

Big Hole Watershed Sourcebook: A guide for residents and visitors



1ST EDITION 2013

Anaconda-Deer Lodge County
Beaverhead County
Big Hole River Foundation
Brainerd Foundation
Butte-Silver Bow County
Cinnabar Foundation
Cooperman Foundation
Foothills Foundation
Madison County

Welcome to the Big Hole Valley

You are reading this book because you are visiting or living in this beautiful area and are seeking more information about this unique and spectacular watershed - the Big Hole River watershed. The Big Hole River in southwest Montana is one of the few free-flowing rivers left in the west. It is a world-renowned, Blue-Ribbon designated trout fishery and is home to a self-sustaining wild population of fluvial Arctic grayling, a federal Candidate Species and Montana Species of Special Concern. It runs over 150 miles and drains a watershed of over 2,800 square miles. It is one of the last wild places left in the lower 48: still home to wolves, grizzly bears, eagles, a stronghold for native fishes, and wilderness.

The unique open-space character of the Big Hole is made possible through large, single-ownership ranches. Ranching is a social and economic mainstay of the Big Hole valley. Recreation and tourism is another. The lifeblood of these ranches and tourism is through the river and its tributaries; irrigation for ranching and flow for recreation and tourism. Land and water management can positively or negatively impact the river and its aquatic, riparian, and associated up-land habitats.

The Big Hole River Foundation's mission is to conserve, enhance and protect the free-flowing character of the Big Hole River, its unique culture, fish and wildlife. The Big Hole River Foundation (BHRF; www.bhrf.org) is a non-profit 501(c)(3)

organization headquartered in Butte, Montana. We deliver our mission across three initiatives. Our Research Initiative seeks to understand the ecology of the Big Hole River system. Our Conservation Initiative efforts improve the system where needed and opportunity exists. Our Education Initiative is designed to share information about the system with others and promote science-based conservation strategies.

We produced this Sourcebook through our Education Initiative with the help of counties, state and federal agencies, other non-government organizations, and landowners. It is intended as an introduction - or compendium - of the information and resources available throughout the Big Hole Watershed.

This book is intended to provide an overview of the watershed, its resources, and the laws affecting them, but it is not a comprehensive statement of the law. You MUST do your own legal research to ensure you fully understand the law.

Please peruse this document. Feel free to let us know what you think about it and how we may improve upon it in the future. Be sure to get out and enjoy all the resources this spectacular watershed has to offer and enjoy the Last, Best River.



The Big Hole near Jerry Creek

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Front page photo - Big Hole River with Goat Peak in the distance, by Corky Logan. Above photo - Big Hole River from above Maiden Rock, by Steve Parker. Facing Page - Near Jerry Creek, by Corky Logan

Chapter 1 ~ The Big Hole River and its Communities

Montana's Last Best River

The Big Hole flows over 150 miles from the mountains above the town of Jackson to its confluence with the Beaverhead and Ruby Rivers on the sagebrush prairie at Twin Bridges, forming the Jefferson River. The watershed takes in more than 2,800 square miles, yet is home to just two thousand people. It is a land of family ranches and outdoor recreation, providing fine beef and superb trout fishing.

The Big Hole is truly Montana's 'Last Best River.' Family cattle ranches dot the wide-open landscape, with little of the suburban sprawl that plagues many western rivers. For outdoor enthusiasts, the vast Beaverhead-Deerlodge National Forest takes in both the Pintler Wilderness and the West Big Hole Roadless Area. For anglers, public access to the river is readily available along with parking, boat ramps, and camping sites. Many of the towns along the river offer lodging and good food and drink year round.

Though many visitors come to backpack, hunt, or camp, the Big Hole is best known as a blue ribbon trout stream. After high water recedes around the end of June, flows gentle. The River's diverse character creates a sense of intimacy, with long gliding riffles, sections of alternating riffle-pool-riffle-pool water, deep holes, broad water braiding around islands, and boulder-strewn pocket water.

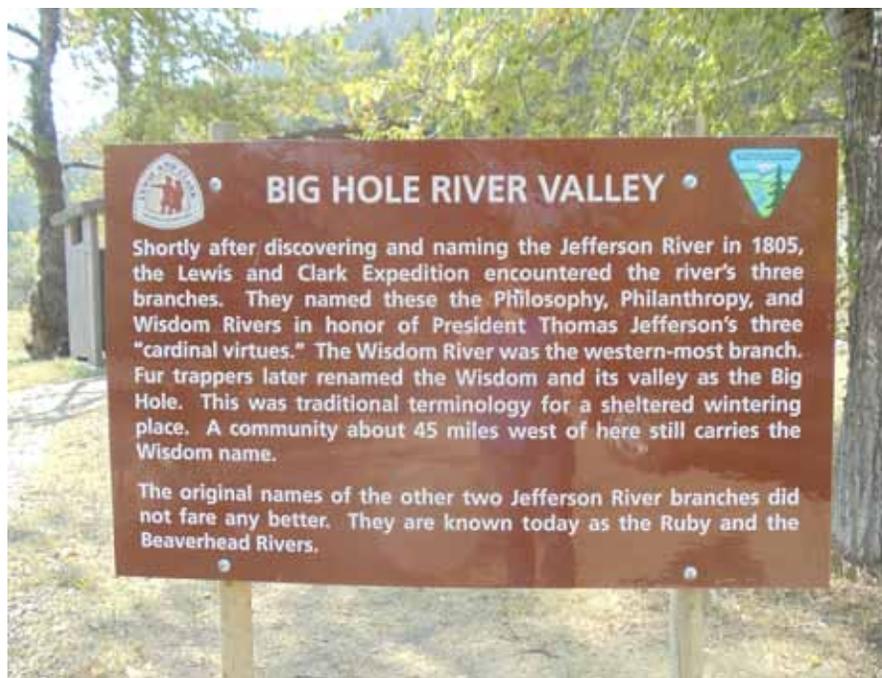
The Big Hole supports the last remaining wild native population of fluvial Arctic grayling in the forty-eight contiguous

states. The grayling is a stunningly beautiful fish, with a large sail-like dorsal fin and iridescent violet sides.

Native mammals – now rare in other parts of their historic range – are also found in the Big Hole. Lynx stalk snowshoe hares in the dense spruce bogs in headwater valleys. Pine martens pursue squirrels in mid-elevation lodgepole pine stands. Wolverines range widely, from the valley floor to the scree-covered flanks of the Continental Divide.

For the big-game hunter, there are elk, moose, antelope, mule and white tailed deer, along with rarer trophies such as mountain goat and bighorn sheep.

Today, Americans are rediscovering how to let the land own them. The Native Americans, of course, knew that land was not a commodity to be bought, used, and sold at will. They belonged to the land, and even became ill when removed to some distant reservation. Similarly, visitors to the Big Hole feel a pull that brings them back time and again. More than a century ago, homesteading ranchers experienced this same phenomenon. Many left the Big Hole for greener pastures, only to return, sometimes from thousands of miles away. We are confident that you, too, will find it difficult to leave the Big Hole behind.



Divide Fishing Access Site

Towns Along the Big Hole

Jackson is 20 miles from Idaho by snowshoe and 45 by automobile. It sits near the headwaters of the Big Hole River and is a popular winter recreation and hot springs destination. The area was named for Anton Jackson, who also served as the town's first postmaster, in 1896.

Wisdom was named for the original designation given the Big Hole River, which flows through the town. In 1805 Lewis and Clark, at the confluence of the three tributaries of the Jefferson River near the present site of Twin Bridges, decided to name the three streams for the three "cardinal virtues" of President Thomas Jefferson: Philosophy, Philanthropy, and Wisdom. But that proved too much for later settlers, who changed the names to the Beaverhead, Ruby and Big Hole Rivers. But the town of Wisdom kept the name, and later a nearby waterway was named the Wise River. The other two virtues seem to have been lost entirely over the years.



Main Street Wise River

The Big Hole valley is often called the "valley of 10,000 haystacks." It is quite a sight to watch the ranchers put up hay during late July and early August. They still use the beaverslide, an early-day haying invention originating in Beaverhead County.

Wise River is located where the Wise River flows under Highway 43 on its way to the Big Hole. Since the Big Hole was originally named the

Wisdom River, it is possible that the tributary's name was derived from that concept. Wise River is surrounded by a half-million acres of peaks, lakes and headwaters in the Pioneer Mountains and offers some of Montana's most breathtaking scenery.

Dewey, a small community mid-way between Divide and Wise River, features a handful of small businesses as well as a fishing access site named after George F. Grant, noted fly tier, conservationist and founder of the Big Hole River Foundation.

Divide derives its name from its proximity to the Continental Divide, where waters on the west side flow into the Pacific Ocean and waters on the east side flow into the Gulf of Mexico. As a station on the Union Pacific Railroad, Divide

served as a distribution and stock shipping point for the Big Hole Valley.



Ski Jouring in Wisdom in winter

Melrose, with a summer population of about 90 and once known as "Camp Creek", had its early beginnings as a tiny stage stop along the Big Hole River. It eventually became a terminus for the railroad and a shipping and receiving point for the Hecla Consolidated Mining Company and the Bryant Mining District.

The area along the Big Hole River (now Melrose) was settled as early as 1870 by three families who shared the valley, Jefferson McCauley, John Stone and William Bowe. With the railroad nearing, Bowe platted the Town site of Camp Creek and named it "Melrose". He began selling lots in this newly platted town around 1880. Businesses and homes quickly sprang up as the railroad inched closer. Miners and their families arrived and went to work in the mines of the Hecla Company, west of Melrose.

Melrose is home to Big Hole River Day, an all-day event held the third Saturday in July each year, sponsored by the Big Hole River Foundation and the town of Melrose, with vendors, musicians, a casting competition, raffles, auctions and a BBQ pig roast.

Glen has had a post office since 1950. Once a Union Pacific station, it was named because it is in a glen between the Big Hole and Beaverhead Rivers.

Twin Bridges was either named for the two bridges that spanned the Jefferson River nearby, or for two bridges over the Beaverhead and Big Hole Rivers built by the Lott brothers in 1865. The town is near the confluence of the Beaverhead, Big Hole, and Ruby Rivers, which join to form the Jefferson River, also named by Lewis and Clark in 1805.

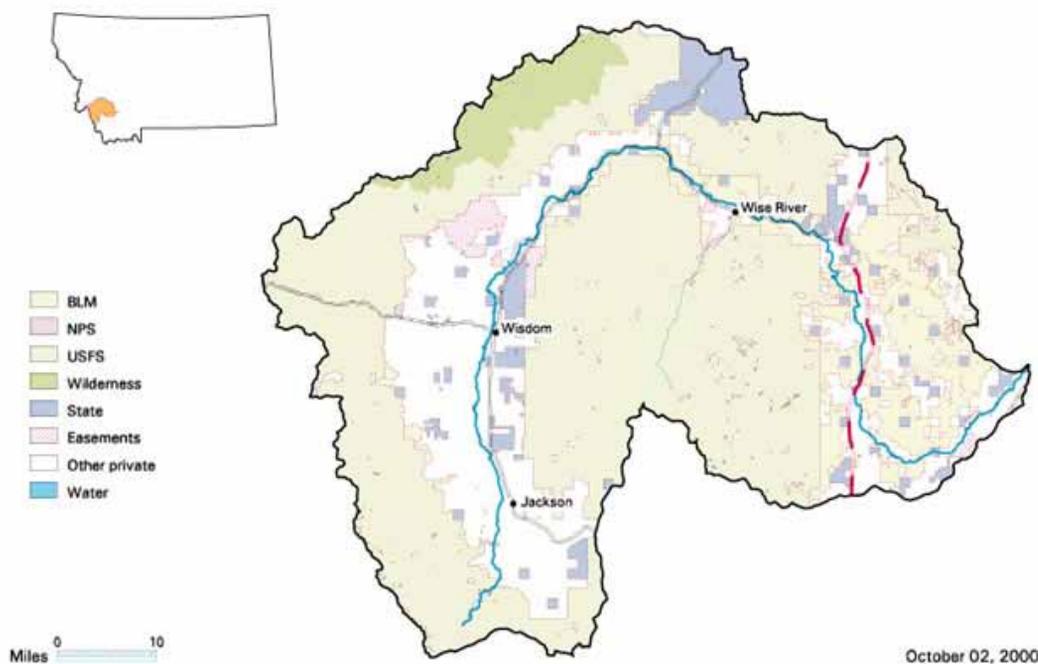
What is a Watershed?

The term 'watershed' has traditionally designated the dividing line, or drainage divide, between two drainage basins; that is, the ridge of high land or boundary separating regions drained by different stream systems. Some uses of the term keep this meaning; but in North America, use of the term 'watershed' has come to be interchangeable with the term 'drainage basin'. In other words, 'watershed' refers to the entire region or area from which all waters drain into the same body of water. Both are accepted definitions but the latter meaning applies throughout this publication.

In ecology, watersheds as drainage basins are important units. As water flows over the ground and in rivers, it can pick up nutrients, sediment, and pollutants, which get transported towards the outlet of the basin and can affect ecological processes, both along the way and in the receiving water body. Modern use of fertilizers containing nitrogen, phosphorus, and potassium, for instance, has negatively impacted watersheds.

Each watershed is unique, based on its specific size, terrain, soil, land use, flora and fauna, climate, and so forth. All human activities impact watersheds, whether these activities are agricultural, residential, or commercial. The Big Hole is no different.

Big Hole River Watershed (1,800,000 acres)



The Big Hole valley is the highest and widest mountain valley of southwestern Montana, with much of the valley floor above 6,000 feet in elevation. The Big Hole River emanates from the Beaverhead Mountains of the Bitterroot Range and winds for 150 miles through the broad valley. The Big Hole River is one of only a few free-flowing rivers left in the west.

Land ownership in the Big Hole watershed is 70% public and 30% private. The public lands are predominately located in the foothills and mountains, managed by the U.S. Forest Service and U.S. Bureau of Land Management. The valley bottom is mostly private land owned by large cattle ranches, and is

In hydrology, the drainage basin is a logical unit of focus for studying the movement of water within the hydrological cycle, because the majority of water that discharges from the basin outlet originated as precipitation falling on the basin. A portion of the water that enters the groundwater system beneath the drainage basin may flow towards the outlet of another drainage basin because groundwater flow directions do not always match those of their overlying drainage network.

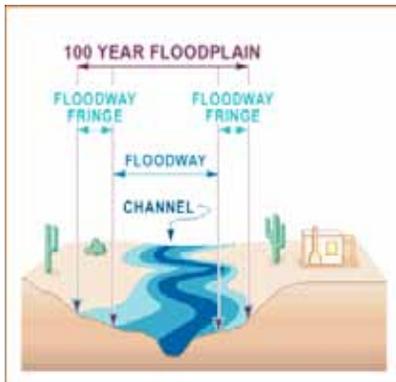
managed mostly for hay production and livestock grazing. The valley is sparsely populated with only about 2,000 residents, but development pressures are steadily increasing.

For more information on watersheds, visit <http://www.ewworldencyclopedia.org> Montana Department of Environmental Quality <http://www.deq.mt.gov> or Montana Department of Natural Resources Conservation <http://www.dnrc.mt.gov>

Definitions

Floodplain. A floodplain is flood-prone land. Generally, a floodplain adjoins a stream and would be covered by the floodwater of a 100-year flood, or perhaps a higher local standard. From a regulatory and flood insurance perspective, a floodplain is the area subject to locally adopted floodplain management ordinances.

Floodway. The floodway is the higher-hazard area, comprised of the stream channel and its banks. This is the area considered necessary to carry flood waters downstream and generally experiences faster water velocities and greater floodwater depths during runoff.



Flood Fringe. The flood fringe is the lower-hazard area outside of the floodway. It generally consists of the flood storage and backwater areas, and experiences lower water depths and velocities, and usually is located on the outer part of the regulatory floodplain.

Water Budget. A water budget reflects the relationship between input and output of water through a watershed.

Riparian Plant Community. A riparian plant community is adjacent to perennial (continuous flow), intermittent (seasonal), and ephemeral (after precipitation) rivers, streams, lakes, or drainage-ways. Riparian areas can have distinctively different plant species than adjacent areas, as well as species similar to those in adjacent areas, but that exhibit more vigorous or robust growth. Riparian vegetation is associated with the natural presence of surface waters, rather than man made practices such as irrigation.

Riverbank. The area from the top of the stream's banks to the water's edge, covered by all types of vegetation that reduce erosion and floodwater velocity while supporting bank shear strength and stream channel morphology.

Ordinary High Water Mark. The ordinary high water mark is the line that water impresses on land by covering it for sufficient periods to cause physical characteristics that distinguish the area below the line from the area above it.

Characteristics of the area below the ordinary high water mark include removal of the soil and substantially all vegetation, and destruction of its agricultural value.



Ordinary high water mark

Wetlands. Wetlands are areas that are inundated or saturated by surface or ground water 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.

Water Rights. A water right is the right to use a specified amount of water, within state guidelines. Water rights holders do not own the water itself. A water right is protected by the constitution. It cannot be taken away without just compensation. Generally, it can be bought and sold independent of the land, but not outside the watershed in which the water right exists.

Basis of Montana Water Rights - [A]ll surface, underground, flood, and atmospheric waters within the boundaries of the state are the property of the state for the use of its people . . . (Article IX, section 3(3)).

- First in time is first in right. A person's right to use a specific quantity of water depends on when the use of water began.
- Water must be put to a beneficial use. "Beneficial use is the basis, measure and limit of the [water] right." This means that if one cannot use the water beneficially, even if one has an existing water right, one loses the authority to exercise the right.

Big Hole River Conservation Development Standards and Permitting Processes

Between 2004 and 2005, the four local governments along the Big Hole River (Anaconda-Deer Lodge County, Beaverhead County, Butte-Silver Bow County and Madison County) adopted, by ordinance, the Big Hole River Conservation Development Standards and Permitting Process.

The ordinance can be found in its entirety by visiting the county websites or by contacting the county planning departments. Briefly, the purposes of the ordinance are:

1. To provide for the preservation of orderly development along the Big Hole River by establishing standards and a permitting process for new construction and the transaction of such business.
2. To protect water quality and quantity, floodplain, and riparian resources.
3. To preserve an undisturbed river corridor and maintain natural resource functions and conditions.
4. To protect the health and safety of residents and visitors of the Big Hole River watershed.

