

Seventy-five percent of the earth is covered in water. On our blue planet, 97.5 percent of the water is saltwater. The remaining 2.5 percent is fresh, but most of that is frozen in polar snow and ice.

– *New Internationalist*

Some 97 percent of Earth's liquid fresh water is stored underground in aquifers. Up to two billion people, a third of the world's population, rely on groundwater for their needs. It can take centuries for precipitation to recharge aquifers and the world is currently running a groundwater overdraft of more than 200 billion cubic meters a year.

– *United Nations Environment Program, Global Environment Outlook 3 (Earthscan 2002)*

At birth, about 78 percent of a baby's body is made up of water. For adults, the percentage generally ranges between 55 and 65 percent.

– *Jeffrey Utz, M.D., Allegheny University*

Although people can live without food for more than a month, they can only live without water for about a week.

– *American Water Works Association*

The recommended basic water requirement per person per day is about 13 gallons. But people can get by on about 8 gallons of water a day: about 1.5 gallons for drinking and cooking and 6.5 gallons to maintain hygiene.

– *Water Supply: Our Impact on the Planet by Rob Bowden*

The average person in the United States uses 80 to 130 gallons of water each day. During medieval times, the average person used only 5 gallons per day.

– *American Water Works Association*



Down to the Last Drop

*Some telling, if grim,
water facts and figures*

One person out of every three on the planet today lacks reliable access to fresh water.

– *International Water Management Institute*

Some 2.6 billion people have inadequate sanitation.

– *World Health Organization*

Every day, more children die from dirty water than HIV/AIDS, war, malaria and accidents all put together.

– *Council of Canadians*

By 2025, all of Africa and the Middle East, and almost all of South and Central America and Asia, will either be running out of water or unable to afford its cost.

– *International Water Management Institute*

Today about 10 percent of the Earth's population is served by private water companies.

– *Pinsent Masons Water Yearbook*

A hundred years ago, most U.S. water systems were private, but because the private systems weren't serving the poor in cities, American municipalities bought out most private companies and placed them under public ownership. Since World War II, public water systems have supplied drinking water to 85 percent of Americans, but rising populations, aging infrastructure and laws mandating pure water have pushed cities like Atlanta, Indianapolis and Milwaukee to return to privately run systems.

– *Pacific Institute*

Texas, Florida and California have operations underway to make sea water suitable to drink. Due mostly to the energy required, desalination costs about \$650 per acre-foot (326,000 gallons) as opposed to \$200 for purifying the same amount of fresh water. According to its Department of Water Resources, California plans to get about half a million of its yearly use of 70 million acre-feet of water from desalination. Worldwide, capital investment in the desalination industry is expected to grow to \$56 billion by 2015.

– *Global Water Intelligence*

At least fifteen "ecosystem services," including fisheries and fresh water, that nature currently provides for free are being degraded or used unsustainably. Between 1960 and 2005, the world's population doubled and economic activity increased by a factor of six. Water use, acres of irrigated land, food production and hydropower also doubled. But these gains have been achieved at growing costs that, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.

– *Millennium Ecosystem Assessment*

Protecting Water Protects Life

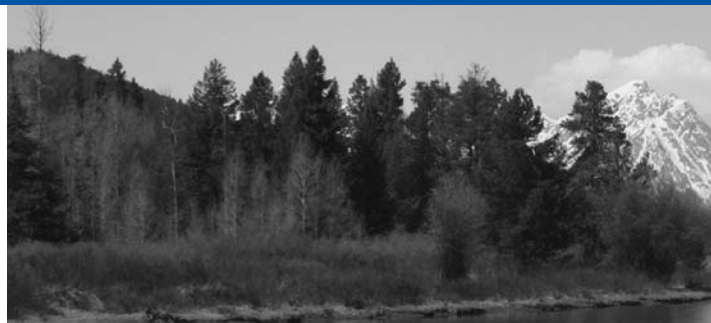
By Tim Palmer

“When I came here, the mountains were the first attraction,” the renowned Jackson Hole wildlife biologist, Frank Craighead, once told me. “But the river is what grew in my interest.” ♦ Frank was not alone. ♦ With visions of the iconic peaks embedded in my young brain, I hitchhiked to Jackson in 1969. Carrying a pack on my back, I couldn’t wait to set out for the high country on a path of adventure. But when I got there, and looked down on all the world below, and saw the veinwork of valleys and canyons with rivers winding through them, I could tell at a glance that those were the true pathways of life – green-edged, sinuous, glistening in the heat. When I came down, I sat by the bubbling water, and I felt refreshed and nourished by the flow. ♦ The river grew in my mind. Twenty years later, I returned to write a book about the Snake and its landscape. To me, this seemed not only fascinating, but also important. ♦ Everything that lives needs water, and rivers are the water supply of the world. Riverfront habitat is the most critical to wildlife, and what would Jackson Hole be without fishing? ♦ Now, when I return to this great place, I still go to the river. I still sit, and I still feel nourished. And I am not alone. If you raft, canoe, fish, sit quietly by the stream, or simply drink – drink anything – the connection we have with flowing water is really no mystery: our bodies are 70 percent water, every drop coming from a river, or from groundwater intimately tied to the surface flow. ♦ Frank Craighead would agree: to know a place, know its rivers. To steward all life and to care for our communities, take good care of the water. To defend the places we love against powerful forces of unconscionable greed or simply the heartless momentum of growth, protect these stunningly beautiful lifelines, which become more important to us and to our children with every precious day. ♦ The next generation will judge us by whether or not we saved our rivers. ♦

Tim Palmer is the author and photographer of seventeen books, including The Snake River: Window to the West, which is available for sale at the Alliance office, and Rivers of America, an art book of color photos published in 2006 by Harry N. Abrams.



Tim Palmer



The largest river in Wyoming, the Snake spans just over 1,000 miles from Yellowstone to the Columbia River. It receives 30 percent of the runoff from the eight mountain

Snake River’s

Your input could help pass a bill to protect 397 miles of local creeks and rivers.

