's...In the general confusion of getting all the pack animals into camp, it was some time before anyone noticed that Everts was missing. Signal guns were fired and several men went back along the trail, but no real search was initiated because all felt that Everts would get back to camp or to the previously agreed-upon rendezvous at the geyser basin on the Thumb of Lake Yellowstone.

Meanwhile, the camp moved on to the head of Flat Mountain Arm, a beacon fire was set on the ridge above, and signal guns were fired during the night; yet, the





**Dragon's Mouth Spring.** Rick and Susie Graetz

morning of the eleventh day dawned without Everts showing. All were convinced that the lost man had pushed on to the rendezvous on Thumb Bay; so the party again moved forward.

Finding no indication that Everts had been there [Thumb Bay], or at the hot spring area opposite their camp, the expedition decided to layover and begin a systematic search for him on the twelfth. But a storm set in that night, and snow hid whatever trails Everts may have used.

By September 17 the food supply was dangerously low; it was decided that they should begin the trek to the settlements of Montana. The main party had left in the morning moving westward across the timbered ridges lying between Thumb Bay and the Firehole River, about as the road goes now. It was a dreary march in unsettled weather. Camp was made that night on Spring Creek, within four miles of the great geysers; but they had no crystal ball, and Hedges sounded the prevailing mood when he wrote by the firelight, "much doubt as to where we are & where we should go."

But they were nearer to glory than they knew. Two hours after breaking camp the next day they rode into a scene that caused Hedges to forget all his "bad feelings of the morning." They were on the right bank of the Firehole River when the Upper Geyser Basin opened to view, and just then Old Faithful saluted them with a one-hundred foot pillar of boiling water. Yesterday's despondence was gone; they had reached the fabled Firehole.

Camp was on the margin of a small, marshy pond opposite Beehive Geyser. Then the expeditioners scattered throughout the basin on a hunt for geysers. General Washburn is credited with the inspiration to designate the geyser that heralded their entry, Old Faithful.

Four hundred yards northwesterly from the camp, and in full view across the little pond, was a massive cone that only splashed and slopped over in a patronizing way, but its form was so like the keep of some moldered, medieval fortress that there seemed no better name for it than the Castle.

One-half mile directly north of the Castle, another geyser cone attracted their attention. It had the form of a great hollow tree stump with a part of one side broken away to expose the six-foot aperture through which its waters discharged. Upon observing an hour-long eruption in which that enormous nozzle played a constant stream to more than one hundred feet, Walter Trumbull noted: "We thought it deserved to be called the Giant, as it discharged more water than any other geyser which we saw in operation." Just at sunset there was a spectacular eruption opposite camp. What had first appeared to be only a large, bowl-shaped hot pool began rocketing jets of boiling water as high as two hundred feet against a backdrop of iridescent vapor. This earth-shaking geyser was obviously less powerful than the Giant, but also more beautiful, so there was only one really appropriate name for it – the Giantess.

The pack train was under way at 9 A.M. on September 19. At Midway they admired "an enormous bluestone spring" (present Grand Prismatic Spring) and took note of a great, steaming caldron that was discharging a large volume of boiling water into Firehole River. That night the Washburn party camped where the Firehole and Gibbon rivers join to form the Madison, and there, by a pleasant campfire beneath the pines, the conversation is said to have turned to a discussion of the wonder-filled region they were leaving.

> According to Langford: "The proposition was made by some member that we utilize the result of our exploration by taking up quarter sections of land at the most prominent points of interest, and a general discussion followed. One member of our party suggested that if there could be secured by pre-emption a good title to two or three quarter sections of land opposite the lower fall of the Yellowstone, they would eventually become a source of great profit to the owners. Another member of the party thought that it would be more desirable to take up a quarter section of land at the Upper Geyser Basin, for the reason that that locality could be more easily reached by tourists and pleasure seekers. A third suggestion was that each member of the party pre-empt a claim, and in order that no one should have an advantage over the others, the whole would be thrown into a common pool for the benefit of the entire party.
>
> Mr. Hedges then said that he did not approve of any of these plans, that there ought to be no private ownership of any portion of that region, but the whole ought to be set apart as a great National Park, and that each one of us ought to make an effort to have this accomplished."

The Washburn party continued down the Madison River until the afternoon of September 22, when they reached a ranch fourteen miles from Virginia City. The next morning Langford rode ahead to the town with the news of the loss of Everts. Then they began the trek back to Helena.

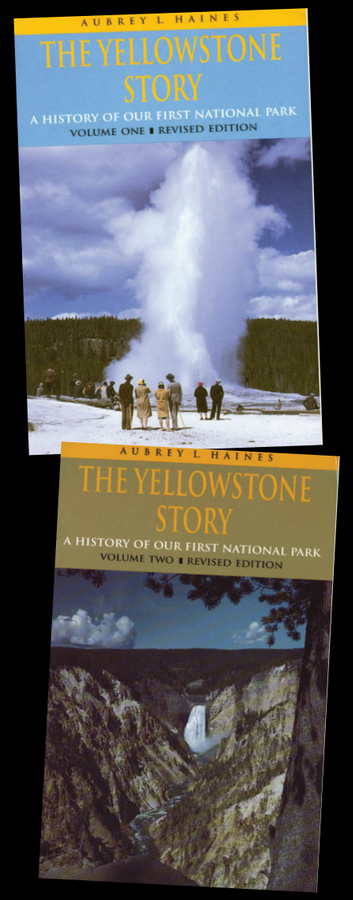
**Grand Prismatic Spring**: Larry Mayer

Gillette and the two soldiers (who were left behind to search for Everts) were back to Helena on October 2, with the discouraging news that they could find no trace of the missing man. Yet, some of the missing man's friends were not satisfied to leave his fate undetermined. Hedge's law partner, Judge R. Lawrence, offered a reward of $600 for Everts' recovery. **Note:** The story of Everts' life-threatening experience and rescue is related in an article written for Scribner's Monthly titled, *Thirty-seven Days of Peril.*

What did the expedition accomplish? Soon after his return to Helena, Cornelius Hedges began a series of articles that appeared in the *Helena Herald*. The Yellowstone Lake article is of particular interest because it contains the only published suggestion for reserving Yellowstone to come from any member of the Washburn party prior to initiation of Park legislation. The wide-spread publicity that followed the Washburn-Langford-Doane Expedition led one-year later to the Hayden Geological Survey of 1871 that in turn led to the creation of Yellowstone National Park in 1872.

