3. 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 past copper smelting operations continues to be remediated, the pollution extended beyond the industrial sites and has impacted natural resources countywide. Many of the county's streams are listed as impaired due to mining operations. Airborne particulates and polluted soils can result in bare land unable to support vegetation. 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 areas, 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 15 inches a year with May and June being the wettest months. Anaconda will average about 68 inches of snow each year.

Table 3-1: Climate Summary Anaconda, MT

January Avg. Temp Min.- Max	July Avg. Temp Min.-Max	Annual Precipitation	Annual Snowfall
14.6" – 35.1"	47.5" – 81.1"	15.07"	67.9"

Source: Western Regional Climate Center https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?mt0199

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

The Montana Climate Office is an independent state-designated body that provides Montanans with high-quality, timely, relevant, and scientifically based climate information and services. The office is located in Missoula at the University of Montana and collaborates with other state and federal institutions. The NOAA's National Center for Environmental Information (NCEI), North Carolina State University's Cooperative Institute for Climate and Satellites, along with cooperating partners in every state has compiled a state by state assessment of climate change. The assessment made the following key points regarding Montana.

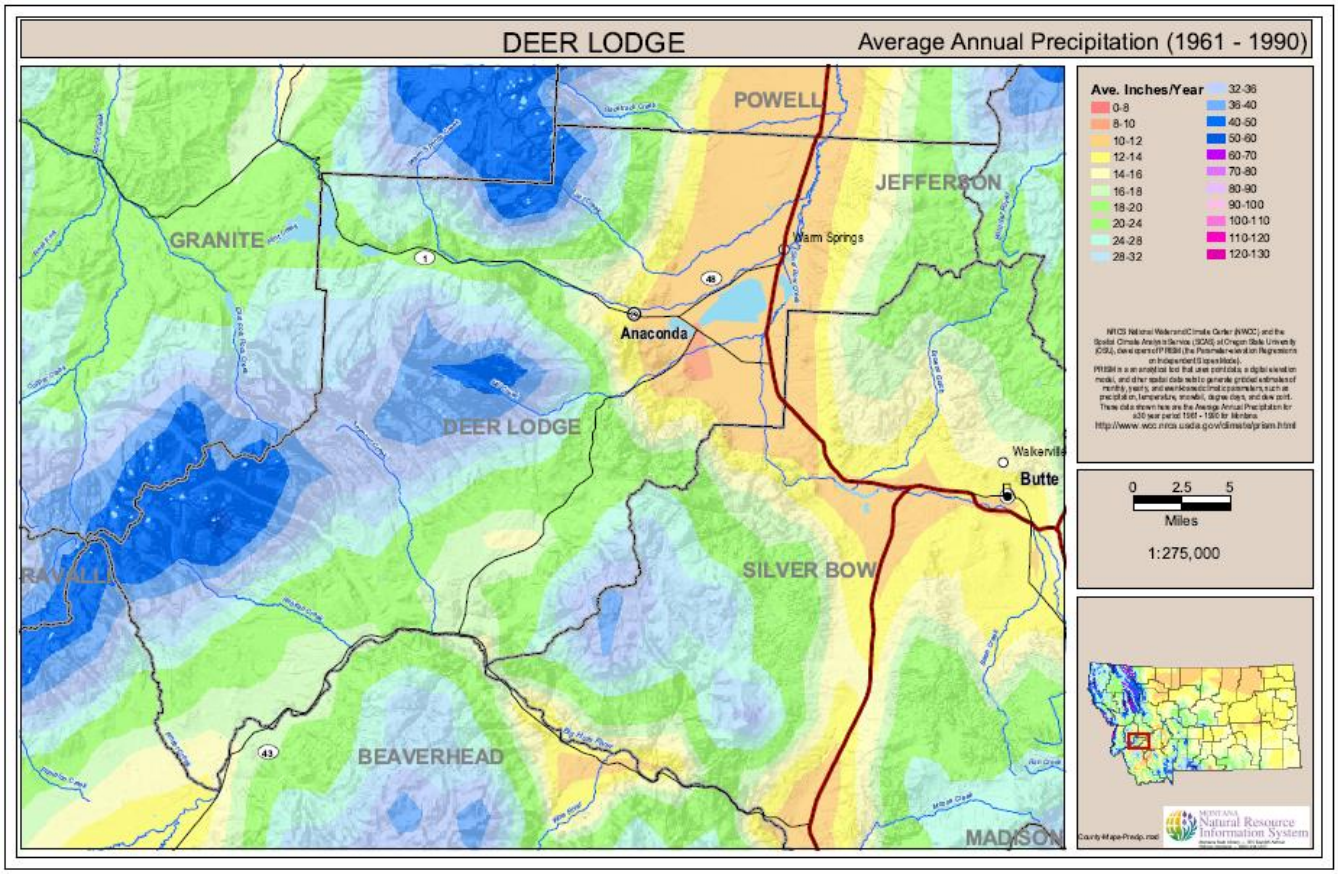
- Average annual temperature has increased approximately 2°F since the early 20th century. This increase is most evident in winter warming, which has been characterized by fewer very cold days since 1990. Under a higher emissions pathway, historically unprecedented warming is projected by the end of the 21st century.

