VOL. 1 NO. 1 SUMMER 2001

CONTENTS

The Friends of the Teton River is dedicated to understanding and improving ground and surface water resources in the Teton Basin, including the Teton River, its tributaries and wetlands. We will further this mission by conducting scientific research about the Teton watershed, effectively communicating this information to the public, and implementing on-the-ground improvement projects. In carrying out this mission we will actively cooperate and collaborate with all other groups, agencies and individuals working for the welfare of the Teton Basin.

Friends of the Teton River

WATER LINES

A QUARTERLY NEWSLETTER PUBLISHED BY FRIENDS OF THE TETON RIVER

Research & Monitoring on the Teton River

IN MAY 2001 FRIENDS OF THE TETON RIVER BEGAN a three year research and monitoring program on the Teton River and several of its tributary streams. The objectives of the study are to develop a better understanding of how water moves in the Teton Basin and to provide information about water quality (the chemistry of surface and underground water).

Several groups, including the Idaho National Engineering and Environmental Laboratory, Utah State University and Idaho Department of Environmental Quality (IDEQ), have attempted to understand how water moves in the Teton Basin, how much water is present in subsurface reserves, and what are "normal" and healthy values for water quality here in the Teton Basin. Unfortunately, due to lack of basic data these early attempts were thwarted.

As the population of Teton Valley increases and land use changes, Friends of the Teton River feel that it is critically important to better understand the status of water resources and how they can be impacted by future development.

What do we know about the water system (hydrology) of the Teton Basin?

There are several different parts of the hydrologic system including: streams that are fed primarily by snowmelt like Moose or Trail Creek, spring creeks that are fed primarily by underground water coming to the surface like Warm Creek, the Teton River that is fed by both snowmelt and underground springs, and an aquifer which is a large underground reservoir of water. All of these components interact with and are affected by each other.

Precipitation (primarily snow) provides the input to this system and water either travels on the surface or underground, or can be returned to the atmosphere by evaporation and evapotranspiration (use of water by plants).

Since the Teton Valley was settled in the nineteenth century people have used water for domestic and agricultural purposes by digging wells to access underground water and diverting streams to use for irrigation. In the past thirty years irrigation practices have changed from flood irrigation (where water was diverted into a series of canals and spread over fields) to sprinkler irrigation, and much land has been converted from agricultural to residential use. It is likely that these changes have affected both recharge and discharge processes in the aquifer underlying the Teton Valley and the amount of subsurface water emerging from springs or flowing into the Teton River.

Unfortunately, because very little historic data exists about the hydrology of the Teton Basin, we have a poor understanding of how exact-

-continued on page 7

Friends of the Teton River

MANY THANKS TO THE FOLLOWING INDIVIDUALS FOR THEIR GENEROUS DONATIONS:

Richard Barker
Jim Cecil
Al Baldwin
Mr. & Mrs. Charles Crary
Chip & Tammy Cushman
Harold K. Dunn, M.D
Tom Fauntleroy
George Geiges
Richard Hokin
Blaine Huntsman
Richard Max
Wood & Judith Moyle
Drs. Carl & Jeanette Pergam
Tom E. Purcell
John M. Sanders
Karen Scheid
Eugene J. Weisberg
Mr. & Mrs.David Work
John & Rosemary Young

Many thanks to Ted Kerasote, Wayne Ranney and Rob Van Kirk for editorial comments. Thanks also to Mary Lou Hansen for her layout and production skills and her endless patience with our many changes.

From the Board President …

Welcome to the first issue of "Water Lines," Friends of the Teton River's quarterly newsletter. We're looking forward to sharing some of the ideas that we have been discussing for the past year.

Friends of the Teton River was created last summer after three months of public meetings about problems that many of us have seen developing on the Teton River, its tributaries and wetlands. Friends of the Teton River's mission is to develop a thorough scientific understanding of the water resources in the Teton Valley, to educate the public about water-related issues and to implement on-the-ground improvement projects.