*Note: In the next issue of this E-magazine, in the third and final part of the initial explorations of Yellowstone, we will detail the Hayden adventure.*

We highly recommend *The Yellowstone Story*, both Volumes 1 and 2 by Aubrey L. Haines. You can purchase these as well as research other Yellowstone oriented titles by visiting the Yellowstone Association's website www.YellowstoneAssociation.org



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The administration, faculty, and students at Brigham Young University–Idaho were honored and appreciative when approached by the University of Montana to contribute to their Crown of the Continent and Greater Yellowstone Initiative. We see this as an opportunity to afford our faculty and students the occasion to work with the first-class professors, researchers, and public and private collaborators gathered by the University of Montana to inform the public of all that makes up these natural systems. The E-magazine also provides a reputable venue for the scholarly work produced on our campus.

We live in an amazing, yet often underappreciated part of the world with an immense biological and geological richness. It is our hope that we, at BYU–Idaho, can further share the results of our great interest, study, and gained understanding of this vast region.

BYU–Idaho is a private university with approximately 25,000 students from all fifty states and seventy foreign countries. We hope to involve a significant number of our almost eighty majors in this project. Professors and students in English, Communications, History, Art, Biology, Plant & Wildlife Ecology, Geology, and many other departments will have the opportunity to share their finest work and bring the stories, perils, needs, discoveries and victories of this region to the attention of our combined readers.

We enthusiastically join hands with the University of Montana and sincerely hope this will be the beginning of a long and fruitful partnership.

***Fenton Broadhead***
***Academic Vice President***
***Brigham Young University - Idaho***

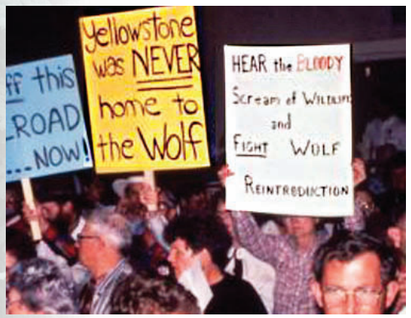




**Canyon wolf near Mammoth Hot Springs.** Jim Peaco, NPS

# Wolves Caught in the Crosshairs... Again

By **Paige Nelson**




**Demonstrators let their voices be heard in Helena.** Norm Bishop, NPS

It took 20 years, and over the protests of angry and fearful ranchers, who saw wolves as sinister killers that threaten children, pets, livestock, and the ranching way of life, for gray wolves (Canis lupis) to be set free in Yellowstone National Park in 1995. Now, some 18 years after the reintroduction of the 31 adult wolves into the Northern Rocky Mountain (NRM) region, gray wolves will most likely be taken off the US Fish and Wildlife Service's Endangered Species list. Not without controversy, the proposal, published in June of 2013, had the public comment period extended to Dec. 17, 2013.

According to Dan Ashe, Director of the US Fish and Wildlife Service (USFWS), in his statement Gray Wolves are Recovered; Next Up, the Mexican Wolf," they are no longer in danger of extinction now or in the foreseeable future." Confident that the professionals at the state and tribal wildlife agencies will be able to ensure the success of gray wolves for future generations, he describes the Endangered Species Act (ESA) as, "biodiversity's emergency room. We are given patient species that need intensive care. We stabilize them; we get them through recovery. Then we hand them to other providers who will ensure they get the long-term care they need and deserve."

As of December 2012, the USFWS found the NRM wolf population numbers to be as follows: Idaho, 683; Montana, 625; Oregon, 46; Washington, 43; Wyoming, 277; for a total of 1,674 wolves living in at least 321 packs and having 103 breeding pairs. The fact that the wolf population in the NRM has exceeded its recovery goals for 11 consecutive years is testament to the rationale for delisting the species.

## Is It Really All "The Big Bad Wolf's" Fault?

Many hunters throughout the Greater Yellowstone and elsewhere blame the low elk numbers on wolves. You hear it or see it everywhere, in the news, on the internet..."Wolves have decimated elk populations!" "Wolves have ruined elk-hunting!" What are the facts?


**Straight to the point.** Jim Peaco, NPS

Within the Park, elk (Cervus canadensis) numbers have begun to steady after a large dive in numbers corresponding to wolf population peaks. According to the National Park Service's (NPS) January 2011 news release, in 1995, the first year of wolf reintroduction, there were 16,791 elk in the northern herd. Since then, there has been a 70 percent decrease in numbers. Predation was cited as the main reason, but with a drought in the early 2000's also playing a significant role. Wolf numbers fell substantially from 94 in 2007 to 37 in 2010. Biologists suspect this change was in response to declining prey (elk) numbers and expect to see the elk numbers increase as the two species' respond to one another.

Outside of the Park, wolf mortality within the NRM region is due to a combination of three factors: periodic disease; response to prey availability; and hunting/control measures used by government agencies. The October 2013 Idaho Wolf Management Update listed a mortality of 374 wolves for the year. By mid-November 2013, Montana FWP recorded a total of 92, and the Wyoming Gray Wolf Population Monitoring and Management Annual Report cited 310 wolf deaths.

However, another big game species in the NRM region is also seeing a decline in population numbers. Moose (Alces alces) populations in Idaho, Montana and Wyoming are decreasing, but the changing numbers can't be solely attributed to any single factor. According to the Idaho Fish and Game 2011 Progress Report, Idaho moose populations have expanded into Washington, Oregon and Utah, but in the central Idaho wilderness areas, their numbers are sinking as wolves are increasing.

Montana FWP's "Moose Status 2011" cites a host of reasons for the declines such as: wolves, grizzly bears (Ursus arctos horribilis), timber regeneration, parasites and disease, and harvest. The Wyoming Game and Fish Department lists similar reasons for its declining numbers.

While both elk and moose numbers are down, the NPS reported in its Summer 2013 Bison Population Estimate that the bison (Bison bison) population has increased by 8.75 percent since last year's count and now sits at 4,600 total. However, according to the Park's news release, bison numbers reached their peak in 2005 with an estimated total of 5,000.

It is clear that big game and bison populations are continuing to respond to wolves, other predators and changing habitats. Numbers will ever be dynamic, but as proper consideration and management principles are applied, it looks as if all species will be able to coexist for years to come.

