TROUBLED WATERS

by George Ochenski - 05/15/2007

Nearly 40 years ago, I stood fishing in the middle of the Upper Gallatin River and cupped a handful of the crystalline waters to drink. Tiny mayflies swirled around boulders like fairy ships taken on the current and each rounded stone on the river bottom was shiny and clean. A cast behind a mid-stream boulder brought a wild rainbow trout n or perhaps cutthroat n slashing up for the fly.

Such halcyon memories fill the annals of fishing lore around the world, and Montana is known as the place where the rivers are clean and full of wild trout.

This has been our legacy and our joy.

But now, a series of recent studies show the future of Montana's fabled waters is in doubt. These days, drinking out of the once-pristine Gallatin is not recommended. There's more algae on the river's bed, and soon, thanks to increased sedimentation, those mayflies may disappear entirely. Assailed by drought, development, pollution and dewatering, the Blue Ribbon trout streams that form the great Missouri River are troubled waters, indeed.

Montana's Legendary Rivers The web of Montana's great trout rivers find their beginnings in the snowcapped mountains, fed by hundreds of tiny tributaries. The Gallatin River starts as a trickle in Yellowstone National Park, then leaves the northern boundary and picks up both volume and speed as it threads the steep and narrow gorge between the Gallatin and Madison Ranges before finally pouring out into the broad and beautiful Gallatin Valley.

The Madison, formed of the Firehole and Gibbon Rivers within Yellowstone, exits the west boundary of the park and is immediately slowed in Hebgen Lake. A few miles below the Hebgen Dam it is once again slowed by Quake Lake, where the bony fingers of long-dead trees stand in mute testimony to the 1959 earthquake that brought a mountainside crashing down into the river's bed. The Army Corps of Engineers excavated a trench some 600-feet deep to release the Madison's waters and the legendary free-stone stream, then flows unimpeded to the broad and shallow waters of Ennis Lake, where it is once again dammed, slowed and significantly warmed.

The Big Hole River starts high on the east slope of the Continental Divide and on its way to join the Beaverhead and Ruby Rivers near Twin Bridges. There, it officially becomes the Jefferson River, which joins the Gallatin and Madison Rivers at their Three Forks confluence to become the mighty Missouri.

The Studies: Recent, but unrelated, studies on both the rivers and their adjoining groundwater give us the best idea to date about just what is happening to our waters n and sorry to say, it isn't pretty.

The Gallatin River One of the most comprehensive river studies ever done is the Department of Environmental Quality's (DEQ) Environmental Impact Statement (EIS) as part of a six-year attempt to list the Yellowstone-to-Spanish Creek stretch of the Gallatin as the state's first Outstanding Resource Water (ORW). Initiated by American Wildlands, that effort is currently "on hold" as discussions with area developers and businesses continue. What is not on hold is the degradation of the river which, according to the EIS, is ongoing and showing up in a variety of ways.

Prior to 1971, the gorge through which the Gallatin flowed was mostly wild, undeveloped country. The

ancient Karst Guest Ranch was about the only place to get a meal and the tiny Soldier's Chapel framed the whitecapped majesty of Lone Peak in its western window. Then came nationallyfamous anchorman Chet Huntley, backed by the finances of the Chrysler Corporation, and suddenly the solitude, wildness and purity of the Gallatin was subsumed by the birth of Big Sky and all its attendant development reaching up the West Fork to the very summit of Lone Peak.

Over the ensuing decades, Big Sky has been joined by Moonlight Basin, Meadow Village, the notorious Yellowstone Club and a host of subdivisions and commercial building projects on both the tributaries and mainstem of the Gallatin. Those developments did not come without a price.

The EIS found that six of nine major tributaries to the Gallatin are impaired because of nutrient loading (typically from septic systems) and other factors.

Storm Castle Creek, the Taylor Fork and Cache Creek are all "listed as only partially supporting aquatic life and coldwater fish due to bank erosion, fish habitat degradation, other habitat alterations and nutrients." The Middle and South Fork of the West Fork, which drains the Big Sky- Yellowstone Club area, are impaired by "nutrients, bank erosion, pathogens, suspended solids and other habitat alterations" and the South Fork was "downgraded from partially supporting to non-supporting contact recreation" (swimming, kayaking, etc), last year.

Overall, the DEQ found the West Fork as "downgraded from partial support to nonsupport for cold water fishery and contact recreation." Even worse, "nutrient enrichment and sedimentation" are providing "evidence that the stream is being colonized by Tubifex tubifex, the immediate host for whirling disease and a species tolerant of sedimentation and nutrient pollution." In summary, the EIS states: "DEQ finds this progression of water quality information strongly suggests that water quality degradation is occurring in the tributaries of the proposed ORW reach, and thus puts the quality of the water in the Gallatin River at risk." What it means to the river and its fisheries, according to the EIS, is that there will be "a shift in the macroinvertebrate [aquatic insects] community towards more nutrient tolerant community species with less energetic value to trout. Midges continue to be plentiful, but large hatches of caddis, mayflies and stoneflies may be reduced." In plain language, that means the clean and cold water bugs are losing out as sediment fills the interstices between the rocks on the river's bottom. Unfortunately, this is not just a theory, as yet another of the recent studies found.