The general authority of county commissioners, and their ability to make and enforce such ordinances, are broadly described in Montana Code Annotated 7-5-2101 and 2102. http://data.opi.mt.gov/bills/mca_toc/index.htm



Fire and then ice jam on home built too close to the river

The Ordinance covers all the property within five hundred feet (500') of the ordinary high water mark of the Big Hole River. (Note that this is NOT a 500-foot building setback.) No structure may be located or structurally altered without full compliance with the terms of the Ordinance.



Existing bridge at Maidenrock. New bridges are subject to ordinances

The respective County Planning Offices are to review each proposed structure or structural alteration for compliance with the following criteria:

1. A setback of 150 feet or more from the ordinary high water mark of the Big Hole River.
2. Compliance with state and local sanitation requirements and water quality standards.
3. Protection of property from riverbank instability.
4. Compliance with local, state, and federal floodplain regulations and other applicable Ordinances.
5. Protection of the riparian resources and natural resource functions; and Protection of public health and safety.

A setback of more than 150 feet may be required in order to meet criteria 2 through 6, above. Through the variance or permitting process, a setback of less than 150 feet may be allowed if the criteria in 2 through 6 above are met. A permit must be obtained from the affected county prior to the beginning of construction.

Right to Farm Ordinance



Anaconda-Deer Lodge County, Beaverhead County, Butte-Silver Bow County and Madison County "recognize that: ranching, farming, and all manner of agricultural activities and operations within

and throughout the Counties are integral elements of, and necessary for, the continued vitality of the Counties' history, economy, landscape, open space, lifestyle, and culture. Given their importance to the Counties, and the State of Montana, agricultural lands and operations are worthy of recognition and protection."

"Landowners, residents, and visitors must be prepared to accept the activities, sights, sounds, and smells of the Counties' agricultural operations as a normal and necessary aspect of living in a County with a strong rural character and a healthy agricultural sector. Those with an urban sensitivity may perceive such activities, sights, sounds, and smells as an inconvenience, eyesore, or nuisance. However, State law and County policy provide that traditional ranching, farming, or other agricultural activities and operations within the Counties shall not be considered to be nuisances so long as operated in conformance with State law. Therefore, all must be prepared to encounter

noises, odors, lights, mud, dust, smoke, chemicals, machinery on public roads, livestock on public roads, storage and disposal of manure, and the application and possible over-spray of chemical fertilizers, soil amendments, herbicides, and pesticides, any one or more of which may naturally occur. Operations may also take place at all hours of the day and night and may also include use of waterways with cattle and machinery crossings."

"In addition, all owners of land, whether agricultural business, farm, ranch, or residence, have obligations to maintain their fences under State law and County regulation. Livestock must be fenced out (open range). Irrigators have the right to maintain irrigation ditches through established easements that transport water for their use only as prescribed by a water right and irrigation ditches are not to be used for the dumping of refuse. All residents and landowners are



encouraged to learn about these rights and responsibilities and act as good neighbors and citizens of the County.

Conflicts may arise from: trespass; harassment of livestock and livestock losses due to free roaming dogs; trespass by livestock; livestock on highways, county and private roads; leaving gates open; fence maintenance; harvest and transportation of agricultural and silvicultural crops; agricultural and prescribed burning; complaints of noise, dust, aesthetics, and odor resulting from production and processing operations; disposal of dead animals; weed, pest and predator control."

"The County Planning Boards have established a dispute resolution procedure with locally chosen mediators from the immediate area to informally resolve conflicts that may arise between landowners or residents relating to agricultural operations or activities. When rural residents cannot come to an agreement or understanding about fences, ditches, livestock, or other agricultural issues, this may be the forum used to resolve disputes. Mediators must be knowledgeable, solution oriented, and at least one such mediator in each dispute must be directly involved in agriculture, or an agricultural producer must serve in an advisory role to the trained mediator."

"People need to be aware that children and adults are exposed to different hazards in the country than in an urban or suburban setting. Farm equipment, ponds and irrigation ditches, electrical power for pumps/center pivot operations and electrical fences, traffic, use of agricultural chemicals with possible over-spray, territorial farm dogs, and livestock present real threats to children and adults. Controlling children's activities is important, not only for their safety, but also for the protection of the farmer's livelihood. Open irrigation waters are essential to agriculture and have legal right of ways that must not be obstructed. Open ditch operations often result in seepage and spills of storm waters at unpredictable locations and times."



"People need to be aware that they are responsible for the treatment of noxious weeds on their property and should not plant or propagate invasive species so as not to infringe on neighboring farms and ranches."



Anaconda-Deer Lodge County



Anaconda is the county seat of Deer Lodge County and is located just six miles from Interstate 90 and 15 miles from the I-15, I-90, intersection. Anaconda covers an area of three square miles and sits at 5,335 feet above sea level. The county encompasses 741 square miles, much of which is densely timbered forestland, lakes, and recreation ground. Average rainfall is 14 inches, average annual snowfall is 5.95 inches, and average length of the growing season is 114 days. The population in 2010 was 9,298. Nearly one-third of the covered employment is in the government sector and nearly one-fourth of the total private workforce is in health care.

Anaconda-Deer Lodge County (ADLC) includes 20+ miles of shoreline along the Big Hole River between Wise River and north of Wisdom. Land along the river includes both privately-owned property and large sections owned and managed by a variety of public agencies, including the Bureau of Land Management (BLM), United States Forest Service (USFS), Montana Department of Transportation, and Montana Fish, Wildlife & Parks (FWP).

Recreation

The Anaconda Sportman's Club (ASC) maintains one of the most convenient recreation access points along the Big Hole River in Anaconda-Deer Lodge County. Known as Sportsman's Park, this campground is a 21-acre area along State Highway 43, and is open to the public at no cost. It is located about 2 1/2 miles west of the intersection of Big Hole/Mill Creek Road and Highway 43. From the Wisdom area, look for the campground just east of mile marker 51. The campground is easily identified by the pink and blue outhouses located throughout the site.

Sportsman's Park is generally open by the start of the fishing season (mid-May) and closes following Labor Day weekend. The campground is managed by an onsite host. Campers are asked to register during their stay to maintain safety and to facilitate emergency assistance, if needed. Each year, the campground is frequented by people from across the US and visitors from all over the world. The campground's location allows relatively easy access to several mountain lakes and to the Anaconda-Pintler Wilderness. Many visitors use it as a convenient hub from which to explore the surrounding region.

While no fee is required to use the campground, the ASC operates entirely on donations and the campsite host can accept donations from those wishing to make a contribution. In addition to overnight campsites, the campground provides picnic tables for day-use, running water, and outhouses available to the general public. Campers and day-users are

particularly asked to observe proper outdoor etiquette by packing out whatever they bring in.

Fish Trap Fishing Access is maintained by the State of Montana along State Highway 43, between mile markers 48 and 49. Approximately 82 acres in size, the site is open to both camping and day use and is a popular boat access area as it has a concrete ramp. Additional site amenities include picnic sites with tables and fire rings, drinking water, and a handicap-accessible toilet. For the latest information on fees, usage season and maps, visit <http://fwp.mt.gov/fishing/siteDetail.html?id=281724>

Land Use and Development

Anaconda-Deer Lodge County regulates land-use, growth and property development throughout the county through a variety of regulatory tools, including the ADLC 2010 Growth Policy, the ADLC Development Permit System, and the ADLC Subdivision Regulations. In addition to these basic county-wide standards, in 2005 the ADLC County Commissioners passed the Big Hole River Conservation Development Standards and Permitting Process, known as Ordinance No. 208 (see pages 8 & 9). The main objective of Ordinance No. 208 is to promote conservation by maintaining and preserving the environmental health and quality of the Big Hole River corridor. The full ordinance can be found online at the County's website at <http://anacondadeerlodge.mt.gov/>



Any development and land-use activities within the ADLC Big Hole River Development District are subject to the ADLC Development Permit System, which is administered by the ADLC Planning Department. Depending

on the scope of the project, property owners may be required to obtain an Administrative Development Permit (\$25) or a Major Development Permit (\$100). Land-use activities that require a development permit include, but are not limited to, the following:

- Building of any structure over 200 square feet.
- Any project requiring the excavation or disturbance of more than five cubic yards of soil.
- Any proposed change of land-use that falls outside of explicitly allowed residential and agricultural uses.
- Any proposed additional use or development of a residential or agricultural property, including commercial activities. This includes hobby businesses that provide on-site services or produce goods on-site for paying customers.

In addition to obtaining a Development Permit, any project that includes building a structure over 200 square feet is required to obtain a building permit. Building permit fees are based on the size and scope of the building project and can be determined by contacting or visiting the Planning Department at the County Courthouse at 800 S. Main St., Anaconda, MT 59711, (406) 563-4010. www.anacondadeerlodge.mt.gov

ADLC Environmental Health

If you own property in the ADLC portion of the Big Hole River drainage and are interested in drilling a well or installing a septic system, you must first contact the Tri-County Health/ADLC Sanitarian located in the ADLC Courthouse. Tri-County Health services are responsible for reviewing and issuing permits for wells and septic systems and are the County's primary liaison with the State of Montana's Department of Environmental Quality (DEQ). Tri-County Health also offers well-water testing services, provided through a contract with a regional lab. Test kits can be acquired from Tri-County Health; you must specify what tests you are seeking when you pick up the kit. Additional services provided by Tri-County Health include Flood Cleanup Health Tips, Food Program information, Air Quality information, Subdivision of Land review (for well and septic), Community Complaints Program, and Junk Vehicle Program.

The Tri-County Health/ADLC Sanitarian's office serves Powell, Granite, & Anaconda-Deer Lodge. Please call (406) 563-4066 in advance to set an appointment. For more information, please visit www.anacondadeerlodge.mt.gov/departments/env_health.aspx

Weed Control

The Anaconda-Deer Lodge Weed Control Department is tasked with abating noxious weeds in the County through a variety of means, including public information and education efforts, and reviewing and enforcing all weed management plans. In addition, through the summer months the Weed Management Department works with regional, state and federal agencies and local landowners to apply herbicides for weed abatement.

All private landowners are responsible for eliminating noxious weeds on their land and for helping prevent the spread of invasive species. If you intend to develop or subdivide property in the Big Hole area, or if you simply need assistance or tips to help properly abate weeds on your property, please contact the ADLC Weed Management Department at (406) 563-4055. www.anacondadeerlodge.mt.gov/departments/weeds.aspx

Clean-up Days

Starting the second weekend in May and continuing for one week, the County hosts the annual "Clean-up Days" event. This event allows residents to dispose of toxic and corrosive household chemicals, e-waste, and junk vehicles. The program is conducted cooperatively with the Sanitarian's office, the Planning Department, the ADLC solid waste board, and Butte-Silver Bow County. This event is an opportunity for County residents to dispose of waste that typically is not accepted by the ADLC landfill. If you have waste or junk vehicles in the Big Hole that you'd like to dispose of, please contact the Planning Department or the Sanitarian's office for further information regarding clean-up dates and landfill information.



Big Hole River near Hwy 43 and Mill Creek Highway

Please Note: The above information is specific to county regulations and resources. Please review information in other parts of the sourcebook for federal programs that apply regardless of county, and also for programs administered locally that apply to all counties.

Beaverhead County



Dillon is the County Seat and major trading area for over 13,000 people in Beaverhead and western Madison counties. It is the headquarters of the Beaverhead-Deerlodge National Forest, the Dillon Field Office of the Bureau of Land Management, the University of Montana-Western, and the national franchise office of Great Harvest Bread Company. Dillon also forms the center of Montana's largest cattle and hay producing areas, and is one of Montana's top agricultural centers. With an approximate population of 9,000 in Beaverhead County, and nearly 6,000 in Madison County, the area provides a buying income of over \$150 million a year.

The Beaverhead County Land Use and Planning Department provides technical planning assistance and land use and development services in Beaverhead County. The department provides technical planning support to the County Commission, Planning Board, and general public for the development and implementation of the Beaverhead County Growth Policy and other land use plans.

The Planning Department

- Manages and administers the County's Subdivision Regulations, and a variety of other land use ordinances and regulations.
- Provides staff support and issues permits as part of the Big Hole River Conservation Development Standards and Permitting Process; Administers and reports to the County Commission on applications as part of the Beaverhead County Wireless Communications Facilities Ordinance.
- Reviews and reports to decision-making bodies on subdivision proposals.
- Administers and issues permits as part of the Airport Affected Area Regulations for the Dillon Airport.

Services Provided by the Planning Department include:

Subdivision

- Certificates of Surveys (COS)
- Exemptions
- Applying for subdivision, hearings, etc.
- Subdivision regulations
- Subdivision and COS process

Land Use Permits

- Big Hole River Conservation Development Standards Application Process
- Wireless Communications Facilities Permit Process
- Dillon Airport Affected Area Ordinance

Beaverhead County has a septic permitting system, covered by the Beaverhead County Wastewater Systems Regulations, which are administered by the County Sanitarian.

The County does not have a building permit system, and does not have any zoning in the Big Hole valley.

Subdivision Regulations were updated in 2010; they regulate all subdivisions within the County. The County requires a weed management plan as a part of the development process, and a minimum of 300' frontage for each lot that borders the Big Hole River.

Landfill

Landfill hours are 10:00 a.m. to 6:00 p.m., Monday through Saturday.

The landfill is closed on Sundays except during the summer months of June, July, and August. An attendant is on the site during regular business hours.

The County has solid waste canister collection sites located at the Rock Creek exit near Glen, one between Dewey and Thompsons Corner, one just north of Wisdom, and one north of Jackson. The county landfill is located approximately five miles west of Dillon on Ten Mile Road.

The Beaverhead County Weed District

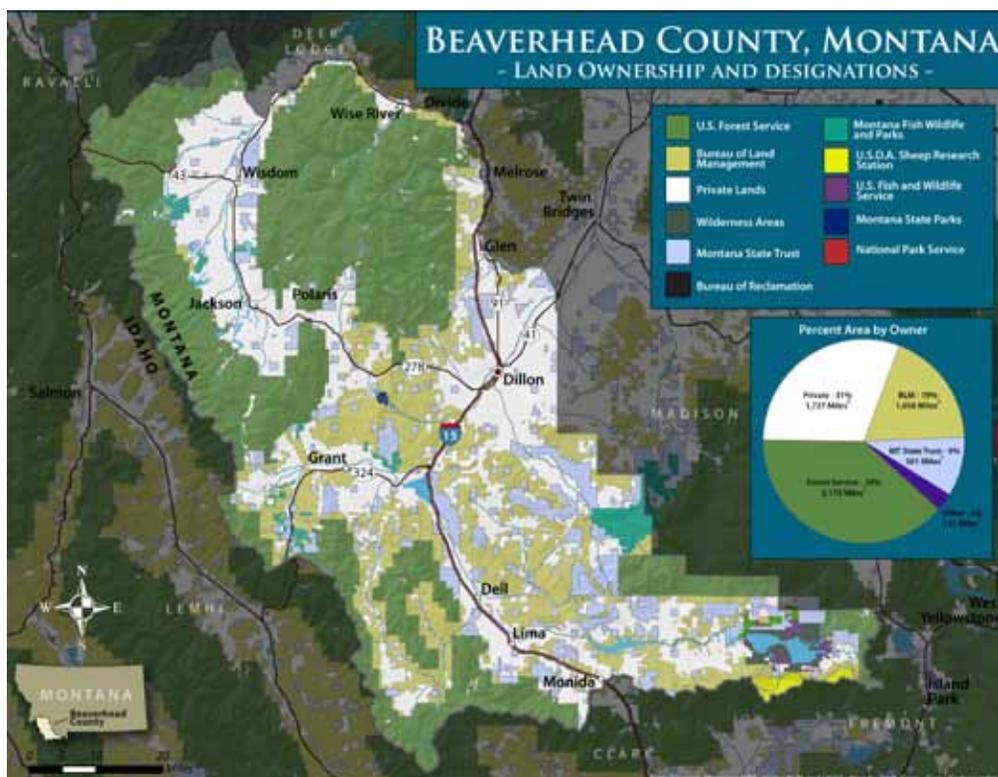
The mission of the Beaverhead County Weed District is to bring together those responsible for weed management within Beaverhead County in order to develop common management objectives and to facilitate effective treatment and coordination efforts along logical geographic boundaries with similar land types, use patterns and problem species. Cooperators include private landowners, county government, state agencies, federal land management agencies, and other interested agencies and individuals. Services provided include help with weed control and education about noxious weeds.

Fire Protection

To minimize the risk of wildfire danger:

- Choose a level area for your house, set back from steep slopes. Homes overhanging steep slopes are more vulnerable because fire travels uphill faster than on level ground.
- Stack wood piles away from the house, not against the house or under the deck.
- Enclose the underside of decks, structures, and overhangs. Avoid wooden decks overhanging steep slopes and flammable vegetation. They are very vulnerable to fire.
- Avoid large windows facing steep slopes with heavy vegetation.
- Install spark arresters on all chimneys.
- Provide driveway access sufficient in width for fire vehicles, avoiding severe grades or sharp turns. Allow adequate turn-around space near the structure. A turning radius of 50 feet is not unusual for fire vehicles.
- Use underground power lines.
- Develop a 30 - 100 foot Fire-Safe Zone (defensible space) around the house.
- Establish lawns for at least 30 feet from the house whenever possible. The most critical area is five feet from the house. Leave this area clean and clear. Do not plant flammable evergreen shrubs or trees such as juniper, cedar or pine in this area.
- Flammable vegetation and leaves should be removed and thinned at least 30 feet from the house, and up to 100 feet on the downhill side. In many cases, fire resistant plants may be effectively incorporated into landscaping plans. Remove limbs overhanging or within 10 feet of roofs and chimneys.

Talk to your local fire protection authority. Try to gain an understanding of potential problems and solicit their advice as to measures you might take to make your home more defensible. Then implement those measures and



continue to maintain them. If you have any questions about protecting your property from fire, please contact your local fire protection agency or Beaverhead County Emergency Management.