***Paige Nelson*** *graduated from Brigham Young University-Idaho with a Bachelor's degree in Animal and Food Science, accompanied by a double minor in Journalism and Natural Resources. She is currently pursuing a career in agriculture journalism.*

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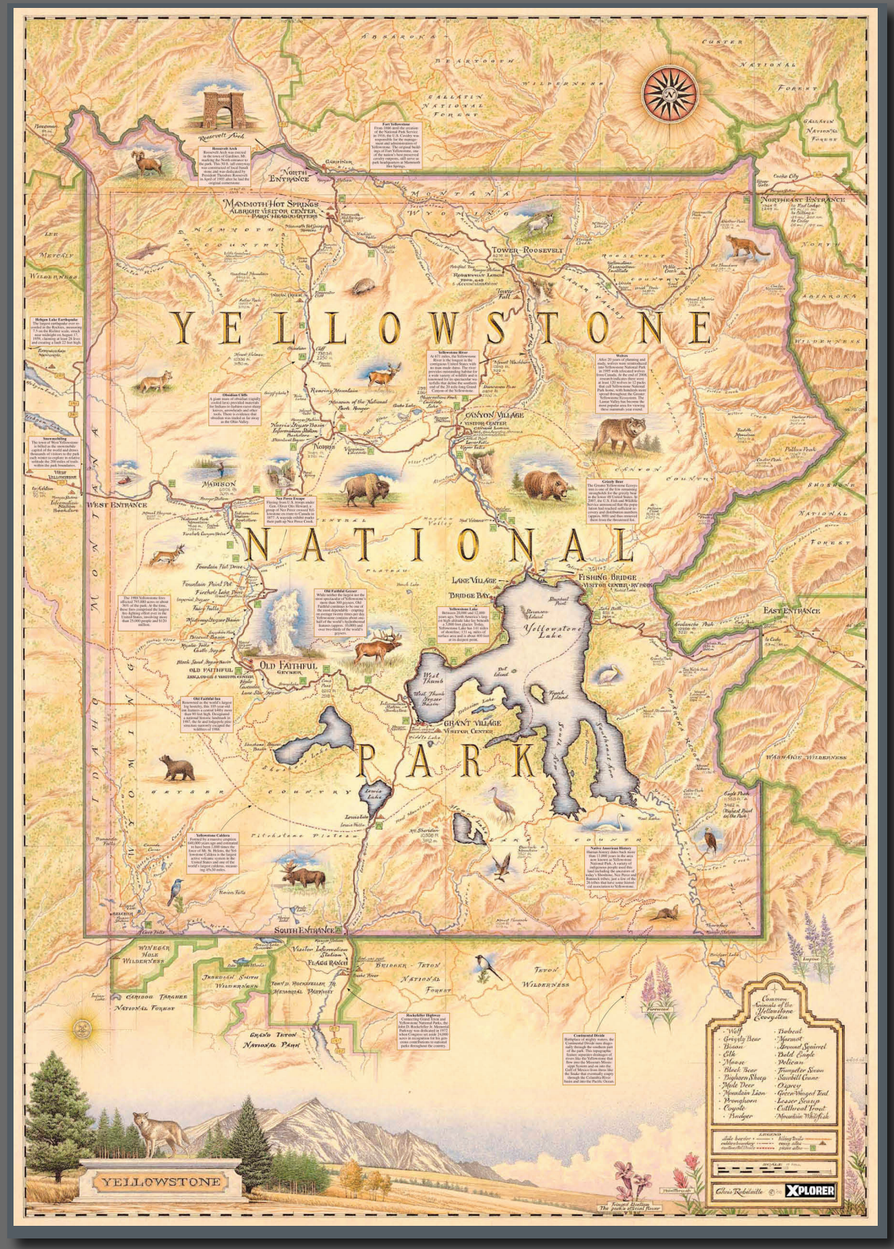


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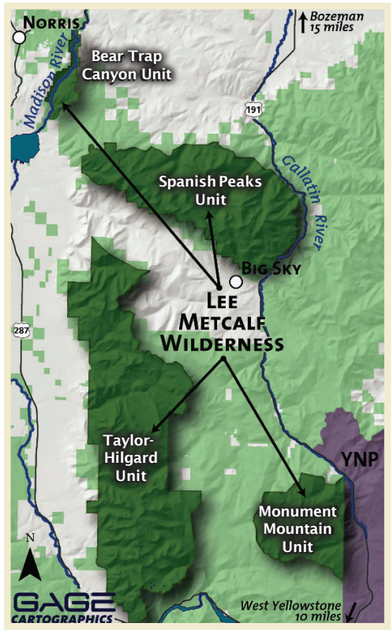
# Thirty Years of the Lee Metcalf Wilderness Area

By **Will Klaczynski**








**Expedition Lake, Taylor-Hilgard Unit.**
Rick and Susie Graetz

When people hear the term "natural disaster," images of tornadoes, floods, hurricanes, and earthquakes easily come to mind. In actuality, the subtle, lingering effects of a drought can be just as devastating. In terms of Wilderness, this is exactly what we have in Montana today—A "Wilderness Drought." Not since 1983 has an area of the state been designated federal Wilderness by Congress. This is why it is so important to celebrate the thirtieth anniversary of the Lee Metcalf Wilderness Area's creation and pay homage to the man whose name it bears, Senator Lee Metcalf of Montana.

The story revolves around a group of dedicated advocates who saw the need for more protected land in the state's southwest corner, the land itself, which is a vital part of the Greater Yellowstone Ecosystem, and the man himself, Senator Lee Metcalf, for which the Wilderness Area is named. It contains all the elements that were typical in the fight for wilderness in this state – arguments over mechanized recreation, navigating complex land ownership patterns, development pressures, and the not so simple act of getting the legislation actually introduced before Congress.

To begin with, though, we need to know more about the senator in order to understand why this Wilderness Area was named after him.

Lee Warren Metcalf was born on January 28, 1911 on a small farm in Stevensville, Montana. He spent his formative years in the Bitterroot Valley gaining an appreciation for the surrounding landscape. After graduating high school, Lee spent a year at the University of Montana before attending Stanford University, where he received a bachelor's degree in history. He then returned home, received a law degree from the University of Montana in 1936, and began a private practice. That same year, he began his long career in public service and was elected to Montana's state legislature as a representative from Ravalli County.

Metcalf was appointed Montana's Assistant Attorney General in 1937 and served in that position until 1941. During this time, he married Donna Hoover, a fellow UM graduate. When the United States entered World War II, Metcalf went on to serve as an officer in five separate campaigns in Europe and then oversaw the first civilian court, police force, and the first free elections in US-occupied Germany.

Returning home Lee was immediately elected to Montana's Supreme Court as an associate justice where he served until 1952 when he ran for Montana's lone congressional seat and won. During four terms in the House, he championed the working class and disadvantaged and pushed forward many progressive ideas. One of his first major actions regarding natural resource management was the successful termination of the Ellsworth Timber


**Senator Metcalf serving on the House Education Committee.**

Exchange Bill, which would have allowed private timber companies to directly exchange their own clear-cut land for forested federal land whenever a government agency invoked eminent domain. Referring to this as "trading trees for stumps," Metcalf gained notoriety for his opposition to the bill and began a long career of conservation-minded legislative activity.