- Montana's mountains and river systems provide critical water resources not only for Montana but also for other downstream states. Projected increases in spring precipitation may have both beneficial (increased water supplies) and negative (increased flooding) impacts.

- Higher temperatures will increase the rate of soil moisture loss during dry spells, leading to an increase in the intensity of naturally occurring future droughts. The frequency of wildfire occurrence and severity is projected to increase in Montana.

Source: https://statesummaries.ncics.org/mt and *http://climate.umt.edu/*

Map 3-1: Precipitation in Deer Lodge County



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.

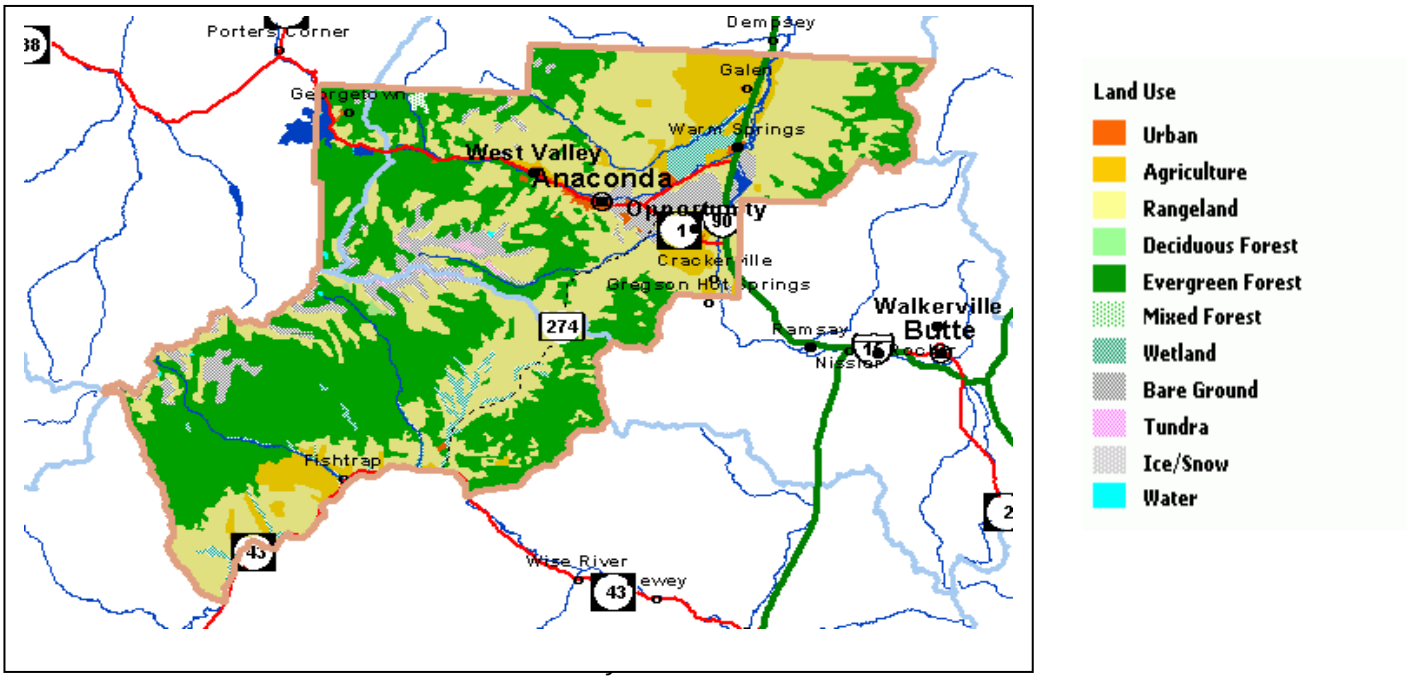
Table 3-2: Land Cover Statistics in Anaconda Deer Lodge County