For more information see www.sccfiresafe.org
Code of the New West: A Citizens Guide to Rural Responsibility http://beaverheadcounty.org/Code_of_the_New_West.pdf

Report and Recommendations for Planning the Dillon Growth Area. http://www.beaverheadcounty.org/CPC_Final_report_June_11_1_.pdf

Please Note: The above information is specific to county regulations and resources. Please review information in other parts of the sourcebook for federal programs that apply regardless of county, and also for programs administered locally that apply to all counties.

Butte-Silver Bow County



Butte-Silver Bow is a consolidated local government and has operated as a city/county government since 1977. A city/county municipal code of ordinances is in effect. A comprehensive city/county plan was completed in 1971, updated in 1986 and 2002. The legislative power of the city/county is vested in a Council of Commissioners. The Council of Commissioners is the legislative and policy determining body of the city/county.

Butte, the county seat, often referred to as 'the richest hill on earth', is steeped in mining history. Mining elevator frames called headframes dot the landscape above uptown Butte, silent memorials to copper miners who laid the foundation of Butte's history.

Floodplain Regulation

The entire length of the Big Hole River (approximately 38 miles) adjacent to Butte-Silver Bow is regulated by Federal Emergency Management Agency (FEMA) floodplain maps. Butte-Silver Bow also has a Floodplain Ordinance - Title 18, of the Butte-Silver Bow Municipal Code, which can be viewed and downloaded at: <http://www.co.silverbow.mt.us/> These regulations specify setbacks from the river for development.

The adopted Digitized Flood Insurance Rate Maps (DFIRMs) regulate the Butte-Silver Bow side of the river. The following DFIRM Panels regulate the Big Hole River floodplain: 30093C0375E, 30093C0400E, 30093C0425E, 30093C0575E, 30093C0600E, 30093C0595E, and 30093C0590E. About one mile of river, west of Melrose, is regulated as a Zone AE (Base Flood Elevations determined). The floodplain boundaries and Base Flood Elevations (BFE) for this reach of the Big Hole River are found on DFIRM Panel 30093C0590E. The remainder of the River is regulated as a Zone A (No Base Flood Elevations determined). Paper copies of the DFIRMs can be viewed at the Butte-Silver Bow Planning Department, Courthouse, 155 W. Granite Street, Suite 108, Butte, MT. Individual panels (PDFs) can also be viewed and downloaded from the FEMA Flood Map Center website: <https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1>

Subdivision Regulations

To protect the water quality and quantity of the Big Hole River, additional setbacks from the river and its tributaries are also required. The Butte-Silver Bow Subdivision Regulations include setbacks from Type I, Type II, Type III, and Type IV water courses.

Type I water courses are defined under MCA 23-2-301. The Big Hole River is considered a Type I water course. As such,

a 250-foot setback is required from the ordinary high water mark of the River for all structures and roads. A 100-foot vegetated buffer in which native species may not be removed is also required within the setback area of 250 feet.

Type II water courses are generally defined as all main tributaries of Type I water courses. A 200-foot setback from the ordinary high water mark is required, including a 75-foot vegetated buffer adjacent to the watercourse, in which native species may not be removed.

Type III water courses are generally defined as all tributaries of Type II water courses including all intermittent streams and reservoirs. Type III water courses require a 100-foot setback from the ordinary high water mark, including a 50-foot vegetated buffer adjacent to the watercourse, in which native species may not be removed.

Type IV water courses are generally considered drainage channels capable of carrying or collecting storm water and snowmelt runoff, and irrigation district canals. Type IV water courses require a 50-foot setback, including a 30-foot vegetated buffer adjacent to the watercourse, in which native species may not be removed.

Wetlands of one acre or less require a setback of 50 feet. Wetlands of more than one acre require a setback of 100 feet.

To protect critical wildlife habitat and migration corridors, the Butte-Silver Bow Subdivision Regulations also require mitigation measures to eliminate or reduce adverse impacts on wildlife and wildlife habitat. Critical wildlife habitat and corridors must be protected by a required 200-foot open space buffer between any structures and critical wildlife habitat and corridors.

To prevent or reduce the opportunity or spread of wildland fires, the Butte-Silver Bow Subdivision Regulations also require an on-site fire protection water supply system or a

residential fire suppression system in each residence. The size of the on-site fire protection water supply system is dependent on the number of lots proposed for each particular subdivision. The Butte-Silver Bow Subdivision Regulations can be read or downloaded from the Butte-Silver Bow website under the Planning Department. The Butte-Silver Bow website address is: <http://www.co.silverbow.mt.us/>

Growth Policy

Greenway Corridor Land Use

This Growth Policy land use designation establishes Greenway Corridors along the Big Hole River. It establishes a ¼-mile wide corridor from the centerline of the Big Hole River to help maintain the public's connection with its history of utilizing the Big Hole River for agriculture, fishing, hunting, and other outdoor recreation activities.

The Growth Policy also seeks to encourage new residential development near existing towns, i.e. Melrose and Divide. To encourage new growth near these two towns the Growth Policy designates the Divide area as Rural District 3 - three acre minimum for new parcels, and the Melrose area as Rural Center - no minimum lot area. Otherwise, the rest of the river is designated as Rural District 40 – minimum of 40 acres for new parcels. New parcels created through subdivision must be compatible with the Growth Policy designations.

Zoning

In 2004 Butte-Silver Bow County and the other three counties that border the River (Madison, Beaverhead and Anaconda-Deer Lodge) adopted the Big Hole River Conservation Standards (Standards) through an Intergovernmental Agreement. The purpose was to: (1) protect the water quality and quantity of the River, (2) protect floodplain and riparian resources, (3) preserve an undisturbed river corridor and maintain natural resource function and conditions, and (4) provide for the health and safety of residents and visitors to the Big Hole River watershed. All four counties also recognized that the Big Hole River is an important economic resource.

Butte-Silver Bow implemented the included water conservation standards by creating Chapter 17.47 - Water Channel Management Zone in the Butte-Silver Bow Code. Chapter 17.47 regulates development adjacent to the River, requiring

that all new structures be located a minimum of 150' from the ordinary high water mark of the River.

Chapter 17.47 also includes minimum development standards for the installation of private bridges over the Big Hole River. General guidelines for private bridges include that they must:

1. Support existing agricultural operations and not have negative effects on agricultural water users and water user facilities.
2. Not have an adverse effect on local services.
3. Not have an adverse effect on the natural environment or a negative impact on the riparian and aquatic ecosystems.
4. Not be located within 300 feet of known fish spawning grounds.
5. Not have an adverse effect on wildlife and wildlife habitat, and including not placing a bridge within 300 feet of wildlife migration corridors, feeding and breeding areas, watering holes.
6. Not have an adverse effect on public health and safety.

Minimum requirements for bridges require that applicants provide easements for public utilities; provide legal and physical access to the bridge from an existing public right-of-way; not locate a bridge on a dynamic section of the waterway or streambank; keep the bridge open for emergency public access, and adhere to all setbacks and design standards of the ordinance. The full ordinance can be obtained by contacting the Planning Department of Butte-Silver Bow County.

Historic Preservation

All proposed demolitions within Butte-Silver Bow County must be reviewed by the Historic Preservation Officer, before demolition work begins, to determine if the structure is listed on the National Register of historic landmarks, is or eligible for Listing on the National Register.

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Madison County



The county seat is Virginia City, which was the Montana Territorial Capital from 1865 to 1875. The courthouse, constructed in 1875, is still used for County offices.

National Historic Landmark Virginia City, one of the State's early successful mining towns, is now a visitor stop for thousands of travelers each year. Virginia City was home to over 10,000 residents in the mining boom of the 1860s and 70s. Virginia City and its neighboring town, Nevada City, are recognized as one of the busiest tourist attractions in Montana, and are major seasonal employers. The State of Montana now owns and manages much of the historical district of Virginia City.

Much of the information relevant for new visitors and land-owners is available on the Madison County website, www.madison.mt.gov. A listing of departments can be found at www.madison.mt.gov/departments/ A map of office locations is available at www.madison.mt.gov/aboutus/MadCo2.jpg

Departments

The Madison County Board of Commissioners conducts a regular meeting on each Tuesday beginning at 9:00 a.m. If there are exceptions or changes to the date or schedule of a regular Tuesday Commission meeting, a notice is published in the local "Madisonian" newspaper and is posted on the calendar on the Madison County Website. For any questions regarding these meetings, please call (406) 843-4277. www.madison.mt.gov/departments/commissioners/comm.asp

The Madison County Emergency Operations Plan, including the jurisdictions of Madison County and the Towns of Ennis, Sheridan, Twin Bridges, and Virginia City, is a guiding and coordination document for managing disasters, emergencies, and incidents that exceed the standard operations of agencies and departments within the jurisdictions. www.madison.mt.gov/departments/emergency_management/emerg_mng-mt.asp

The Madison County Strategic Wildland Fire Plan (Fire Plan), summarizes plans and activities targeted at reducing the risk of a catastrophic wildland/urban interface (WUI) fire event in Madison County, and provides coordination and guidance to first responders and their respective jurisdictions in the event of a wildland or wildland/urban interface fire. By implementing this planning document, Madison County seeks to ensure the health, safety and welfare of its citizens. The Fire Plan improves planning tools for the County, which results in better subdivision and development regulations as they relate

to growth in the wildland/urban interface. This Fire Plan may also aid economic development of forest products through the potential development of a sustainable forest by-product industry from fuels reduction and mitigation efforts. www.madison.mt.gov/departments/emergency_management/RiskMit/Wildland/wildland.asp

Subdivision reviews are required in Madison County. Since the mid-1960s, and particularly since 2000, more and more people have subdivided and developed areas adjacent to public wildlands for residential, recreational and commercial uses. The result of this development has been the creation of communities and suburban areas mixed with or in close proximity to wildland vegetation. FAQs (Subdivision): www.madison.mt.gov/departments/plan/FAQs.asp

The practices of uninformed developers and homeowners can greatly exacerbate potential hazards and lead to unnecessary losses from wildfires in the WUI. At the same time, thoughtful preparatory actions can greatly improve the chances homes will survive a wildfire, while significantly reducing the risks that confront firefighters. People who choose to live in or near the scenic wildlands have the responsibility to take necessary precautions when facing predictable hazards such as forest and range fires. It is in the interest of the owners and potential owners of homes in the wildland/urban interface, of members of emergency management agencies, and of the public at large, both collectively and individually, to do their utmost to prevent and mitigate the effect of such disasters. www.madison.mt.gov/departments/emergency_management/RiskMit/SubReview/SubReview.asp

Before beginning a construction or demolition project in Madison County, it is the responsibility of property owners to inquire whether a Construction/Demolition permit from the Madison County Sanitarian must be obtained. www.madison.mt.gov/departments/sanitarian/sani.asp

A permit is required for all septic systems or waste water treatment systems installed in Madison County. All waste water systems must be installed by a Madison County licensed installer. www.madison.mt.gov/departments/sanitarian/septic/septic_info.asp

Landfills and container sites are for Madison County residents only. A person transporting solid waste on a public highway shall attach, cover or otherwise secure the load sufficiently to prevent littering. Madison County has two class III landfills: 1.5 miles east of Twin Bridges, and 2.5 miles east of Jeffers on Jack Creek Bench Road, near Ennis. www.madison.mt.gov/departments/sanitarian/solid_waste/sw.asp

Invasive weeds are a great threat to Montana's environment. When these invaders are allowed to spread, they cause a reduction in wildlife forage, degrade fisheries through erosion and sediment buildup, reduce property values, and erode the County's beautiful viewsheds. In Montana, there are approximately 7.6 million precious acres infested with state-listed noxious weeds, and several new and potentially devastating invaders are knocking at the State's borders. The Madison County Weed Board administers a noxious weed management control plan, opencut mining noxious weed control management plan, and a subdivision weed management plan, and also maintains a list of commercial pesticide applicators in the area. You can find a list of county-declared noxious weeds on its website, along with information on the herbicide cost share program and recommendations for application of herbicides. www.madison.mt.gov/departments/weed/weeds.asp

Property along the Big Hole River in Madison County is subject to the Big Hole Conservation Development Standards. A permit is required for buildings within 500' of the river, with a minimum 150' setback. There is also a Tall Towers ordinance which is required for all structures 100' or taller. <http://madison.mt.gov/departments/plan/publications/planpub.asp>



Boot Hill overlooking Virginia City

Additional Links

Madison/Jefferson County Extension Office: www.madison.mt.gov/departments/Extension/extension.asp

Big Hole River Conservation Development ordinance www.madison.mt.gov/aboutus/publicnotices/ordinance/2004/ord12004.pdf and permit application form: www.madison.mt.gov/departments/plan/forms/bigholepermitapp.pdf

Living With Wildlife Tips: www.fwp.mt.gov/fishandwildlife/livingwithwildlife/tips.html

Building With Wildlife: www.fwp.mt.gov/fishandwildlife/livingwithwildlife/buildingwithwildlife/

Fire Prevention/Fire Protection tips: www.madison.mt.gov/departments/plan/firetips.asp

Big Hole River Study and maps: www.dtmgis.net/bighole/

Montana Fish, Wildlife & Parks Crucial Areas Planning System (CAPS): www.fwp.mt.gov/fishandwildlife/conservationinaction/crucialareas.html

Services Directory Tab: www.madison.mt.gov/services/

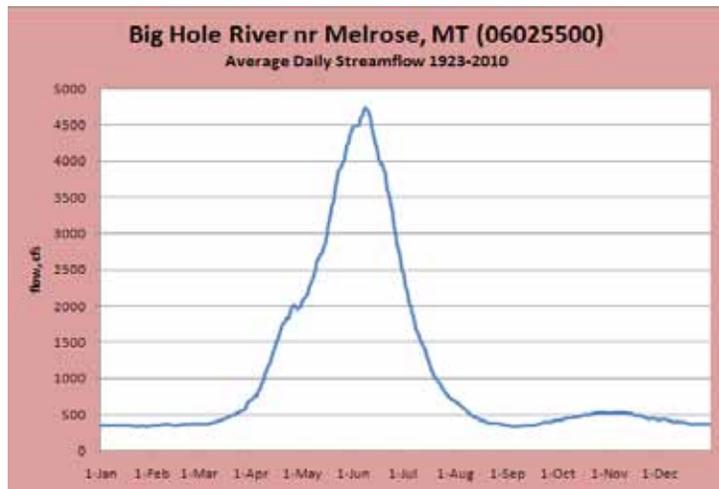
County Extensions/Phone/Fax: www.madison.mt.gov/services/ext.asp

On-line Property Owner Tax Information: www.mtcounty.com/bmsrdl/bmsrdl.php?customer_id=106¤t_app=tax&header_text=tax%20search&body_include=tax_search_form

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Big Hole River Stream Flows

The Big Hole River is a high-elevation basin that produces an annual streamflow of approximately 800,000 acre-feet based on the long-term streamflow gage at Melrose.



Annual precipitation averages less than 10 inches in the lower valley to more than 60 inches in the higher elevations. Streamflow is highly dependent on snowpack. The months from April to July supply 75 percent of the flow in the River. During snowmelt, flows in the River typically experience an early season peak due to low- to mid-elevation snowmelt. As the soil profile becomes saturated from snowmelt and flood irrigation and warmer temperatures ensue, a much higher peak typically occurs in early- to mid-June from melting of the high elevation snowpack. Following snowmelt runoff, flows drop off, occasionally to dramatically low levels, depending on the magnitude and timing of summer precipitation and temperature. Typically, mid-September to October flows rebound due to fall precipitation, less irrigation demand, and cooler temperatures and shorter days that inhibit basin evapotranspiration.

The upper Big Hole Valley is unique for many reasons, including the presence of fluvial Arctic grayling, the last

naturally occurring fluvial population of grayling in the lower 48 United States. Adding to the uniqueness is the presence and expanse of irrigation in the upper Big Hole valley, above Wise River. At a valley elevation of over 6000 feet, a very short growing season allows only one cutting of grass hay. With over 100,000 acres of flood-irrigated lands, the demand on water in May and June is extensive and competes with instream demands for grayling spawning, channel maintenance, and other down-stream uses. The lower valley supports irrigation more typical of western and central Montana with a mix of flood and sprinkler irrigation and several cuttings of grass hay and alfalfa.

The Big Hole is a highly gaged stream with ten active real-time streamflow gages, all of which broadcast on the USGS real-time website. The River near Melrose supports an 88-year period of record and provides a much-needed long-term flow database for the basin. <http://waterdata.usgs.gov/nwis>



Water Links of Interest

Clean Water Act Information Center: The Center conveys information about the quality of Montana's rivers, streams, lakes and wetlands in relation to Montana's Water Quality Standards. Specifically, it displays the results of water quality assessments made on the basis of available water monitoring data. This site is not intended as a means of accessing water quality monitoring field data. <http://cwaic.mt.gov/>

Montana DEQ Nonpoint Source Program: The Montana Nonpoint Source Program protects and restores water quality through the management of nonpoint sources of pollution such as grazing, farming, mining, construction, logging, and many other activities. <http://montananps319grants.pbworks.com/w/page/21640335/NPS%20Home>

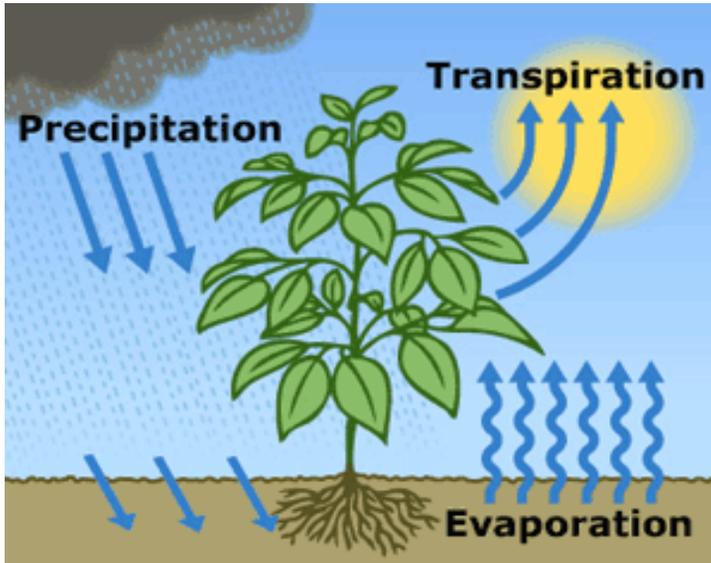
Natural Resource Information System (NRIS) Water Information: The Water Information System is the starting point for locating water resources information in Montana, such as data on surface water, groundwater, water quality, riparian areas, water rights, climate data and more. www.nris.mt.gov/

The Montana Water Center: The Montana Water Center at Montana State University advances water research, information, education, and problem-solving partnerships throughout the state and more widely. For more about what they do, visit their website. <http://watercenter.montana.edu/>

The Montana Volunteer Water Monitoring Project: This organization's aim is to promote knowledge and stewardship of aquatic resources by teaching local citizen volunteers the skills needed to gather accurate, non-biased water quality information. <http://mtwatercourse.org/vwm/>

Return Flows to the Big Hole River

The Montana Bureau of Mines and Geology, Montana Tech of the University of Montana, performed a study in the upper Big Hole River Basin to assess the dynamics between surface water, ground water, evapotranspiration and precipitation. During 2005 and 2006, ground water was monitored monthly, including every two weeks during the growing season. Big Hole River stream flows were monitored continuously from April to October as they entered and exited the study area.



