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PLANNING IN THE WEST

Wild Rivers and Riprap: The Case of the Yellowstone

This story is part of a series on Planning in the West, underwritten by the Orton Foundation in conjunction with the PLACEMATTERS06 conference taking place Oct. 19-21 in Denver.



A RIVER EATS THROUGH IT The dramatic cutbank at Mallard's Rest demonstrates the erosive power of the Yellowstone, particularly when it encounters land without supporting vegetation. Homes are being built at the edges of similar bends in the river. Photos by Chris Lombardi.

It is a dream shared by millions, many of them coming to the end of successful careers in the rush of city and suburb, the endless juggling of money and family, the stress of the deal and the commute. The dream is of a western river like Montana's Yellowstone, and a home within sight of the place where a clear ripple of shoal water falls away to a deeper green, and a trout rises to a passing caddis fly. Real estate ads across the west are full of the promise: this river, this creek, these trout and these magnificent cottonwoods, can be yours. Sink your gaze into the river, wade its waters

born of high country snows, cast your fly on a sun-splashed afternoon. Awaken each morning to the timeless whisper of the water among the stones.

Such a dream does not come cheap. Land

along almost any blue-ribbon trout stream can run to \$500,000 an acre or more. There is, apparently, no shortage of people willing and able to pay that price. Trophy homes, along with hundreds of lesser structures, dot the banks of the Bitterroot, the Madison, the Yellowstone, and most of the other major rivers of Montana.

In many places, where fishermen and boaters once passed grazing cattle and sagebrush and rimrock, the ambiance has changed forever. Irrigated lawns glow green in the dun-colored grasslands of late summer. Huge picture windows reflect the sun. The feeling that a river trip is an adventure – a feeling that is the basis for many a river outfitter's business – has been replaced with a dose of the suburban, exactly what many a guided client, and many a resident fisherman, has come to the river to escape.

Conflict, under such circumstances, is a given. Montana's unique stream access law is perhaps the most liberal in the nation, giving recreationists the right to access rivers at any public bridge, and to fish and wander freely anywhere below the annual high water mark, which can, in some instances, be in the very yard of a riverbank home. Often, newcomers to Montana, having paid such a premium for a riverside property, and knowing the reputation of their adopted state as a conservative stronghold, cannot believe that such a populist law could exist. Shouting matches and calls to an already overburdened Sheriff ensue. New fences are built, and orange paint – Montana's accepted shorthand for "No Trespassing" – is slathered on the riverside cottonwoods.

But the real cost of riverbank development lies far beyond the aesthetic and the social. In order to protect those homes and that valuable land, through year after year of snowmelt and flood, the river must be controlled. The banks must be kept from eroding. Only in the past decade, as more and more development has occurred, has it become clear that such control destroys the river as a functioning system. It is yet another of the paradoxes of living in the modern West. We move to places like Park County, in the Paradise Valley of Montana, drawn by the lure of a wild river. We build our homes close to what we love. But for us to stay there, through year after year of spring flood, the river must be controlled. And a river like the Yellowstone, like any force of wild nature, cannot be controlled and remain that which attracted us, and thousands of others, in the first place.

Two great floods, in 1996 and 1997, made blazingly obvious the consequences of unrestrained riverfront development along the Yellowstone. A task force was convened. The science was clear. But ten years later, even as some Montana counties have moved to protect their rivers, essentially nothing has been done for the Yellowstone, and the longest undammed river in lower 48 may yet be reduced to a fortified, house-lined channel.