In 1960, Metcalf began his first of three terms in the Senate. Along with his staunch support of civil rights, women's rights, organized labor, veterans, and the elderly, he was a major proponent of conservation and environmental protection. In 1962, he introduced the "Save Our Streams" bill, which mandated that fish, wildlife, and recreation resources be considered and protected during rampant new road construction in the US. He also helped pass the Wilderness Act of 1964, which still remains the highest law of the land in terms of the protection of America's wild places. Additionally, Metcalf was the sponsor of the Montana Wilderness Study Act of 1977, which created ten Wilderness Study Areas in the state. Although the areas were not designated as wilderness, they were described as having characteristics worthy of that designation in the future; the US Forest Service was ordered to manage them in a way that preserved their wilderness character as it existed at the time of the bill's passage.

Lee Metcalf passed away due to natural causes the next year in 1978 at the age of 66. Although he is not a household name like many of the national icons of that era, he left a lasting mark on this country and this state, and as a result, a certain part of it literally bears his name.

As mentioned earlier, the 259,000-acre Lee Metcalf Wilderness Area was designated in October of 1983 and consists of four noncontiguous units spread across southwestern Montana in the Madison Range. The





Bear Trap Unit protects a stretch of the Madison River known for its intense whitewater rafting/kayaking; it is also the first wilderness area to be administered by the Bureau of Land Management. The Spanish Peaks Unit to the southwest of Gallatin Gateway preserves an amazing stretch of the Madison Range and offers the ever-growing population of Bozeman access to wilderness directly off of the busy Hwy 191 on the way to Big Sky. The Taylor-Hilgard Unit, by far the largest in the Wilderness Area, protects the highest peaks found in Montana outside of the Beartooth Plateau. Finally, there is the Monument Mountain Unit, which is adjacent to Yellowstone National Park's northwestern corner; this unit extends federal protection of critical elk, moose, and grizzly bear habitat outside of the park, therefore connecting vital migration routes from the Madison Range to the park.

Originally, the Wilderness Area was envisioned as a large swath of protected land in the Madison range along with the Porcupine-Buffalo Horn Wilderness Study Area in the Gallatin Range. This was the vision of the Montana Wilderness Association and the 200-member grassroots organization The Madison-Gallatin Alliance. Taking lessons learned from the successful effort to create the Scapegoat Wilderness, utilizing the passion of a few people to affect change was the main strategy.

A steady stream of inserts in local papers about why this part of Montana needed to be protected was one part of the effort. These were designed to highlight how important the Madison and Gallatin Ranges are to the Greater Yellowstone Ecosystem in terms of wildlife migration, habitat availability, and recreational opportunities for people who felt like they needed to escape the fast-growing urban center of Bozeman.

The original idea of one continuous wilderness could not be realized even though compromises and concessions were attempted between wilderness advocacy groups, motorized recreationalists, such as snowmobilers, and large landholding interests such as the Burlington Northern Railroad and developers focused on the Big Sky area. In the end, connecting the Taylor-Hilgard Unit to the Spanish Peaks Unit across Jack Creek was not successful and a 38,000-acre tract of land along Cabin Creek between the Monument Mountain and Taylor-Hilgard Units remained open to snowmobile use.

Although the Wilderness Area is fragmented, the lands it does protect showcase some of the greatest alpine regions in Montana and provide vital habitat in the Greater Yellowstone Ecosystem. Additionally, the fact that it is named after Senator Metcalf cements his legacy and honors his efforts to protect the wild places left in America.

When introducing and naming the Wilderness Area, Senator Max Baucus' words attest to the importance that Lee Metcalf had to this state and the idea of Wilderness in the United States when he said:

> *"Over 17 years ago, Senator Lee Metcalf first proposed that the Spanish Peaks Primitive Area be protected. It is a fitting tribute to this great conservationist that this area not only be designated a wilderness area, but that it be forever known as the Lee Metcalf Wilderness. I can think of no more fitting tribute than the naming of this massive mountain range for the man who did so much to conserve Montana's wilderness heritage."*

Now, anyone taking a hike in the Spanish Peaks, attempting an ascent of 11,316-foot Hilgard Peak, or braving the rapids in Bear Trap Canyon should thank the small group of men and women who fought hard to create this wilderness and think of the humble man in the horn-rimmed glasses who did what he thought was right for the people of Montana and the country as a whole.

For more information, please visit the following sites:

**The Wilderness Society - Summer of Lee**
**Remembering Lee Metcalf - YouTube Video**

***Will Klaczynski*** *is a research assistant, writer, and photographer for the Crown of the Continent and Greater Yellowstone Initiative. He is currently pursuing his M.A. in the field of Geography.*

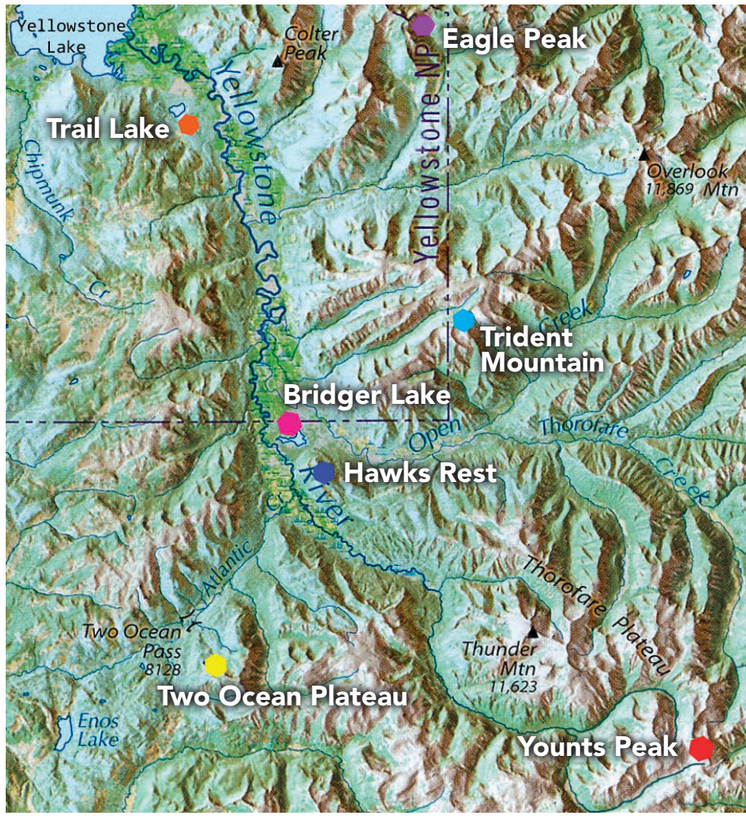
**Spanish Peaks.** Rick and Susie Graetz

# The Yellowstone River in Yellowstone National Park

## Beginning in the Teton Wilderness

By **Rick and Susie Graetz**






Just off the Continental Divide, deep in Wyoming's Absaroka Range and Teton Wilderness, Younts Peak brushes thin air at 12,156 feet. When the melt season arrives, snowfields in a cirque high up on the massif's north face and other flanks are adorned with countless rivulets. Trickling off the snow, they weave in the mountain's tundra forming small creeks as they gather in the denser vegetation below, providing the initial waters for the North and South forks of the Yellowstone River. Beneath Younts' west wall the two branches unite to power the surge of the largest undammed, free running river in America as it commences its 670-mile long odyssey to meet the Missouri beyond Sidney, Montana. And what a journey it makes!