By Beverly Lane, Outreach Associate

On May 3, U.S. Sen. Craig Thomas introduced the Snake Headwaters Legacy Act, a visionary bill that would include 397 miles of 13 rivers and streams in northwest Wyoming in the National Wild and Scenic Rivers System. Local involvement was key in getting the bill introduced and will be critical to get it passed.

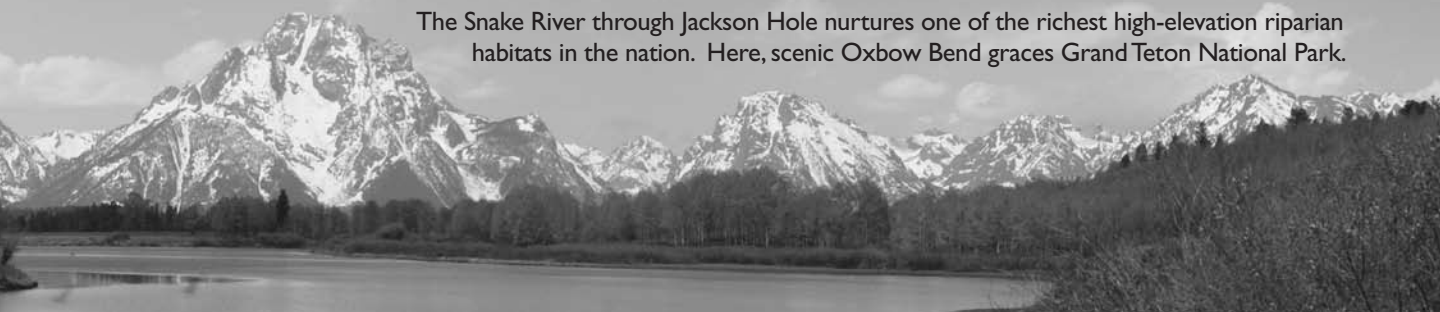
The Campaign for the Snake Headwaters, a coalition of anglers, outfitters, guides, landowners, business owners and conservation groups including the Alliance, has worked for the past three years to gain wild and scenic designation for these waterways in the Snake River watershed. Such designation would preserve their outstanding water quality and prohibit dam building and major water diversion projects, while not affecting water rights, private property rights or multiple uses on public lands.

The National Parks Subcommittee of the Senate Energy and Natural Resources Committee held a hearing on the bill on May 15. Jackson Hole fly-fishing legend Jack Dennis testified in support, saying that it is “good for rivers, good for small businesses and good for Wyoming.” The National Park Service and U.S. Forest Service also testified that they support the bill.

On June 4, the State of Wyoming lost a champion when Sen. Craig Thomas passed away from leukemia. Without his leadership, the Snake Headwaters Legacy Act remains a viable bill in the Senate but its fate is uncertain. The Campaign for the Snake Headwaters is working to ensure that it becomes law, but the task of moving the bill now falls to Sen. Mike Enzi and newly-appointed Sen. John Barrasso. It will be up to them to uphold Sen. Thomas’ legacy, and up to us to let them know we want the Snake headwaters protected. (Please see the box on Page 5 for their contact information.)

For more information, please visit www.snakeheadwaters.org. For the bill’s status and full text, visit www.govtrack.us/congress/billsearch.xpd and under “Search for” just type in S. 1281. ♦

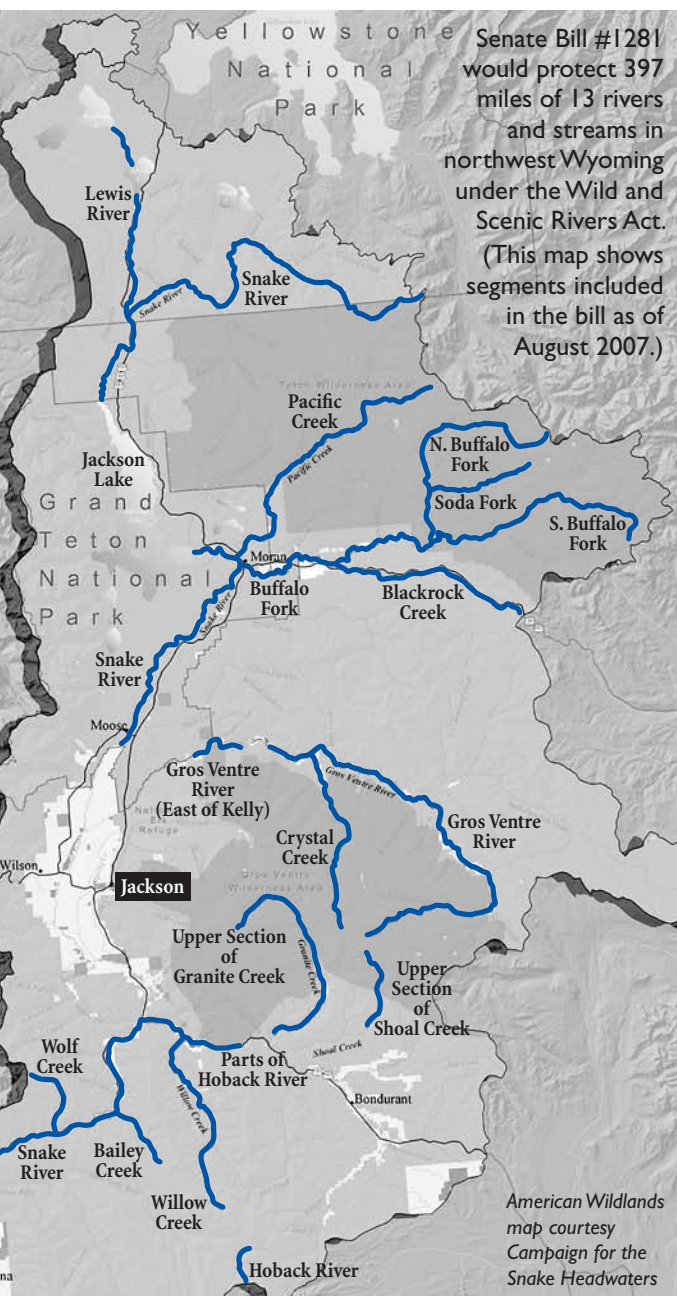
The Snake River through Jackson Hole nurtures one of the richest high-elevation riparian habitats in the nation. Here, scenic Oxbow Bend graces Grand Teton National Park.



