NATURAL RESOURCES

PART 1: KEY FINDINGS

1. The county is part of a larger eco-system that crosses multiple jurisdictional boundaries.

While this element individually describes each natural feature, it is important to recognize that these components function together and form an eco-system that extends beyond the boundaries of the county. The degradation of one natural resource will impact the other components of the ecosystem. Likewise, activities in other counties can have implications for natural resources in Anaconda -Deer Lodge County (ADLC). For example, draining wetlands impact wildlife habitat and water quality, climate change influences forest health, and erosion affects water quality and soils. Land management decisions must consider these relationships and the affect of land and resource development on the long-term health of natural resources and the greater eco-system.

2. Past industrial operations have impacted many of the natural resources in the county.

While the contamination from the copper smelter is now being remediated, the pollution extended beyond the industrial sites and has impacted natural resources countywide. Many of the streams are listed as impaired due to mining operations. Airborne particulates polluted soils resulting in bare land unable to support vegetation. Groundwater contamination in the Opportunity area has resulted in a moratorium on wells. Soils in parts of the county have elevated arsenic levels. Each of these concerns is being or will be remediated to restore the landscape to a healthy state that will support a vibrant community.

3. Environmentally sensitive areas, or "critical areas", are important to any community.

Critical areas have important environmental benefits such as storing flood waters, providing wildlife habitat, or recharging ground water. In an urban environment, critical areas can be even more important because they also provide open space and visual relief. Critical areas include: wetlands, riparian corridors, geologically hazardous areas, floodplains, and fish and wildlife habitat. Communities protect the function and values of critical areas in order to protect the public from threats to human safety, protect private property from natural hazards, enhance quality of life, and maintain valuable ecological functions.

4. Natural resources are essential to the quality of life and economic development.

Clean air, clean water, and outdoor amenities are frequently cited by residents in the county as the most important aspects contributing to a high quality of life. Prospective businesses and employees also view environmental well being as essential to their location decisions. The long term health of the natural resources in the county can provide a basis for sustainable economic development. The County has many features to attract new residents including abundant wildlife, national forest/wilderness area, ample outdoor recreational opportunities, and quality fisheries. Fishing, birding, and wildlife viewing are among the top attractions for drawing visitors. Anaconda is surrounded by mountains; Highway 1 is part of the Pintler Scenic Loop and throughout the county there are outstanding vistas. Protecting these resources will be a key to successful economic development efforts.

PART 2: EXISTING CONDITIONS

1. Climate

A. By the Numbers

Climate in Anaconda-Deer Lodge County (ADLC) is influenced by its northerly latitude and high elevation. Cold winters and mild summers with dry conditions throughout the year are typical in the county. July and August are the warmest months, while December and January are the coldest. Annual precipitation in the valley averages around 14 inches a year with May and June being the wettest months. Anaconda will average about 72 inches of snow each year.

Table 1: Climate Summary for Period from 1982 – 2005, Anaconda, MT

January Avg. Temp Min.- Max	July Avg. Temp Min.-Max	Annual Precipitation	Annual Snowfall
15.3" – 36.6"	47.3" – 81.7"	14.04"	72.3"

Source: Western Regional Climate Center, www.wrcc.dri.edu/summary/climsmmt.html

Variability in temperature and moisture occur throughout the County because of natural terrain variation. Moisture levels tend to be highest at middle elevations, on north-facing slopes, and in sheltered valleys. Relatively dry sites can be found on low, south-facing sites and high, windy ridges (See Map 1). Temperature is also affected by terrain. High-elevation terrain and shaded, north-facing slopes at lower elevations are generally cooler, while low elevation sites and south-facing slopes tend to be warmer.

B. Climate Change

In 2005, the Governor directed the Montana Department of Environmental Quality (DEQ) to establish a Climate Change Advisory Committee (CCAC). The CCAC was charged with evaluating state-level greenhouse gas (GHG) emissions and identifying reduction opportunities in various sectors of Montana's economy. The Committee's report is available on-line (http://www.deq.mt.gov/ClimateChange/plan.asp).

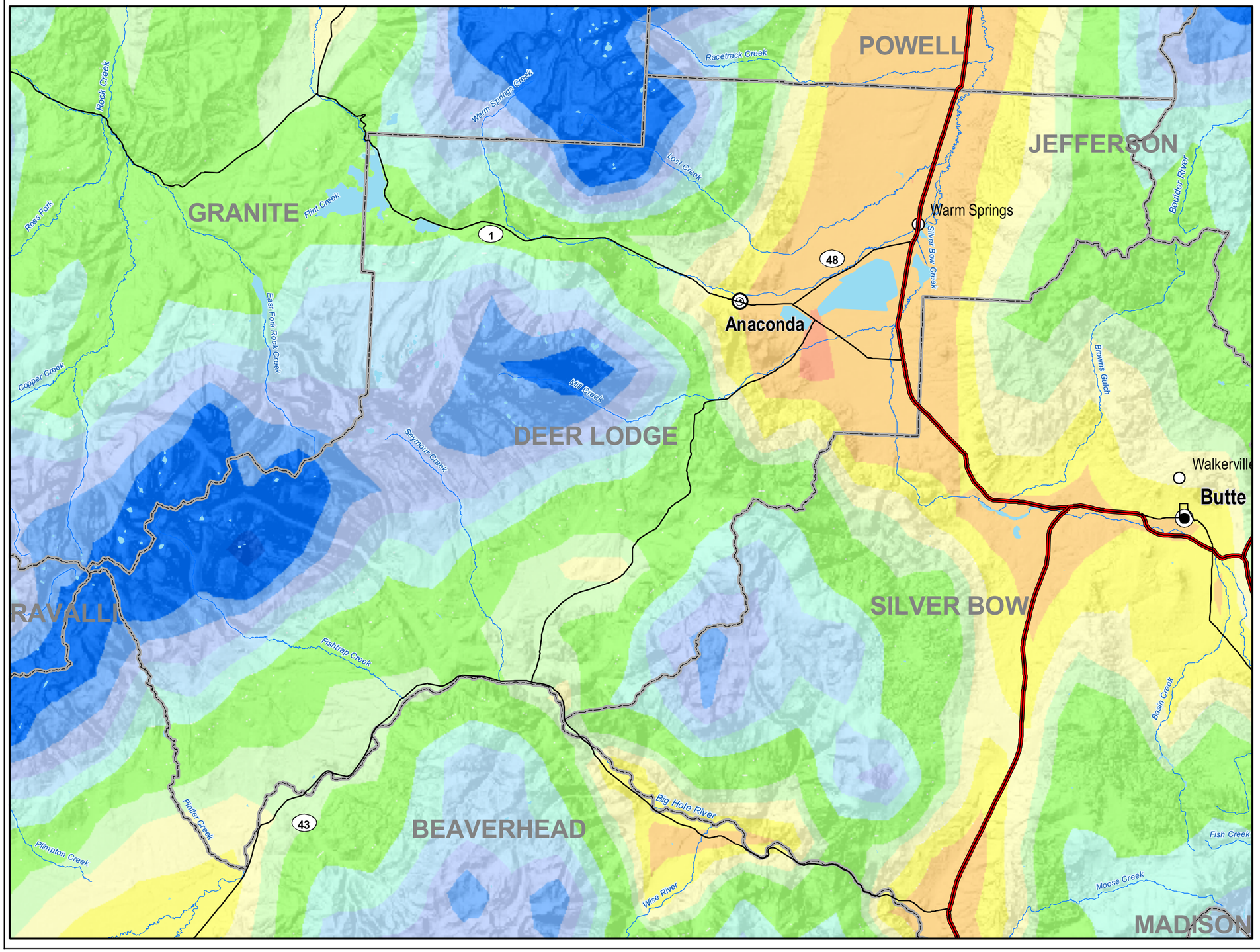
The report noted that between 1990 and 2005, there was a 14% increase in GHG. Consequently, Montana now has a per capita rate of GHG emissions that is nearly double the national average. The reasons for this include the state's large fossil fuel production industry, substantial agricultural industry, long travel distances, high heating demands, and low population base. The electricity and agriculture sectors each account for 26% of emissions while the transportation sectors account for 20% of emissions. Montana has a significant fossil fuel production sector that accounts for 11% of gross GHG emissions.