As our executive director, Lyn Benjamin, presents in her article on research and monitoring on the Teton River, we have already started our first three year research project. The Driggs and Tetonia fourth grade will both be working on Stream Study projects with assistance from Lyn. Katie Salsbury and Lyle Kunz, FTR board members, are assessing possible restoration projects on Foster Slough. FTR is working closely with the Teton County Commissioners to develop a research plan to investigate groundwater resources in the Teton Basin. Board member, Bill Kelly, put together and has submitted an application for congressional appropriation funds, which has received formal support from the Teton County Commissioners. Tom Fenger and I have had many discussions with guests at the Teton Valley Lodge about the Teton River and greatly appreciate the support that they have given FTR. We have received excellent feedback on our plans from the Teton Basin Subcommittee of the Henrys Fork Watershed council, many thanks to them. It has been an extremely busy spring for everybody at FTR and we're proud of having accomplished so much in such a short time.

On a more personal note, I am very happy to be involved with an effort to protect and improve a river that I know and care about so much. I have been fishing the Teton River for 42 years and have watched many changes occur. In the early 1960s I remember days when two fishermen could catch 100 fish on a good day! I feel that it is extremely important, at this time in the Teton Valley's history, to collect information about the river and other water resources that will permit us to make intelligent management decisions in future years. At present there is no comprehensive understanding of either water resource amounts or water quality and, as a result, there is no comprehensive plan to manage these resources. FTR will play a leading role in collecting the baseline data that we need to make management decisions. Many people come here to recreate or enjoy the beauty of the Teton valley and the Teton River. We need to do all we can to ensure the sustainability of these natural resources.

Please help Friends of the Teton River to understand, protect and improve the river that we love so much by joining our organization today. If we don't do something now, nobody will!

Randy Berry

REFLECTIONS ON THE RIVER

Driving the tractor, planting spuds, I thought about the Teton River and how much I love it. Over a lifetime, it's given me some wonderful times and stories,

the first coming up at Buxton Bridge, where I cross the river almost every day and often see two bald eagles perched on the power line. My family is so attached to them that we've named them Heckle and Jeckle.

Perhaps I could also write about the Furniss family, homesteaders from the early 1900s. There were no bridges back then, and they had to ford the river. One spring during high water, their wagon box floated off the frame, and the family lost two little girls to the Teton.

Maybe, too, I could write about swimming in the buff as a boy on hot summer days, of chicken fry parties with church groups when I was a teenager, and of the seining trips with all the men and boys of the Bates community where I live. We'd fill our net with white fish on the first pull, and two or three men with a team of horses would go downriver and prepare a dutch oven fish dinner. After eating we'd all stand around the fire and tell each other tall tales.

So many things to describe: great fishing trips, duck and goose hunting. I even got bucked off a horse once while crossing the Teton when he got tangled in the long moss and panicked. Boom, suddenly I was in the water!

But of all the things I recall about the Teton River the one I remember most often is the night my family and I woke up the entire valley. It was the full moon of August, and so warm and nice that we decided to float from the sportsman's access at Fox Creek down to the Nickerson Bridge, about a two-and-a-half hour trip. Our little sojourn on the river started out just right: very warm, dead calm, and with the moon to light our way.

It's amazing how far sound travels over water on a still night. Right away we could hear the geese down river talking to each other in their goose talk. We decided to be as quiet as possible just to see how close we could get to them. Not saying a word, we floated as silently as possible, careful not to bump the side of the canoe with the paddle. I knew that the geese had realized that something was up, for as we drifted closer they quit talking to each other. A standoff: they knew that we were upriver; we knew that they were below us.

"But of all the things I recall about the Teton River the one I remember most often is the night my family and I woke up the entire valley."

By the time they decided to get out of there, I realized that we were right in the middle of them. Hundreds of wings beat the water. It was like being on a jet runway, or at the base of a waterfall—we could hear nothing but one big roar mixed with splashing water. For the first thirty seconds the geese circled around and around, not knowing where to go or what to do except honk.