The Madison County example

State Senator Bob Hawks, from Bozeman, is a retired optometrist who has been a witness to the explosive growth of Gallatin County (the fastest growing county in the Montana), its effect on the Gallatin River

watershed, and the painful, year-after-year struggle to address the problem at the local level. In 2005, Hawks introduced a bill to impose a statewide limit on development within 225 feet of a riverbank. Hawks grew up on a ranch on the Crow Reservation of eastern Montana, and he knew that his bill would infuriate private property rights activists. "I have ranching family members, so I did not come at this from a naïve position," he said. "But the need for something like this was obvious to anyone who has studied the detrimental impacts of this development on our rivers. Living in the Gallatin Valley is a constant reminder." Controversy over the bill, Hawks said, was



A PIECE OF PARADISE Paradise Valley has yet to see the kind of explosive development as in other parts of Montana, but signs suggest it is coming. The pock of pneumatic nail guns is as common as the cry of osprey, and ranchers' fields along the riverfront are producing a bumper crop of For Sale signs.

a given. "I knew, though, that you could take that ultimate property rights argument and turn it on its head. Legislation like this can be a protection of property rights, too. Nobody likes zoning until they need protection from something." To nobody's surprise, the bill failed. But to enormous surprise, it died in the Senate with a 24-25 vote, indicating that Hawks and his constituents were far from alone in their concerns. The shift, from a legislature that has often seemed to start with the answer "property

rights" before addressing any questions, was profound.

"We are going to redefine our approach now," Hawks said. "We started out with just an idea, just the process. The fact that it almost passed on the state level has really energized local governments to take this on. You are seeing it in the Bitterroot, everywhere. And ideally this would all be handled on a local level anyway, because there is no one-size-fits-all approach."

Indeed, many Montana counties are working to address the problem on their own. Gallatin County has just weighed in with a setback for subdivisions of 150 feet from a river's highwater line (the level that the river reaches when charged with rain and snowmelt during an ordinary spring). All four of the counties that hold a part of the famous Big Hole River, for example, have agreed to limit development within 150 feet of the river's high water line.

Madison County, which is among those counties, also contains the renowned portions of the Madison River, the Ruby and the Beaverhead. Commissioners there have established limits on development within 500 feet of the highwater line throughout the county. Val Drake, a director of the environmental group the Greater Yellowstone Coalition, lives in Gallatin County in the watershed of the East Gallatin River. After several years of work with the county planning board, Drake led a local citizens group to jumpstart setback regulations on their part of the river. "Gallatin County has discussed a county-wide planning initiative like this for over a decade now," Drake said, "and we are just now getting the will to do something like this, directing the growth to places where the infrastructure already exists, protecting the places we want to preserve." Drake and her fellow East Gallatin residents jumped ahead of the county to create some setback regulations tailored to their river, which is low-gradient, meaning that it is fairly flat and moves water slowly. When it floods, the water goes a long way from the main channel. In the East Gallatin district, development is limited within 300 feet of the ordinary highwater line, or outside the 100 year floodplain (the land covered by the highest recorded flood in a century, as recorded by state and federal flood maps.) "We looked at the setbacks of 500 feet in Madison County," Drake said, "and they have been in place for a long

time. They were not even that controversial, because those residents recognized a long time ago the economic and wildlife value of their rivers."

Ravalli County, which contains the Bitterroot River, perhaps the most beset by development of any waterway in the state, prohibited new construction within the mapped floodplain in 1999 (such development has been described as "pitching your tent in the middle of the highway when no cars are in sight."). The county is now in the process of discussing further setback regulations, but it is a battle between entrenched private property rights activists, and the growing realization that the fabled Bitterroot is running out of time. In a recent interview with the Ravalli Republic, Phil Romans, a local fishing guide and advocate for limiting development on the river, said that septic tanks and bank stabilization projects were threatening to turn the Bitterroot into "the LA River."

"The river has got to be able to meander and pick its own course," Romans told the reporter. "Channelize the river and it will destroy itself."

Learning from the floods

Ironically, the place where such knowledge first gained wide public circulation was in Park County, Montana, in the aftermath of the Yellowstone River floods of 1996-97. Ironic, because even though those floods and their aftermath dramatically defined the true costs of allowing development along a western river, spurring other counties to look for solutions, nothing in the way Park County deals with development has changed.

In 2006, the conservation group American Rivers declared the 80-mile stretch of the Yellowstone in Park County's Paradise Valley the second most endangered river in the US, citing unrestricted development, and the probability that, when the floods return, those new structures will demand a whole new flurry of projects designed to protect them, projects that will further the channelization of this iconic river.