The Committee agreed on 54 recommendations to reduce GHG emissions. These recommendations focused on energy conservation, renewable energy sources, fuel efficiency in vehicles, open space preservation, and efficient use of resources. Recommendations related directly to land use include using smart growth principles such as infill development, mixed-use development, and transit to reduce the total of vehicle miles traveled.

Map 1: Precipitation in Deer Lodge County

DEER LODGE

Average Annual Precipitation (1961 - 1990)



Ave. Inches/Year

- 0-8
- 8-10
- 10-12
- 12-14
- 14-16
- 16-18
- 18-20
- 20-24
- 24-28
- 28-32
- 32-36
- 36-40
- 40-50
- 50-60
- 60-70
- 70-80
- 80-90
- 90-100
- 100-110
- 110-120
- 120-130

NRCS National Water and Climate Center (NWCC) and the Spatial Climate Analysis Service (SCAS) at Oregon State University (OSU), developers of PRISM (the Parameter-elevation Regressions on Independent Slopes Model).
PRISM is a an analytical tool that uses point data, a digital elevation model, and other spatial data sets to generate gridded estimates of monthly, yearly, and event-based climatic parameters, such as precipitation, temperature, snowfall, degree days, and dew point. These data shown here are the Average Annual Precipitation for a 30 year period 1961 - 1990 for Montana.
http://www.wcc.nrcs.usda.gov/climate/prism.html

0 2.5 5
Miles

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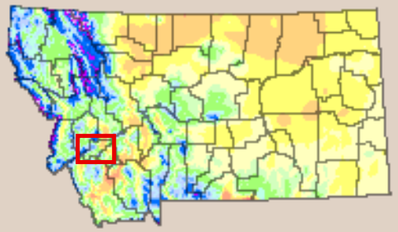

County-Maps-Precip.mxd

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2. Vegetation

A. Land Cover

Vegetation in the county is characterized by large acreages of evergreen forests on public lands and brush and grass rangeland on private lands. Cultivated crop and pasture land comprise less than 10% of the land area in the county.

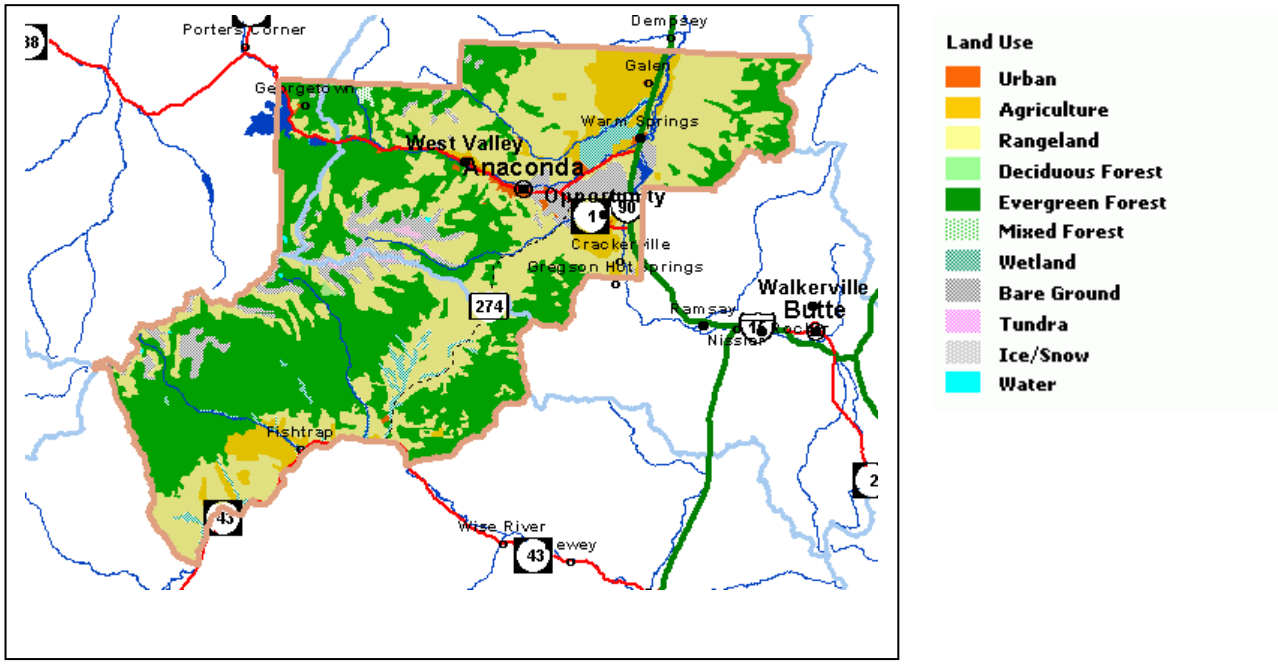
Table 2: Land Cover Statistics in Anaconda Deer Lodge County

Land Cover	Acres	%
Evergreen Forest	206,644	43.6%
Brush Rangeland	127,254	26.9%
Crop/Pasture	31,256	6.6%
Grass Rangeland	28,031	5.9%
Mixed Rangeland	27,694	5.8%
Exposed Rock	20,065	4.2%
Wetland	11,986	2.5%

Source: Montana Natural Resource Information System, Data Derived from USGS Files.

The Anaconda Smelter National Priority List site is located at the southern end of the Deer Lodge Valley. The site covers about 300 square miles including the Old Works, Arbiter Plant, and Smelter Hill as well as numerous piles, waste ponds, and demolition dumps. Extensive acreage was contaminated by aerial deposition of smelter stack emissions which resulted in elevated concentrations of metals and low pH in the upper few inches of the soil. This harmed existing vegetation and limited seed germination, leaving a sparsely-vegetated, easily eroded landscape. Much of this area, designated as bare ground on Map 2, is currently being remediated.

Map 2: Anaconda - Deer Lodge County Land Cover



Source: Montana Natural Resource Information System

B. Noxious Weeds

Noxious weeds are defined as non-native plants that have been introduced through human actions. Due to their aggressive growth and lack of natural enemies, these species can be highly destructive, competitive, or difficult to control. Noxious weeds diminish foliage, lower agricultural production, reduce water quantity and quality, lower water tables, crowd out native plant populations, degrade wilderness areas, modify habitat structures, change species interaction within ecosystems, and displace both plant and animal species.

The 56 County Weed Districts in Montana implement and enforce the Montana County Weed Control Act. The ADLC weed control ordinance may require that a noxious weed mitigation plan be included with any development application. Each district also conducts weed education and awareness programs, manages noxious weeds on county-owned/controlled lands and rights-of way, coordinates weed management activities with other agencies, and monitors weed infestations on private and public lands.