Evapotranspiration is the sum of evaporation from the land surface plus transpiration from plants.

After accounting for all surface water entering and exiting the study area, more water was leaving the system than entering during May and June, indicating a gain in stream flow. Ground water was rapidly released from aquifer storage once irrigation ended in July and by mid-August ground water had returned to within 90 percent of pre-irrigation levels in over 50 percent of the wells monitored. From July through October the surface water showed a slight loss or was essentially balanced with no significant gains or losses after irrigation ended. The results were consistent for both 2005 and 2006.

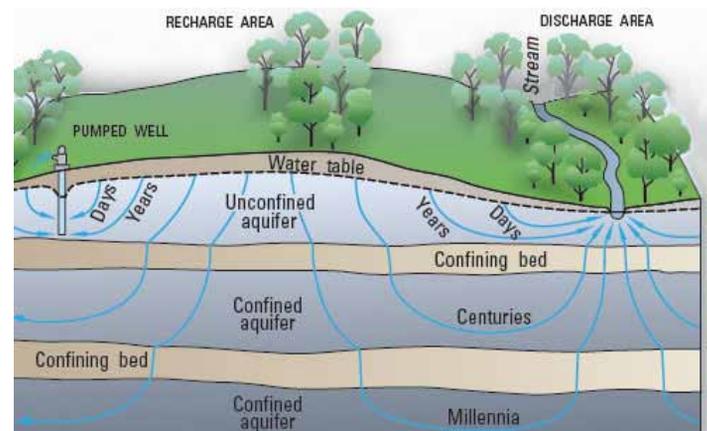
A water budget was approximated within the study area to examine the sources that contribute water and losses to the hydrogeologic system. The analyses provided information on how the system responds during periods of pre-irrigation, at the height of irrigation, and later in the summer/fall. The water budget revealed that water lost to evapotranspiration was equivalent to or exceeded the amount of ground water released from storage. This does not mean that ground water discharged from storage was not returning to the river during this time, but the gains from storage were matched or exceeded by losses due to evapotranspiration. Although no surface-water flows were monitored throughout the win-

ter months when evapotranspiration losses were minimal, it was estimated that about three to five cubic feet per second were released from ground-water storage within the study area during the winter months and most likely helped sustain river flows during this time.

Data indicate that augmentation of surface flow by irrigation return flow is most significant during June, July and August when the highest quantity of ground water is released from storage. However, evapotranspiration demands during these months roughly equal or exceed ground-water contributions and in fact, surface flows throughout the study area either slightly increased (June) or were at a net loss (July and August).

Due to the variable nature of flood irrigation in the upper Big Hole Basin, it was difficult to quantify the impacts of a potential reduction in the amount of water used to flood irrigate, even at a study-area scale. Many of the operators flood irrigate to the point of field saturation, however, thus promoting surface ponding and tailwater runoff of excess irrigation waters. In these cases, ground-water recharge has been satisfied and a reduction in the amount of water diverted would not likely impact ground-water storage, but could in effect enhance instream flows by reducing the amount of diverted water.

In addition, with more efficient irrigation management, which may include a reduction in the amount of water diverted, evapotranspiration in some areas would decrease due to the conversion of more water consumptive plants, such as sedges, to grass hay.



Ground Water and Surface Water in a Study Area within the Upper Big Hole River Basin - Open-File Report MBMG 572 by Ginette Abdo
Montana Bureau of Mines and Geology
Montana Tech of the University of Montana
1300 West Park Steet
Butte, Montana 59701-8997

Groundwater Protection

All people can protect or harm groundwater -- our nation's and the world's most abundant freshwater supply. The first step toward protecting groundwater is to become aware of how it can be contaminated. The second step is to do your part to avoid contaminating it.

Forty-four percent of the American population depends on groundwater for its drinking water supply -- reason enough to act to protect groundwater. Another reason is that contaminated groundwater can harm the environment, including the ecosystems that depend on groundwater.

Groundwater protection

- Properly store hazardous household substances in secure containers. Examples of hazardous household substances are paints, paint thinners, petroleum products, fertilizers, herbicides, insecticides, and cleaning products.
- Mix hazardous household substances over concrete or asphalt where they can be cleaned up or absorbed.
- Dispose of hazardous household wastes at an appropriate waste disposal facility or drop-off.
- Do not put hazardous household wastes down the drain or in the toilet.
- Do not put any wastes down a dry or abandoned well.
- If you own a septic system, service it according to local health department recommendations.
- If you own a water well, get a yearly maintenance check to ensure sanitary seals are intact.
- Decommission abandoned wells on your property using a qualified water well contractor.
- Fix or replace any leaking above ground or underground tanks storing hazardous substances.

Groundwater conservation

Most surface water bodies such as lakes, rivers, and streams are connected to groundwater. So, whether your water supply comes from groundwater or surface water, conservation matters.

According to the EPA, nearly three-quarters of water used inside the home occurs in the bathroom, with 41 percent used for toilet flushing and 33 percent for bathing. The remainder of indoor water use is divided between clothes washing and kitchen use, including dishwashing. Understanding where you use water most can provide hints on where the most water can be conserved. www.ngwa.org

The EPA recommends that you test well water annually for nitrates and coliform bacteria, but the lab may suggest additional tests important for your specific property or region.

Keeping Your Drinking Water Safe

These other tests can include:

- Testing for pesticides if the home is built on the site of an old orchard or farm.
- Testing for volatile organic chemicals if an oil tank is buried on the property, or if commercial storage tanks are buried nearby.
- Testing for lead if the home has lead pipes. Lead tests are important for homes with public water, too, since contamination occurs after the water enters the plumbing.

The results of your water tests might show contaminants that are offensive, but not health risks. The lab can advise you about the differences between that type of contaminant and dangerous contaminants, and their possible sources.

Problems That Can Be Corrected

The well casing is a pipe that lines the well shaft. A cracked casing makes it easy for surface water to run directly into the well. The well should have a protective barrier of grout in the space between the casing and the sides of the borehole. There should be a tight-fitting cap at the top of the casing to prevent water and insects from entering. The well should be sanitized after repairs are complete, and then retested to ensure the problem has truly been corrected.

Well Safety Tips

- Don't store or mix chemicals near the wellhead. A simple spill could go directly into the well.
- Don't pour pesticides or other dangerous chemicals down the drain.
- Take care when using chemicals to melt ice in the winter as they can pollute groundwater.

Other Recommendations

- Seal abandoned wells. They are a direct route from the surface to groundwater.
- Fit your house with check valves that keep polluted household water from flowing back into the well.
- Test your well water annually. Inspect visible well components for signs of problems.

www.homebuying.about.com

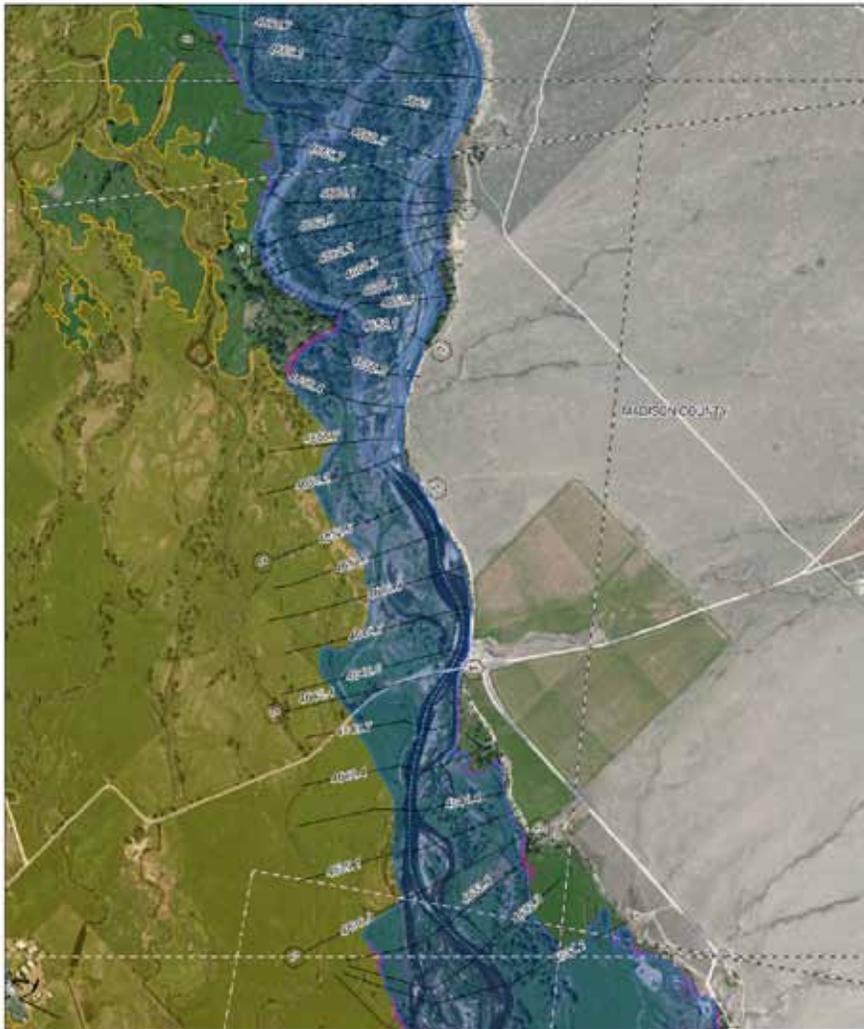
Floods

Floods are one of the most common hazards in the United States. Flood effects can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states. Not all floods are alike. Some floods develop slowly, sometimes over a period of days. Flash floods can develop quickly, sometimes in just a few minutes and without any visible signs of rain. Flash floods often produce a dangerous wall of roaring water that carries rocks, mud, ice and other debris, and can sweep away most things in its path. Flooding can also occur when a dam breaks, or an ice jam breaks apart, producing effects similar to flash floods.

Be aware of flood hazards no matter where you live, but especially if you live in a low-lying area, near water or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds, or low-lying ground that appears harmless in dry weather can flood.

Big Hole Land Use Committee Flood Plain Mapping

In order to provide the Counties along the river with good floodplain information, a collaborative effort was made between local and state partners providing funds for a floodplain study to produce Approximate Zone A floodplain maps. Zone A is the flood insurance rate zone that corresponds to the one percent annual chance floodplains that are determined in the Flood Insurance Study by approximate methods of analysis. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.



Flood plain mapping sections

The methods being utilized in producing these maps will be recognized by DNRC as new, approved approaches for floodplain mapping for the state of Montana. The approach is considerably more affordable than FEMA mapping standards, yet still meets state engineering standards. But prior to endorsing these methods, DNRC has identified the need to examine and test them. The project will allow DNRC to establish written guidelines, standards and processes for completing new Approximate-level floodplain studies that incorporate modern technology and methods.

The adoption process is scheduled for 2013. For more information, contact your local county flood plain administrator or DNRC at http://dnrc.mt.gov/wrd/water_op/floodplain/

Candidate Conservation Agreement with Assurances (CCAA)

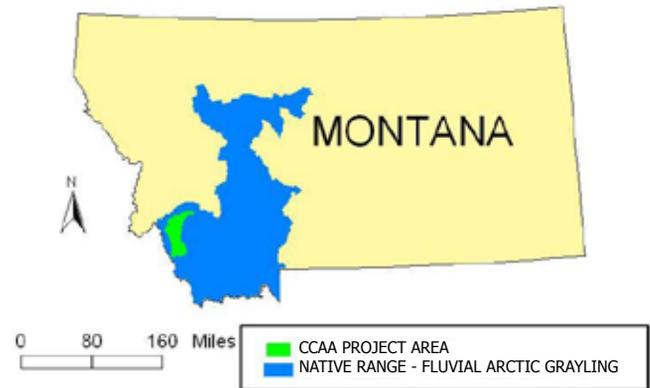
The last self-sustaining wild population of fluvial Arctic grayling, a Montana Species of Special Concern, occurs in the Big Hole River. Grayling conservation efforts in the upper Big Hole River basin are led by the Candidate Conservation Agreement with Assurances (CCAA). The CCAA is an agreement between the US Fish and Wildlife Service and any non-federal entity, usually private landowners, through which the landowners voluntarily agree to manage their lands and waters to remove threats to grayling, and in turn they receive assurances against additional regulatory requirements should the grayling be threatened or listed as endangered under the Endangered Species Act.

Under the Agreement, Montana Fish, Wildlife and Parks (FWP) issues a Certificate of Inclusion to each non-federal landowner within the Project Area who agrees to comply with all the stipulations of the Agreement and to develop an approved site-specific plan. Site-specific plans are developed with each landowner by an interdisciplinary technical team of individuals representing Fish, Wildlife & Parks, Fish and Wildlife Service, Natural Resources Conservation Service, and Montana Department of Natural Resources and Conservation (collectively, the Agencies). The conservation guidelines of the Agreement are met by implementing conservation measures that:

- Improve streamflow.
- Improve and protect the function of riparian habitat.
- Identify and reduce or eliminate entrainment threats for grayling.
- Remove barriers to grayling migration.

Most of the habitat occupied by grayling in the Big Hole River is on private land. Although the recent decline of grayling in the system has been linked to agricultural activities on these lands, their persistence in this area suggests that land management practices may be significant to the future of grayling. Active involvement of private landowners is thus critical to the conservation of the species in the Big Hole. A healthy grayling population is important to private landowners because of the potential for regulatory restrictions on farm or ranch operations should grayling be listed as threatened or endangered under the Endangered Species Act.

Figure 1. The CCAA Project Area encompasses the Big Hole River watershed above Dickie Bridge within the upper native range of the fluvial Arctic grayling in Montana.



The complexity of water use, water rights, and water conveyance for agricultural purposes in the upper Big Hole drainage requires a comprehensive approach to managing land and water uses that affect grayling. Changes in the operations of one landowner may affect the operations of one or more neighboring landowners, so coordination among landowners is essential. Such coordination requires substantial personal attention and communication between landowners and the Agencies to preserve and expand grayling populations in the Big Hole River.

The Agencies use comprehensive umbrella-type arrangements in the CCAA to benefit grayling, and they work with landowners to comprehensively implement conservation measures across a large area. In this instance, an umbrella-type agreement will generate greater collective support from private landowners; provide a holistic approach to developing and implementing basin-wide conservation that recognizes the ecology of grayling; and provide the Agencies with a manageable method to ensure that landowners in the upper Big Hole watershed will be able to fully participate in the conservation of grayling. The Big Hole Candidate Conservation Agreement with Assurances can be read in its entirety at: http://www.fws.gov/mountain-prairie/species/fish/grayling/CCAA_June2006.pdf

Big Hole River Corridor Land Use Planning

In February 2009, the Big Hole Watershed Committee (BHWC), a consensus-based group consisting of ranchers and conservationists, guides and business owners, government representatives, and concerned citizens initiated a community-wide discussion about the long-term management of the Big Hole River corridor. The discussion resulted in the realization that managing the corridor has to be done in a manner that stresses the importance of resource protection, as well as investigating solutions and strategies that are flexible and offer landowners alternatives, yet are still effective. The group agreed that the initiative process should follow a format of:

1. Educational forums.
2. Distributing information and soliciting responses.
3. Investigating and generating solutions.
4. Bringing the best solutions supported by the community to decision-makers.

Long-Term Goals

- Foster a community vision on importance of watersheds and corridors.
- Long-term planning for population growth and expected impacts on the river system.
- Incentives for landowners to practice sustainable land-management.

Description

The BHWC has been developing two programs, one focusing on enhancing the riparian corridor and the other on addressing safety in the floodplain. These two programs have been developed with the input and guidance of local residents through public meetings run by local, state, and national professionals involved with floodplain management, through small group discussions with landowners, and by listening and responding to the concerns of the residents in, and the users of, the watershed.

Program 1

This is a voluntary incentive program that targets the Big Hole riparian corridor. Not only does this winding ribbon of willows and cottonwoods provide some of the most critical wildlife habitat in the valley, but the riparian corridor is also critical in maintaining water quality.

The corridor also provides very important services such as storing floodwater and dissipating the energy of high stream and river flows. Because there is such tremendous public benefit from these lands, the BHWC has developed a pilot program that would reward continued good stewardship of the riparian corridor with annual payments. The intent is to enroll willing landowners in a lease agreement, whereby the landowner agrees to management activities which benefit not only agriculture but fish, wildlife, and water quality. In return for these management actions, the landowner would receive a modest annual per acre payment for the length of the lease (10, 15 or 20 years). The BHWC is currently exploring partnerships with agencies and nonprofit organizations to identify funding and administration opportunities for this type of program.

Program 2

This program is focused on maintaining human health and safety in the Big Hole floodplain. The proposed program would replace the current development standards along the Big Hole River, which includes a 150 foot setback from the ordinary high water mark, with a restricted area of the 100-year floodplain. These areas pose substantial risk to property, health, and safety of residents and emergency responders. BHWC is currently drafting the proposed standards with the aid of county and state officials, as well as counsel from the National Association of Floodplain Managers. Because the Big Hole floodplain is variable, the distance required to ensure safety is sometimes quite close to the water's edge and in other places an impressive distance from it. Mapping information for public discussions will take place during the summer of 2013.