In all probability, if you are dreaming of a riverbank home in Montana today, you were not in the Paradise Valley that spring of 1996. Those who were there have a different understanding of western rivers. They know



FLOOD AMNESIA Not 10 years since back-to-back record floods, people are building at the edge of thin banks, on historic floodplains and on eroding cutbanks. At the least, such practices will require more river-damaging riprap; at the worst, a future disaster bail-out courtesy the federal government and the US taxpayer.

what happens when the whisper of water among the stones becomes a roar.

1996 was the first winter since before the great Yellowstone fires of 1988 that the snowpack in the Yellowstone high country was above normal. The snows had fallen across the vast stretch—over a million acres—of burned country, where there were no boughs left on the dead trees to catch any of it, and allow it to melt in the days of winter sun. The snows piled and drifted on the scorched land, accumulating through a cool wet spring. When the May sun emerged, its power fell directly on the snowpack. With no live trees to shade it, the exposed pack melted fast. Trickles became torrents. The world began to move.

Far below, the Yellowstone at Livingston rose fast, overtopping its banks, flooding houses in the southern part of the town with a freezing rush of dark and debris-laden water. By the third week in May, the river was running 37,000 cubic feet of water per second (cfs) past the gauge at Livingston (for scale, this past year the Yellowstone reached flood stage at 20,400 cfs. During the dog days of August, it can fall to 1600 cfs on this same stretch). Throughout the floodplain, the river was carving new channels, scouring old ones. Undercut banks collapsed, toppling huge cottonwoods and pulling away entire willow thickets into the maelstrom. The current tore away the unstable banks comprised of ancient glacial

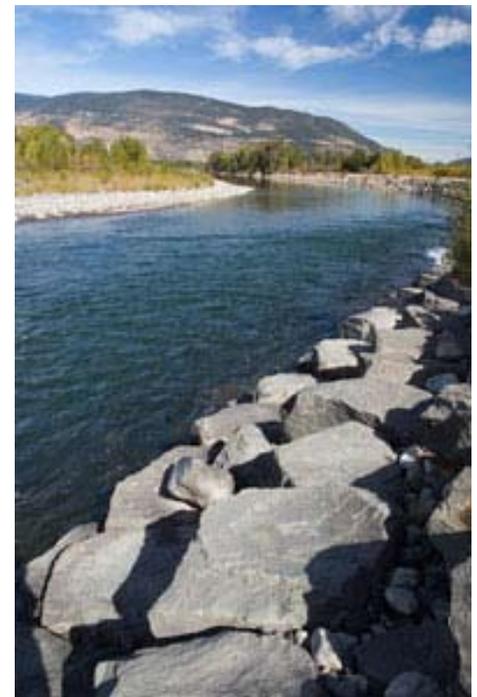
moraine, and added the gravels and cobbles to the maelstrom, piling them at bends, forcing itself in new directions. The river reoccupied channels that it had not used for generations, threatening to reopen abandoned courses that included the world-

famous spring creeks Armstrong's and Nelson's, where anglers pay fees to ranch owners to fish for hyper-wary and outsized trout. As the water receded, the river was reconfigured, and not necessarily in the way that landowners wanted. Jerry O'Hair, the owner of Armstrong Spring Creek, moved quickly to rebuild the banks that had protected his spring creek from the main channel of the river, which required a struggle with the US Army Corps of Engineers, the agency responsible for writing the permits. Andrew Dana, owner of Nelson's Spring Creek, told High Country News that trying to get a Corps permit to protect his land after the flood was "like a bad dream."

But if Dana and other landowners were in a fight for the permits to protect their property, a lot of other Paradise Valley residents were horrified at the number of stabilization projects that the Corps was approving. The most common method of stabilizing a river bank is by using "riprap." Heavy equipment is brought in to shave off vegetation and smooth the banks, then a blanket of boulders is poured onto the slope, a process that is also called "armoring." In the year following the '96 flood, dozens of such projects were completed in Park County. Jerry O'Hair went out of his way to try and create a stabilization project that would be more environmentally friendly, using a combination of natural materials, including root wads and tree trunks, to try and keep the river from claiming his valuable fishery

and the rest of his land (O'Hair says that he has lost almost 100 acres to the river).