states and drains much of the northwestern Rockies – a 109,000-square-mile area larger than Colorado. Carrying 37 million acre-feet a year (1 acre-foot covers an acre

with 1 foot of water), the Snake exceeds the volume of the Colorado River by two and a half times. (Source: The Snake River: Window to the West by Tim Palmer)

Headwaters Need Your Aid



How You Can Help

Please contact Wyoming's Congressional delegation to voice your support for passage of the late U.S. Sen. Craig Thomas' Snake Headwaters Legacy Act, Senate Bill #1281:

U.S. Sen. Mike Enzi

379 Russell Senate Office Bldg., Washington, D.C. 20510
(202) 224-3424

Email via: <http://enzi.senate.gov/email.htm>

U.S. Sen. John Barrasso

307 Dirksen Senate Office Bldg., Washington, D.C. 20510
(202) 224-6441

senator_jbarrasso@barrasso.senate.gov

U.S. Rep. Barbara Cubin

1114 Longworth, HOB, Washington, D.C. 20515
(202) 225-2311

Email via: http://www.house.gov/cubin/zip_auth.html

The Wild & Scenic Rivers Act

First proposed by Jackson Hole biologists John and Frank Craighead, the federal Wild and Scenic Rivers Act was signed into law by President Lyndon Johnson in 1968.

Since then, it has been used to protect 160 rivers totaling 11,292 stream miles throughout the United States, but only a 20-mile section of the Clarks Fork of the Yellowstone River northwest of Cody has been designated in Wyoming so far.

The Wild and Scenic Rivers Act:

- Bans all new dams and other potentially harmful water development projects,
- Restricts activities that would impair a designated river's "outstandingly remarkable values,"
- Ensures that water quality at the time of designation is maintained and enhanced,
- Creates a federal reserved water right for the amount of unappropriated water that is necessary to protect a designated river's special values, and
- Requires the development of a cooperative river management plan to govern future management of designated rivers. 💧



The spawning period of the Snake River fine-spotted cutthroat trout coincides with the typical peak of spring runoff in mid-June – a harsh environment for successful spawning in the main river.

The fine-spotted cutthroat evolved to spawn primarily in the riparian spring creeks and other springs tributary to the Snake River, so a healthy trout population is highly dependent on the health of the riparian system. *Photo by Scott Smith*

The Fine-spotted Cutthroat Trout

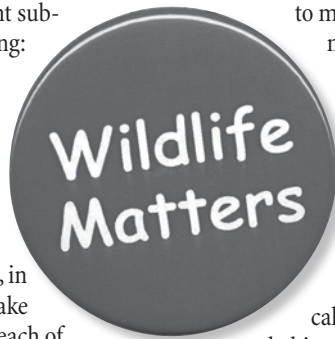
By **Ralph Hudelson**, *Retired Fisheries Biologist*

The only trout indigenous or native to the State of Wyoming was first described by the Lewis and Clark expedition near the Great Falls of the Missouri River in 1805. The characteristic reddish marks under the gills suggested the common name cutthroat for this species of trout. Five different subspecies of cutthroat trout are found in Wyoming: the Westslope, the Yellowstone, the Colorado River, the Bonneville or Bear River, and the Snake River cutthroats.

The Snake River cutthroat is generally recognized by its pattern of fine spots found profusely over the body behind the operculum (gill covering). Interestingly, Everman and Cox, in about 1903, suggested that the fine-spotted Snake River cutthroat trout was quite limited to the reach of river between the confluence of Pacific Creek and about Palisades Creek. Both upstream of Pacific Creek and downstream of Palisades Creek, the indigenous cutthroat exhibit much larger spots and are often relegated as Yellowstone cutthroat.

The Snake River tends to be of higher gradient and consequently of higher velocity through the reach below Pacific Creek. The typical peak of spring runoff, about a week before summer solstice, essentially coincides with the spawning period of the Snake River cutthroat trout. The hydraulic characteristics of the river create a harsh environment for successful spawning in the main river. The fine-spotted cutthroat evolved to spawn primarily in the riparian spring creeks and other springs tributary to the Snake River. Successful recruitment to the trout population is highly dependent on the health of the riparian system.

The construction of Jackson Lake dam in the early 1900s altered the natural flow pattern of the Snake River through Jackson's Hole. Spring flooding was somewhat reduced by water storage, followed by higher flows extending through the summer months by releases for irrigation in Idaho. For the most part the impact was minimal below the confluence of the Buffalo Fork. A major impact on spawning potential was noted following the construction of the levee system in the 1950s. The levees were constructed to provide relief from flood damage to adjacent landowners. The effect on the trout was the reduction of periodic flooding



of the riparian spring creeks, which flushed sediments and recharged suitable spawning gravels through stream hydraulics. Connectivity to the main river was also affected in some cases.

In 1955, fisheries management efforts shifted from emphasizing a harvestable trout population to managing specifically to maximize protection of the native trout. Management tools to this effect included reduction of creel limits and restricting introduction of exotic species into the Snake River basin. Planting of privately owned waters could no longer utilize brook trout, or the rainbow trout which readily hybridize with cutthroat. The riparian habitat limitations created by the levee system were addressed by working with landowners to mechanically remove sediments and strategically place suitable spawning gravels. Some tributary habitat restoration has occurred in Grand Teton National Park, because of the altered flow pattern of the river. The riparian system is generally intact upstream of the levees.

Threats of concern to the trout fisheries in the Snake River drainage are the presence of the whirling disease pathogen and the New Zealand Mud Snail. Whirling disease originated in Europe and the New Zealand Mud Snail obviously originated in New Zealand. Whirling disease is most prevalent in the Salt River but has also been found in some areas of the Snake River. The New Zealand Mud Snail has been detected in the Snake River upstream of Jackson Lake, and is relatively abundant in Polecat Creek in the John D. Rockefeller, Jr., Memorial Parkway. Take precaution to clean up your fishing gear any time you move from one angling experience to another.