The cows along the river were running around furiously trying to locate their calves. The calves were bawling for their moms. The foxes in the area started yelping. The dogs far away from the river began to bark. What a commotion we caused! We thought that everyone must have heard it and that they must be wondering what the heck was going on. Well, after thirty minutes the geese settled down farther upstream and soon all was quiet and tranquil on the Teton. Even though we had an exciting time, we hoped that the geese would forgive us.

These are some of my thoughts and memories of the Teton River, a river that is part of who I am, and that's a special place go whether one lives here or just visits. It's why I believe we must do all we can to protect, improve, and maintain it for all of us. I'll say it again, I love the Teton.

-By Jaydell Buxton, Friends of the Teton River Board member. Jaydell is a potato farmer who lives and works on the west side of the Teton Valley.

The watershed approach to aquatic

PRIOR TO THE 1980S, aquatic resource research and management was highly compartmentalized; fisheries scientists worked with fish, hydrologists worked with water, water quality scientists studied water chemistry, and so on. Rarely did scientists and managers from different disciplines communicate with each other, much less carry out interdisciplinary projects. That has all changed dramatically over the past 15 years with the emergence of the watershed approach to understanding and managing aquatic resources. Examples of successful watershed research and management programs can be found throughout the country, and one of the most well known of these programs has been centered around the work of the Henry's Fork Watershed Council right here in eastern Idaho. The methods developed by the Watershed Council and similar groups were published in 1997 by the American Fisheries Society in WATERSHED RESTORATION: PRINCIPLES AND PRACTICES, which has become the standard textbook on the watershed approach to aquatic resource conservation and management. The purpose of this article is to provide an introductory overview of the watershed approach and its relevance to the Teton River. -ROB VAN KIRK

WHAT IS A WATERSHED? A watershed is an area of land whose surface water drains to a common point. Thus, a watershed is defined by topography, with mountains forming the top of a watershed, and streams and rivers themselves forming the bottom. For example, the Darby Creek watershed consists of all land whose surface water drains into Darby Creek. The top of the watershed is the Teton crest to the east and the ridges defining Darby Canyon to the north and south of the creek. The bottom of the watershed is the confluence of Darby Creek with the Teton River.

Watersheds occur at all different spatial scales, ranging from those of a mountain stream to those of continental-scale river systems. For example, the Darby Creek watershed is one subwatershed in the Teton River watershed, which is itself a subwatershed of the Henry's Fork watershed, which is, in turn, a subwatershed of the Snake River watershed, which includes most of the state of Idaho and parts of western Wyoming, northern Nevada, eastern Oregon and eastern Washington. The Snake is tributary to the Columbia River, whose watershed consists of a large portion of the western North American continent.

> A watershed is an area of land whose surface water drains to a common point Thus, a watershed is defined by topography, with mountains forming the top of a watershed, and streams and rivers themselves forming the bottom.

> Because water flow anything that occu in a watershed—ei water body itself— of all water downst

In many cases, Teton Valley included, surface water and ground water (water in underground aquifers) interact closely with each other, and the definition of a watershed can be expanded to include the drainage area of both surface and ground water.

WHY WATERSHEDS? The quick answer is that water flows downhill! This basic observation (due to gravity, of course) implies that nearly anything that occurs at a given point in a watershed—either on land or in a water body itself— affects the nature of all water downstream of that point. The most basic example is provided by the hydrologic cycle itself.

That powder bowl you skied back in February is providing water for crops and fish this summer. As the snowpack melts, water flows downhill both in surface streams and through the aquifer. Runoff is the surface water component of snowmelt. The ground water component may reappear as the surface flow from springs later in the summer. Thus, the snow that falls on the side of a peak in the Tetons affects the timing and amount of flow in the Teton River later in the summer.

Another example of a "water flows downhill" effect is that of chemical or physical inputs to the stream. Suppose that an old culvert built on a mountain road fails during spring runoff, and as a result, fill from the roadbed washes into the stream. This additional sediment will then be transported downstream, where it will eventually end up in the river. Sediment in the river can alter the availability of fish spawning habitat, the types of insects that can live in the river, and the types and abundance of aquatic plants in the river. Again, that single culvert up on a mountain road affects conditions in the river many miles downstream.

resource research and management

ws downhill, nearly
rs at a given point
ther on land or in a
–affects the nature
ream of that point.