Land Cover	Acres	%
Forest & Woodland Systems	182,819	38%
Grasslands	106,718	23%
Shrubland/Steppe	57,128	12%
Recently Disturbed (Insect killed & harvested forest)	45,911	10%
Wetland & Riparian Systems	27,744	6%
Developed	15,121	3%
Alpine	12,801	3%
Agriculture	11,976	3%

Source: Montana Natural Heritage Program, http://mtnhp.org/ (File downloaded, Sept. 2017)

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 3-2: Anaconda - Deer Lodge County Land Cover



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 and the Bureau of Indian Affairs implement and enforce the Montana County Weed Control Act. The weed control provisions of the ADLC Code of Ordinances provide that a noxious weed mitigation plan may be required 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.

Fig. 3-1. Two of the most common noxious weeds in Anaconda-Deer Lodge County are the leafy spurge (far left) and the spotted knapweed.

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 tables.

Table 3-3: 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

In 2010, the Montana Department of Natural Resources & Conservation (DNRC) drafted the first version of Montana's Forest Action Plan (FAP). The plan was funded through the USDA Forest Service and was required to include a Statewide Assessment of Forest Resources and an implementation component. Each state highlighted issues specific to their state and identified priority actions for both state and private forests. In 2017, DNRC revised the Forest Action Plan to include the following focus areas:

1) **Forest Products and Industry Retention** - Montana's forest economy comprises timber and non-timber forest products and services, wood energy and renewable resources, a sustainable resource base, a diversity of manufacturers, and a skilled workforce that provides economic, social and ecological value. Diverse and robust forest markets and industry infrastructure in Montana are essential to managing and retaining our forest land base for multiple products and values.

   Goal: Retain and bolster Montana's forest industry so that forests can be managed in an ecologically and economically practical manner.

2) **Stewardship of Wildland, Rural and Urban Landscapes** - Forests are vital to the heritage of the American West, are critical parts of urban infrastructure, and provide significant public benefits. Forest stewardship means recognizing our dependence on forest resources and subsequently using and conserving them in a way that sustains their function, productivity and character. Stewardship responsibilities fall upon a wide diversity of people including land managers, public users, private landowners, communities, tribal members and the forestry workforce. They play a critical role in sustaining these resources.

   Goal: Guide forest owners, managers and communities in implementing stewardship objectives and promote the benefits of engaged forest stewardship.

3) **Forest Restoration, Ecology and Function** - Montana forests are diverse and dynamic, spanning watersheds and communities in a variety of landscapes and ecosystems. Wildfire, insects and diseases, non-native invasive organisms, climate, weather events and management practices are all significant drivers of change in Montana's forests.

   Goal: Promote responsible, active forest management that ensures ecological conditions meet the needs of future generations for clean water, wildlife habitat, sustainable timber supply and recreation opportunities.

4) **Federal Forest Management** - The major issues affecting forestlands in the West are universal regardless of jurisdictional boundaries. With much of Montana's forests in federal ownership, it is incumbent upon elected officials, natural resource managers and citizens to support management activities that restore forests, enhance watersheds and reduce wildfire risk.

   Goal: Increase the amount of forest restoration on federal lands through partnerships with government agencies and Montana communities.