More than half a century of management for the fine-spotted Snake River cutthroat trout has been successful in maintaining a viable and self-sustaining population in its historically described range. This species has been introduced widely in trout management efforts around the country. It is safe to say that the range of the species has actually been expanded well beyond the reach of Snake River between Pacific Creek and Palisades Creek. 💧

The Wildlife Matters Campaign is made possible with support from Earth Friends Wildlife Foundation, Skinny Skis and Patagonia, Inc.

A River Almost Runs Through

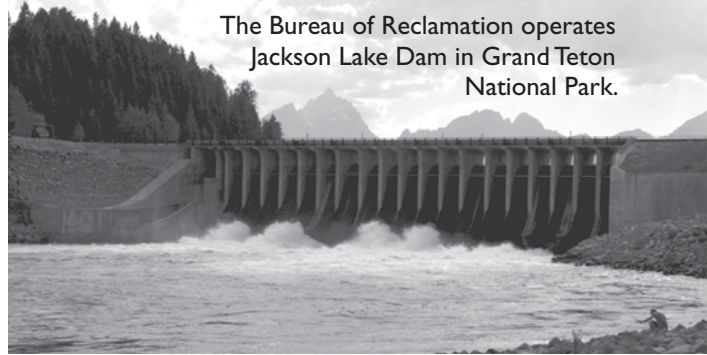
The Snake makes one stop in Wyoming.

By Franz J. Camenzind, *Executive Director*

The Snake River has its origins in the secluded southern region of Yellowstone National Park, nearly 8,500 feet above and 1,040 miles from its confluence with the Columbia River in Washington. In Wyoming, its flow is interrupted by one dam – Jackson Lake Dam in Grand Teton National Park.

Jackson Lake, a natural lake that originally covered about 17,100 acres, grew to more than 25,500 acres with the reconstruction of the current 65-foot-tall dam between 1987-89. The first two attempts to dam the lake's outlet with log structures – first by private irrigators in 1905 and again by the Reclamation Service in 1906 – failed. The first concrete dam with its earthen dike was completed in 1916. The Reclamation Service was renamed the Bureau of Reclamation in 1923 and remains in charge of Jackson Lake Dam, despite the 1950 expansion of Grand Teton National Park to encompass the entire lake and dam facility.

A 1956 “memorandum of understanding” between the bureau and the park states that the bureau “...retains complete and exclusive control of the flow and utilization of water in the reservoir... but will fully consider maintaining a constant level from June through September.” With 94 percent of the controlled water allocated to Idaho irrigation districts, little remains for use in Jackson Hole. However, the bureau, the park and the Wyoming Game and Fish Department have come to agreements on water



Franz J. Camenzind

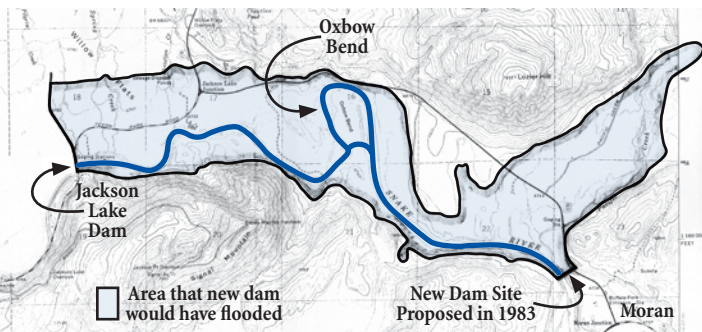
flow strategies to benefit local fisheries and recreational floaters and still meet the demands of downstream users.

More recent interests in the Snake's waters have centered on the installation of a hydropower plant at the dam to generate power for local use. First proposed in the 1980s, the idea has never gotten very far. Although it might seem logical to go green with local power sources, the precedent set by such industrialization of the park would be unacceptable. The Federal Energy Regulatory Agency denied early requests, citing federal laws prohibiting construction of hydroelectric facilities in national parks. In addition, the 1956 memorandum requires the bureau to consult with the park before developing anything at the dam.

As the West continues to grow – creating more demand for water, energy and recreational opportunities – we can count on more proposals for more “creative” uses of Jackson Hole's water. Proposals for diversions on tributaries of the Snake are likely. The mandate of the National Park Service continues to provide some protection to our free-flowing water resources, but the additional protection of the Wild and Scenic Rivers Act and an informed and passionate community of water protectionists might just carry us through this century. ♦

SNAKE RIVER SNIPPETS

- ♦ In 1983, the Bureau of Reclamation proposed to build a new dam on the Snake River at its confluence with Pacific Creek that would have drowned Oxbow Bend in Grand Teton National Park. Spirited efforts by locals, spurred on by the Conservation Alliance, saved this scenic section.
 - ♦ In 1973, 24,300 people enjoyed recreating in the Snake River Canyon. By 2006, the number grew to 145,560.*
 - ♦ The Snake hosts 13 native and 9 non-native fish species, 5 amphibian species, 7 reptile species and 2 native mollusk species.**
- *Bridger-Teton National Forest **Wyoming Game & Fish Department



Reviving a River Trapped by Levees

Thanks to the efforts of the Army Corps of Engineers, the Wyoming Game and Fish Department, Teton County Commissioners led by Bill Paddleford and many others, the on-again, off-again Snake River Rehabilitation effort will soon be on again.

This project to restore some of the dynamics and life back to the portion of the Snake River now trapped between levees will include: stabilizing in-stream islands to encourage willow growth and enhance moose and other wildlife habitat; remov-

ing some of the riverbed cobble, which provides virtually no fish habitat because of its instability, and constructing culverts to allow controlled rewatering of riparian areas behind the levees currently deprived of periodic flooding.