PHYSICS, CHEMISTRY AND BIOLOGY. Yes, these are subjects that students study in school, but they are also the fundamentals of watershed research and management. The physical part of the equation is summed up in the "water flows downhill" statement. Physical aspects of watershed research and management include the timing and magnitude of water flow, the nature and mobility of stream sediment, and the shape of streams and their floodplains.

An example that is particularly important to the agricultural economy here in eastern Idaho is delivery of irrigation water for crops. Efficient management of irrigation resources requires detailed knowledge of the timing and amount of stream inputs from snowmelt, springs and storage reservoirs, and the timing and amount of diversions throughout the watershed.

Chemical aspects include nutrient cycles, contaminant sources, and the suitability of water for use by various organisms, including us. A particularly important chemical component of watershed research and management is the nitrogen cycle. Nitrogen is a basic compound needed for growth of all organisms, but too much nitrogen in a stream can lead to excessive growth of unwanted organisms such as algae, which then make the stream unsuitable for more favorable organisms such as trout and aquatic insects upon which they feed.

The trout and insects are two representatives of the biological component of a watershed, which also includes plants, microorganisms, and even terrestrial wildlife. Very often, the ultimate goal of a watershed research and management effort is conservation or enhancement of a biological resource associated with the river, trout or waterfowl, to name two common examples.

COOPERATION IS ESSENTIAL. The interdisciplinary nature of the watershed approach requires cooperation and collaboration among scientists, citizens, and government agencies representing a wide variety of interests, backgrounds and expertise.

As an example, suppose a landowner armors a piece of streambank on his land to prevent erosion of valuable cropland. Because water flows downhill, his armored bank will alter the flow of the river downstream, more than likely accelerating current velocity and causing increased erosion of his neighbor's land downstream. The reason he armored the bank in the first place was likely because of loss of streamside (riparian) vegetation that might have occurred due to land management practices upstream many decades ago. Loss of riparian vegetation caused accelerated erosion and changes in the shape of the stream channel. Meanwhile, a nearby homeowner may have noticed a drop in his well level, because as current velocity increased, the stream eroded down into the floodplain, thereby causing the stream to draw water from the aquifer rather than the other way around. Not coincidentally, a long-time fishermen has noticed that there is less cover for trout in the form of undercut banks and woody debris in the stream channel.

Just as there is no single factor that led to erosion of the farmer's streambank, subsequent erosion of his neighbor's land, lowering of the well level, and fewer fish in the river, there is no single solution to these problems. However, with adequate knowledge of all of the physical, chemical and biological factors involved, a collaborative team consisting of landowners, scientists and resource managers can find a solution that will benefit everyone. To be effective and not end up creating new problems, the solution must take a watershed perspective and not just a single-component "band-aid" approach. The success of the watershed approach to these types of problems elsewhere in eastern Idaho bodes well for application of the watershed approach to the Teton River.

Nitrogen is a basic compound needed for growth of all organisms, but too much nitrogen in a stream can lead to excessive growth of unwanted organisms such as algae, which then make the stream unsuitable for more favorable organisms such as trout and aquatic insects upon which they feed.

-ROB VAN KIRK HAS FISHED IN EASTERN IDAHO SINCE HE WAS A YOUNG BOY. HE WAS RESEARCH DIRECTOR FOR THE HENRY'S FORK FOUNDATION FOR SIX YEARS DURING WHICH TIME HE CONDUCTED A PIONEERING WATERSHED RESEARCH PROGRAM. HE CURRENTLY IS ASSISTANT PROFESSOR OF MATHEMATICS AT IDAHO STATE UNIVERSITY IN POCATELLO, IDAHO.

Learning about water with the fourth grade

Walker Williams, Ashley Williams, Nataly Maya and Jacqueline Martinez collect aquatic insects on their kicknet.