Then, in the spring of 1997, it all happened again. The Yellowstone did not crest quite as high as the year before, but it was still believed to be a one hundred year flood event. O'Hair's eco-friendly project disappeared as the river, as Andrew Dana told High Country News, "came unglued." The front page of local papers showed a 4200 square foot home, hanging out over a massive newly cut bank, being torched by the firefighters before it could collapse into the flood, spin downstream and take out the bridge. The home, before the '96 flood, had been 200 feet east of the river. The



THE GREAT WALL OF DANA The tongue-in-cheek name given by critics to one of the largest and most expensive private riprap projects on the Yellowstone. This massive wall of well-laid stones may protect this bend of the river for many years, but it will also accelerate the flow of the river, potentially creating havoc for downstream neighbors, who may have to riprap themselves in response, creating havoc for their downstream neighbors....

Corps of Engineers, reflecting the climate of desperation, began work on a huge dike project at Livingston, that would come to be ridiculed (and mostly disassembled, at the request of citizens who hated being cut off from their river) as "The Great Wall of

Livingston.”

The snow all melted, the river went back down, as it had been doing since the last of the glaciers. Property owners along the river raced to protect themselves before the floods could come again. What ensued was a fury of bank stabilizations that Livingston resident Dennis Glick and his fellow members of the Greater Yellowstone Coalition called “riprap anarchy.” More than eleven miles of riprap were laid on the banks of the Yellowstone in Park County alone, a figure that amounted to 25% of the length of the river there. Glick told High Country News, “...the Yellowstone may not have a dam across it, but in some places, it looks like we’re working to put one in all along it!”

The Urge to Riprap

Rob Hazlewood, of the Montana branch of the US Fish and Wildlife Service, told this reporter in 1999 that he wrote “dozens of letters” to the Corps of Engineers’ Allen Steinle during 1996 and ’97, saying that the riprap projects would endanger the ecological functions of the river. “They were turning the river into a rock-lined rain gutter, simply because people wanted to live



POOR MAN’S RIPRAP A cheap but ineffective attempt at bolstering the banks of a wild river. Logs, braids of branches, broken slabs of concrete and thousands of loads of rock have been dumped over the banks of the Yellowstone in an attempt to reform the river of its wandering ways.

in the floodplain,” Hazlewood said. “The Corps just kept on issuing the permits, in direct conflict with our interests at Fish and Wildlife.” Steinle never answered his letters, Hazelwood said.

Steinle, who still works with the Corps’ office in Helena, said then that his agency did try to address the concerns of the USFWS, even if they never replied to the letters. But in reality, Steinle and the Corps had very little choice in approving the permits for the riprap projects. There was no mechanism to evaluate the cumulative effects of so much armor. No permit could be denied simply because the riprap would abut a neighbor’s section of riprap, or a riprap project on the other side of the river. The environmental effects of each application were considered as if the project existed in a vacuum.

The armoring of the Yellowstone in 1997 began to take on a life of its own, driven by the most basic understanding of hydrology. A channel confined by riprap has been described as a “firehose” sweeping everything downstream. A river in its natural state will overflow its banks, and dissipate huge amounts of energy into the willows, cottonwoods, and grasslands of its floodplain. It may move within that floodplain, creating new channels, distributing the seeds and stems of willow and cottonwood, cutting away some forests and making new ones elsewhere, leaving behind ghost channels, wetlands, and oxbows that nourish everything from invertebrates to big brown trout, otters and trumpeter swans.

Confined, the river can only scour down its own channel, deepening it, or disperse its concentrated energy onto a point downstream or across from a riprap project, you may be in trouble. “Riprap begets riprap,” said Missoula hydrologist and river consultant Bruce Anderson. “A river like the Yellowstone is a completely dynamic system. If you pin it down in one place, the energy moves somewhere else. This fact forces a landowner downstream of a riprap project to consider a riprap project of his own.”