The rehabilitation should begin next year, contingent upon obtaining a \$500,000 appropriations request being brought to Congress with the aid of U.S. Sen. John Barrasso. If all goes well, the project will continue into 2028, covering the river

from Grand Teton National Park's southern boundary to the end of the levees at South Park. Although these efforts will never duplicate nature's wild river action, it is hoped that by stabilizing islands within the river and rewatering areas behind the levees we can have both protection from flooding and a more vibrant and wildlife-sustaining river corridor.

For a look at the history of the Snake River levees, please visit www.jhalliance.org/Library/Reports/levee.pdf. ♦

Death of a River?

Annual dewatering of the Gros Ventre causes concern.

A substantial portion of the Gros Ventre River downstream of Kelly until about two miles below the Highway 89 Bridge (just south of Gros Ventre Junction in Grand Teton National Park) is either partially or completely dewatered most years during parts of July, August and September. Low flows and dry sections of river are caused by water diverted for irrigation, drought and an undetermined amount of natural seepage into the aquifer.

Franz J. Camenzind

By Dr. Bruce Hayse
Alliance Board Member

Driving north from Jackson one crosses the tree-lined, pastoral clear waters of the Gros Ventre River. Crossing it at this time of year, however, one is faced with a barren expanse of cobble rocks and dead riverine vegetation. How a once vigorous and beloved stream has suffered dewatering and destruction is a typical story of the American West. The tragedy is that this has occurred despite being under the ostensible authority of the National Park Service.

The Gros Ventre is one of those increasingly rare features of our world: a free-flowing river with a nearly undisturbed watershed. Tracing a path from green alpine meadows to craggy sagebrush canyons and rolling grassland, it quenches the thirst of big game, provides valuable streamside wildlife habitat, enhances the Jackson Hole fishing experience and draws the eye to its limpid pools and stately cottonwoods.

Yet to visit the river in July where it drops through the soft lands at the lower end of Grand Teton National Park is to visit a river that is a parched shadow of its former self. The Gros Ventre by August gives up the ghost miles short of its junction with the Snake, expiring as a series of tired warm pools. The reason for this is not difficult to decipher – even casual tourists have commented on the odd juxtaposition of brimming ditches crossing the highway in close proximity to the depleted riverbed.

Beginning around Kelly, the river suffers a series of wounds in the form of diversions

and ditches, continuing until the river has no more to give. In earlier years, the river traced a verdant line across the valley floor. There were adequate flows that supported an excellent fishery and a community of water-dependent life. Beginning more than 100 years ago, irrigation ditches were dug to help support the agriculture that was a major foundation of the economic life of Jackson Hole. As was typical of the West, these diversions proliferated without control, essentially ending the life of this portion of the river.

What's Instream Flow?

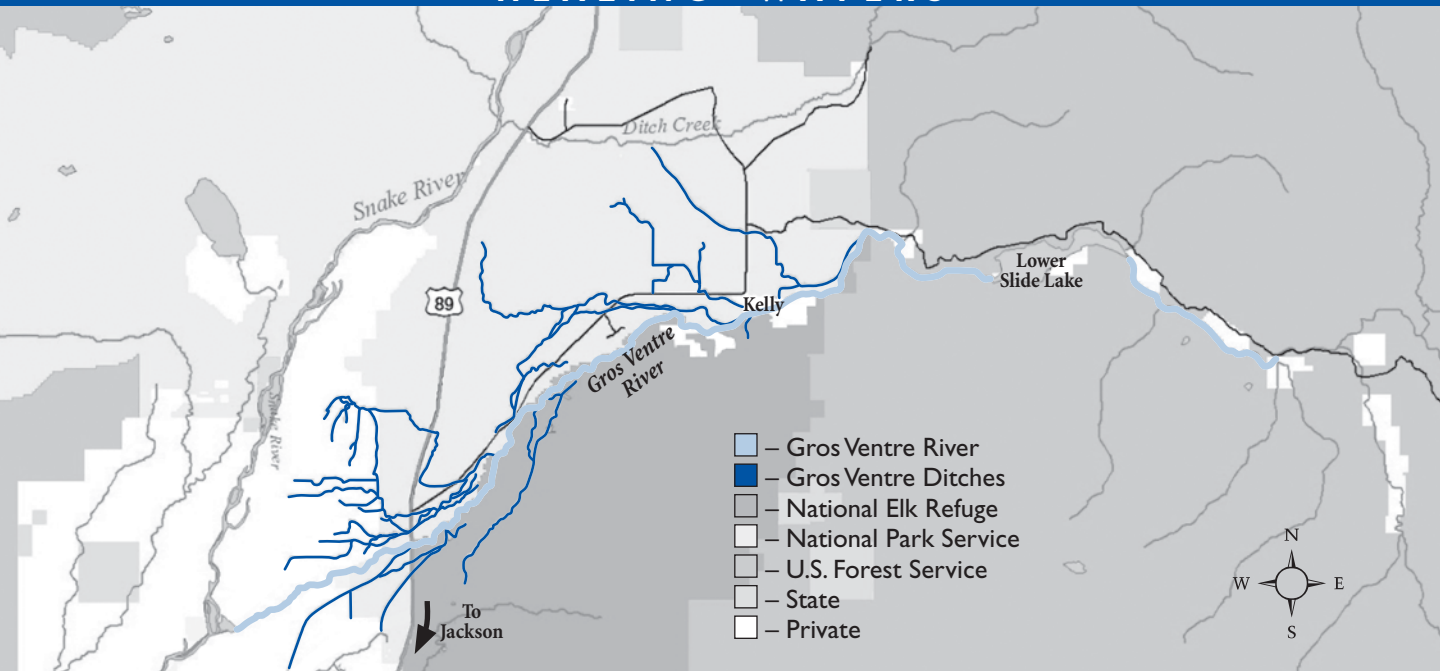
Instream flow is the name given to water that is appropriated to stay in a stream or river for the benefit of fisheries or the environment. Wyoming's current laws require that, to designate an amount of water as instream flow, the state must own the water right. But many water right owners are hesitant to transfer their rights to the state in perpetuity. Also, if the state does acquire the right, it loses its priority date, meaning that that right will be the first one shut off in the event of water shortage.