I always wanted a field trip that a classroom full of ten year olds could walk to. It seemed like it would have more flexibility for the trials of Teton Basin weather than the kind of field trip that one must schedule a school bus for. At the same time I wanted to teach kids that life is a "field trip," if they just opened their eyes. So when I met a hydrologist named Lyn Benjamin who said, "I'll help you teach your kids about water," I had the spot to do it already picked out.

At that time I did not realize that it was the stream that was drawing me to that particular place, I would have said that it was the trees. However, in our "Stream Study" we learned that the trees would not be there without the stream.

At our study site on Spring Creek, on Dick and Alta Egbert's land, we do everything that scientists do and everything that children love to do (which in this case overlap considerably!) We make observations, we take measurements, we ask questions, we gather data and record it and we even get to collect and sort living creatures ... all of this as we walk around in big boots and watch the weather. Water provides the perfect medium for children to become scientists.

Taking such a close look at one part of our watershed alerts us to the bigger picture. After drawing our own maps of the short section of the creek that we are responsible for, we move to real maps and read them as we go to the headwaters of our stream. This then gives us a reason to look at all the tributaries of the Teton River.

Our study is mostly science and geography, but it involves a lot of math too! Also writing and technology as we put together a multimedia presentation to help us teach others what we have learned.

As water is central to our lives, so it has been the focus of study for the Tetonia 4th grade this past year.

-By Barb Agnew, who has been teaching in Tetonia for 12 years and is an avid outdoorswoman and nature watcher.

GUIDE'S CORNER

Despite tough drought conditions remember that there really are fish in the river and that they must eat! At the beginning of June, due to this year's near absence of snowmelt run-off, the Teton River is already low and clear. Set your angling clock ahead by a couple of weeks because we have already had some good dry fly fishing.

In a few weeks the insect hatches will become more prolific and they should last until mid to late July. Under low, clear water conditions, like we are experiencing, it is important to fish early or late in the day on hot sunny days. This will especially be true as summer wears on and temperatures warm up. And be sure to remember the hopper fishing between the hatches.

As fall arrives fishing will improve with changing weather. Blanket hatches will appear on cloudy days with light rain or drizzle. Sunny days will not be as good.

Good luck!

-By Tom Fenger, who has guided on the Teton River for 23 years.

ly this system works and how it is affected by changes that are occurring. The research and monitoring program that FTR has established will help us to understand better the hydrology of the valley and provide baseline data with which to make water resource management decisions.

What is water quality and why is it important?

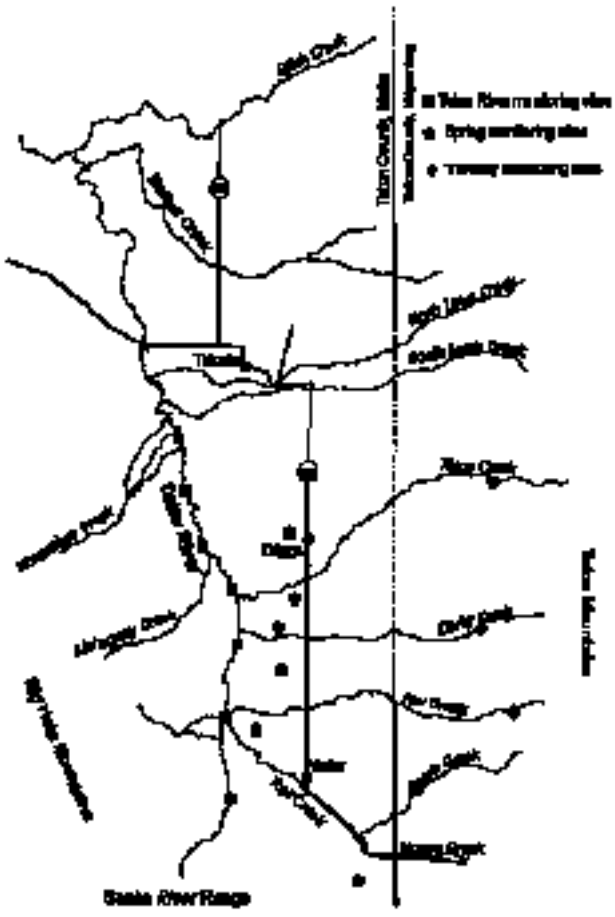
Water is the universal solvent and as long as most dissolved substances are in relatively limited concentration, this is no problem. However, when concentrations become too high, water quality becomes impaired and the water use by humans or natural systems is limited. Water quality standards have been developed at a federal and state level for aquatic life, recreation, wildlife habitat, aesthetics and domestic, agricultural and industrial water use.