The cumulative effect of so much armor is still not really understood. It is known that the increased force of the confined channel causes it to scour itself deeper, a process known as “downcutting.” As the channel deepens, the river does not spill out across its floodplain, so wetlands, those nurser-

ies for fish and wildlife, began to disappear. Side channels that provide the main habitat for fish go dry. The floodplain loses what hydrologists call “connectivity” to the river itself, and it becomes smaller and drier, which can affect aquifers and water supplies in the river for everything from drinking water to fisheries to irrigation and boating.



CONFLUENCE A prodigal side channel rejoins the main flow of the Yellowstone, the Absaroka’s Emigrant Peak watching on. If the Yellowstone carves a deeper channel, such side-channels, the breeding grounds for much riparian life, will become more rare.

life habitats, decline. With less rooted vegetation in the system, and a more powerful current, unarmored sections of riverbank erode at an unnaturally fast rate, contributing pulses of gravel and dirt that the river deposits at bends, which then makes the river change course much more often. The burden of eroded gravel, where ever it is finally deposited, shallows the river, raising the temperature of the water and increasing evaporation. The variables of instability are almost endless. Their effects are almost always costly, though not necessarily to the owner of the riprapped property.

In 1998, fisheries biologist Joel Tohtz made a survey of trout species in the Yellowstone near Livingston, and found a decline of 60% from his previous surveys. The US Fish and Wildlife Service had already asked the Corps of Engineers for a mora-

torium on placing any more riprap projects in Park County. The Corps had refused the request. In 1997, then-Governor Marc Racicot, under pressure from Paradise Valley residents, appointed the Upper Yellowstone Task Force to study the problems and make recommendations as to what should be done. Task Force Chairman John Bailey, the owner of flyfishing's mecca, Dan Bailey's Fly Shop, in Livingston, was adamantly opposed to a moratorium on riprap projects. "If one side of the river is confined, the other side is going to pay a price, and the moratorium says that we just write that side off. I don't think we can do that in all fairness."

Years passed.

The Task Force turned in their findings to then-Governor Judy Martz in August of 2003. The report, available at [here](#), overwhelmingly called for more studies, as well as recommending that private property rights be respected and that dredging continue to be allowed to maintain irrigation flows. Suggestions that conservation easements be acquired to preserve agricultural lands and limit riverbank development seemed unlikely to produce results, given the value of such lands, and the low tax base of Park County. The recommendations presented did not include setbacks or any restrictions on riverbank development. (Jerry O'Hair, who was a member of the Task Force, said recently, in response to a question about setbacks, "Too much regulation is a detriment to agriculture, and it's a taking of private property rights. The river doesn't need any more protection than it's got.")

Wanted: Political Will

The Corps of Engineers, as of August 29th, 2006, was still working on the Special Area Management Plan (SAMP) in its office in Omaha, Nebraska. According to Allen Steinle, in Helena, permits are still required for stabilization projects on the river. The cumulative effects are still not considered. "Nothing has changed," he said. Asked if a state or local setback rule could address some of the problems on the Yellowstone, Steinle replied, "Well, it would sure make my life easier." He added, "From an on-the-ground standpoint it would work, but the political will has not been there."

The question of political will is a particu-

larly thorny one in Park County. Other counties, especially Gallatin, have been flooded with newcomers drawn to the area by its rivers and landscape, and many of them come from places where those attractions have long-ago been sacrificed. These newcomers are more aware of what is at stake, and, perhaps, more comfortable with regulations.

Park County is still sparsely inhabited, and just beginning to see an influx of extraordinarily well-heeled outsiders. For the ranchers and farmers who have been in the valley for generations, in many cases struggling to make ends meet, the sudden explosion in real estate prices, especially the astronomical value of riverfront land, is a stroke of extraordinary good fortune. They do not see why anyone should have the right to limit that good fortune now. As Jerry O'Hair puts it, "We've been found out. All of a sudden, this property has become so valuable, well, we must have managed it pretty well. Or else why would they all want to come here? I say that private property trumps everything. But I'm an agriculturist, one of the few left. I know I'm in the minority." But that minority has, according to the Dennis Glick, who now works for the Sonora Institute, "consistently derailed" any proposals for setbacks or restrictions on development in Paradise Valley. "These people wield an inordinate amount of political power. And one of the problems that I have as a taxpayer is that I am paying for all these levees, and all this riprap and everything that is destroying the river. We are plucking feathers off the golden goose."