Big Hole River Drought Management Plan

The mission of the Montana Department of Fish, Wildlife and Parks Fisheries Program is to preserve, maintain, and enhance aquatic species and their ecosystems to meet the public's demand for recreational opportunities and stewardship of aquatic wildlife. To ensure that fisheries are protected under critical drought conditions, the state of Montana adopted a set of criteria to guide fishing closure and re-opening decisions. The State's policy, however, allows that on some streams, watershed groups composed of local agricultural, conservation, business, and angler interests can develop individualized drought plans to address site-specific stream flow and fishery issues. These drought plans control drought-related actions in the waters covered by them.

The Big Hole River Drought Management Plan (DMP) is far more comprehensive than just restricting fishing. Its purpose is to mitigate the effects of low stream flows and lethal water temperatures on fisheries (particularly fluvial Arctic grayling) through voluntary efforts between all water users, including agricultural users, municipalities, businesses, conservation groups, anglers, and affected government agencies. The Big Hole River DMP was developed and adopted by members of the Big Hole Watershed Committee, including representatives of the Big Hole River Foundation, ranchers, and outfitters, together with input from agencies.

The DMP is an adaptive management plan that can be modified based on the lessons learned from research projects, increased information from new river gages, and from the experience gained through implementation of the plan itself. The DMP is reviewed, modified if necessary, and adopted by the Big Hole Watershed Committee each January.

The DMP separates the Big Hole River into five reaches, each reach having a series of stages at which various management actions are implemented. Trigger levels are based on the average daily flow, measured in cubic feet per second (cfs). Flow levels are reviewed the following day to determine whether low flow trigger levels have been reached and fishing closures are necessary. At the uppermost reach, Headwaters to the confluence with the North Fork, management actions occur when flow targets hit 160, 60, 40, and 20 (cfs). At the reach between the North Fork and Dickie Bridge, management actions occur when flow targets hit 100, 80, and 60 cfs. Throughout the two reaches between Dickie Bridge and Melrose Bridge, and Melrose Bridge and the Notch Bottom Fishing Access Site,



Divide Bridge in August

management actions occur when flow targets hit 250, 200, and 150 cfs. At the lowest reach, Notch Bottom to the Jefferson River, management actions occur when flow targets hit 200, 150, and 100 cfs.

Big Hole Watershed Committee roles:

- Educate interested and affected parties.
- Develop, adopt, and as necessary, annually modify the DMP.
- Receive, monitor, and act on information regarding stream conditions and snowpack levels throughout the year.
- Notify interested and affected parties of implementation of the DMP, and secure their support.
- Evaluate the environmental, social, and economic impacts of the plan.

Montana Fish, Wildlife and Parks (MFWP), Montana Department of Natural Resources and Conservation (DNRC), and the United States Natural Resource Conservation Service (NRCS) roles are to:

- Provide accurate and timely information regarding stream conditions and snowpack levels throughout the year.
- Provide technical assistance in reviewing the plan and monitoring its implementation.
- Ensure coordination of effort among all affected government agencies.
- Contact and inform media of plan implementation and stream flow and temperature status.

The Big Hole Watershed Committee reviews and evaluates snowpack levels and forecasted stream flows provided by the USGS and NRCS throughout the year to prepare for potential water conservation measures. Stream flow information gathered from the USGS and FWP gages at Wisdom, Mudd Creek, thermograph at Dickie Bridge, Maiden Rock, Melrose, Glen, thermograph at Notch Bottom, and the High Road is used to determine whether to recommend specific voluntary actions by water users to

conserve water and to mitigate the effects of low-flow conditions on fish populations from May 1 through October 31. The annual evaluation of the effectiveness of the DMP allows further analysis of the minimum instream flows necessary to sustain adequate habitat quality and to buffer water temperature.

Plan Implementation:

When river flow decreases below the first trigger, DNRC and FWP contact water users to advise of flow conditions and to encourage conservation measures.

When river flow decreases below the next flow trigger, DNRC and FWP officials meet with the Big Hole Watershed Committee to present the flow data; to formulate options, including voluntary reduction of irrigation drawdowns, stock water diversions, municipal water use, and to encourage the use of stock watering wells; and to prepare to take action. A phone tree is initiated to advise water users, outfitters and anglers of low water conditions and to encourage conservation measures.

Upon decreasing below the next trigger on a reach, notice is given to outfitters and anglers requesting that they voluntarily limit their angling activities to earlier, cooler hours of the day. Well water use is encouraged for stock watering. A phone tree is initiated to advise water users of low water conditions and to encourage conservation measures. The media are then contacted and a press release is issued to inform the public of low flow conditions.

When flows drop below the last trigger for a reach, FWP closes the river to fishing according to the FWP Drought Plan, and will no longer conduct electrofishing surveys. Voluntary reduction of irrigation and public municipal water use is encouraged, and continued well use for stock watering is encouraged. DNRC and FWP contact water users to advise them of extreme low water conditions and to encourage conservation measures. The media are contacted and informed of fishing closures, and asked to encourage public conservation efforts. The river remains closed until flows exceed the lowest trigger for seven consecutive days.

"Hoot Owl" Angling Restrictions:

During 2013, the DMP incorporated for the first time "Hoot-owl" fishing restrictions. Within each reach, hoot-owl fishing restrictions will be in place when daily maximum water temperature reaches or exceeds 73° F (23° C) for at least some period of time during three consecutive days. Hoot-owl fishing closure prohibits fishing between the hours of 2:00 p.m. and 12:00 a.m. (Midnight). They will remain in place until September 15 or until re-opening criteria are met. Also, riv-



Wisdom Bridge in August

er closure based on water temperature may be implemented if hoot-owl restrictions are inadequate to protect the fishery (e.g., prolonged periods where water temperatures exceed 73° F and forecasts are not favorable for cooler temperatures, thermal stress in fish observed by biologist, etc.) A particular reach may be closed to fishing and remain closed until September 15 or until re-opening criteria are met. Re-opening criteria generally consist of water temperatures at a particular reach's thermograph being less than 70° F for 3 consecutive days.

For Information Contact:

Randy Smith (BHWC Chairman) 406-835-3451

Jen Titus (BHWC Executive Director) 406-960-4855
jtitus@bhwc.org

Other Contacts:

Montana Department of Fish, Wildlife & Parks (FWP)
Jim Olsen (Big Hole River Fisheries Biologist)
406-533-8451 JimOlsen@mt.gov

Montana Department of Natural Resources & Conservation (DNRC) Mike Roberts (Hydrologist) 406-444-6641 miroberts@mt.gov

Montana Drought Monitoring 406-444-5354

Internet Resources:

NRIS Drought Report <http://nris.mt.gov/drought/>

USGS Real Time Flow Data <http://waterdata.usgs.gov/mt/nwis/current?type=flow>

NRCS Snowpack Monitoring <http://www.wcc.nrcs.usda.gov/snow/>

Montana Fish, Wildlife & Parks Closure Policy <http://fwp.mt.gov/news/drought/closurepolicy.html> or <http://fwp.mt.gov/news/drought/>

Big Hole Watershed Committee <http://bhwc.org>

Total Maximum Daily Loads (TMDLs) for the Big Hole River



Lower Big Hole River aerial view

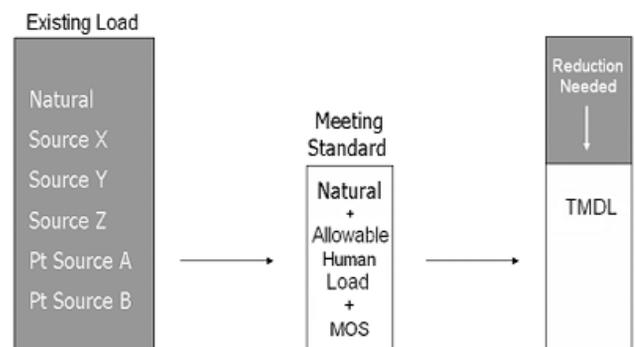
The Montana Water Quality Act requires the Department of Environmental Quality (DEQ) to develop TMDLs for streams and lakes that do not meet Montana water quality standards. The TMDLs address sediment, nutrients, metals, and temperature-related water quality impairments. TMDLs are the maximum amount of a pollutant a water body can receive and still meet water quality standards, and set the level of reduction in pollutant loading that is needed for a water body to meet water quality standards. The goal of monitoring TMDLs is to attain and maintain water quality standards in all of Montana's streams and lakes.

The DEQ has divided the Big Hole River watershed into three planning areas for the purposes of developing 'framework' water quality plans. The Upper and North Fork Big Hole TMDL Planning Areas (TPAs) are located in Beaverhead County and include the Big Hole River and its tributaries from the headwaters to the confluence with Doolittle Creek. The tributaries originate in the Pintler, Pioneer, and Beaverhead Mountains. The Middle Big Hole River TPA extends 43.8 miles from the confluence of Pintlar Creek downstream to the confluence with Divide Creek. The Lower Big Hole River TPA extends 51.4 miles from Divide Creek to the mouth, where the Big Hole River meets the Beaverhead River to form the Jefferson River. Thus, collectively the TPAs encompass the 150 mile long Big Hole River, cover approximately 1.8 million acres, and encompass portions of Beaverhead, Anaconda-Deer Lodge, Madison, and Butte-Silver Bow counties.

Sediment – DEQ's assessments have determined that the Big Hole River above Doolittle Creek together with the 18 tributary creeks in the section, do not meet applicable water quality standards. Sediment TMDLs were developed for the Big Hole River, the North Fork Big Hole River, and for Doolittle, Fox, Francis, Governor, Johnson, Joseph, McVey, Miner, Mussigbrod, Pine, Rock, Ruby, Steel, Swamp, Tie, and Trail Creeks. Sediment is impacting beneficial water uses in these streams by smothering aquatic insect habitat, reducing fish spawning success, or filling pools which reduce fish populations. Water quality restoration endpoints for sediment in these stream segments have been established for fine sediment levels in trout spawning areas, in riffles where many aquatic insects reside, in a number of pools within a reach of a stream, riparian vegetation health and the stability of streambanks. FWP believes that attainment of these endpoint levels will restore all water uses presently impacted by sediment.

Sediment loads were quantified for naturally occurring conditions and impacted conditions for bank erosion, hillslope erosion, and roads. The most significant sources included natural sediment loads, agricultural related loads from riparian vegetation impacts that influence bank erosion, and unpaved roads.

Sediment TMDLs were determined for twenty-six water body segments in the Middle and Lower Big Hole TPAs. The most significant sources included upland erosion associated with grazing, streambank erosion related to roads, and riparian vegetation removal associated with agriculture, unpaved roads, and natural sources.



Schematic example of TMDL development

Nutrients – Francis and Steel Creeks were identified for nutrient TMDL formation in the Upper and North Fork Big Hole River TPA. Nutrient targets include total nitrogen, total phosphorus, algae-related measures and dissolved oxygen. Nutrient TMDLs are based upon target concentrations and stream flow. Rock, McVey, Swamp, Fox, Pine and Warm Spring Creek watersheds may need nutrient TMDLs in the future.

Nitrogen and Phosphorus TMDLs in the Middle and Lower Big Hole TPA were above thresholds, and were linked to nuisance algae growth. Nutrient targets for these streams are intended to control algae growth. The most significant sources of nutrients were from natural and agricultural conditions, which include livestock grazing and hay/alfalfa production. The most easily implemented restoration approaches include streamside natural vegetation restoration in range areas, fertilizer and irrigation management on fields, and moving corrals away from streams.

Metals – Various metals were assessed in Steel, Governor, Mussigbrod, and Joseph Creeks for the Upper and North Fork Big Hole TPA. Either human sources were not present when metals were found, or metals were not found above targets if mining sources were present.

Twenty eight metals TMDLs are provided for eleven water body segments within the Middle and Lower Big Hole TPA. The metals of concern include arsenic, copper, cadmium, lead, mercury, and zinc. Metals TMDLs are based on target concentrations and stream flow. Abandoned mines and atmospheric deposition from the Anaconda Smelter were the most significant sources.

Water Temperature – A temperature TMDL has been established for the Upper Big Hole River above Doolittle Creek confluence. The most significant temperature reductions will come from restoration of natural shrubby riparian buffers in the area. Healthy riparian zones filter sediment and nutrients from runoff and nutrients from groundwater before it enters streams. Promoting healthy riparian vegetation also slows bank erosion and increases shade over streams. Creating more healthy riparian vegetation can be accomplished by employing grazing management techniques and moving hay production away from immediate streamside areas.

Temperature TMDLs have been established for three water body segments in the Middle and Lower Big Hole TPA. Water quality targets for temperature depend on conditions that

influence temperature, such as streamside shade-producing vegetation, instream flow, and channel geometry.

Heating was quantified for naturally occurring background conditions, and for human activities, which influence stream shading, and shifts in stream channel geometry. The human influences on the capacity of the stream to buffer temperature changes are primarily diversions from the river for irrigation and domestic uses. The most significant causes include riparian vegetation removal associated with agriculture, natural sources, and the loss of thermal buffering capacity due to decreased streamflow.

Implementation of most measures discussed here will be based on voluntary cooperation by watershed stakeholders; proposed actions will not conflict with water rights or private property rights. The TMDLs and associated documentation will be used by local watershed groups and other watershed stakeholders to help guide and prioritize local water quality improvement activities.

Complete TMDL reports and documents can be accessed online by visiting <http://deq.mt.gov/wqinfo/tmdl/finalreports.mcp>.



Irrigation ditch and headgate

How Do You Know If You Have a Wetland?

Wetlands are areas that are inundated or saturated by surface or ground water 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. Wetlands generally include swamps, marshes, bogs, and similar areas. Jurisdictional wetlands are those wetlands that are protected by law.



Wetlands are where water is the dominant factor determining soil, plant, and animal communities.

Wetlands are not always wet. During some seasons, a wetland may actually be dry. If you think your land may contain a wetland, ask a wetland specialist who understands vegetation, soils, and hydrology. Some of these specialists work for agencies like the Natural Resources Conservation Service and the Army Corps of Engineers; others are private consultants. Be sure to accompany this person so you can ask questions and understand the exact location and characteristics of your wetland. The wetland specialist can also provide the names of people to contact about projects that might affect the wetland, require permits, etc. Visit www.deq.mt.gov for specific information on permits.

Threats to Wetlands

Human alterations to the landscape have caused massive wetland loss. Wetlands in rural areas continue to be lost as land is put into agricultural production. In urban areas, development fragments wetland areas, and in some cases eliminates them altogether. Human activities that cause wetland degradation include the following:

Hydrologic alterations due to:

- Draining or filling for development and farming.
- Dredging and stream channelization for flood control and development.
- Diking and damming to form ponds and lakes.
- Diverting flow to or from wetlands.
- Adding impervious surfaces in the watershed, thereby increasing water runoff into wetlands.

Vegetative damage due to:

- Overgrazing and trampling by livestock.
- Browsing by wild and domestic ungulates.
- Introduction of non-native species that compete with native species.
- Removal of riparian vegetation for unimpeded watershed views.

Pollution inputs of sediment, fertilizer, human sewage, animal waste, road salts, pesticides, and heavy metals come from sources such as:

- Runoff from urban, agricultural, silvicultural, and mining areas.
- Air pollution from cars, industries, and power plants.
- Old landfills and dumps that leak toxic substances.

Land use changes due to:

- Plowing native grassland for crop production.
- Locating homes and other development in riparian corridors.
- Building roads and other infrastructure that fragment habitat and increase runoff.

What Happens if We Interfere with Wetlands?

Destruction of wetlands can create far-reaching impacts:

- Decline in wildlife populations.
- Increased flood damage.
- Increased sediment and nutrients in lakes and streams.
- Contaminated drinking water and irrigation wells.
- Reduced fish productivity due to poor water quality and habitat loss.
- Increased costs of treating drinking water.
- Reduced recreational opportunities and loss of tourist dollars.
- Lower water tables.
- Reduced production of livestock.

Reference: "Landowners' Guide to Montana Wetlands" can be viewed at <http://www.mtwatercourse.org/Publications/Publications.htm>



Wise River meandering through wetland meadow in the upper reach

Wetlands Permitting Processes

A property containing wetlands or riparian areas is subject to certain regulations. By understanding the basics of the wetland permitting process, the landowner will feel more confident and knowledgeable about the property and be able to make wise land use decisions.

Rooted in the Clean Water Act, wetland permitting regulations are designed to minimize damage to these valuable areas protecting water quality for the benefit of landowners, their communities, and fish and wildlife resources. Stewardship of these areas begins with recognizing their value and avoiding impacts to them by building away from these areas, and restoring them if necessary. If construction near these areas is unavoidable, the permit system ensures that minimal damage is done and, if necessary, mitigation or restoration projects are completed.

To reduce paperwork, several Montana agencies involved in permitting have developed a joint application. Landowners can now fill out and submit one application covering four different permits. Agency staff in charge of administering the permits are willing to answer questions and may be available for a site visit.

Landowner activities that require permits include, but are not limited to: dredging or filling of wetlands, bridge construction, river bank stabilization, use of heavy equipment near surface waters, road construction, building a dock or boat ramp, building a pond, and installing or replacing a culvert. Often, maintenance work on irrigation headgates requires a permit.



Wetlands and riparian areas along a stream

Commonly Required Permits

Joint Application:

Landowners can complete a single application for the Section 310 Permit, the Floodplain Permit, the Section 404 Permit, and the Section 318 Authorization. The application is available online at <http://www.deq.mt.gov/Permits.mcp>

Section 310 Permit:

The Board of Supervisors of the local Conservation District administers the Montana Natural Streambank and Land Preservation Act (Section 310 permit), which regulates any activity that physically alters or modifies the bed or banks of a perennially flowing stream. These activities include, but are not limited to: streambank stabilization, placing a culvert in the stream, building a bridge, diversions, reservoirs, or making other channel changes. Contact the affected local Conservation District. Deer Lodge 846-1703, Beaverhead 683-3802, Mile High (Butte) 287-7875 and Madison 682-7289.