Earlier this year, the Wyoming Legislature failed to pass an instream flow bill that would have allowed willing parties to sell and buy water rights. Such a law could have been used to keep water in rivers like the depleted Gros Ventre to benefit fisheries.

For a number of years agriculture has been on the decline in Jackson Hole, and many of these diversions no longer serve to support an agricultural economy. The crucial importance to a river's health of maintaining a minimum flow has been widely recognized (see box). Likewise, throughout much of the West, with the critical biological and agricultural role of water, users have become much more sophisticated in the allocation, monitoring and control of water resources. Unfortunately, despite the importance of the Gros Ventre River and the fact that it runs through a national park, there have been no serious efforts to develop a plan to preserve the biological integrity of the river. Instead, dewatering continues year after year, with little apparent thought as to the damage it causes. An independently produced paper* examined this issue more than 20 years ago, pointing out the deleterious effects of dewatering and suggesting methods for remediation. Instead of anyone taking any of the suggestions, there has been an unbroken chain of years of inaction.

The Alliance would like to see a strong effort mounted to correct this situation, with dialogue among Park Service officials, conservationists and water users. Every year there is less water coming down the Gros Ventre, and we don't believe anyone feels this river deserves the fate that is looming. ♦

**Minimum Instream Flows for the Lower Gros Ventre River, Teton County, Wyoming* (Report prepared for the Water Heritage Trust and Jackson Hole Chapter of Trout Unlimited by the Lower Gros Ventre River Study Group, June 1990)



Map courtesy Trout Unlimited

A Warm and Dry Forecast

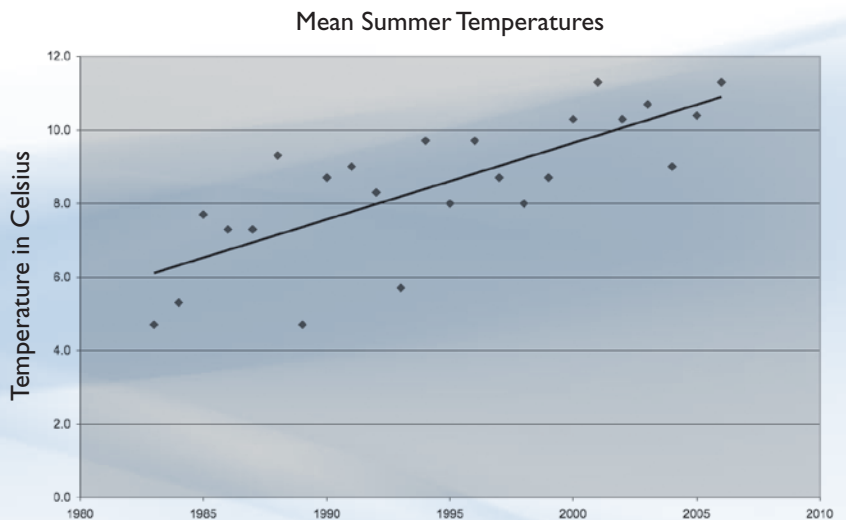
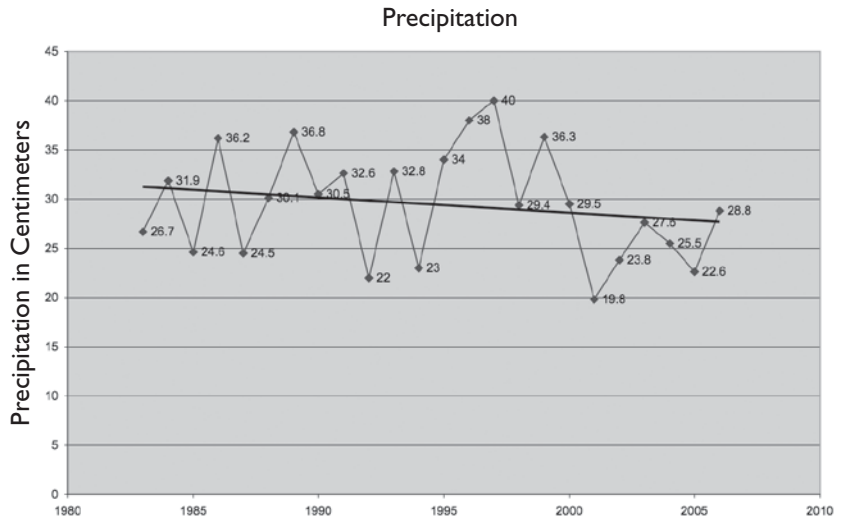
Irrigation, fish ponds incompatible with global warming, wild rivers.

The fishing closures of rivers in Yellowstone National Park this past July may not occur in the future, if current trends continue. Unfortunately, the reason they may not be necessary is that the rivers of the Rockies may lose their populations of cold-water fish such as cutthroats.

All the data from recent years in Wyoming demonstrate an accelerating trend of decreased winter precipitation and warmer summer temperatures. We are already seeing insect epidemics and widespread tree loss as a result; lakes are drying as well, and glaciers are shrinking.

For streams such as the Gros Ventre, the lesson is clear that consumptive uses such as irrigation and fish ponds may no longer be compatible with a wild and free-flowing river. No one knows exactly what the future may hold, and there are myriad other possible effects of climate change, but potential effects on our rivers and their ecosystems cannot be neglected by those making decisions as to their treatment.

Accompanying are some graphs demonstrating precipitation and mean summer temperatures in northwest Wyoming. (These measurements were taken at Togwotee Pass.) If current trends continue, years such as 2007 could become the norm in Jackson Hole. 💧



Wonderful Wetlands

Every last drop counts in nature's water purification system.

By **Lindsay Patterson**, *Watershed Specialist*
Conservation Research Center
of Teton Science Schools

Hearing the squeak of soggy sneakers as you walk through an open meadow may not be the most welcoming sound, but taking a closer look at the squishy ground below may reap tremendous rewards. Despite representing less than 2 percent of the land surface area in Wyoming, wetlands fulfill life requirements for more than 80 percent of wildlife species. In addition to their benefits to wildlife, wetlands minimize the impacts of flooding, act as natural water purification systems and are among the most biologically diverse areas in the state.