Jackie Robbins has been Park County's planner for the past three and half years, during which time, she says, she has witnessed a "land rush." "Our property values are ten times what they were a few years ago," Robbins said. "Realtors are telling landowners, 'name your price.' We are getting not just national interest, but international interest, where people are finding out about the valley and all the wildlife that is here." Although Park county does have a setback law – 150 feet from the high water mark—for new subdivisions, most of the land is already grandfathered in. (When the state of Montana changed its law regarding the review of subdivisions in 1993, there was a huge rush to subdivide properties in the valley before the new rules could take effect.) The setback law does not affect individual landowners.

"We don't really have any way to discourage development on the river," Robbins explained, "or even in the floodplain. We have people who come in and want to do this, and we desperately try to discourage them from building in those places, but they have so much money, they say, 'if it washes away, I'll just replace it.' I wish there were stronger rules, but we live in a democratic system, and I can't enforce rules if we don't make them." Asked if a statewide setback law would address some of the county's problems, Robbins said it might. "A lot of local people don't like other local people bossing them around," she said, "but if there are regulations at the state level, it represents some greater power—it's not me bossing them around." Robbins, who has lived in the valley since the 1970's, concluded, "I see a lot of people who were born here, and they seem to feel like this is no big deal, that the natural beauty will always be here, no matter what. Hopefully, before it is too late, we can change some of these rules. Because the big, big money is moving in here now."

That money is being drawn by the pris-



THE LURE World-class flying fishing is a major draw for new residents of the Paradise Valley. Continued "riprap anarchy" could change the fundamental character of the river's ecology and threaten its trout.

tine nature of the place and its wealth of public lands and recreational opportunities, many of which are tied to the health

of the Yellowstone River. “I would like to see some recognition that the function of the river is an economic concern as well as an ecological concern,” said Jim Barrett of the citizen’s group Park County Environmental Council. “One of the good things produced by the (Upper Yellowstone) Task Force was a huge amount of science that said, yes, there’s problems in the reach of the river around Livingston, and a few other areas, but it is still a healthy system. Maybe in 1997, we had ignorance as an excuse, but the Task Force changed that. Now there’s no excuse. If everybody is allowed to develop in the floodplain, and then protect their investment, then we all lose... We are up against a huge economic force that wants to take this asset and piece it out for big short-term profit at the expense of the whole asset. We still have a window to address that problem.”

Park County has not had a major flood since 1997, and, as a result, there have been few requests for permits to riprap. But, according to Scott Bosse of the Greater Yellowstone Coalition, “Permitting of construction in the riverbottom has been going full steam. The stage is set for more stabilization projects as soon as there is a high-water year.”

Bosse is a strong advocate of a state-wide setback law. “Montana cities and counties do not have the expertise or the budgets to tackle this on their own. We need a baseline to work with, a floor.” He says that polls taken by the Greater Yellowstone Coalition show strong support for such a law, and that Montanans, perhaps uniquely, have seen enough change in the past decade to know that something has to be done, before it is too late. “If you read the press coverage of this issue, you would think that it is divisive, but we have not found that to be the case. Montana has this chance—the people here float the rivers, they fish and hunt on them, the rivers are a huge part of life here, it’s not some theoretical sense like it might be in a different state. It is why we have the stream access law in the first place. We have this wild river, flowing through what is mostly a working landscape. It’s one of the rarities of this earth. Look at the Columbia River, or the Snake down in Jackson (Wyo.). Once you destroy something beyond recognition, you don’t get it back. Montana has a chance to do something that no other state is doing. Most people see that as a good idea.”