5) **Capacity, Collaboration and Partnerships** - Issue statement: Community capacity is defined as the skills and resources contained within a landscape, tribe, government, community group, and/or general citizenry with the ability to apply those skills and resources in response to change. Fostering this capacity through diverse partnerships and collaboration is vital to achieving forest management objectives.

   Goal: Increase the ability of landowners, natural resource managers and communities to meet management objectives by providing financial, technical and logistical support.

3. Watersheds

A watershed is the total area drained by a river and its tributaries. The three watersheds that have their headwaters located within 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, pesticides, fertilizers, septic drainfields, 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 non-point source pollution problems that contribute to a watershed's decline. Watershed management addresses a wide 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 that have a stake in it. In general, the EPA defines a watershed plan as follows:

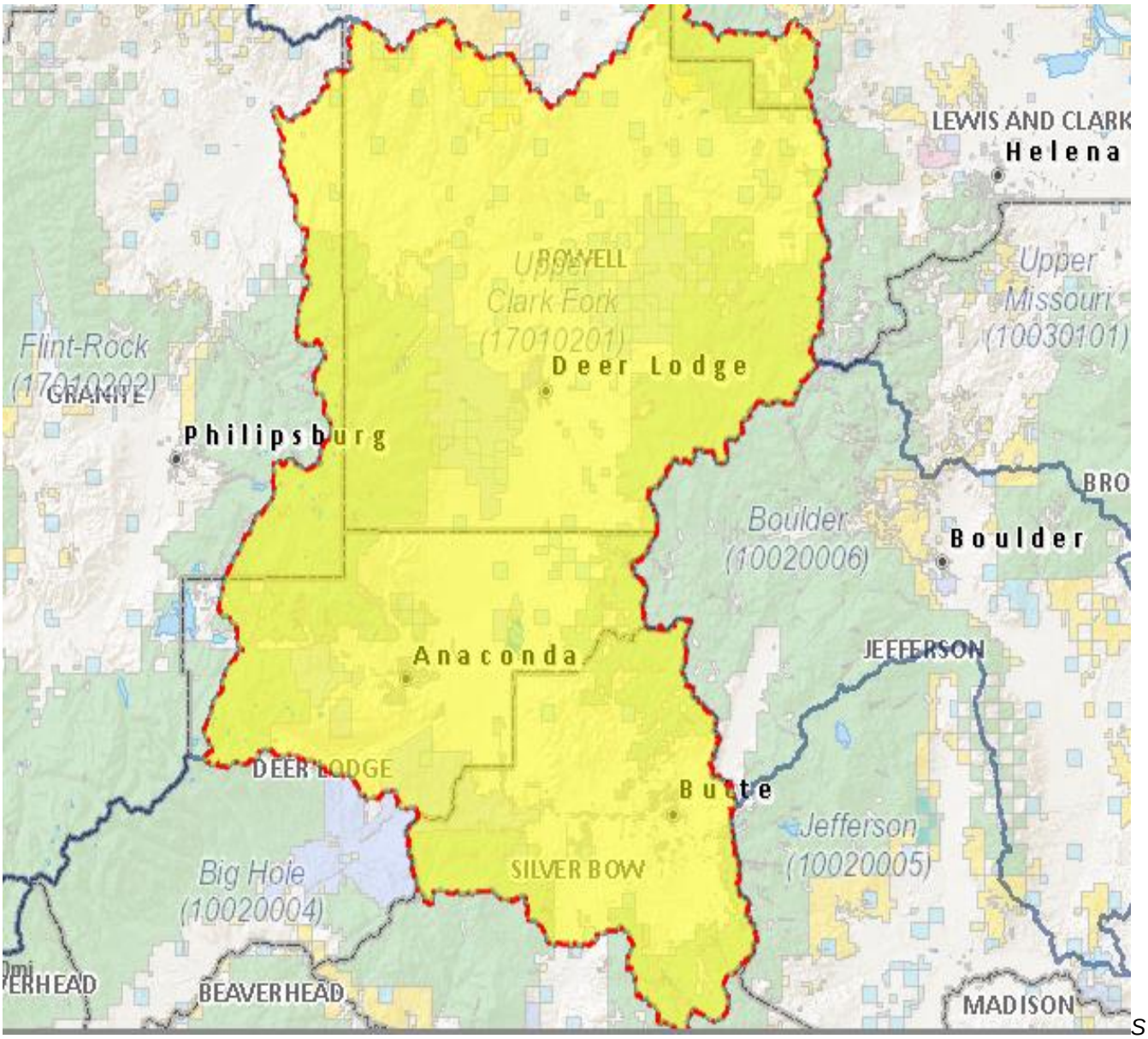
> "A *watershed plan* is a strategy that provides assessment and management information for a geographically defined watershed, including the analyses, actions, participants, and resources related to developing and implementing the plan."