The county weed control district is responsible for developing a district-wide noxious weed management plan to assist county residents in complying with the Montana County Noxious Weed Law. The "Anaconda – Deer Lodge County Weed Management Plan" divides the county into eight weed management areas as outlined in the following table:

Table 3: ADLC Noxious Weed Management Districts

#	Location	Description	Predominant Weeds	Management	Partners
1	Big Hole	River bottom, Pastureland, Timber.	Low % of noxious weeds	Herbicides Mowing Grazing	Landowners MT FWP & DOC USFS
2	Mill Creek & Willow Creek	Mountainous Timber, Valley Pastureland	Leafy Spurge Spotted Knapweed Whitetop	Herbicides Biological controls Grazing, Mowing	Landowners ARCO MT DOC & FWP
3	Georgetown	Lakes, Timber	Leafy Spurge Spotted Knapweed	Herbicides Mowing	Landowners USFS, ARCO
4	West Valley	Valley, Hills, Timber	Leafy Spurge	Herbicides Biological Control Mowing, Grazing	USFS, Railroad, ARCO, Landowners
5	East Valley	Foothills, Ranchland	Multiple varieties	Herbicides Biological Control Mowing, Grazing	Land Owners FWP, DNRC, DOT, ARCO
6	Lost Creek	Valley floor to Mountainous	Leafy Spurge Spotted Knapweed Whitetop	Herbicides Mowing Grazing Biological Control	Landowners ARCO, FWP USFS
7	Anaconda	Urban	Spotted Knapweed	Herbicides Mowing	ARCO, Railroad
8	Opportunity	Rural Residential	Spotted Knapweed Whitetop	Herbicides	Landowners

Source: "Anaconda-Deer Lodge County Weed Management Plan – 2007"

C. Forest Health

Before there was European settlement in the west, numerous forest fires, large and small, occurred periodically throughout the region. During the 20th century, however, fire policies dictated that public land management agencies and private landowners suppress wildfires throughout the west, including in the county. These policies were likely the result of a desire by the public to protect the aesthetic beauty of the forest as well as a concern that uncontrolled fires destroyed the opportunity to harvest forest products.

Policies and attitudes have changed and now natural wildfires in the west are considered by many to be natural and necessary for the general health of the greater regional ecology. Widespread fire suppression prevented the natural role of a major ecological force in forests and has generally resulted in negative impacts to forest health within the inter-mountain west. According to the ADLC Community Wildfire Protection Plan, fire suppression in the many forested areas of the County has resulted in areas are over-stocked, insect infested, diseased, and therefore, highly fire-prone.

The most current threat is from insect infestation, especially the mountain pine beetle. Pine beetles bore through the outer bark of a host tree, where they feed and lay eggs. Their feeding activity, combined with a blue-colored fungus they introduce, is fatal to the host. Trees begin to turn color the spring following attack, and will turn reddish-brown by midsummer.

When conditions are right, mountain pine beetle populations escalate to outbreak levels. Beetles kill large numbers of healthy trees across hundreds to thousands of acres. Over the last decade, Montana has experienced below-normal precipitation. The resulting conditions have reduced the vigor of trees and their ability to repel or survive beetle attacks. In addition, the lack of extreme cold in the fall, before larvae have had a chance to prepare for cold, or in late spring, after larvae have resumed feeding, allowed large numbers of beetle offspring to survive.

The current pine beetle outbreak in Montana began in the late 1990's. Pine beetle populations began increasing in county and around Butte in 2001. By 2003, the outbreak was continuing to expand elsewhere in the state. In 2008, the state saw a substantial increase in the amount of infested areas. Areas of the Lolo and Deer Lodge National Forests that had been experiencing high levels of mortality declined or remained the same as susceptible trees disappeared. Other areas, notable around Helena, western Deer Lodge and Beaverhead National Forests, continued to increase. Mortality in whitebark pine also increased, particularly on the Gallatin, Helena, Lewis & Clark, and Beaverhead National Forests.

Protecting healthy forests in ADLC is important for a number of reasons. First and most obvious is the direct economic impact of wood products. Employment in this industry is still significant in the county and surrounding regions. Healthy forests mean healthy watershed. Tree roots stabilize the forest floor, and the forest canopy slows the rate of runoff by retaining rain and snow. This keeps streams free of silt and promotes healthier fisheries. Finally, forests provide habitats for all types of game animals such as deer, elk, moose, and big horn sheep. The county's game herds attract hunters from all over the state and the nation, and add to the very special qualities of living in the Anaconda-Deer Lodge area.

3. Watersheds

A watershed is the total area drained by a river and its tributaries. The three watersheds that extend into parts of the county are the Upper Clark Fork, Flint – Rock, and Big Hole (See maps.). Common issues and concerns in watersheds include non-point pollution from storm water run-off, stream flows, habitat alteration, siltation, erosion, and suspended solids.

More frequently, watershed planning is the basis for managing water resources. Traditionally, water quality improvements have focused on specific sources of pollution---often called point sources---, such as sewage discharges. While this approach may be successful in resolving isolated sources of pollution, it often fails to address the chronic problems that contribute to a watershed's decline. Watershed management addresses a wide a range of factors that contribute to the overall health of the watershed.

The U.S. Environmental Protection Agency (EPA) recommends that local groups work together to formulate a watershed plan. Watershed management plans vary in scope of effort, geographical area, and objectives depending on the characteristics of the watershed and the stakeholders/partners in the area. Whatever the scale, the most common, general goal of watershed management is to plan and work toward an environmentally and economically healthy watershed that benefits all who have a stake in it. In general, the EPA defines a watershed plan as follows:

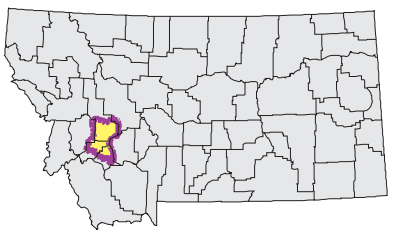
> "A *watershed plan* is a strategy that provides assessment and management information for a geographically defined watershed, including the analyses, actions, participants, and resources related to developing and implementing the plan." (www.epa.gov/owow/nps/watershed_handbook)

Groups that are working on watershed issues in ADLC include:

- Montana Watershed Coordination Council - Works with local groups coordinate watershed planning efforts. (http://mtwatersheds.org/)
- The Deer Lodge Valley Conservation District - Serves Deer Lodge and southern Powell County and works with local groups on watershed management. The District is an active partner in the Upper Clark Fork River Basin Management project and coordinates on planning efforts in the Hearst Lake Watershed and East Deer Lodge Valley.
- Watershed Restoration Coalition of the Upper Clark Fork (WRC) - The organization works with landowners, stakeholders, and agency representatives that are interested in implementing Best Management Practices (BMP), watershed restoration project, and encouraging environmental stewardship that conserve natural resources.(www.watershedrestorationcoalition.org/index.html)
- Big Hole River Foundation *(http://www.bhrf.org*)
- Watershed Land Trust – Montana (*http://www.WatershedLandTrust.biz)*
- *University of Montana, Watershed Health Clinic (http://www.umt.edu/watershedclinic/)*
- Montana River Action Network – Nonprofit organization founded in 1994 dedicated to protecting and improving Montana's stream flows and water quality. (http://montanariveraction.org)

UPPER CLARK FORK
Watershed

National Hydrography Dataset



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Mapscale 1: 400000 Scale In miles:

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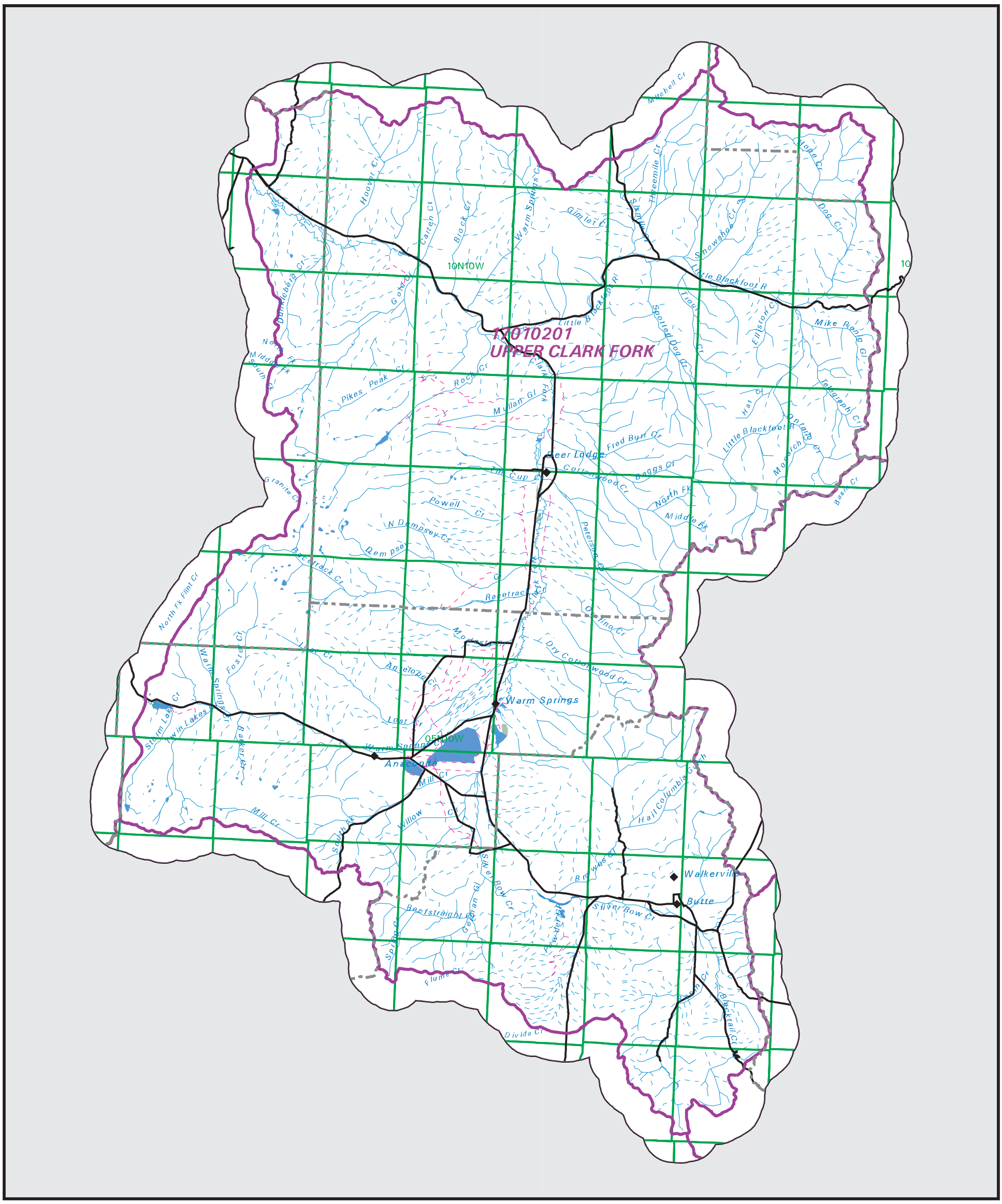
Map Request: 04MSL0001 - 17010201 - NHD

- County Border
- Highway
- Public Land Survey System Townships
- Fourth Code Watersheds
- LAKE/POND
- SWAMP/MARSH
- Canal, Ditch
- Pipeline
- Intermittent Stream
- Perennial Stream, River
- Artificial Centerline

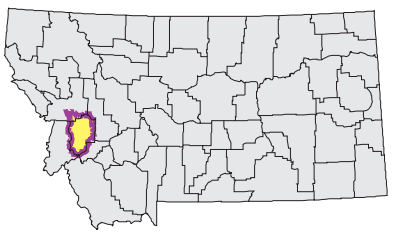
Purpose: Provide support for surface water analysis and display. Not all items in legend will always appear on the map.
SOURCE: United States Geological Survey, NHD for Montana
The National Hydrography Dataset (NHD) is a comprehensive set of digital spatial data that contains information about surface water features such as lakes, ponds, streams, rivers, springs and wells.

This map is to be used as a primary reference source and is not intended for use in site - specific planning. This is public information and may be interpreted by organizations, agencies, units of government, or others, based on needs; however,they are responsible for the appropriate application. Federal, State, or local regulatory bodies are not to reassign to the Natural Resource Information System any authority for the decisions they make.



FLINT-ROCK Watershed

National Hydrography Dataset



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Date created: November 12, 2003

Map Request: 04MSL0001 - 17010202 - NHD

- County Border
- Highway
- Public Land Survey System Townships
- Fourth Code Watersheds
- LAKE/POND
- Canal, Ditch
- Pipeline
- Intermittent Stream
- Perennial Stream, River
- Artificial Centerline

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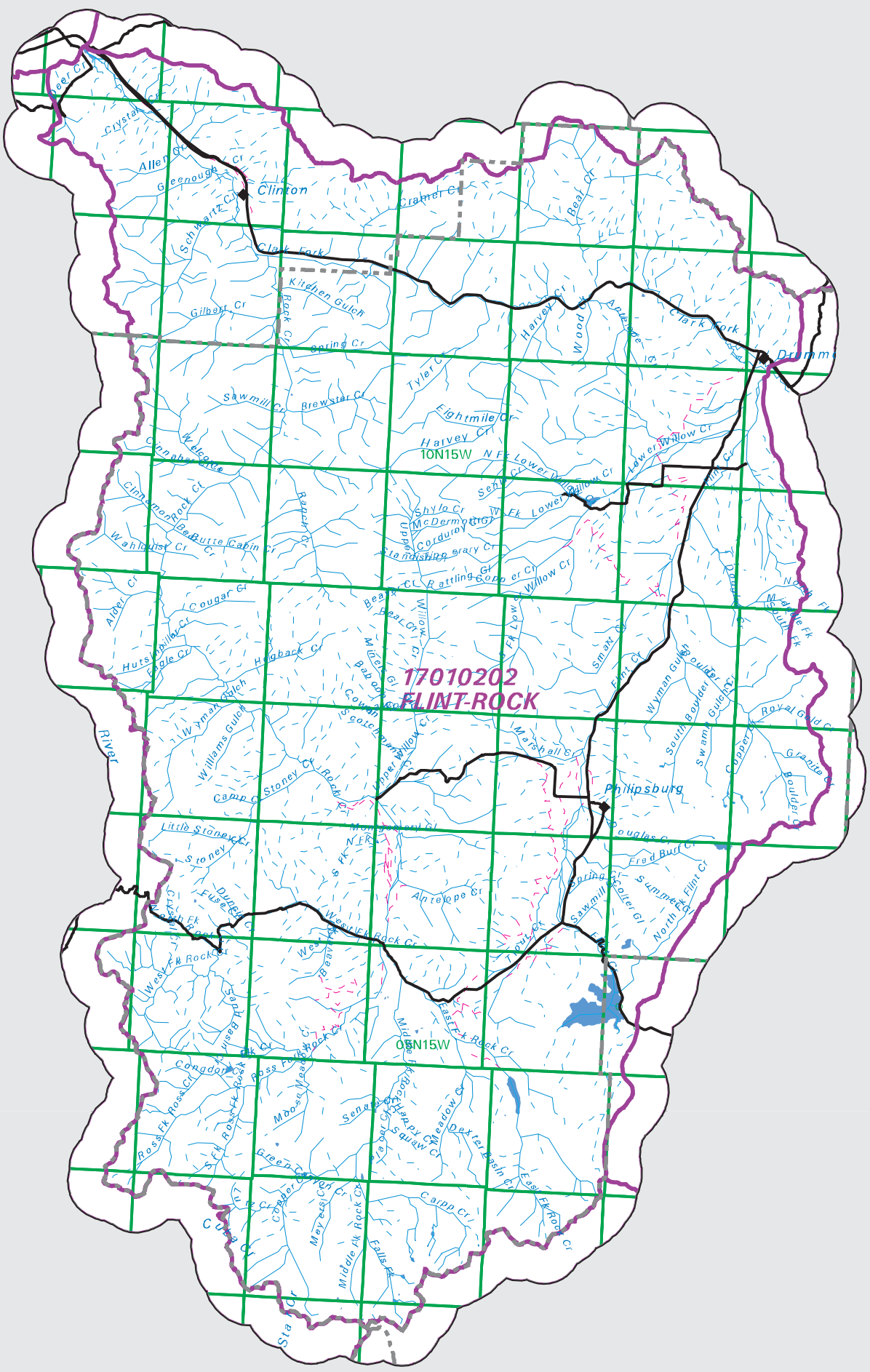