Section 404 Permit:

The U.S. Army Corps of Engineers (USACE) administers the Clean Water Act Section 404 Permit, regulating the discharge of dredged or fill material in "waters of the United States," which includes jurisdictional wetlands and open water systems. Landowners proposing projects that involve a regulated discharge must have this permit. The application is available on the web at <http://www.fws.gov/habitatconservation/cwa.htm> Contact: USACE: Helena, 406-441-1375; Billings, 406-657-5910.

Section 318 Permit:

A 318 Authorization must be obtained from the Department of Environmental Quality, prior to initiating any project that will cause unavoidable short term violations of state water quality standards. Under certain circumstances, Montana Fish, Wildlife & Parks can issue 318 permits on behalf of the Montana Department of Environmental Quality. "State water" includes all bodies of water, irrigation systems and/or drainage systems, either surface or underground, including wetlands, except for irrigation water where the water is used up within the irrigation system and the water is not returned to other state waters.

The purpose of the law is to:

- Provide a short term water quality turbidity standard for construction activities.
- Protect water quality.
- Minimize sedimentation.

Floodplain Permit:

These permits are administered locally by the floodplain administrator, who may be the city or county planner, sanitarian, building inspector, town clerk, or county commissioner. Landowners planning to build within a designated 100-year floodplain must apply for a floodplain permit. Local planning officials or the Department of Natural Resources and Conservation will have floodplain maps if one has been prepared for that area. More information is available on the web at http://dnrc.mt.gov/wrd/water_op/floodplain/. Contact the local county or city government, or the DNRC at 406-444-0862.

Local Setback Regulations

Many of Montana's counties and cities have regulations governing minimal distances between new buildings and nearby rivers, streams and wetlands. Contact city and county planning offices to find out about setback requirements in your area. For more information on setbacks see "A Planning Guide for Protecting Montana's Wetlands and Riparian Areas", available from the Montana Watercourse at <http://www.mtwatercourse.org/Publications/Publications.htm>

If you are considering any activities that may affect wetlands, you may need one of the following permits before beginning work.

If the property has wetlands or potential wetlands:

- 404 Permit
- 318 Authorization
- Local setback approval

If the property has a river or stream:

- 310 Permit
- Floodplain Permit
- 404 Permit
- 318 Authorization
- Water Rights
- Local setback approval

If the property is near a lake:

- Lakeshore setback approval
- 318 Authorization

If the property has a well or will require a septic system:

- Ground water certificate, issued by the state
- Septic system permit, issued by the local government

Fish Ponds

Montana Fish, Wildlife and Parks (FWP) administers private fish pond licensing. Regulations are intended to (1) allow the stocking of private fish ponds while ensuring that public resources are not adversely affected by unwanted fish or fish diseases, (2) guarantee that nuisance aquatic species are not planted into ponds where they can escape or be introduced into state waters, and (3) ensure that the habitat of wild fish is not harmed.

Many streams suffer from dewatering by consumptive water uses. Additional water withdrawals for ponds can compound an already serious problem for wild fish and their habitat. Pond builders must consider that water withdrawals for new fish ponds may negatively impact downstream public resources, including wild fish. Every effort should be made to eliminate or minimize the use of stream surface water or alluvial groundwater for ponds.

FWP will not process a fish pond license application until it is certain that the landowner has legal water rights. The license must be renewed every ten years. More information is available on the web at <http://fwp.mt.gov/fishing/regulations/ponds.html>. Contact Montana Fish, Wildlife and Parks at 406-444-2535.

Depending on the location, the pond may be subject to the wetland regulations previously explained. If the proposed pond is in the floodplain, near a stream, a river, a wetland, or a lake, or on a reservation, additional regulations may apply as well.

For more information, see The Guide to Stream Permitting at: http://dnrc.mt.gov/permits/stream_permitting/

Nutrient Pollution

The primary sources of nutrient pollution are:

- **Agriculture:** Animal manure, excess fertilizer applied to crops and fields, and soil erosion make agriculture one of the largest sources of nitrogen and phosphorous pollution in the Big Hole Valley. Animal waste can contribute significant volumes of excess nutrients to waterways if the manure is improperly managed.



- **Stormwater:** When precipitation falls on our cities and towns, it runs across hard surfaces – rooftops, sidewalks and roads, etc. – and carries pollutants, including nitrogen and phosphorus, into local waterways.
- **Wastewater:** Our sewer and septic systems are responsible for treating large quantities of waste, and these systems do not always operate properly or remove enough nitrogen and phosphorus before discharging effluent into waterways.
- **In and Around the Home:** Fertilizers, yard and pet waste, and certain soaps and detergents contain nitrogen and phosphorous, and can contribute to nutrient pollution if not properly used or disposed of. The area of hard surfaces and the type of landscaping on a property can also increase the runoff of nitrogen and phosphorus during wet weather.

Pet Waste

Failing to pick up after your pet is a health concern for humans and other animals, and can lead to water quality problems. Pet waste contributes nutrients, parasites, and bacteria to water bodies when it is not disposed of properly. This can lead to water conditions that are unsafe for human recreation. Polluted water bodies can also sicken and kill pets and livestock that drink the water.

What you can do to prevent pet waste from polluting our water ways:

- When taking your pet for a walk, bring a bag to collect and dispose of pet waste in a trash can. Waste left on sidewalks, streets, and other paved areas is carried away by storm water directly into streams.
- Inform other pet owners about why picking up pet waste is important and encourage them to do so.
- Take part in a storm drain marking program in your area to help make others aware of where pet waste and other runoff goes when not disposed of properly.

Please pick up after your dog



Lawn and Garden Care



Our lawns and gardens, and how we maintain them, can have a big influence on nutrient pollution. A number of easy landscaping techniques can reduce the flow of water and the transport of nutrients off the lawn and into local waterways and storm drains. Special care should be taken to prevent nutrient-rich fertilizer from flowing off the property. The EPA has estimated that 50 percent of the nitrogen

in fertilizer can be carried off a lawn as a result of improper fertilizer use.

Gardens:

- Plant a rain garden of native plants, shrubs, and trees that reduces the amount of fertilizer needed and provides a way for water to soak into the ground.
- Install a rain barrel to collect rainwater. The water collected can later be used to wash your car or water your plants and lawn.
- Adopt techniques that utilize natural processes, such as grassed swales, filter strips, or buffer strips to control and temporarily store storm water runoff and to reduce the impact of runoff from impervious surfaces on water quality.
- Use pervious pavers for walkways and low traffic areas to allow water to soak into the ground.
- Use yard waste, which includes grass clippings and leaves, in mulch or compost for your garden. If this is not an option, prepare all clippings and leaves for community composting, or store them in barrels or secured paper bags for disposal, which keeps them from washing into streams.
- **Never dump grass clippings or other yard waste into irrigation, drainage ditches or waterways.**

Lawns:

- Apply fertilizers only when necessary and at the recommended amounts. Select the best fertilizer for your needs based on a test of your soil.
- Apply fertilizer after rainstorms or during calm, windless days.
- Apply fertilizer as close as possible to the period of maximum uptake and growth for grass and other plants, which is usually spring and fall in cool climates, and early and late summer in warm climates.
- Avoid applying fertilizer close to waterways.
- Do not overwater lawns and garden. Use a soaker hose (a porous hose that releases water directly to the ground) which can reduce overwatering that carries away fertilizers.
- Aerate compacted soils before application to increase fertilizer uptake.
- Properly calibrate spreaders before applying fertilizers. Settings can change over time due to wear and tear on the spreader.
- Fill fertilizer spreaders on a hard surface so that any spills can be easily cleaned up.
- Properly store unused fertilizers and properly dispose of empty containers.
- Maintain your lawn mowers, snow blowers, chain saws, leaf vacuums, and similar outdoor power equipment to reduce nitrogen oxide emissions. Maintaining your equipment regularly optimizes performance and minimizes pollution.



Chapter 7 ~ Waste Management

Caring for your Septic Tank and System

Taking care of a septic system is not difficult because modern systems function efficiently when a few basic guidelines are followed.

Divert rainwater from the septic drainfield. A soggy drainfield will not absorb and neutralize liquid waste. Plan landscaping, roof gutters, and foundation drains so that excess water is diverted away from the septic drainfield.

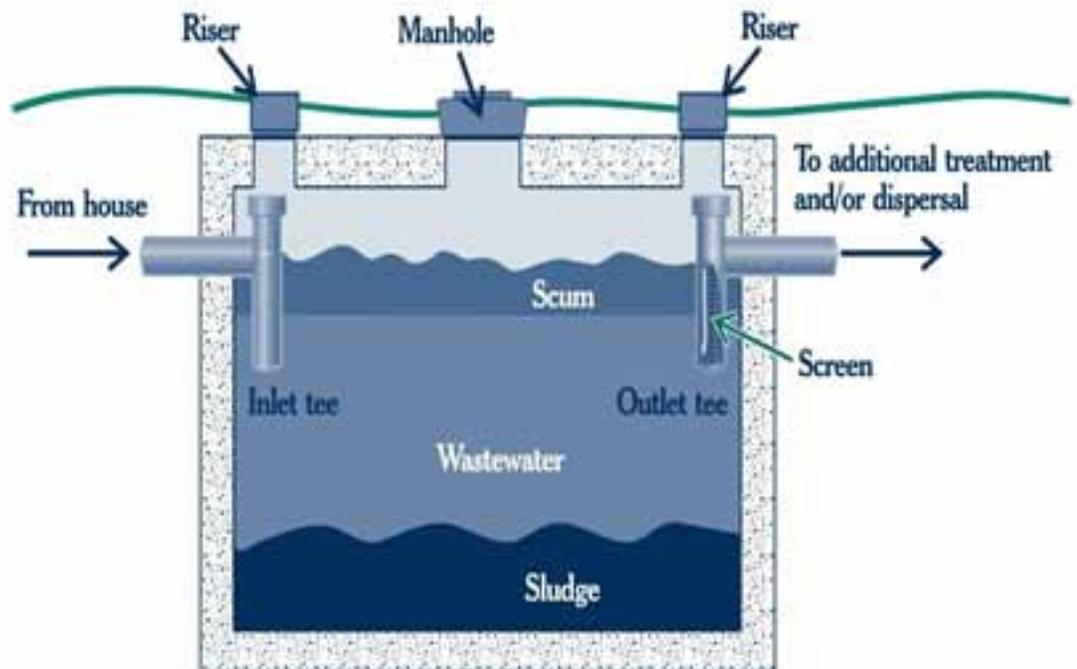
Do not overload the septic tank and drainfield:

- Check faucets and toilets for leaks and make repairs if necessary.
- Use aerators on faucets and flow reducer nozzles on showers to help reduce water consumption.
- Reduce water levels for small loads of laundry.
- Wait until the dishwasher is full to run it.
- Use a displacer to reduce the amount of water needed to flush the toilet.

Keep trees at least 100 feet from the septic system. Roots can damage the septic system. Trees with very aggressive roots, such as willows, should be even farther away from the system.

The toilet is not a garbage disposal. Never flush cat litter, disposable diapers, sanitary napkins, tampons, paper towels, facial tissues, coffee grounds, or cigarette butts and filters. They will clog your septic tank very quickly.

Use garbage disposals wisely. A garbage disposal can double the amount of solids added to a septic tank. Choose a top-line disposal that grinds food into tiny particles that are easier for the system to digest. Some garbage disposals periodically inject small amounts of enzymes into the drain. Keep the reservoir filled--you won't have to remember to add enzymes to the septic tank on a monthly basis.



Minimize use of heavy duty cleaners. Heavy cleaners can kill beneficial bacteria in the septic tank and as a result, solids will not decompose as well.

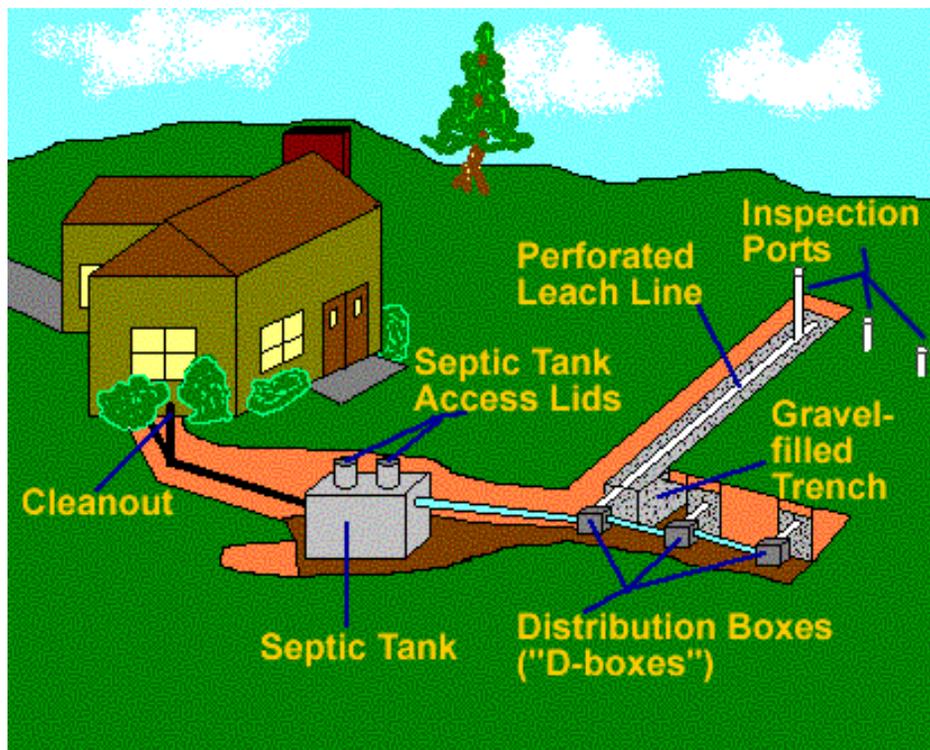
Do not pour grease down the drain. Grease can clog the septic drainfield, making it impossible for soil to absorb liquids. If that happens you will need to restore the system or change to a new drainfield.

Avoid disposal of hazardous chemicals into the septic system. Varnish, paint thinners, motor oils, gasoline, and other similar chemicals can ruin your system and are a hazard to groundwater. Dispose of them properly.

Protect the septic system from physical damage. Do not drive over the drainfield, build a structure on top of it, or cover it with concrete or asphalt. Do plant grass on the drainfield to minimize soil erosion.

Perform regular septic system maintenance. Solids must eventually be pumped from the tank. Many experts advise a family of four with a 1,000 gallon septic tank to have the tank pumped after three to five years of full-time use.

Never attempt to open a septic tank yourself. Gases and bacteria in it are dangerous.



Weed Identification and Control



Leafy Spurge

A noxious weed can be any plant that causes significant economic or environmental damage. Generally, noxious weeds are non-native plants that have been introduced accidentally, as ornamentals in gardens, or as a result of experiments gone awry. Some are poisonous to humans and livestock. Most grow rapidly and are extremely difficult to control. They can reduce crop yields, displace desirable plant species, destroy beneficial native habitat, damage recreational opportunities, clog waterways, and diminish land values.

When noxious weeds invade an area, many aspects of the environment are affected. They can result in decreased grazing for livestock and wildlife; decreased plant and wildlife diversity, leading to a reduction in stability of the ecosystem; increased soil erosion; decreased water quality and fish habitat; decreased food production from ranches and farms; decreased tourism; and decreased distribution of beneficial plants.

Dense infestations of noxious weeds reduce wildlife forage, alter thermal and escape cover, change water flow and availability to wildlife, and may reduce territorial space necessary for wildlife survival. For example, areas dominated by leafy spurge receive three times less use by deer and four times less use by bison when compared with similar uninfested areas. Elk use has been shown to increase about four times after controlling dense spotted knapweed infestations on study sites.



Tall Buttercup

Leafy spurge and spotted knapweed can render many range sites useless for cattle production by displacing valuable

forage. Grazing capacities for livestock can be reduced 65 percent to 90 percent from the original productivity. Noxious weeds out-compete most native plants for soil nutrients and soil moisture. In Glacier National Park, spotted knapweed reduced the frequency of six native species and totally eliminated seven other rare and uncommon native species in a three-year period. Eleven native species were found adjacent to a leafy spurge infestation, but only three native species remained inside the infestation. The invasion of our range land by noxious weeds poses a serious threat to the conservation of native plant communities.



Oxeye Daisy



Spotted Knapweed

For most recreationists, the enjoyment of being outdoors is diminished in areas dominated by noxious weeds. Riding horseback through Hounds Tongue promotes husbandry problems for horses when seeds attach to the hide. The invasion of spiny weeds, such as Canada thistle and musk thistle, make walking difficult. Leafy spurge has a white sticky sap that is an irritant to some people. Loss of habitat for game animals and fish decreases success of hunters and anglers.

Noxious weeds are difficult to eliminate because they produce many seeds, have runners and thus spread rapidly, or have deep roots. Many are not palatable to livestock and wildlife, so the grazers eat the other desirable plants first, leaving the weeds to flourish. Weeds are adapted to rapidly colonize disturbed areas. Many give off chemicals that inhibit the growth of other plants, and often they have waxy leaves, so herbicides do not stick to the leaves and cannot kill the plant.



Common Tansy

There is no one way to eradicate weeds completely, so the best strategy is a mixed bag of methods including:

- Prevention - Keeping weeds out.
- Chemicals - Using chemicals such as herbicides that kill or retard the growth of weeds.
- Biological Control - Using beneficial creatures such as insects or fungi that damage the weeds.
- Mechanical - Tilling or hand pulling the weeds.
- Controlled Burning - Safely burning the weeds.
- Grazing - Using grazing animals such as sheep or goats that will eat the weeds.
- Revegetation - Revegetate a disturbed site to block or choke out the weeds.
- Physical Methods - Hand pulling, cutting, mowing, digging, etc.
- Cultural - Development of weed prevention programs, such as requiring the use of weed free forage and weed free gravel, and vehicle washing, etc.



Dalmatian Toadflax

The best results are often obtained by using several of these control methods together. For example, burn and re-seed in the first year, spot treat remaining plants with herbicides in the second year, change to fall grazing, and restrict vehicle use in the area. After performing weed control, it may be necessary to perform site restoration.

Advice on control methods, as well as specific, local concerns is available from local land managers, extension specialists, and weed control specialists.