The Madison, Jefferson, Big Hole and Upper Missouri Rivers At the Bozeman meeting of the American Fisheries Society last year, Dan McGuire, a researcher who has been studying the Upper Missouri basin for 30 years, broke grim news with his presentation, titled: "Long-term macroinvertebrate monitoring indicates fundamental environmental changes in the Upper Missouri River basin." McGuire looked at historic levels of aquatic insects, plants, sedimentation and flow rates on the Madison, Jefferson, Big Hole and Upper Missouri Rivers. After repeating a 1978 Fish, Wildlife and Parks study on the Jefferson River, McGuire wrote: "The differences in the macroinvertebrate community were dramatic." Like the Gallatin EIS, McGuire found the traditional clean and cold water species of insects were diminishing and being replaced by non-insects such as "mollusks, worms, crustaceans." While McGuire says the main cause of the changes appears to be drought, he also mentions water use and management.

Lower flows mean less natural scouring (cleaning) of the riverbeds, which in turn leads to "increased plant growth that further slows the flows, increases sediment deposition [and] increases nutrient retention." Four Fishes of the Apocalypse What his data portends, McGuire surmised, is that if the trends he's seeing continue, warm water species will likely prosper while coldwater species, such as trout, that are highly susceptible to changes in water temperatures, will suffer. The most dramatic future

outcome is a replacement of our world-class trout fisheries with what McGuire calls "The Four Fishes of the Apocalypse." These fish n Northern Pike, Bass, Walleye and Catfish n are all common to warmer, more polluted waters than the traditionally cold and clean rivers of the Upper Missouri.

McGuire also posits that these impacts are amplifying the eutrophication n or over fertilization n of Canyon Ferry Reservoir, which has already seen significant reductions in trout populations after one of the Four Fishes of the Apocalypse, the walleye, was illegally planted there.

The Helena Valley If drought was the only concern, maybe there would be hope that an upturn in precipitation and snowpack would keep our rivers clean and cold.

Unfortunately, with global climate change, the chance of getting more water seems slim at best. As explorer John Wesley Powell so accurately predicted more than a century ago, water will always be the limiting factor in the West, which he called "the arid lands." What Powell couldn't foresee, however, is what we would ultimately do to what precious little water we have. And what we have done n and are doing n is now getting downright scary.

Last month the EPA and DEQ published the findings of their joint, multiyear investigations on the groundwater in the Helena watershed. Like the Gallatin Valley, the Helena Valley is filling with more subdivisions and septic tanks every day, suffering impairment of water quality from a number of sources, and is basically sitting on an enormous bed of groundwater that moves continually down gradient to the rivers. Current estimates are that the Helena Valley has more than 20,000 septic systems.

Because the watershed does not meet Clean Water Act standards, a federal judge compelled the agencies to study the problems and come up with a plan to address them. The findings from the in-depth groundwater study are part of the effort and it's probably fair to assume that, were such a study done on the Gallatin Valley's groundwater, similar results would likely show up n at least they did in a similar study in Missoula n and that, as you'll see, isn't good.

To determine what, exactly, is in Helena's groundwater, the agencies conducted a number of tests on wells throughout the valley. As one might expect, the usual suspects of nitrates and phosphates showed up and, compared to data from a few years ago, are increasing. These chemicals are the ones most commonly looked for because they are associated with septic tank effluent, feedlot and agricultural run-off.

What was perhaps less expected, but much more shocking to the general public, was the discovery of 22 PPCPs (pharmaceuticals, personal care products, endocrine disrupting compounds and pesticides). Of the 38 public and private domestic water wells tested, a shocking 80 percent contained the antibiotic sulfamethoxazole (SMX) and 40 percent contained the broadleaf weed-control herbicide atrazine, with lower detection rates for carbamazepine (an anticonvulsant, anti-manic agent used to treat epilepsy, neuralgia and bipolar disorders), dilantin (an anti-seizure medication) and diclofenac (a nonsteroidal anti-inflammatory drug that works by reducing hormones that cause inflammation and pain in the body). Also present were detectable amounts of DEET (insect repellant); Ibuprofen (anti-inflammatory); 17-betaestradiol (estrogen); Bisphenol A (used in plastics, but also activates estrogen receptors); Diethylstilbestrol (estrogen replacement removed from market in 1997); estriol (estrogen); fluoxetine (anti-depressant); gemfibrozil (cholesterol treatment); meprobamate (used to treat anxiety/tension); naproxen (antiinflammatory); oxybenzone (sunscreen); pentoxifylline (treatment of leg pain from poor blood flow); progesterone (female hormone replacement); triclosan (antibacterial agent in soaps and detergents); and timethoprim (used to treat urinary tract infections).

Just reading that list makes you never want to take another drink of water from a valley well again n especially when you remember that all those drugs already passed through someone else's body.

As DEQ investigator Kate Miller wrote in her report (which can be viewed at www.deq.mt.gov/wqinfo/pws/docs/Helena%20valley%20pharms_new.pdf): "The presence of these compounds in ground water and surface water has drawn public attention not only because of potential health risks from exposure to one or a mixture of these chemicals, but also because the primary mode of entry into our environment is not from manufacturing discharge but from widespread and continual use in human and veterinary and clinical practice (Lancet, 2002) and discharge associated with domestic wastewater.

Low levels of various PPCPs in ground water provide clear evidence that domestic wastewater is a source of contamination. In spite of a growing body of evidence describing their distribution in the environment, little is known about their mobility and persistence in ground water or surface water, nor are their effects on human health and aquatic ecosystems well understood." The good news is that most of the substances were found in very low concentrations.

The bad news, as Miller said in a recent interview on Brian Kahn's "Home Ground" radio show, is that most of these drugs are designed to be effective at very low concentrations. Moreover, there are no federal standards for their presence in aquatic systems, so no one knows exactly what they will do to the fish, insects and plants in our rivers.