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 Anaconda-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 (BMPs), watershed restoration projects, and encouraging environmental stewardship that conserve natural resources. *http://www.mt-wrc.org*
- Big Hole River Foundation- The Foundation partners with local, state, and federal agencies, sportsmen's organizations, and conservationists on issue such as stream flow, habitat loss, grazing management, trophy trout management, and management of native species including the Arctic grayling. *http://www.bhrf.org*
- Watershed Land Trust – Montana *http://www.WatershedLandTrust.biz*
- University of Montana, Watershed Health Clinic- Matches watershed groups with UM students and staff in watershed science, planning, and action *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*

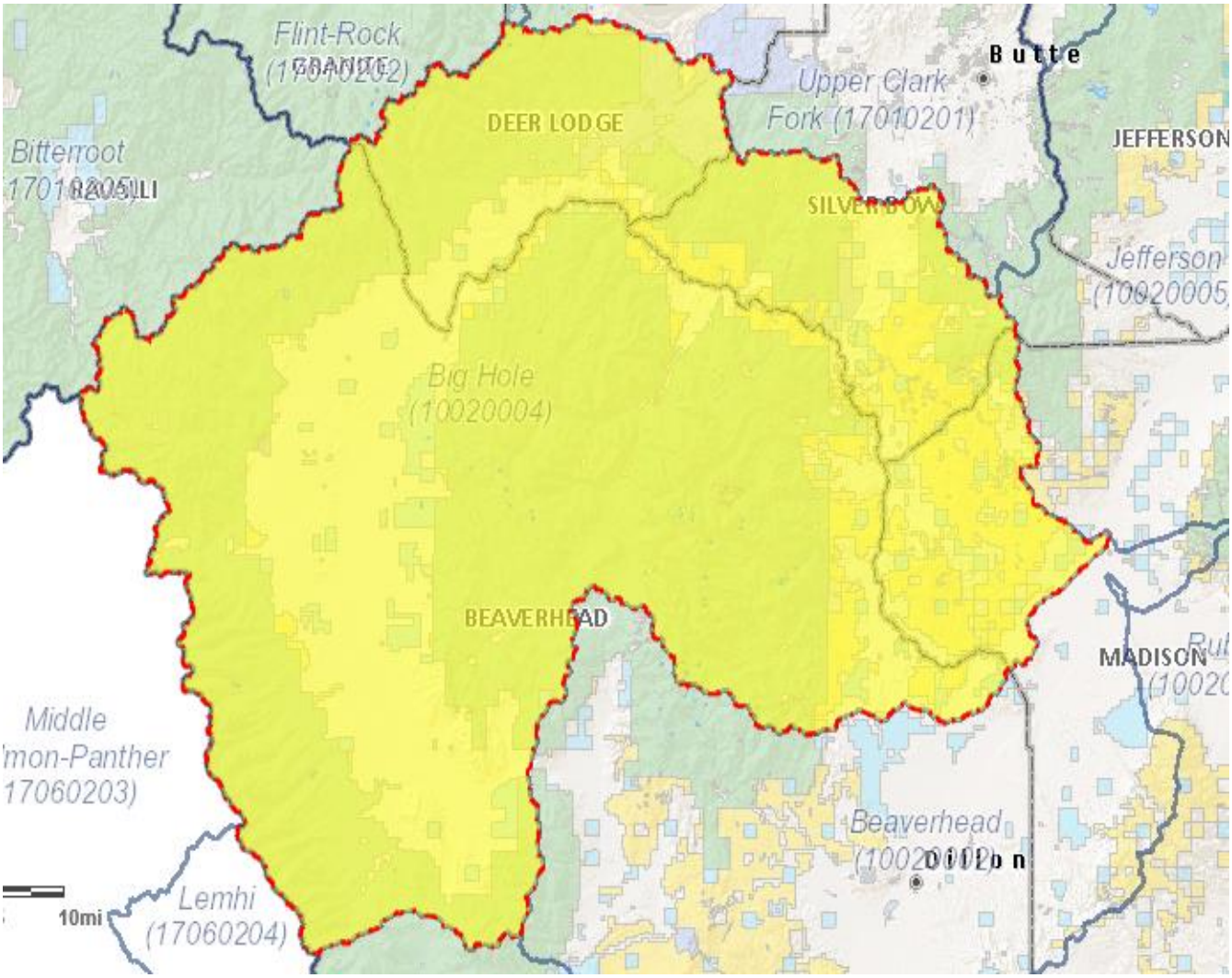
- Clark Fork Coalition - A Missoula-based non-profit dedicated to restoring and protecting the 22,000 square mile Clark Fork River Basin in Montana and Idaho. Conducts local stream restoration and conservation efforts in Powell and Anaconda-Deer Lodge counties, among others. Works with local watershed groups and individual property owners. Operates the Dry Cottonwood Creek Ranch to help restore the Clark Fork River and to conduct demonstration restoration projects. www.clarkfork.org