The Army Corps of Engineers, the federal agency with jurisdiction over all "waters of the United States," defines wetlands as areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." In other words, wetlands are areas that are wet often enough to develop soils that indicate periods of saturation and that support hydrophytic, or water loving, plants. So despite the name, wetlands are not always wet. And even though your sneakers may be wet, you may in fact not be in a wetland.

Other than areas around rivers, lakes and ponds, the four major types of freshwater wetlands are marshes, swamps, bogs and fens. The semi-arid climate of our region limits wetland occurrence to marshes and fens. Fens are fed predominantly by groundwater and have thick organic soils, known as peat. Peat formation occurs over hundreds to thousands of years as dead plant material accumulates. Marshes are characterized by a lack of peat accumulation and are fed by surface or groundwater.

Riparian Areas: The interface between land and water, riparian areas make up less than 5 percent of the landscape, yet they contain up to 75 percent of our plant and animal diversity. A riparian area is the land adjacent to a river or stream that is periodically influenced by flooding, which determines the type and productivity of vegetation, such as willows, alders and cottonwoods, found along watercourses. Riparian areas generally have soils with high permeability and a high water table, making them unsuitable for traditional septic systems.

Other wondrous waterbodies

Streams: Streams offer important habitat for wildlife. In Teton County, a stream is defined as a body of running water that is not an identified river or an irrigation ditch, and has an average annual flow of 3 cubic feet per second or greater and/or provides winter habitat for trumpeter swans or is a cutthroat trout spawning area. To protect habitat, development must be set back at least 50 feet from streams. Setbacks are 150 feet from trout-spawning streams.

Source: *Rural Living Handbook* by the Teton Conservation District

Both fens and marshes occur in Jackson, you just have to know where to look. The Bert Raynes Wildlife Observation Deck at the visitors center on North Cache is a good place to start.

Teton County Land Development Regulations require the protection of water bodies, 10-year floodplains and wetlands. In most cases, a 30-foot buffer is required between a wetland and any development. Developing any site therefore necessitates the delineation of a wetland's boundary to avoid impacts to the resource. While wetland delineation will identify the location of hydrophytic vegetation and hydric soils, identifying the boundary of a wetland does not necessarily equate to wetland protection. True wetland protection involves maintaining the water source that sustains the wetland. In many cases wetland boundaries may have been protected, but the water that supports the wetland has been diverted or altered in such a way that the wetland becomes degraded.

As conflicts over water grow in intensity, the need for increased vigilance in the protection of wetlands and their water sources also grows. Despite our geographic gift of being in a headwaters area, the threats to wetlands are remarkably similar to those across the West. Climate change, changing irrigation practices, increasing regulation of stream flows and development represent the most pressing threats to wetlands.

Because wetlands are among our most valuable resources, for wildlife and humans alike, stewardship must be a top priority. In order to best steward our wetland resources here in Jackson, we need to recognize that alteration in water flows, including groundwater flow paths, can have a major impact on wetlands. Keep this in mind the next time you change irrigation practices, alter flow regimes or conduct development of any kind. ♦

Floodplains: Development in Teton County's waterbodies and floodplains is prohibited with very limited exceptions. A 10-year floodplain is land that is subject to a 10 percent or greater chance of flooding in any given year. Flooding is a temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland waters and/or the unusual and rapid accumulation or runoff of surface waters from any source.

Groundwater: Groundwater is stored in, and moves slowly through, moderately to highly permeable rocks called aquifers. An aquifer may be a layer of gravel, sand, sandstone or cavernous limestone, or even a large body of massive rock that has sizeable openings. Groundwater is replenished by precipitation and, depending on local climate and geology, is unevenly distributed in both quantity and quality. Most rural landowners in Teton County rely on a well for their drinking water, which may become contaminated if not protected from pollution.





Franz J. Camenzind

Listed as “threatened” by the Wyoming Department of Environmental Quality in 1996, Flat Creek’s water quality, trout habitat and overall health are now on the mend due to ongoing restoration efforts by the Teton Conservation District, Town of Jackson, Teton County, Wyoming Game and Fish Department, Bridger-Teton National Forest, Wyoming Department of Transportation and adjacent landowners. You can help by properly disposing of hazardous household wastes, such as pesticides, herbicides, bleach-based cleansers and antifreeze, which might otherwise pollute our waters.

Waste Not, Pollute Not

What, and how much, goes down the drain is up to you.

By Heather Thomas Overholser, Jackson Community Recycling

Jackson Hole is at the headwaters of some of our nation’s largest river systems, so illegal dumping of hazardous waste pollutes not only our area, but also the natural and human communities downstream from us.

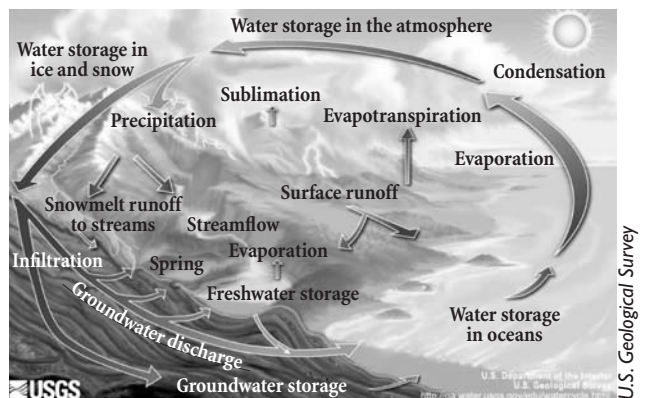
So how can you responsibly get rid of toxic stuff you may have around the house? Jackson Community Recycling offers the only local option for Teton County residents to safely dispose of flammables, poisons, reactives and corrosives.

Before Jackson Community Recycling started its household hazardous waste collection program in 1999, an estimated 80 percent of what’s now being collected was being dumped on fields and down drains, hidden in trash or buried. Proper disposal of hazardous wastes ensures they won’t contaminate our ground, air and water, thus protecting people and wildlife.