From its spawning grounds 28 air miles below Yellowstone National Park's southeast corner, the fabled river enters a narrow deep canyon and fights its way down a boulder-strewn course. For almost ten miles, it passes through a forest of pine, spruce and fir fitted with small meadows and willow flats. As a result of the 1988 fires that burned so much of Yellowstone National Park and this corner of the Teton Wilderness, the flora mix is changing; some new aspen growth is now being observed and lodgepole pine is coming back in many places, while exhibits of wildflowers, including arnica and fireweed, are sprouting up under burnt snags.

From the Continental Divide on its west and Thunder Mountain and volcanic cliffs on its east, numerous unnamed streams and waterfalls add to the flow, and industrious beavers construct their dams. The rough Continental Divide Trail follows the river on its north and east side with many small, but easy creek crossings.

It is here, in its first mile of flow, that the river, in connecting with one of the nation's finest, untamed wilderness landscapes... gains its wild soul. Far from any road, this is the canyon of the Upper Yellowstone.

Near Hawk's Rest, the Yellowstone departs its narrow confines and embarks on a torturous meander through the marshy river bottoms of the 21 mile long Yellowstone Meadows and Thorofare Valley. These wetlands extend from one to two miles across, and the river, with its islands, channels and deep pools, is up to 160 feet wide in places. Lush meadows of high grass and dense willows border prime moose habitat as well as

**Younts Peak.** Larry Mayer

At the same time an eastern Montana farmer and his sons near Glendive are pumping warm irrigation water from a slow paced, silt-laden river for their fields, far upstream in the Thorofare Valley, a grizzly sow and her cubs are splashing through the Yellowstone River's cold, clear, fast moving water in search of breakfast.

**Two Ocean Plateau.** Larry Mayer





**THe Yellowstone River's "delta."** Larry Mayer

a summer home for the Northern Yellowstone and Jackson Hole elk herds. Cutthroat trout move upriver to spawn here in early summer, attracting the king of the wilderness... the silvertip grizzly bear. Other wildlife, including bison, eagles, big horn sheep, cougars and deer are plentiful. Canada geese and sandhill cranes call out in the early morning. Skirting and passing through the meadow's east perimeter, the Thorofare Trail commences and leads toward Yellowstone Lake. The water in these wildlands is swift, deep and cold. High runoff and lasting snowbanks make much of it impassable until mid-July.

While the bottomlands the Yellowstone River occupies are spacious, the mountains on either side reaching high above them continue to be impressive. Some of the views combining panoramas of the river and its lofty guardians are almost implausible. Wyoming's 80-mile long Absaroka Range with its 10,000- to 11,000-foot summits, including the Park's highest point, 11,358-foot Eagle Peak, forms a fortress on the river's sunrise side.

Early explorers who entered this wonderland called the Absarokas "Yellowstone Mountains" and "Great Yellowstone Range." In 1885, the US Geological Survey maps, referring to the moniker the Crow Indian Nation used to describe themselves—"children of the large beaked bird"— gave the range the name Absaroka. Trident Mountain, a 10,969-foot huge wall-like feature with a plateau top rises abruptly above the Thorofare Valley just as the big river enters Yellowstone NP. Three finger-like arms that extend out from the plateau westward gave the formation its name.

Running along the Absaroka Mountains, the Continental Divide snakes northwest, loses elevation and crosses Two Ocean Pass, a nearly flat area with plenty of water. Here, North and South Two Ocean creeks meet and then part. One fork becomes Atlantic Creek and makes its way east to the Yellowstone River, while the other drains toward the west and the Snake River. The massive Two Ocean Plateau, reaching 10,115 feet at its highest mark, is now home to the Continental Divide. As the Plateau drops off to Yellowstone Lake on the north, the Continental Divide takes its leave and climbs to the heights west of the lake.

The historically rich Upper Yellowstone River Country fascinated and intrigued early-day trappers who often mentioned the area in their diaries. In 1807, John Colter, from the Lewis and Clark Expedition, was the first known fur seeker/explorer to enter the region; and it wasn't until 60 years after his first visit that any serious exploration of the Park occurred. The legendary Jim Bridger, who is credited with the discovery of Two Ocean Pass, camped at today's Bridger Lake in 1830. The tales told by these mountain men of the countless diverse thermal features they saw were thought to be exaggerations. Colter's incredible, and to some, unbelievable, stories of hot water pools, geysers, bubbling earth and sterile landscape, caused listeners to name the area Colter's Hell.

During the fur trade era of the early 1800s to 1840, trappers established well-used routes from Jackson Hole and the Snake River to the Yellowstone Plateau. The low and marshy Two Ocean Pass was an easy course for them to follow. On the east side of the pass, they named the valley the Yellowstone River follows, "Thoroughfare." Somehow over time, the spelling was shortened to Thorofare.

In noting the separating of the waters at Two Ocean Pass in his journal, trapper Osborne Russell wrote, "One side bound for the Pacific and the other for the Atlantic Ocean. Here a trout of 12 inches in length may cross the mountains in safety." Theory has it, this was how the cutthroats made it to the upper river and Yellowstone Lake.

The Thorofare Valley terminates in the area of the Yellowstone River's "delta" as it reaches Yellowstone Lake in the Park's remote southeast region. In attaining the lake, the young waterway has traveled approximately 70 miles from its inception; by trail the distance is only about 32 miles.