Map 3-3: Upper Clark Fork Watershed



ource: https://mslservices.mt.gov/geographic_information/maps/watershed

Map 3-4: Big Whole Watershed



Source: https://mslservices.mt.gov/geographic_information/maps/watershed

4. Water Quality

A. Impaired Streams

Section 303(d) of the Federal Water Pollution Control Act of 1972 (Clean Water Act, or CWA) 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 3-4). 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 Maximum Daily 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.).

The Montana Department of Environmental Quality (DEQ) has developed a series "Final Documents and EPA Approval Letters for Completed TMDLs". These documents address the impairments of each stream on the 303(d)-list basin by basin. The two basins that encompass the vast majority of ADLC are the Middle and Lower Big Hole and the Upper Clark Fork. Each of these documents includes a TMDL for every impairment impacting each listed (impaired) stream in the watershed. For example, the Middle and Lower Big Hole Planning Area TMDLs and Water Quality Improvement Plan contains 62 separate TMDLs for 29 water bodies. However, many best management practices (BMPs) are commonly recommended basin wide, and those are summarized below. Both documents as well as supplementary information may be found at *http://deq.mt.gov/Water/WQPB/TMDL/finalReports*

Middle and Lower Big Hole Planning Area TMDLs and Water Quality Improvement Plan

- Grazing impacts (usually sediment and water temperature): Develop riparian grazing management plans for those properties that do not already have one. The primary recommended BMPs for the Middle and Lower Big Hole River Watershed are providing off-site watering sources, limiting livestock access to streams and hardening the stream at access points, planting woody vegetation along stream banks, and establishing riparian buffers.
- Animal feeding operations impacts (mostly sediment and nutrients): Develop Comprehensive Nutrient Management Plans (CNMPs). This plan is a written document detailing manure storage and handling systems, surface runoff control measures, mortality management, chemical handling, manure application rates, schedules to meet crop nutrient needs, land management practices, and other options for manure disposal. Properly installed vegetative filter strips, in conjunction with other practices to reduce waste loads and runoff volume, are very effective at trapping and detaining sediment and reducing transport of nutrients and pathogens to surface waters, with removal rates approaching 90%. Other options may include clean water diversions, roof gutters, berms, sediment traps, fencing, structures for temporary manure storage, shaping, and grading. As an aside, animal health and productivity also benefit when clean, alternative water sources are installed to prevent contamination of surface water.
- Irrigation/dewatering (multiple impacts): Changes to stream flow can have a profound effect on the ability of a stream to attenuate pollutants, especially nutrients, metals and heat. Flow reduction may increase water temperature, allow sediment to accumulate in stream channels, reduce available habitat for fish and other aquatic life, and may cause the channel to respond by changing in size, morphology, meander pattern, rate of migration, bed elevation, bed material composition, floodplain morphology, and streamside vegetation if flood flows are reduced. Irrigation management is a critical component of attaining both Arctic grayling conservation and TMDL goals. Irrigation efficiency management practices in the Big Hole Watershed should involve investigating how to reduce the amount of stream water diverted during July and August, while still growing crops on traditional cropland. It may be desirable to promote inefficient irrigation practices earlier in the year to promote groundwater return during July and August.