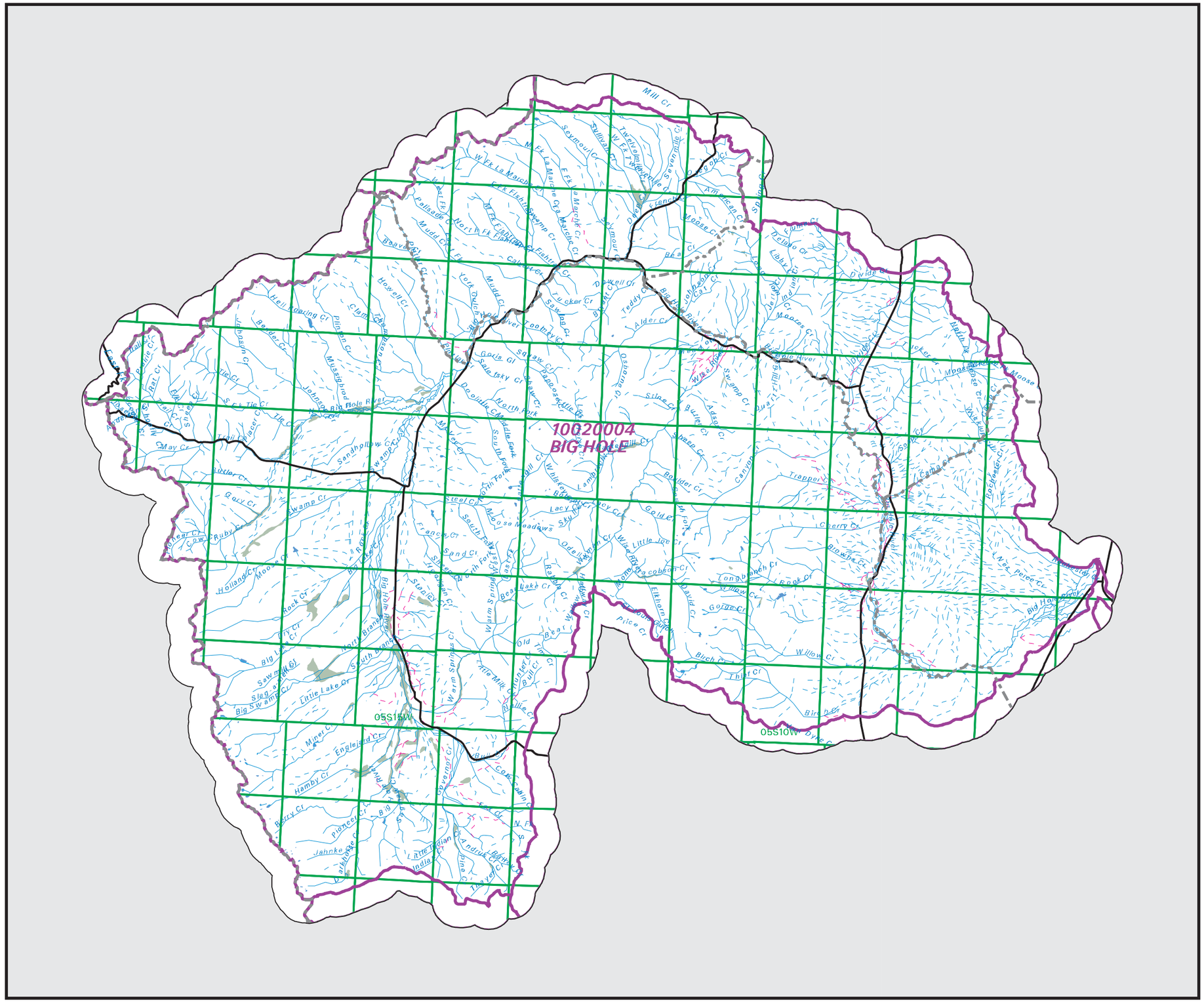

BIG HOLE

Watershed
National Hydrography Dataset

- County Border
- Highway
- Public Land Survey System Townships
- Fourth Code Watersheds
- LAKE/POND
- SWAMP/MARSH
- Flow Connector
- Canal, Ditch
- Intermittent Stream
- Perennial Stream, River
- Artificial Centerline

Purpose: Provide support for surface water analysis and display.
Not all items in legend will always appear on the map.
SOURCE: United States Geological Survey, NHD for Montana
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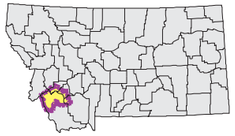

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Mapscale 1: 488000, Scale in miles:

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Date created: November 12, 2003

Map Request: 04MSL0001 - 10020004 - NHD

4. Water Quality

A. Impaired Streams

Section 303(d) of the federal Clean Water Act requires states to identify water bodies where quality is impaired (does not fully meet standards) or threatened (is likely to violate standards in the near future). Every two years the states are required to submit a list of these impaired or threatened waters to the EPA (see Table 4). This "303(d) List" must prioritize impaired and threatened water bodies in order to develop plans to bring the listed waters into compliance with water quality standards.

The major component of the compliance plan is the establishment of a Total Daily Maximum Loading (TMDL) for each impaired or threatened water body. The TMDL is essentially the maximum daily pollutant load to which the water body can be subjected and still meet the standards for the various uses of the water (agriculture, fishing, human contact, etc.). None of the water bodies on the 303(d) list in ADLC has a completed TMDL at this time.

B. Point Source Pollution

The Monitoring and Data Management Bureau (Bureau) of the Department of Environmental Quality (DEQ) has the responsibility under the Federal Clean Water Act and Montana Water Quality Act to monitor and assess the quality of Montana surface waters. A part of that responsibility is to determine TMDLs for each pollutant entering an impaired or threatened body of water. Discharge permits are required for uses such as wastewater treatment plants, concentrated animal feeding operations, sand and gravel operations, oil and gas extractions, and some types of construction activities. Some common pollutants that are limited under the permits are nutrients, heavy metals, and toxic organic pollutants. For point source discharges, the waste load allocation of the TMDL is incorporated into a regulatory permit. There are eight water discharge permits for facilities in the County, including the Anaconda urban storm drainage system.

C. Non-Point Pollution (NPS)

The DEQ “Montana Nonpoint Source Management Plan – 2007”, notes the following:

> “NPS pollution is the leading cause of surface water impairments in Montana, accounting for approximately 90 percent of the documented problems in streams and 70 percent of the problems in lakes, reservoirs and wetlands. According to Montana Department of Environmental Quality’s (DEQ) 2006 Statewide Water Quality Assessment, sediment, nutrients, water temperature problems, heavy metals, primarily from nonpoint sources, are responsible for the greatest number of impaired stream miles in Montana relative to other causes of water quality impairment. The pollutants affecting the greatest number of lake and reservoir acres are metals, particularly mercury and lead, sediment, polychlorinated biphenyls (PCBs), and nutrients. These pollutants are generated by a variety of land uses, including farming, grazing, logging, mining, roads, urban and suburban development, and many other activities.”