**Yellowstone Lake at sunset.** Harlan Kredit, NPS.



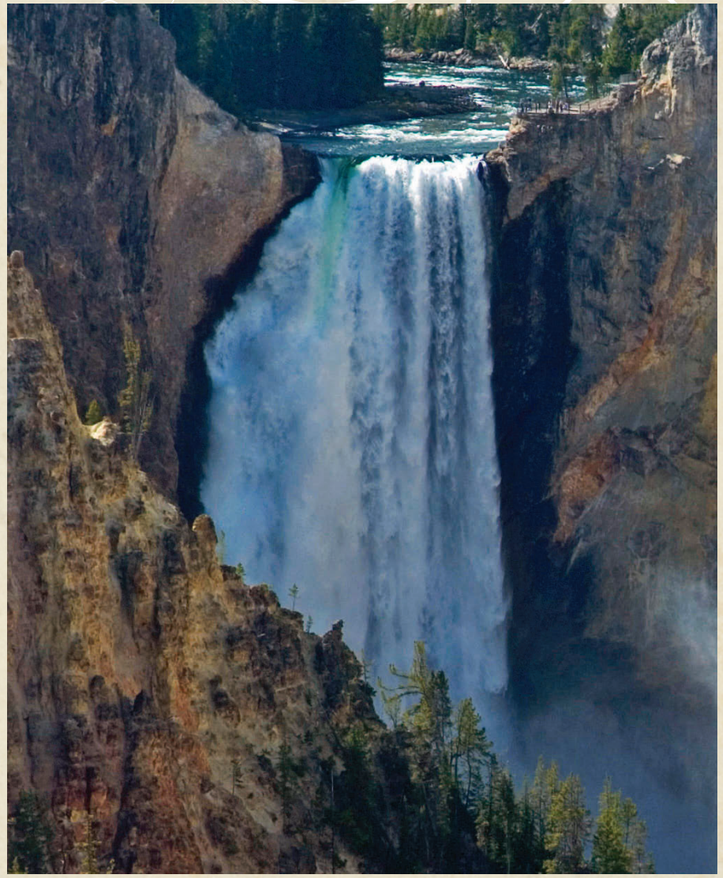
## Lower Yellowstone Falls

By Greg Pape

Standing on asphalt laid down on rock
just at the place where the Yellowstone river
has come around a bend, riffling,
picking up speed, hugging a big rock
cutting the current, island-like,
just before the river forms
a last slick run to a ledge of rock,

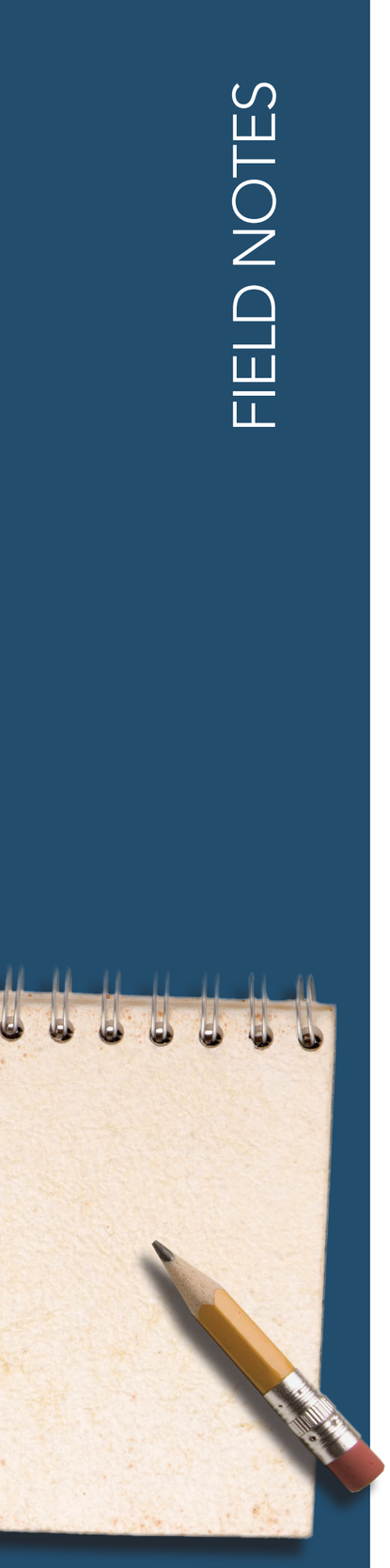
a brief horizon,

and falls down the cliff face
into the chasm of the lower canyon
in a continuous roar
a white-water storm hosannaing hard
down through layers of air
watery columns collapsing
waves breaking into tumbling ovoid
shapes pulling apart
colliding in a rush the eye
can't stop or hold
so the body feels its falling
as uprush through legs hips
into the solar plexus the heart
the blasting synapses
sheathed in water—step back.
Hold on.
A golden stonefly
Lifts off the lip of the falls,
Hovers like a spark in the mist.



Rick and Susie Graetz

***Greg Pape*** *is professor of Creative Writing at the University of Montana and was Montana's Poet Laureate from 2007-2009. As the award-winning author of nine volumes of poetry, he is the recipient of two National Endowment for the Arts Individual Fellowships, the Pushcart Prize, the Richard Hugo Memorial Prize, and many more honors.*





# JEFF MOW IS THE NEW SUPERINTENDENT OF GLACIER NATIONAL PARK

*By Vince Devlin of the Missoulian*

After spending 21 of the last 25 years in Alaska – most recently as superintendent of Kenai Fjords National Park – Mow has finally returned to the Lower 48. And he does so as the new superintendent of Glacier National Park, replacing Chas Cartwright, who retired in December.

Mow, 54, takes over at a critical time for Glacier. The park is in the process of producing a corridor management plan that addresses the traffic and congestion on its iconic highway, Going-to-the-Sun Road. The Park's spectacular but creaking hotels are at or nearing their 100th year of operation. What's more, the concessionaire that ran them for the past 30 years has been replaced. Last but not least, the glaciers that are Glacier's namesake are rapidly disappearing in the face of a warmer world.

**Superintendent Mow.** NPS

Mow is no stranger to the latter topic. He's been a policy analyst on the Park Service's Climate Change Response Program since 2001.

"In Alaska," he says, "climate change is in your face. Parks have done climate change workshops co-sponsored by local chambers of commerce. You can't ignore it there. Glacier had approximately 150 glaciers when it became a national park in 1910, now it's down to 25. Almost all of those, Mow says, are expected to shrink to less than 25 acres – the standard for being considered a glacier – within the next 20 to 30 years. "The places we know to be most sensitive to being affected by climate change are areas of high latitude and high altitude, and Glacier is a combination of both."

"A lot of my peers have been ingrained with the idea that national parks are to be vignettes of a primitive America," he says. "That's not something we can continue to do. We can't keep things as they've been for the last 100 years when things are changing all around us."

Mow began his Park Service career as a seasonal ranger at Glacier Bay National Park and Preserve in Alaska. "I was at eight duty stations in Alaska," he says. "Overall, I spent six years in southeast Alaska, eight years above the Arctic Circle living in bush communities, and 8 1/2 years in south-central Alaska on the coast." In addition to Kenai Fjords, Mow was an acting superintendent at Denali National Park.