What is the difference between a pesticide and an herbicide?

Pesticide is a mixture of chemicals used for preventing, controlling, or lessening the damage caused by a pest usually an insect or an animal. Most pesticides are poisonous to humans. An herbicide is used to kill specific types of plants.



Canada Thistle



Example of a biological control

What is biological control?

Biological control is the deliberate introduction or manipulation of a weed's natural enemies with the goal of suppressing a weed's population. A biological control agent can be an insect, a

fungus, a nematode, or any other organism that retards the weed's growth or reproduction. Biological control agents never completely eradicate a weed from an area but can keep a weed population below economic impact levels.

Weeds in the Big Hole

In the Big Hole watershed, there are several *Weeds of Concern* which are known to be present. These include Leafy Spurge, Canada Thistle, Spotted Knapweed, Dalmatian Toadflax, Common Tansy, Oxeye Daisy, Hounds Tongue, Hoary Alyssum and Tall Buttercup. In an effort to keep them from becoming a problem in the watershed the following weeds are on the *Weed Watch List*: Blueweed, Rush Skeleton Weed, and St. Johnswort.

For more information on weeds in the Big Hole and their control, please visit <http://mtwow.org>



Hounds Tongue

Wildlife Friendly Fences: Tools for Healthy Riparian Areas

Healthy riparian areas help maintain good water quality. The Big Hole River supports a landscape rich in cultural, economic, recreational, and biological values. To sustain these values, the river must provide clean water for drinking, irrigation, fishing, swimming, boating, and aquatic life.

Healthy riparian areas include strips of native vegetation along stream banks that form a buffer between the uplands and the stream. Protecting these important transition areas has been shown to lower water temperatures and air temperatures through shading by shrubs and trees. In addition, riparian buffers reduce flooding, reduce pollution, reduce stream bank erosion, provide fish and wildlife habitat, provide economic benefits, provide recreational benefits, and provide privacy.

Controlled grazing in riparian areas can be an effective tool for managing livestock, vegetation, and wildlife. In Montana, managing cattle numbers and the intensity of grazing, or using rest-rotation systems of grazing, can reduce the amount of dead vegetation while maintaining overall plant cover, increasing palatability and nutritional value of plant forage, and increasing seed germination.

Riparian fencing can be constructed in a manner that helps restore water quality by allowing managed grazing along stream banks and allowing wildlife to move freely across the landscape. Unfortunately, fences can pose risks to wildlife if they become ensnared in the wires or are unable to cross under or over the fence. Elk, moose, deer, sheep, and antelope can all have difficulty crossing fences. Many birds (owls, swans, herons, cranes, raptors, and grouse) and even bats collide with, and can become ensnared in, wire fencing. This is especially true in areas with high bird traffic, such as stream corridors.



Mule deer doe attempting to cross a barbed wire fence. Photo: BLM



Mule deer crawling under an otherwise non wildlife-friendly four-strand barbed wire fence with vertical wire stays. Photo: BLM

Animals typically have difficulty negotiating fences that have:

- A top height that is too high for them to jump over.
- Woven wire, which creates an impenetrable barrier and increases the risk of leg or wing entanglement.
- Bottom wires that are too low for animals to crawl or fly under.
- Wires that may not be visible to fast moving animals.

There are many different design options to consider when installing fences. Finding the optimal balance between the need to manage livestock effectively while allowing wildlife barrier-free access to riparian areas is in the best interest of the landowner. Creating open networks of habitat connectivity across areas with wildlife-friendly fencing reduces the number of injuries and deaths among wildlife and also reduces the cost of fence maintenance.

When constructing a riparian area fence, evaluate what design works well with:

- The type of livestock (horse, cattle, sheep, etc) that will occupy the landscape.
- The cost of maintenance associated with different fence designs.
- The type and number of wildlife that frequent the area.
- The topography and natural wildlife corridors.
- Seasonal wildlife use of the area as a corridor.



Owl ensnared in a barbed wire fence. Photo: BLM

Fence problems encountered by wildlife can often be easily fixed by retrofitting existing fences or building new fences that allow free travel of wildlife under, over, or around the fence, while still maintaining an effective barrier

for livestock. Fences should be constructed to the following guidelines to reduce adverse impacts on wildlife:

- Construct the fence entirely of smooth wire or rail, or at least smooth wire or rail along the top and smooth wire along the bottom.
- Place the top wire or rail at no more than 40 to 42 inches above the ground.

- Place the bottom wire or rail at least 18 inches above the ground.
- Place gates, drop downs, or openings in the fence in known wildlife corridors or flyways.
- Ensure that the top of the fence is highly visible—use a top rail, reflective tape, vinyl markers, or some type of flagging.
- Ensure a minimum of twelve inches of spacing between the top two wires.
- Avoid vertical stays.

Not all of these fence design recommendations may be appropriate for all areas of your property. For example, a smooth top and bottom wire can work well for horse pastures but may not work as well with cattle.

To read the entire document, *Wildlife-Friendly Fences: Tools for Healthy Riparian Areas*, a Technical Guidance Series - Big Hole River Foundation, visit <http://www.bhrf.org/index.php/explore-the-big-hole-river-watershed/publications-of-the-big-hole-river-foundation>



Recommended wildlife-friendly jack fence along a riparian area.



Openings, crossings, and passes incorporated into your fencing system allows for easy wildlife passage.

Hunting and Hunting Access



Photo: FWP

Hunting opportunities are abundant in the Big Hole watershed, on both public and private lands. Trespass on private land without permission is not permitted in Montana to harvest or to retrieve downed game, even though all of Montana's wildlife are managed as a public trust and are not owned by private landowners. It is the responsibility of the hunter to harvest game in a legal manner. It is also the hunter's responsibility to be aware of all hunting rules and regulations. A good place to start is the Montana Fish, Wildlife & Parks Hunt Planner, available on the FWP website <http://fwp.mt.gov>.

Maps are essential to hunting safely and legally. FWP publishes the Directory of Montana Maps, which provides a listing of all agency and local government contacts to find land ownership information. Land ownership changes over time, so it is important to use current maps and resources. In the case of hunting on public land, it is a good idea to verify public ownership with your local land management agency. Public and private land ownership can also be verified on the web through the Montana Cadastral Mapping Project at <http://gis.mt.gov/>

All hunters should have a good understanding of Montana's access laws. The law requires every hunter to have permission from the landowner, lessee or an agent of either before hunting on private property, regardless of whether the land is posted. It is the hunter's responsibility to know the land ownership of the area he or she intends to hunt, together with any land use restrictions that may apply there. Additionally, permission must be obtained to cross adjacent private land to hunt on public land. Failure to obtain permission is punishable by a fine of up to \$1,000 or six months in jail, and may also result in the revocation of hunting, fishing, and trapping privileges for a period of time.

Permission to hunt on private lands may be obtained by personal correspondence between individual hunters and landowners. Landowners have the right to deny access, permit access for a fee (e.g. lease a hunting opportunity), or give free access. Landowners may require that hunters follow specific instructions as a condition of access. To facilitate access, FWP organizes a hunter / landowner cooperative program called Block Management as a service to both hunters and landowners. Block Management helps landowners manage hunting activities and provides



the public with free hunting access to over 8.5 million acres of private land each year, as well as access to adjacent or isolated public lands in some cases. Landowner participation in Block Management is voluntary. Landowners are compensated with funds from hunting enhancement access fees and non-resident hunting licenses.

When hunting on public land, hunters must also follow rules and regulations set forth by the state or federal agency managing those lands, which may include limited use of motorized vehicles, camping restrictions, and even restrictions on hunting opportunities in some cases. Public lands managed by the State include School Trust Lands, Wildlife Management Areas, some fishing access sites, and Montana Department of Corrections lands. Federal lands generally accessible to the public for hunting in Montana include National Forests, Bureau of Land Management property, and some National Refuges and Waterfowl Production Areas, managed by the U.S. Fish and Wildlife Service. Contact these agencies for specific restrictions for hunting public lands under their respective jurisdictions.

Hunting Regulations



Photo: FWP

Hunting regulations depend on species, location, and season. Some general regulations include prohibitions on hunting during a closed season or without a required license, transferring a license, wasting game meat, hunting within a city or town, shooting from a public roadway or a vehicle, using bait to attract game, using two-way communications while hunting, or hunting with artificial light (spot-lighting). Other general requirements include possessing and validating a license appropriately, using legal firearms or archery equipment, hunting during daylight hours, leaving evidence of sex attached to any harvested animal, and wearing hunter orange unless hunting during an 'archery only' season. These regulations, along with regulations for each game species and hunting district, can be found on the <http://www.fwp.mt.gov> website, at any FWP office, and at most businesses that provide licenses. Required licenses for game species are also explained in those regulations.

Regulations vary between hunting districts and depend on the status of the population of a particular species, as well as the social tolerances of landowners and the desires of hunters in each area. Seasons and regulations are established to maintain viable and healthy populations of wildlife. Regulations may range from no hunting opportunity, to limiting the harvest of female or male individuals with permits or

licenses, to unlimited harvest, or by any resident who purchases a general license or a non-resident who draws a general license. Regulations and seasons are reviewed every two years, at which time population data collected by local biologists, together with comments from sportsmen/women and landowners, are considered by the five-member Fish, Wildlife, and Parks Commission.

Living with Wildlife

Montana is one big community of people and wildlife, all sharing its magnificent mountains, plains, forests, and rivers. Wildlife cross private and public lands to find food, water and shelter.



Photo: FWP

Two-thirds of Montana is in private ownership. That means landowners play a key role in supporting wildlife and in providing hunting and fishing access. Yet, wildlife can cause damage and interfere with ranching, farming, and other land uses. The challenge is to turn a problem into a solution that benefits landowners and wildlife alike.

FWP provides many resources for living with wildlife. These include publications listed on the FWP website, and programs designed to assist landowners. The principal program is the Landowner/Wildlife Resources Program, which provides technical assistance and staff support on projects designed to reduce wildlife impacts, improve habitat, and resolve conflicts with wildlife. This program also helps municipalities reduce urban wildlife conflicts, and supports landowners and agency staff through the Living With Wildlife Grants Program and the Game Damage Wildlife Incident Information System. FWP also has specific initiatives related to living or recreating in bear habitat.



Photo: FWP

Visitors and residents of the Big Hole Valley are reminded that feeding wildlife is illegal (MCA 87-6-216), is detrimental to wildlife, and is also potentially dangerous to human safety. Some people think they are helping out by feeding wildlife. But the fact is that feeding wildlife places the animals at risk and puts them on a collision course with humans.



Consider the following facts about feeding wildlife:

- Supplemental feeding encourages wildlife to become dependent on handouts that are not part of their natural diet.
- Human foods are usually nutritionally inadequate for wildlife and may lead to subsequent health problems.
- Young animals that are taught to depend on humans sometimes never develop normal foraging behavior, and could starve if the artificial food sources are removed or, more likely, they will become nuisances and come into conflict with humans.
- If fed, wildlife lose their fear of humans and learn that they can boldly forage for human food. Consequently, conflicts, nuisance behavior, and risks to human safety are sure to occur.
- Wild animals fed by humans may congregate in unnaturally high numbers, providing the perfect opportunity for diseases to spread. Diseases such as rabies, distemper and others are dependent on dense animal populations.
- Feeding wildlife, especially prey species such as deer, squirrels and rabbits, often causes a domino effect in the food chain. Prey densities increase due to such feeding, which in turn attracts predators such as coyotes, bobcats and mountain lions. If you feed the deer in your yard, you may be inviting a mountain lion into the yard as well.



Photo: FWP

Those who illegally feed wildlife can be charged with a misdemeanor, which carries a maximum fine of \$1,000 and six months in jail. The penalty may also include the loss of hunting, fishing, and trapping privileges for a year or more.

The law does not apply to normal feeding of livestock, to backyard gardens where food stuffs are grown, to most recreational bird feeding, or to commercial processing of garbage. It does, however, apply to those who continue to feed birds after receiving a warning by FWP that the feeding is unlawfully attracting big game and other wildlife.

Other Wildlife Resources: Montana Field Guide <http://fieldguide.mt.gov/default.aspx>

Fish of the Big Hole River



Grayling Photo: Joseph Tomelleri

The fluvial Arctic grayling (*Thymallus arcticus*) is a freshwater fish in the Salmonid family, the same family as salmon, trout, and whitefish, but it is not a trout. Fluvial Arctic grayling largely inhabit the upper Big Hole River, from the town of Melrose upstream to Jackson. Highest densities occur from just upstream of the town of Wisdom, downstream to Dickie Bridge. The majority of spawning occurs upstream from the Mudd Creek Bridge in the main stem, and in several tributaries from Deep Creek upstream to Big Lake Creek. Fluvial Arctic grayling rear in the vicinity of where they hatch; thus, mainstem and tributary reaches in this area provide the majority of rearing habitat.

The rainbow trout (*Oncorhynchus mykiss*) is Montana's number one game fish. Rainbow trout were introduced from numerous hatchery stocks into virtually every suitable habitat in the state, beginning in 1889. Rainbow trout introductions have caused a severe reduction in the range of the native cutthroat trout through hybridization and competition.



Rainbow Trout Photo: Joseph Tomelleri



Cutthroat Trout Photo: Joseph Tomelleri

The cutthroat trout is Montana's state fish. Westslope cutthroat trout (*Oncorhynchus clarkii lewisi*, WCT) were first described by the Lewis and Clark Expedition in 1805 near Great Falls. They are native to Montana in the Upper Missouri and Saskatchewan River drainages east of the Continental Divide, and the Upper Columbia Basin west of the Divide. Cutthroat trout are the only trout native to the Big Hole drainage.

The "brookie" or brook trout (*Salvelinus fontinalis*) was introduced to Montana from eastern North America in 1889. It was extensively propagated and stocked in the early half of the 20th century, but is seldom so today. Brook trout favor small, cold, headwater streams and ponds, particularly those that are spring-fed. Brook trout are common throughout most of the western two-thirds of the state in all major drainages.



Brook Trout Photo: Joseph Tomelleri



Brown Trout Photo: Joseph Tomelleri

The brown trout (*Salmo trutta*) belongs to a different genus than our native trout species. They evolved in Europe and western Asia and were introduced to North America in 1883 and to Montana in 1889 in the Madison River. Today brown trout are found throughout most of Montana, the exceptions being the northwest and parts of the east. Generally, they prefer lower gradient, larger streams than cutthroat and rainbow. Brown trout were widely stocked in the first half of the 20th century, but today most come from natural reproduction.

The mountain whitefish (*Prosopium williamsoni*) is familiar to most Montanans. This widespread native fish is primarily a stream-dwelling species. The mountain whitefish is found in abundance in most clear, cold rivers in the western drainages and the eastern mountain front of Montana. The typical mountain whitefish is a cylindrical 10-16 inch fish, but they can reach a weight of five pounds.



Whitefish Photo: Joseph Tomelleri



Burbot Photo: Joseph Tomelleri

The burbot (*Lota lota*) is easily recognized by its single chin barbel. It is native to most of Canada and the northern United States and is found in all three major river drainages in Montana. Burbot, also known as ling, are usually found in larger streams and cold, deep lakes and reservoirs. They are peculiar in that they spawn during winter, under the ice. They are also largely nocturnal and have an enthusiastic following among fishermen. Burbot are voracious predators and opportunistic feeders.

Angling The Big Hole River

The Big Hole River has been a destination for serious trout fisherman since the late 1880s when *The Angler's Guide*, an Eastern angling journal, advertised the Big Hole as a national destination fishery for grayling and cutthroat trout while promising daily 40 lb (18 kg) catches. Although the River still holds some native cutthroat trout, their populations are almost non-existent today. Instead, the River holds healthy wild populations of brook, rainbow and brown trout which were first introduced into the Big Hole in the late 1880's as hatchery operations began in Butte and Bozeman. Native mountain whitefish are also prevalent in the river. In the 1980s, the state of Montana began moving away from general stocking of Montana rivers. The last hatchery fish were stocked in the Big Hole in 1990.

Prevalent Species

Skinner Lake in the headwaters near Wisdom, to Fish Trap (River Mile 81) - This is the slow moving, high meadow stretch of the Big Hole. It ends at Fish Trap Fishing Access Site. The meadow stretch is home to a few remaining native fluvial Arctic grayling, and a good population of exotic brook trout. Rainbows and browns are few in this section.

Fish Trap to Melrose - This section is characterized by boulder pocket water throughout the river. Beginning just below the town of Dewey, the River flows through a narrow canyon offering excellent stonefly water. This section has five public access sites: Sportsman Park (Mile 78), George Grant-Dewey (Mile 57), Greenwood Bottoms (Mile 56.5), Powerhouse (Mile 52), and Maidenrock (Mile 48). Rainbows outnumber brown trout in this stretch 2:1. There are approximately 3,000 fish per mile.

Melrose to Twin Bridges - This section is characterized by cottonwood bottoms with braided channels and long, slow pools, also offering excellent stonefly water. There are public access sites at Salmon Fly, just below Melrose (Mile 38), Brownes Bridge (Mile 32), Kalsta Bridge (Mile 30), Glen (Mile 25), Notch Bottom (Mile 18), Pennington Bridge (Mile 9), and High Road (Mile 2). Browns outnumber rainbow trout in this stretch 2:1. There are approximately 3,000 fish per mile.

Big Hole River Fishing Regulations Summary

Entire river: Extended season for whitefish and catch-and-release only for trout, open December 1st to the third Saturday in May, with artificial lures/flyes and/or maggots only.

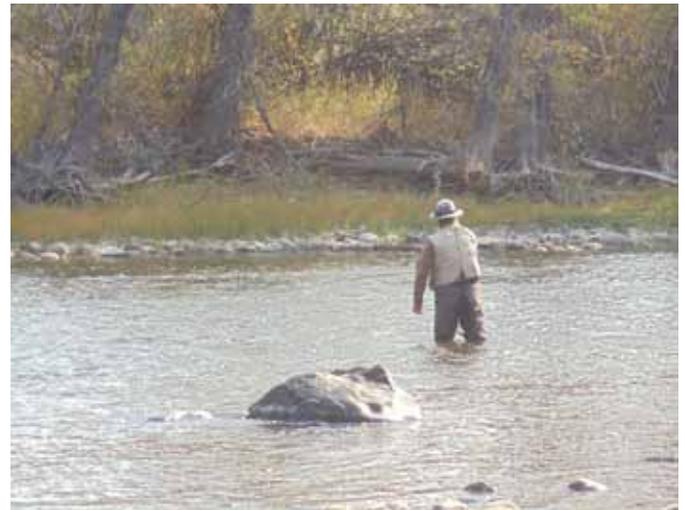
Headwaters to North Fork Big Hole River: Brook trout open entire year.