Among the most effective methods of controlling non-point pollution is a series land management methods known as “best management practices”, or BMPs. Best management practices include measures such as sedimentation barriers, revegetation of disturbed areas, public education on use of fertilizers and pesticides, improved grazing practices that preserve streambanks and streamside vegetation, and a number of stormwater management techniques that include settling ponds and

stormceptor-type filters. BMPs can be implemented through management plans, regulations, or simply through the conscientious efforts of ranchers, farmers, and other property owners.

Regulations can also be effective in protecting surface water bodies from non-point pollution. Many communities throughout the Pacific Northwest, and even many in Montana, have adopted regulations such as:

- Streamside setbacks
- Streamside vegetative buffer requirements
- Impervious surface standards
- Limits or prohibition on construction on steep slopes
- Revegetation/restoration plans

At this time, the only stream in the county that has any development regulations associated with it is the Big Hole River. ADLC Ord. 208 is the Big Hole Conservation Development Standards and Permitting Process. It establishes a permit process for review of structures within 500 feet of the ordinary high water mark (OHWM), and requires that all structures be set back at least 150 feet from OHWM. This basic ordinance has been adopted by Butte-Silver Bow County, Madison County, and Beaverhead County in addition to ADLC. Butte-Silver Bow also has bridge construction standards.

Regulations that protect water quality and the environmental integrity of watersheds in Montana can be found on-line at http://mtaudubon.org/issues/wetlands/planning4.html. These types of regulations, whether called streambank setbacks, critical area ordinances, or hillside development ordinances, are adopted under the same legislative authority as a zoning code. Therefore, they are perfectly legal in Montana provided that they achieve a legitimate public purpose, and that procedural due process and all other statutory requirements are followed. ADLC also has lakeshore standards for the Deer Lodge County portion of Georgetown Lake. In addition, the Georgetown Lake Development District (GLDD) requires structural setbacks of 50 to 100 feet from the lake's high water level.

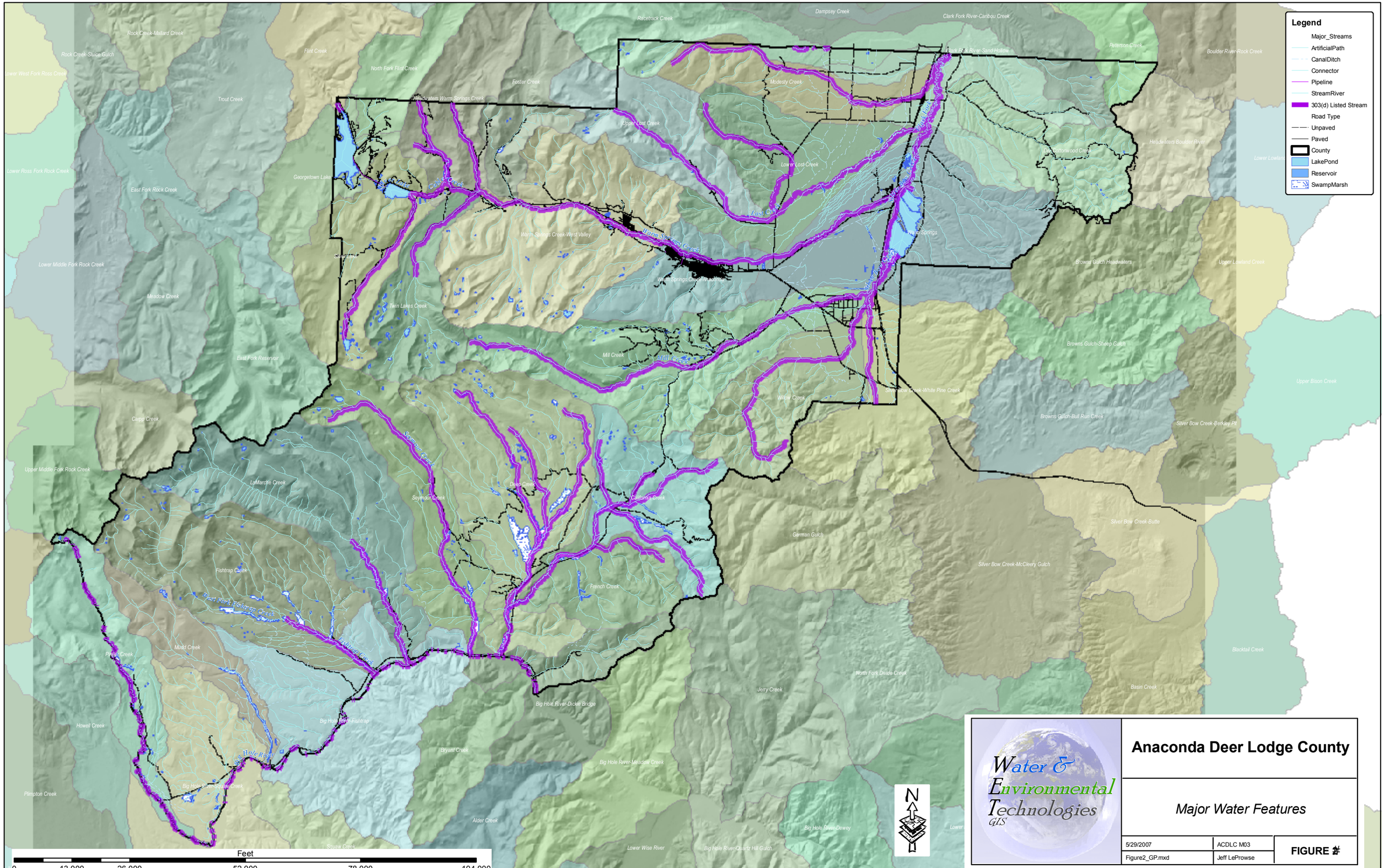
Table 4 is a list of all streams on the 303(d) list along with the specific treat or impairment, and the probable cause. From the types of probably causes of stream impairment, it can be concluded that best management land us and agricultural practice could be very effective in reducing non-point pollution in these water bodies.