The four years he wasn't in Alaska, Mow was superintendent at Florissant Fossil Beds National Monument in Colorado, and spent 2001 in Washington, D.C., working with the Senate Energy and Natural Resources Committee and the Office of Legislative Affairs as an NPS Bevinetto Congressional Fellow.

Dealing with tight budgets while running a popular national park "is like playing in a symphony," he says. "It's about everyone playing their parts, and being well-coordinated. It's a big apple, but you take it a bite at a time." And as for him departing Alaska after more than two decades there to take over here? "You reach a point in your career," Mow says, "where there are certain options you don't pass up. Glacier is one of those."

***Vince Devlin** is the Arts and Entertainment Editor for the Missoulian*





# MARY GIBSON SCOTT IS LEAVING GRAND TETON NATIONAL PARK

*NPS Press Release*

**Superintendent Scott.** Flo McCall

Mary Gibson Scott, superintendent of Grand Teton National Park and the John D. Rockefeller, Jr. Memorial Parkway, today announced her retirement from the National Park Service (NPS), marking the end of a dedicated career in public service that spans 33 years. She is the third longest-serving superintendent in Grand Teton's history, and first female to fill the park's top position.

During her NPS career, Scott served in park management positions at Santa Fe (former NPS Southwest Regional Office) and Carlsbad Caverns in New Mexico, at Golden Gate, Santa Monica Mountains and Channel Islands in California, at Gateway in New York, and at Blue Ridge Parkway in Virginia. She also worked on planning and development projects in Oklahoma, Texas, Colorado, New Mexico, Louisiana, Arkansas, and Arizona. In 2010, Scott served as acting regional director for the NPS Intermountain Region Office in Denver, Colorado, where she provided oversight for 91 units across eight states from the border of Canada to Mexico.

Scott advanced several critical land acquisitions during her tenure at Grand Teton. She completed the conveyance of the Laurance S. Rockefeller Preserve property in 2007 (1,106 acres), and she oversaw the opening of the LSR Preserve Center in 2008. Scott also negotiated an agreement with the State of Wyoming to purchase 1406 acres of state lands within the park and finalized the purchase of a 40-acre subsurface mineral parcel and an 86-acre parcel of school trust lands. She has been actively working with the Department of the Interior, Bureau of Land Management and State of Wyoming to purchase of school trust lands within the park. In addition to the Wyoming school trust lands, Scott helped complete the purchase of several other private land parcels within Grand Teton. The total acreage added during Superintendent Scott's tenure equals 1,286 acres.

Of special note, Scott initiated and facilitated an extensive planning process that resulted in the first-ever comprehensive environmental impact statement for the Jackson Hole Airport, the only commercial airport in a national park. The agreement represented a multi-year process that produced a suite of mitigation measures for protection of park resources, and established a framework for their achievement. Work continues on a wildlife hazard management plan for the JH Airport with support from the FAA.

From 2008-2010, Scott served as chairperson for the Greater Yellowstone Coordinating Committee, which includes federal land managers from national parks, national forests and national wildlife refuges across the Greater Yellowstone Ecosystem. She just stepped down as chair of the Yellowstone Ecosystem Subcommittee of the Interagency Grizzly Bear Committee, a multi-jurisdictional organization focused on the successful recovery and conservation of grizzly bears across a 22-million-acre natural area that spans three states (Idaho, Montana, Wyoming).

Scott consistently supported her NPS staff and various park partner organizations. She often praised her NPS employees and credited her success to the hard work and dedication of an outstanding and committed work force. Throughout her tenure at Grand Teton, Scott worked with one guiding principle and a thought-provoking question, "Is it in the best interest of the Park?" Those words are written on a plaque that hangs above her office door at the park's headquarters building in Moose, Wyoming.

# SUPPRESSION SUCCESS

*By **Mike Koshmrl** of the Jackson Hole News & Guide*

The National Park Service and contracted fishing boats have caught more lake trout this year than any other, marking a turning point in the effort to knock the invasive species out of the big lake.

The commercial fishing boats, now midway through the 11th year of operations, have caught and killed 200,000 lake trout since ice came off Yellowstone Lake this spring. Last year at this time they'd killed 180,000 fish. Boats on the Yellowstone Lake netted and killed 300,000 lake trout in 2012 and 224,000 in 2011. That's twice the total cull of the entire previous decade, which was just 500,000. "We have a little bit better sense of where the fish are," Hottle tells the Jackson Hole News & Guide, "so we're fishing smarter."

Lake trout, also known as mackinaw, is a prized game fish in its native range of the Great Lakes, New England and much of Canada. In Yellowstone, however, the fish eaters, which commonly exceed 20 pounds, are believed to be the primary catalyst in a 90-plus percent drop in numbers of native Yellowstone Cutthroat Trout. The cutthroat collapse has wide-ranging environmental implications, biologists say, and has been connected to everything from failing osprey nests to higher rates of grizzly bear predation on elk calves.

Officials with Trout Unlimited were encouraged by news that lake trout catch rates are dropping. One indication lake trout suppression is working as designed, said Scott Christy, Trout Unlimited's Wyoming Coordinator, is that fish censuses on the lake are beginning to show small cutthroat. Last year the numbers of cutthroat in the gill nets doubled relative to lake trout. "Most years, it's about four cut throat per 100 lake trout," Pat Bigelow, a Park Service fisheries biologist, said. "This year, it's double that."

Yellowstone began targeting laker spawning beds this September. Aided by 270 lake trout implanted with transmitters that send location information, biologists will attempt to kill eggs at two locations using two experimental methods: electrocution and suction. Fisheries biologists hope that spawning bed treatments could hold Yellowstone Lake's lake trout population at a low level at less cost in the long run. Entirely removing mackinaw from the 139-square-mile body of water is believed to be impossible.

*For a full story see Lake Trout Suppression and Yellowstone Trout Recovery in Yellowstone Lake by Ken Barrett on page 44 of our last issue. http://issuu.com/um_crown_gye/docs/greateryellowstone-spring2013*

***Mike Koshmrl** is the Environmental Reporter for the Jackson Hole News & Guide. www.jhnewsandguide.com*

**A Yellowstone cutthroat trout.** Alan Rogers, Star-Tribune



# SWARM OF EARTHQUAKES SHAKE YELLOWSTONE NATIONAL PARK

*By **Mike Koshmrl** of the Jackson Hole News & Guide*

Yellowstone's recent earthquake swarms started on Sept. 10 and were shaking until about 11:30 a.m. Sept. 16.