Headwaters to Dickie Bridge: Combined Trout: five daily and in possession, no size restriction, open entire year.

Dickie Bridge to Divide Bridge: Artificial lures/flyes only, open entire year.

Divide Bridge to Melrose Bridge: Artificial lures/flyes only, open entire year.

This summary is meant only as a quick guide to the fishing regulations. Be sure to consult the most recent Montana Fishing Regulations booklet before fishing the Big Hole River.



Angler near Divide Bridge

Big Hole River Floating Recreation Rules

The Big Hole River Recreation Rules were first adopted in 1999 to address public concerns about crowding. The rules restrict outfitter and non-resident float fishing on different days of the week for specified sections of the Big Hole River. The rules also limit the number of watercraft that may be launched per day by one group at official access sites.

In March 2010, the Commission asked the public to comment on the effectiveness of the current rules. The majority of the responses stated that the rules have improved the recreation experience and should be retained. A few minor changes were made, which the Commission approved. These Rules will be reviewed every five years to assess their effectiveness.

Definitions

1. "Big Hole River" means the river from its headwaters to its confluence with the Jefferson River.
2. "Float fishing" means any fishing from a boat and wade fishing when fishing access is gained by boat.
3. "Float outfitting" means the operation of any boat for the commercial purpose of float fishing by a fishing guide or fishing outfitter.
4. "Official access site" means those river access sites that are publicly owned, managed, and maintained as an access point. The following are official access sites on the Big Hole River:
 - High Road Fishing Access Site (this site is no longer accessible, although negotiations are underway to reopen it)
 - Pennington Fishing Access Site
 - Notch Bottom Fishing Access Site
 - Glen Fishing Access Site
 - Brownes Bridge Fishing Access Site
 - Salmon Fly at Melrose Fishing Access Site
 - Maiden Rock FWP Fishing Access Site
 - Maiden Rock BLM Recreation Site
 - Divide Bridge BLM Recreation Site
 - Power House Fishing Access Site (Silver Bridge)
 - George Grant Fishing Access Site (formerly Dewey)
 - Jerry Creek Bridge BLM Recreation Site
 - Dickie Bridge BLM Recreation Site
 - East Bank BLM Recreation Site
 - Sportsman Park Fishing Access Site
 - Fishtrap Fishing Access Site
 - Mudd Creek Bridge BLM Recreation Site

Big Hole River Recreational Use Restrictions

Starting with the third Saturday in May through Labor Day, recreational use of the Big Hole River is restricted through the defining of eight river zones, with one zone closed to float outfitting each day. Further, the zones restricted on Saturday and Sunday are also closed to nonresident float fishing. Following are the eight restricted river zones:

- For all seven days of the week, the river reach from the headwaters to Mudd Creek Bridge BLM Recreation Site is closed to any float outfitting.
- Sunday, the river reach from Divide Bridge BLM Recreation Site to Salmon Fly Fishing Access Site is closed to any float fishing by non-residents and to any float outfitting.
- Monday, the river reach from Salmon Fly Fishing Access Site to Glen Fishing Access Site is closed to any float outfitting.
- Tuesday, the river reach from Mudd Creek Bridge BLM Recreation Site to Fishtrap Fishing Access Site is closed to any float outfitting.
- Wednesday, the river reach from East Bank BLM Recreation Site to Jerry Creek Bridge BLM Recreation Site is closed to any float outfitting.
- Thursday, the river reach from Fishtrap Fishing Access Site to East Bank BLM Recreation Site is closed to any float outfitting.
- Friday, the river reach from Glen Fishing Access Site to Notch Bottom Fishing Access Site is closed to any float outfitting.
- Saturday, the river reach from Jerry Creek Bridge BLM Recreation Site to Divide Bridge BLM Recreation Site is closed to any float fishing by non-residents and to any float outfitting.

All float users, including each float outfitter, are limited to a total of two launches per day at or near each official access site on the Big Hole River. If a boat is launched at an unofficial site the launch will be counted as occurring at the nearest official site in determining the two-boat limit at or near each official access site.

This summary is intended only as a quick reference to some of the fishing regulations on the Big Hole River. Be sure to consult the most recent Montana Fishing Regulations booklet before fishing the River. For more information, please visit fwp.mt.gov/recreation/management/.

Other Recreational Opportunities

Rockhounding

Crystal Park

Crystal Park is a unique recreation area at an elevation of 7,800 feet in the Pioneer Mountains, 26 miles out of Wise River. Crystal Park is open for day use only and has a fee per car. Facilities include three picnic sites with tables and grills, information signs, toilets, and a paved trail with benches and an overlook. The facilities are designed to be universally accessible.

Quartz crystals are scattered liberally throughout the decomposed granite of this unique 220-acre site. It has been reserved by the U.S. Forest Service for the popular hobby of rockhounding. Quartz crystals are hexagonal prisms, with a pointed "face" at each end. The crystals found at Crystal Park can be clear, cloudy, white, gray or purple, the result of minerals within the quartz. The crystals can be smaller than your little finger or up to several inches in diameter. Gray crystals are known as "smoky" and the highly prized purple ones are called amethyst. Single crystals are most common at Crystal Park. Most of the crystals have little value other than as collector's items.

Directions – three miles south of Dillon on I-15, take Highway 278 exit off Interstate 15, drive west for 22 miles, take Pioneer Mountains Scenic Byway Road 73 north for 17 miles; or from Wise River, take Scenic Byway Road 73 south 26 miles to Crystal Park.

Ghost Towns & Battlefields

Coolidge

Coolidge was a small town created by a former politician and was the site of Montana's largest and final silver development. William R. Allen, a Republican who had been elected Montana's lieutenant governor in 1908, created the Boston-Montana Development Corporation and began buying mining claims in the Elkhorn Mining District. Allen quit politics in 1913 to devote his time exclusively to the company. As early as 1919, the community of Coolidge had begun to thrive, and work was beginning on the mine tunnel. Allen was said to have named the town after his friend Calvin Coolidge. It was rumored that the future President was an investor in the Boston-Montana Development Corporation.

By 1922 the town had both telephone service and electricity provided by a power line running from Divide over the hill to Coolidge. With more families moving to Coolidge, a school district was organized in October 1918. A post office was established in January of 1922.

By the time the mine tunnel and operation were ready to go, the national economy had taken a downturn and silver prices plummeted. In 1923, the whole operation was in receivership. W.R. Allen lost his personal fortune and control of the property. In 1927 a Montana Power Company dam failed and water washed out twelve miles and several bridges of Boston-Montana's railroad. The school district was abandoned and in 1932 the post office was discontinued.

From Interstate 15 south, take exit 102, travel west on Highway 43, then south onto the Wise River Polaris Road (Forest Service Road 73.)

Glendale

In 1875 a 40-ton lead smelter was built at Glendale to process silver and lead production from the local mines. It burned down in July of 1879, but was later rebuilt and enlarged. Ninety pound bars of bullion were shipped from the Glendale smelter to the American Smelting and Refining Company in Omaha, Nebraska for final refining. Kilns on nearby Canyon Creek supplied the more than one million bushels of charcoal the smelter used annually.

In 1893, the mines were hit hard when the Sherman Silver Purchase Act was repealed, causing a disastrous drop in the price of silver. Misfortune continued when the mines began to run out of high grade ore, and in 1900 the smelter at Glendale was torn down.

From Interstate 15, take Exit 93, near Melrose and turn west onto the frontage road, which will change to Trapper Creek Road and lead you to Glendale.

Farlin

The boom years for Farlin were 1905 and 1906, when the Indian Queen mine produced about half a million pounds of copper. Farlin had its own post office and school. Today a few cabins remain along Farlin's main road, and the schoolhouse is a short hike up a side gulch.

From Interstate 15, take the Birch Creek exit between Glen and Dillon, and go west six miles to the town site.

Other Recreational Opportunities continued

Bannack

Bannack was founded in 1862 when John White discovered gold on Grasshopper Creek. Four hundred people moved to Bannack that summer, and a town sprang to life. It was also the home of the infamous renegade sheriff, Henry Plummer, who became Sheriff of Bannack in 1863. It is reported that Plummer was the leader of a gang of road agents and thieves. When a road agent with the name of Erastus "Red" Yeager was about to be hanged, he identified Henry Plummer as the leader of the gang. It was the first indication anyone had that Plummer was a bad man. He was marched from his home to a scaffold he himself had built in his role as sheriff, and hanged by the Vigilantes.



Bannack Ghost Town

In 1864, Bannack was named as the first Territorial Capital of Montana. It remained the capital until Montana became a state, at which time Helena became the capital. From the late 1860s

to the 1930s, Bannack continued as a mining town with a fluctuating population. By the 1950s gold workings had dwindled and most folks had moved on.

Bannack State Park was established in 1954. The buildings and area surrounding them have been preserved to provide a glimpse of how the old west looked in the late 19th century.

Bannack is located about 25 miles southwest of Dillon. From Interstate 15, take Exit 59, then proceed 20 miles west on Secondary 278 to the park sign, and turn south for four miles to Bannack.

Big Hole National Battlefield

Big Hole National Battlefield, located 10 miles west of Wisdom, on Highway 43, is a memorial to the people who fought and died there on August 9 and 10, 1877. About 750 non-treaty Nez Perce were fleeing from U.S. Army troops charged with enforcing the U.S. government's demands that all Nez Perce move to a reservation which was a fraction the size of the tribe's traditional homeland. Just before daybreak on August 9, 1877, mili-



Big Hole National Battlefield

tary forces attacked the Nez Perce as they rested, after six weeks of conflicts and flight from the military forces.

The visitor center overlooks the battlefield. An 18-minute video program and a museum of photographs, quotations and personal belongings of some of the battle participants and non-combatants provide orientation to the park and its story. Self-guiding trails lead to points of interest on the Battlefield. A short drive to the lower parking area connects with foot trails to the Nez Perce Camp, the Siege Area, and the Howitzer Capture site.

Hot Springs

Elkhorn Hot Springs

Elkhorn Hot Springs is located west of Dillon, just off Secondary 278, about 17 miles west of Exit 59 off Interstate 15. It was part of the Beaverhead National Forest until the federal government relinquished ownership of the land and water rights in 1905. Cabins and a stable were built near the site a year later.

Elkhorn Hot Springs is a year-round hot springs resort which offers two outdoor hot mineral pools, a Grecian sauna, a restaurant, and a bar.

Jackson Hot Springs

The town of Jackson and the hot springs were named for the town's first postmaster, Antone Jackson. Members of the Lewis and Clark Expedition first saw the thermal waters in 1806 when a portion of the Expedition passed close by on the return route from the Pacific Ocean.

Jackson lies on the valley floor near the headwaters of the Big Hole River, between Wisdom and Dillon, on Secondary 278. The town is surrounded by several mountain ranges with numerous streams and high mountain lakes.

State Parks

Clark's Lookout

Projecting above the dense cottonwoods and willows along the Beaverhead River, this rock outcropping provided an opportunity for members of the Lewis and Clark Expedition to view the route

ahead. Captain William Clark climbed this hill overlooking the Beaverhead River to plan the continuing journey. The site is located one mile north of Dillon off Highway 41.

Beaverhead Rock

The Lewis and Clark Expedition reached this landmark on August 8, 1805. On the Expedition's westward journey, Sacagawea recognized this spot, referred to by her Shoshone people as Beaverhead Rock, and knew that she was near her tribe's summer homeland. This was very important to Lewis and Clark because they needed desperately to secure horses from the Shoshone for the trip over the mountains to the coast.

From a distance, this huge, high plains rock resembles a beaver's head above water, swimming west. The best viewing spot is at the pullout along Hwy. 41 about 12 miles north of Dillon (mile marker 13) where an interpretive sign is located. <http://goldwest.visitmt.com>

Mining Districts

Quartz Hill and Vipond Districts

The Quartz Hill mining district is located on the northeastern portion of the Pioneer Mountains, about three miles north-east of the abandoned Vipond town site. It includes lands between the Big Hole River and the headwaters of Echo and Quartz Hill Gulches. This area is essentially the north and northeast facing slopes of Sheep Mountain. Although the Quartz Hill mining district is designated as distinct from the Vipond district, the histories are very intertwined, primarily because historic access to both districts was from the road off Highway 43, south of Dewey, Montana, and the geologic setting is essentially the same. Some of the most important silver strikes in the Pioneer range were made in the Quartz Hill and Vipond districts.

Hecla Mining District

In the 1870s, four mining camps got their start in the Hecla Mining District on the side of Lion Mountain, near Melrose. Also referred to as the Glendale or Bryant Mining District, the Hecla District was strung out along ten miles of gulches, and included the towns of Trapper City, Lion City, Glendale, and Hecla. One of the last districts to be established in the Pioneer Mountains, it was also one of the richest, producing silver, lead, copper and zinc ore valued at nearly \$20 million over the years. <http://www.legendsofamerica.com/mt-hecla.html>

The Historic Canyon Creek Charcoal Kilns

Early blast furnaces represented a significant undertaking for mining companies. The furnaces had to be small enough to transport, especially prior to rail access. They needed a source of power, usually a steam boiler, to operate the machinery, and in the case of hot blast furnaces, to heat the air forced into the furnace. The furnaces required fire brick to line the fire box. The other special need was available water, which in the case of Glendale was brought by ditch and flume from Trapper Creek.

The actual production of charcoal involves locating a source of cordwood, felling the trees, limbing and bucking it into cordwood lengths (4 feet), transporting the wood to the burning site, and burning—or "coaling" the wood. Cordwood was reduced to carbon by two methods. It could be burned in earth-covered mounds, called "pits", or it could be burned in brick or stone kilns designed for the purpose.

The 23 charcoal kilns on Canyon Creek are 20 feet high and 25 feet in diameter. They represent the conical type, made usually of brick, most common in the charcoal industry after 1850. Each kiln held between 35 and 45 cords of wood. The mining districts and charcoal kilns can be reached by traveling past the Salmon Fly Fishing Access Site near Melrose and following the road to Hecla, Glendale and Vipond Park. <http://www.foresthistory.org>

Skiing

Maverick Mountain Alpine Ski Area



Maverick Mountain-photo by Jen McKay

Maverick Mountain is located just off the Pioneer Mountain Scenic Byway, just south of Dillon off Highway 278, in the expansive Beaverhead-Deerlodge National Forest. The terrain accommodates novice and expert skiers in a relaxed environment with no crowds, no attitude, no lift lines

and wide open skiing. <http://skimaverick.com>

Mount Haggin Nordic Ski Area

The Mount Haggin trails are located on Mill Creek Road (SH 274) eleven miles south of State Highway 1, near Anaconda. The Mount Haggin Nordic Ski Club maintains approximately 20 km of groomed cross-country ski trails in cooperation with the Montana Department of Fish, Wildlife and Parks. <http://milehighnordic.org/>

First Edition

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The staff and board members of the Big Hole River Foundation felt there was a need in the Big Hole Watershed for this Sourcebook. Contributions by the four counties along the Big Hole were invaluable in preparing the document.

Developed by:

Corky Logan, Big Hole River Foundation bhrf@bhrf.org

Reviewed by:

Mike Bias, Big Hole River Foundation mike@bhrf.org

Contributions by:

Rick Hartz, Planning Director-Beaverhead County
Charity Fechter, Planning Director-Madison County
Steve Hess, Senior Planner-Butte-Silver Bow County
Doug Clark, Planning Director-Anaconda-Deer Lodge County
Braden Burkholder, Montana FWP

Assistance from:

Janet Bender-Keigley, Montana Watercourse

Graphic Design by:

Corky Logan, Big Hole River Foundation

Edited by:

Laura Britt
Janet Bender-Keigley
Tom Welsch

Project Sponsors:

Anaconda-Deer Lodge County
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Cooperman Foundation
Foothills Foundation
Madison County

Resources Consulted:

A Landowners' Guide to Montana Wetlands - Montana Watercourse

Code of the New West: A Citizens' Guide to Rural Responsibility, published by Madison County Planning Board

Gallatin Watershed Sourcebook: A Resident's Guide, by Steve Forrest, Bridger Outdoor Science School

Montana's Ground Water - a citizen's guide to understanding and protecting ground water, W. Adam Sigler, MSU Extension Water Quality

Representing Property with Wetlands and Riparian Areas: A Guide for Montana's Realtors, Debbie Zarnt, Montana Watercourse

Water Availability & Water Rights in Montana, Tom Osborne, HydroSolutions, Inc.

Other Resources:

Montana Watershed Coordination Council
<http://mwcc.montana.edu/groups/default.asp>

The Montana Watercourse, (406) 994-6671
www.mtwatercourse.org/Publications/Publications.htm

Ground Water Use, Availability, and Water Quality Research in the U.S. US Geological Survey <http://water.usgs.gov/>

Chlorinating a Well and Water System: A Homeowner's Guide to Well and Septic Systems <http://waterquality.montana.edu/docs/includes/player.html?movieName=8>

Montana Bureau of Mines and Geology - Ground Water Research and Information <http://mbmggwic.mtech.edu/> and www.mbm.g.mtech.edu/grw/grw-main.asp

Montana Department of Natural Resource and Conservation—Water Resources Division www.dnrc.mt.gov/wrd/default.asp

Montana Department of Environmental Quality-Source Water Protection <http://www.deq.mt.gov/wqinfo/swp/default.mcp>

Montana Nonpoint Source Management Plan (2007 Report) <http://www.deq.mt.gov/wqinfo/nonpoint/nonpoint-sourceprogram.mcp>

Montana State University Extension Water Quality <http://waterquality.montana.edu>

MSU Extension Publications: (406) 994-3273
www.msuextension.org/publications.asp

Montana Department of Agriculture www.agr.mt.gov/