Table 4 : List of Impaired Streams with Probable Causes and Sources

Waterbody	Impairment - Probable Causes	Probable Sources
American Creek	N/A	N/A
Antelope Creek	Low Flow Alterations	Agriculture
Big Hole River	Alteration in Streamside/Littoral Vegetative Covers, Copper, Lead, Low Flow Alterations, Physical habitat alterations, Temperature	Agriculture, Grazing in Riparian or Shoreline Zones, Highways, Roads, Bridges, Infrastructure (New Construction), Impacts from Abandoned Mine Lands, (Inactive), Rangeland Grazing, Irrigated Crop Production, Acid Mine Drainage Impacts from Abandoned Mine Lands (Inactive)
Cable Creek	Chlorophyll-a, Other anthropogenic substrate alterations, Habitat alterations, Sedimentation/siltation	Grazing in Riparian or Shoreline Zones, Impacts from Abandoned Mine Lands (Inactive)
California Creek	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Iron, Low Flow Alterations, Other antrhopogenic substrate alterations, Habitat alterations, Sedimentation/siltation, Turbidity	Agriculture, Grazing in Riparian or Shoreline Zones, Impacts from Abandoned Mine Lands (Inactive), Silviculture Activities, Impacts from Hydrostructure Flow, Regulation/modification, Irrigated Crop Production, Natural Sources, Unpaved Road or Trail
Clark Fork	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Cadmium, Copper, Lead, Low Flow Alterations, Nitrogen, Phosphorus, Sedimentation/Siltation	Mill Tailings, Agricultural, Municipal Point Source Discharges
Corral	Alteration in Streamside/Littoral Vegetative Covers, Habitat alterations, Sedimentation/siltation	Rangeland Grazing, Silviculture Activities, Natural Sources
Deep Creek	Alteration in Streamside/Littoral Vegetative Covers, Low Flow Alterations	Rangeland Grazing, Streambank Modifications/destablization, Irrigation
Fishtrap Creek	Alteration in Streamside/Littoral Vegetative Covers, Low Flow Alterations, Phosphorus, Sedimentation/Siltation	Grazing in Riparian or Shoreline Zones, Flow Alterations from Water Diversions
French Creek	Arsenic	Acid Mine Drainage, Atmospheric Deposition - Toxics, Contaminated Sediments, Impacts from Abandoned Mine Lands (Inactive)
Lost Creek-MT76G002_072	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Iron, Other antrhopogenic substrate alterations, sedimentation/siltation, Turbidity, Low Flow Alterations, Manganese, Nitrate, Habitat alterations, Sulfates	Agriculture, Grazing in Riparian or Shoreline Zones, Irrigated Crop Production, Contaminated Sediments,
Mill Creek-MT76G002_051	Arsenic, Cadmium, Chromium, Copper, Lead, Zinc	Contaminated Sediments, Mill Tailings, Mine Tailings
Mill Creek - MT76G002_052	Alteration in Streamside/Littoral Vegetative Covers, Aluminum, Arsenic, Cadmium, Copper, Iron, Lead, Low flow alterations, Zinc	Irrigated Crop Production, Contaminated sediments, Mill tailings
Mill Willow Bypass	Arsenic, Cadmium, Chromium, Copper, Lead, Ainc	Mill Tailings

Modesty Creek	Arsenic, Low Flow Alterations	Agriculture
Oregon Creek	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Copper, Lead, Habitat alternations, Other anthropogenic substrate alterations, Sedimentation/siltation	Agriculture, Forest Roads (Road Construction and Use), Silviculture Activities, Streambank , Modifications/destablization, Unspecified Unpaved Road or Trail, Acid Mine Drainage, Atmospheric Deposition - Toxics, Impacts from Abandoned Mine Lands (Inactive), Mine Tailings, Channelization, Dredge Mining, Erosion from Derelict Land (Barren Land), Forest Roads (Road Construction and Use), Highways, Roads, Bridges, Infrastructure (New Construction), Irrigated Crop Production
Pintler Creek	Low Flow Alterations, Other Flow Regime Alterations, Habitat alterations, Temperature	Impacts from Abandoned Mine Lands (Inactive), Impacts from Hydrostructure Flow Regulation/modification, Irrigated Crop Production, Grazing in Riparian or Shoreline Zones, Loss of Riparian Habitat, Natural Sources
Racetrack Creek	Alteration in Streamside/Littoral Vegetative Covers, Low Flow Alterations	Agriculture, Irrigated Crop Production
Sawlog Creek	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Phosphorus, Sedimentation/siltation	Grazing in Riparian or Shoreline Zones, Unspecified Unpaved Road or Trail, Natural Sources
Sevenmile Creek	Alteration in Streamside/Littoral Vegetative Covers, Sedimentation/Siltation	Rangeland Grazing, Streambank Modifications/Destablization, Natural Sources, Rangeland Grazing
Silver Bow Creek	Aluminum, Arsenic, Copper, Iron, Lead, Manganese, Nitrates, Habitat alterations, Sedimentation/siltation, Silver, Zinc	Impacts from Abandoned Mine Lands (Inactive), Site Clearance (land development or redevelopment, Loss of Riparian Habitat
Storm Lake Creek	Alteration in Streamside/Littoral Vegetative Covers, Chlorophyll-a, low flow alterations, sedimentation/siltation	Channelization, Highway/Road/Bridge Runoff (Non-construction Related), Flow Alterations from water diversions, Forest Roads (Road Construction and Use), Silviculture Harvesting
Twelvemile Creek	Sedimentation/ Siltation	Grazing in Riparian or Shoreline Zones, Silviculture Harvesting
Warm Springs Creek-MT76G002_011	Physical substrate habitat alterations	Channelization, Highway/Road/Bridge Runoff (Non-construction Related)
Warm Springs Creek - MT76G002_012	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Copper, Lead, Low Flow Alterations, Habitat alterations	Grazing in Riparian or Shoreline Zones, Irrigated Crop Production, Mill Tailings,
Willow Creek - MT76G002_061	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Cadmium, Copper, Lead, Phosphorus, Sedimentation/Siltation	Grazing in Riparian or Shoreline Zones, Mill Tailings
Willow Creek - MT76G002_062	Alteration in Streamside/Littoral Vegetative Covers, Arsenic, Cadmium, Copper, Lead, Low Flow Alteration	Agriculture, Grazing in Riparian or Shoreline Zones, Atmospheric Deposition - Toxics, Mill Tailings

Source: Montana Department of Environmental Quality


Legend
Major_Streams
ArtificialPath
CanalDitch
Connector
Pipeline
StreamRiver
303(d) Listed Stream
Road Type
Unpaved
Paved
County
LakePond
Reservoir
SwampMarsh
Rock Creek-Mallard Creek
Rock Creek-Sluice Gulch
Lower West Fork Ross Creek
Lower Ross Fork Rock Creek
East Fork Rock Creek
Lower Middle Fork Rock Creek
Meadow Creek
East Fork Reservoir
Carpp Creek
Upper Middle Fork Rock Creek
Trout Creek
Flint Creek
North Fork Flint Creek
Racetrack Creek
Dampsey Creek
Clark Fork River-Caribou Creek
Clark Fork River-Small Hollow
Peterson Creek
Boulder River-Rock Creek
Headwaters Warm Springs Creek
Foster Creek
Modesty Creek
Upper Lost Creek
Lower Lost Creek
Lower Cottonwood Creek
Headwaters Boulder River
Lower Lowland
Georgetown Lake
Cliff Creek
Warm Springs Creek-West Valley
Warm Springs Creek
Warm Springs Creek-Warm Springs
Warm Springs
Browns Gulch Headwaters
Upper Lowland Creek
Twin Lakes Creek
Mill Creek
Willow Creek
Silver Bow Creek-White Pine Creek
Browns Gulch-Sheep Gulch
Upper Bison Creek
Browns Gulch-Bull Run Creek
Silver Bow Creek-Berkley Pit
Seymour Creek
Deer Creek
California Creek
German Gulch
Silver Bow Creek-Butte
Silver Bow Creek-McCleery Gulch
Fishtrap Creek
French Creek
Mudd Creek
Pattee Creek
Howell Creek
Plimpton Creek
Big Hole River-Fishtrap
Big Hole River-Dickie Bridge
Bryant Creek
Big Hole River-Meadow Creek
Big Hole River-Squaw Creek
Alder Creek
Squaw Creek
Lower Wise River
Middle Wise River
Big Hole River-Quartz Hill Gulch
Big Hole River-Dewey
North Fork Divide Creek
Jerry Creek
Blacktail Creek
Basin Creek
Feet
0
13,000
26,000
52,000
78,000
104,000
N
Water & Environmental Technologies GIS
Anaconda Deer Lodge County
Major Water Features
5/29/2007
ACDLC M03
Figure2_GP.mxd
Jeff LeProwse
FIGURE 2

5. Groundwater

A. Anaconda Sourcewater Delineation and Assessment

The Federal Safe Drinking Water Act (SDWA) requires states to develop and implement a Source Water Assessment Program (SWAP) that analyzes existing and potential threats to the quality of public water supplies throughout the state. The "Anaconda Well Field Source Water Delination and Assessment Report", was completed in 2003 by Water and Environmental Technologies. That assessment dealt with issues in the Warm Springs watershed where the Anaconda public water supply is located.