The important water quality factors that we measure include: the presence of disease organisms or toxic materials like e. coli, amounts of nutrients like nitrates and phosphates, dissolved oxygen, and sediment, and water temperature.

IDEQ recently completed a large water quality data compilation effort for the Teton Watershed and identified water quality impaired stream sections. However, one conclusion of the report was that baseline water quality data for the upper Teton Watershed is greatly lacking and an ongoing monitoring program is needed.

FTR's research & monitoring plan.

We have started a three year data collection effort that targets water quantity and quality in the Teton River, its tributaries and several spring creeks. We are measuring streamflow and collecting water quality data at eight points on the Teton River between the headwaters and the Highway 33 bridge (sites are shown on map). Samples will be collected once a month until October. We will also measure water quality and streamflow in spring creeks on the east side of the Teton River, and in Fox, Darby and Teton Creek above all irrigation diversions.



This information will help us understand the quantity and timing of flows of surface water, variability in groundwater supplies to springs, the gains and losses of water in the Teton River, and how water quality varies seasonally and at different places.

This research effort has been funded by donations to Friends of the Teton River, a grant from the Henrys Fork Watershed Council, and large contributions of equipment from Idaho Fish and Game and IDEQ. The Idaho Association of Soil Conservation Districts has generously provided us with training in water quality collection protocols. Many thanks to all of you! All results of the study will be made available to the public and interested management agencies both on the internet and in reports.

Future research plans.

In recent years many people have noticed detrimental changes in the Teton River, which include build ups of sediment, decrease in aquatic plant life, smaller insect hatches, and fewer trout. FTR has designed research projects that will investigate these issues. Examples of future projects include:

✓An inventory of habitat and bank stability conditions on the Teton River and tributary streams;

✓A spawning and redd survey in spring creeks and snowmelt-driven streams; and

✓A survey of aquatic plant conditions in the Teton River.

We are working closely with Idaho Fish and Game to understand trout population trends. We are also working with the Teton County Commissioners to develop a research plan to assess groundwater resources in the Teton Basin. Finally, over the winter we will be compiling all existing water resource data for the Teton Basin into a document for the layperson and creating a spatially linked GIS database of these data that will be available on our website. In this process we will identify existing data gaps and ways that we can address them.

We're excited by these plans and look forward to hearing what you think about them!

-LYN BENJAMIN, HYDROLOGIST AND EXECUTIVE DIRECTOR, FRIENDS OF THE TETON RIVER

THANKS FOR

REMEMBERING

FRIENDS OF THE

THE TETON RIVER

WHEN MAKING

YOUR FUN RUN

DONATIONS.

Membership Application

Name _____

Mailing Address _____

City _____ State _____ Zip _____

Phone _____ Email _____

Membership Level:

- ❑ Student, $5/year
- ❑ Individual, $25/year
- ❑ Family, $50/year
- ❑ Corporate, $100/year
- ❑ Benefactor, $1,000/year
- ❑ Additional Gift $_____

❑ Check enclosed Charge my: ❑ Visa ❑ Mastercard

Card No. _____ Exp. Date _____

Signature _____

Members will receive voting privileges, quarterly newsletter, and regular activity updates. Please send completed application form, with your check or credit card information, to:

FRIENDS OF THE TETON RIVER
PO Box 768 • Driggs, Idaho 83422

Friends of the Teton River
P.O. Box 768
Driggs, ID 83422

PLACE
STAMP
HERE

Dedicated to understanding and improving the water resources of Teton Basin.