Until recently, Bob Smith had never witnessed two simultaneous earthquake swarms in his 53 years of monitoring seismic activity in and around the Yellowstone Caldera. Now, Smith, a University of Utah geophysics professor, has seen three swarms at once. "It's very remarkable," Smith said. "How does one swarm relate to another? Can one swarm trigger another and vice versa?"

Because concurrent swarms have never been detected in the past, the answers aren't in yet. The geophysicist said he "wouldn't doubt" if at least two of the events were related. About half a dozen earthquakes are felt in Yellowstone in an average year, he said. "This is pretty unusual, to be honest," Smith said.

Temblors from the three quake swarms mostly hit in three areas: Lewis Lake, the Lower Geyser Basin and the northwest part of Norris Geyser Basin.

"Generally speaking it needs to be 3.0 or higher for individuals to feel it," Yellowstone National Park spokesman Al Nash told the Jackson Hole News & Guide.

"A total of 130 earthquakes of magnitude 0.6 to 3.6 have occurred in these three areas, however, most have occurred in the Lower Geyser Basin," a University of Utah statement said. "Notably much of seismicity in Yellowstone occurs as swarms." The recent swarms produced roughly four quakes that were large enough to feel.

The first, a magnitude 3.5, struck Sept. 13 about 17 miles northeast of West Yellowstone, Mont. Then, in the early hours Sept. 15, two quakes, a magnitude 3.2 and magnitude 3.4, were detected in quick succession at 5:10 and 5:11 a.m., about 15 miles southeast of West Yellowstone. The magnitude 3.6 that marked the peak of the swarm struck nearby about 4 1/2 hours later shaking the ground near Old Faithful Geyser. The epicenter of the magnitude 3.6 quake, the largest in Yellowstone in about a year, was just 6 miles to the north of Old Faithful.

However, none of the recent quakes, Nash said, were strong enough to cause damage or throw off the cycle of the Old Faithful geyser's eruptions. "We know that a significant enough earthquake in the region has potential to alter geyser activity," the spokesman said. "A strong enough earthquake, like the one that occurred out at Hebgen Lake in 1959, did change the interval of Old Faithful eruptions." That quake, a 7.3 to 7.5 on the Richter magnitude scale, caused nearly 300 features on the Yellowstone landscape to erupt, 160 of which had no previous record of geysers.

Smith traced the three recent earthquake swarms to the Hebgen Lake quake. "These are all related," he said. "We think that much of the seismicity is still aftershocks from that event in 1959. It can go on for hundreds of years."

***Mike Koshmrl** is the Environmental Reporter for the Jackson Hole News & Guide. www.jhnewsandguide.com*

**Red Spouter in Lower Geyser Basin.** Jim Peaco, NPS

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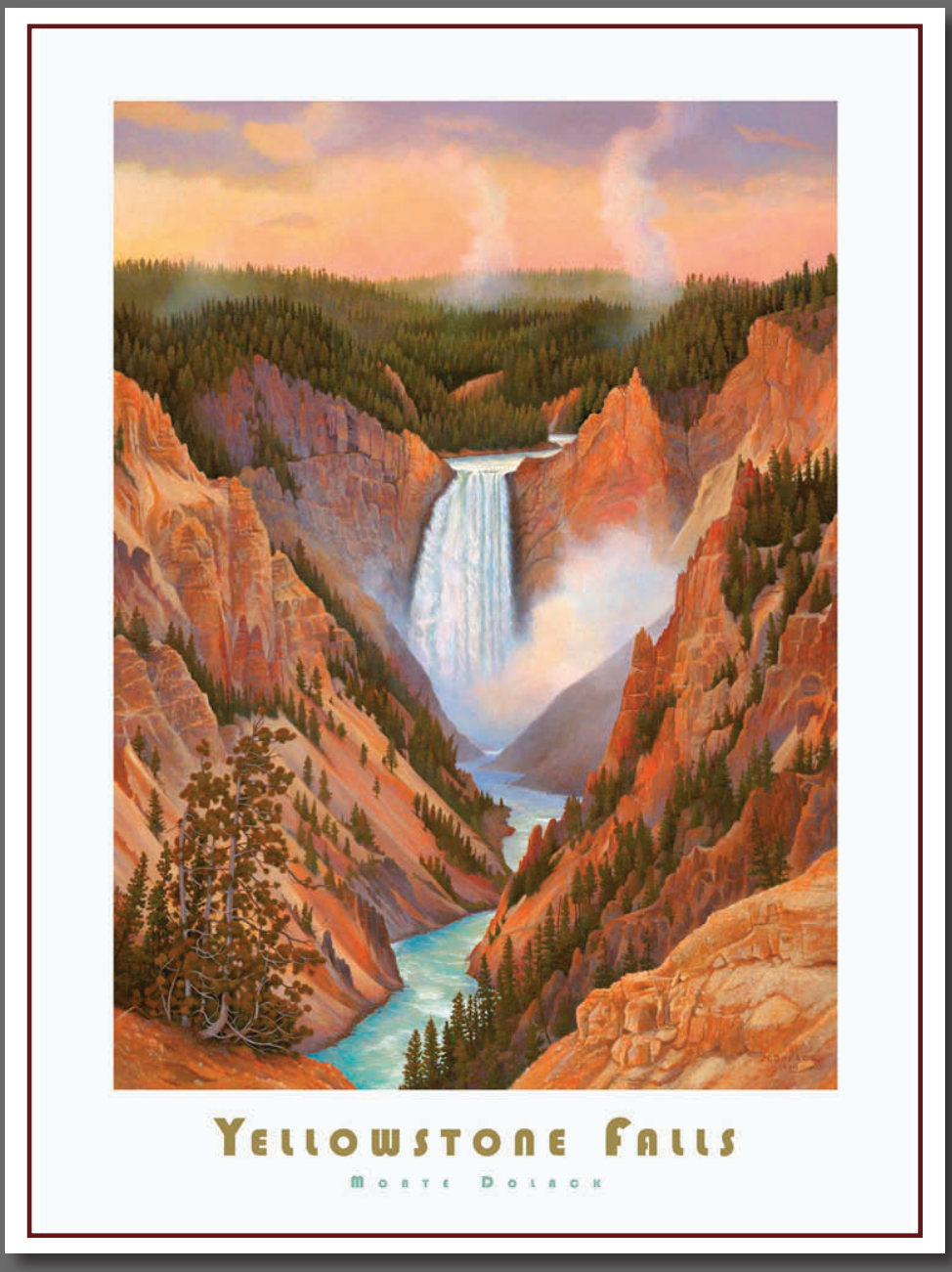


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