The Warm Springs Creek watershed stretches the entire length of the creek from its headwaters in the Flint Creek Range to its outlet at the Clark Fork near I-90. The principal source of ground water in the watershed is the Warm Springs Creek alluvial aquifer. This aquifer is recharged by direct precipitation and infiltration in the valley, runoff from snow pack, precipitation events in the surrounding mountains, seepage from the adjacent bedrock, and seepage from the many minor streams within the watershed. Groundwater in this watershed is generally located in shallow unconfined aquifers, which are more easily contaminated.

The most intense development in the West Valley area happens to be just upgradient of the Anaconda well field. This area does not have a central sewer system, and numerous individual septic drainfields pose a potential threat to the Anaconda public water supply. The source water assessment recommends extending central sewer service into the area to replace individual disposal systems, and restricting livestock use near the well field itself. Another water quality concern is that smelter tailings were used as railroad bed material throughout the Anaconda area, including West Valley. Fortunately, that rail line is being removed, tailings are being hauled away, and the old railroad right-of-way is being remediated as this draft is being prepared (January, 2010).

Recent development activity (2009-10) in the West Valley area has raised concerns about ground water availability and the possible impacts to existing wells. Anecdotally, residents report that the water levels in their wells dropped when the County's well field came on line, and they fear if that additional development draws more well water from the same aquifer it could cause their wells to run dry----at least at certain times of the year. The County's source water assessment documents potential threats to the public water supply as pointed out above. However, it does not make a yield assessment for the entire West Valley area, nor does it attempt to project the long range impacts of further development on existing wells.

B. Opportunity

Even though Opportunity is part of a Superfund site that comprises approximately 5,000 acres of land, homes in the area rely entirely on individual wells for domestic water supply. Because of concerns about the quality and available quantities of ground water, there is currently a moratorium on any new wells in the Opportunity area. Obviously, this affects the area's ability to absorb additional growth. Some ground water monitoring has indicated that a plume is moving toward Opportunity from the southwest. However, there are also indications that the Hwy 1 road bed will intercept the plume and Opportunity will not be impacted by it. The most viable solution for Opportunity appears to be central sewer and/or water systems, and main lines have already been extended to Mill Creek Road in conjunction with new industrial development in that area. *(Source: Opportunity Water & Sewer Feasibility Study, Robert Peccia &Assoc, July 2000)*

C. Georgetown Lake

In 2009, the Montana Legislature enacted legislation to fund a study of groundwater resources by the Montana Bureau of Mines and Geology – Groundwater Investigation Program (GWIP). The GWIP has identified a number of priority projects around the state including Georgetown Lake. The rapid subdivision of private land around the lake has raised some concerns about nitrate loading in both groundwater supplies and in the lake itself. Also, pressure for development in the Phillipsburg area has increased the need to evaluate the transition from agricultural land use to residential subdivisions. Although, the shallow groundwater system has been evaluated in the past from investigations of irrigation return flow, the deeper aquifer(s) is now at risk due to the water demands of residential development. Water from the deeper aquifer is thought to be unaffected by area septic systems.

6. Air Quality

A. Ambient Air Quality

The Clean Air Act (CAA) identifies six common air pollutants that are found all over the United States. These pollutants are called "criteria air pollutants" and can injure health, harm the environment, and cause property damage. The U.S. Environmental Protection Agency (EPA) establishes national ambient air quality standards for each of the criteria pollutants. These standards apply to the concentration of a pollutant in outdoor air. If the air quality in a geographic area meets or exceeds the national standard, it is called an attainment area; areas that do not meet the national standard are called nonattainment areas.

ADLC is an attainment area for all pollutants. The city of Butte and the surrounding area is classified as nonattainment for PM10 (particulates 10 micrometers in size or smaller) based upon 24-hour monitoring values. The PM10 nonattainment area (NAA) boundary is about 13 miles to the southeast of Anaconda.

B. Air Quality Permits

The MT DEQ issues air quality permits for stationary sources such as factories and power plants. These facilities are responsible for installing "Best Available Control Technologies" (BACT) to make sure that emissions do not exceed standards for hazardous pollutants as defined by the Clean Air Act. Each facility must monitor emissions and report violations to DEQ. The three facilities with air quality permits in ADLC are Beal Mountain Mine, Cable Mountain Mine, and Mill Creek Generating Station.

C. Anaconda – Pintler Wilderness Area

The Clean Air Act requires that the potential impact on Class I Areas be assessed as part of the permitting process. Class I Areas, as defined in the CAA, are national parks over 6,000 acres, national wilderness areas, and national memorial parks over 5,000 acres. Under this definition, the Anaconda-Pintler Wilderness is a Class 1 Area. In addition to hazardous pollutants, the impacts to Class 1 Areas includes visible plumes, regional haze, and acid deposition which must also be evaluated.

D. Dust

Because airborne contaminants have been deposited on the soil, dust that is created when winds scour the vast areas in east Anaconda that have been denuded of vegetation can contain contaminants as well. This includes the Opportunity Ponds, which is a repository for contaminated soils. With so much open and

barren land lying between Anaconda and I-90, blowing dust can be a safety hazard as well as a health hazard. In 2006, Atlantic Richfield Corporation (ARCO) submitted a dust control plan to be implemented as each contaminated area is remediated. Upon final reclamation, the addition of cover soil and vegetation should eliminate dust issues for the entire Opportunity Ponds area.

The Atlantic Richfield Company (ARCO) started particulate air sampling in 2006, and their data have generally indicated compliance with state or federal ambient air quality standards. ADLC, with funding from EPA, began supplemental ambient air monitoring in May 2007. Their program uses portable air monitors which collect data on a continuous 24-hour/7day-a-week basis. The monitors are co-located with ARCO's to compare the data collected by each. So far, the results from both sets of monitors are similar. Dust is regularly blown into Anaconda area homes and may have accumulated over decades in isolated areas such as attics, basements, utility rooms, and even closets. This dust may contain contaminants such as arsenic. Treatment of attic dust is addressed by the Institutional Controls Plan (ICP).

7. Mineral Resources

A. Mining

Anaconda-Deer Lodge County has a long history of mining. Map 7 indicates the mining districts in the county and the location of active and inactive mines. As shown on the map, there has been a concentration of mining sites in the northwest part of the county. The Department of Environmental Quality is responsible for permitting mines, and the Hard Rock Mining Program regulates the mining of all ore and rock. Table 5 indicates that active mines are typically small in size and are extracting primarily gold, silver and some gems.

Table 5 : Permitted Mines in ADLC

Mine Name	Mineral	Landower	SEC	TWP	RNG	Acres
Cable	Tungsten	Private	10	5N	13W	0.5
Hidden Valley	Sapphires	USFS	15	5N	8W	0.5
Golden Tech	Gold	Private	26	4N	10W	3
Sunnyside Lode	Copper, Gold, Silver	Private	4	5N	13W	3
M.P.M. Deeded Land	Gold, Sapphires	Private	16, 17	5N	8W	1.5
Rox Lor Placer, #1-7	Gold	USFS	7, 12, 18	2N	12W, 11W	0.5
3 Claims: Silver Sleepers, Banker, & Princess	Gold, Silver	USFS	5	5N	8W	0.5
	Gold, Silver, Platinum	DNRC	34	5N	8W	1
Cable Mountain Adjacent	Gold	Private	10	5N	13W	4

Source: Montana Department of Environmental Quality - 2009