A substance is considered hazardous waste if it will no longer be used for its intended purpose and exhibits any of the following characteristics: it’s flammable, reactive with other chemicals to emit toxic gases or becomes explosive, or it’s corrosive or toxic to humans and animals.

Read labels for toxicity and buy brands that won’t hurt the environment or the water supply. Look for the least toxic product that will get the job done, and buy only the quantity needed. Before disposing of hazardous chemicals, check around to see if some other person or organization may be able to use it.

The Household Hazardous Waste Collection Facility is open by appointment only, the first and third Tuesday of the month, April through the first Tuesday in November. Call 733-7678 or visit www.tetonwyo.org/recycling and click on the hazardous waste link for more information. ♦



The Water Cycle – what goes around comes around.

WATER-SAVING TIPS

- ♦ Fix leaky faucets – a drip per second can waste 2,220 gallons of water a year
- ♦ Toilets use 3 to 7 gallons per flush – flush less often
- ♦ Shorten your showers and install low-volume showerheads
- ♦ Run dishwashers and washing machines only when full
- ♦ Don’t run the tap for cool water – store it in the fridge
- ♦ Wash vegetables in a pan instead of under running water
- ♦ Garbage disposals waste water – consider composting
- ♦ Never pour water down the drain when you could use it for watering plants or cleaning
- ♦ Landscape using plants that don’t require much water
- ♦ Water lawns and gardens in the morning or evening
- ♦ Adjust sprinklers so only your lawn is watered
- ♦ Use a broom, not a hose, to clean driveways and sidewalks
- ♦ Adjust your lawnmower to a higher setting

Town of Jackson

Frac Attack

Gas extraction process depletes, pollutes neighboring groundwater.

By **Linda F. Baker**

Upper Green River Valley Coalition

It's the season of heat, when we all think about water: for fishing and for filling tall, iced glasses. Wyoming's water is a vital and valuable asset – people, wildlife and plant life could not survive here without it. Yet it is vulnerable.

Much of the Upper Green River Valley contains groundwaters that are close to the surface. This water is used by residents for drinking, irrigation and watering livestock. There are more than 2,500 water wells in Sublette County, most for domestic use. Wildlife – including wintering herds from Jackson Hole – also depends on groundwater from springs and wetlands, and the Green and New Fork rivers receive groundwater discharged to the surface.

With perhaps 10,000 new natural gas wells in the Upper Green's future, it's time to get serious about informed water management. Highly toxic materials – including cancer-causing and genetic-mutating chemicals – are used to drill and complete these wells. Each gas well may be hydraulically fractured (or “fraced”) a dozen times, with each frac job using a million gallons of fluids that may contain benzene, toluene and other hazardous materials.

Roughly 30 percent (possibly more than 300,000 gallons) of the fluids from each frac job may remain in the ground and end up in groundwaters. The net amount of fracturing fluid that may be left in the ground from gas field development around Pinedale may exceed a billion gallons. Even a few ounces of some of these chemicals can contaminate a million gallons of groundwater.

Each gas well requires “flowback” pits to store hazardous materials, condensate (light oil) and saline “produced” water. There may also be radioactive materials present. The U.S. Environmental Protection Agency conducted surveys of more than 200 pits in Wyoming and found that roughly one in four were discharging their polluted contents into surface or groundwaters.

The Bureau of Land Management predicts that within 10 years, the Jonah and Pinedale Anticline gas fields southeast of Jackson Hole will collectively be generating more than 1.2 billion gallons of produced, polluted water each year.

The BLM also anticipates that the groundwater table would be drawn down 10 to 30 feet in areas of natural gas development, which could cause some groundwater wells and springs to go dry, and rivers to suffer reduced flows. It will take decades and perhaps centuries for the water tables to recover from a 10 to 30 foot drawdown.

Nevertheless, the BLM's draft resource management plan for more than a million acres of public land in the Upper Green contains no analysis of potential impacts to ground or surface waters from the use of fracturing chemicals. Nor does it address which chemicals are being used, their quantities, how much will stay in the ground or be spilled, or how much groundwater could be rendered undrinkable. ♦



Courtesy UGRVC

Flowback pits and “produced” water facilities are sights about to get a lot more common in the Upper Green.

What's Fracing?

To access gas deposits in the “tight sands” geology of Sublette County, engineers pump a sand/water/polymer mixture into the ground at extremely high pressure, fracturing the rock and freeing gas to seep through the cracks. The fracturing fluids are then pumped out, leaving sand particles behind to hold the fractures open. Before the development of fracturing technology in the early 1990s, gas drilling in this region was too costly to be profitable.

How You Can Help

The Pinedale Bureau of Land Management received about 100,000 letters by the June 18 deadline commenting on its draft plan to manage more than a million acres of public land in the Upper Green River Valley. Plan team leader Kellie Roadifer said the BLM will analyze the comment letters and expects to issue a final environmental impact statement for the plan in December. At that time, there will be a brief opportunity for public comment before a record of decision is issued.

As the resource management plan process proceeds, water users should ask that the Pinedale Bureau of Land Management:

- ♦ Designate areas important for recharging aquifers “unavailable for leasing” or “no surface occupancy”
- ♦ Require the use of non-toxic fluids for drilling and completion
- ♦ Require “pitless” technology, and require liners and residual sludges of previously approved pits to be removed (not buried) and disposed of at appropriate hazardous waste facilities
- ♦ Require produced waters to be treated to drinking water standards before discharge to surface lands or waters
- ♦ Require best available water conservation measures to avoid depleting ground waters
- ♦ Limit groundwater withdrawal to a rate that will be balanced by natural recharge
- ♦ Require companies using hazardous chemicals on public lands to disclose the types and quantities of chemicals, and to post bonds sufficient to fully remediate any potential contamination
- ♦ Require mandatory monitoring, with measurable non-compliance triggers and assurance of sufficient funding and personnel.

Please visit www.jhalliance.org/Library/Alerts/PinedaleBLM_mgmtplan.pdf for more information.