- Riparian vegetation removal impacts (sediment, nutrients, and bank stability): Harvest and transplant locally available sod mats with an existing dense root mass which provide immediate promotion of bank stability and filtering of nutrients and sediments. Transplanting mature shrubs, particularly willows (Salix sp.), provides rapid restoration of instream habitat and water quality through overhead cover and stream shading as well as uptake of nutrients. Seeding with native grasses, sedges, and forbs is a low-cost activity to prevent sediment and nutrients from entering the water body. Willow sprigging would expedite vegetative recovery, involving harvest of dormant willow stakes from local sources.
- Forestry and timber harvest (sediment and water temperature impacts): Harvesting will likely continue in the future within the Beaverhead-Deer Lodge National Forest (BDNF) and on private land. Future harvest activities should be conducted by all landowners according to Forestry BMPs for Montana (MSU Extension Service 2001) and the Montana SMZ Law (77-5-301 through 307, MCA). The Montana Forestry BMPs cover timber harvesting and site preparation, harvest design, other harvesting activities, slash treatment and site preparation, winter logging, and hazardous substances. While the SMZ Law is

intended to guide commercial timber harvesting activities in streamside areas (i.e. within 50 feet of a water body), the riparian protection principles behind the law can be applied to numerous land management activities (i.e. timber harvest for personal use, agriculture, and development).

Upper Clark Fork River Tributaries Sediment, Metals, and Temperature TMDLs and Framework for Water Quality Restoration

- Restoration recommendations involve the promotion of riparian and wetland recovery through improved grazing and land management (including the timing and duration of grazing, the development of multi-pasture systems, and the development of off-site watering areas), application of timber harvest BMPs, restoration of streams affected by mining activity, and floodplain and streambank stabilization and revegetation efforts where necessary.
- Divert water from roads and ditches before it enters the stream. The diverted water should be routed through natural healthy vegetation, which will act as filter zones for the sediment laden runoff before it enters streams. In addition, routine maintenance and upkeep of unpaved roads is a crucial component to limiting sediment production from roads.
- Cropland filter strip extension, vegetative restoration, and long-term filter area maintenance are vital BMPs for achieving nutrient TMDLs in predominantly agricultural watersheds. Grazing systems with the explicit goal of increased post-grazing vegetative ground cover are needed to address the same nutrient loading from rangelands. Grazing prescriptions that enhance the filtering capacity of riparian filter areas offer a second tier of controls on the sediment content of upland runoff.
- Animals grazing on small acreages can lead to overgrazing and a shortage of grass cover, leaving the soil subject to erosion and runoff to surface waters. General BMP recommendations for small acreage lots with animals include creating drylots, developing a rotational grazing system, and maintaining healthy riparian buffers.

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, as discussed above. 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.

C. Non-Point Pollution (NPS)

Among the most effective methods of controlling non-point pollution is a series of land management techniques 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

Programmatic strategies can include wastewater treatment upgrades (often in conjunction with a TMDL) and septic system maintenance and replacement programs. With the 2015 Development Permit System (DPS) rewrite, ADLC now has standards for development in critical (environmentally sensitive) areas, and standards for site restoration post-development and control of erosion and sedimentation.

In addition to the county-wide standards contained in the DPS, the County also has special standards and a permitting process specific to the Big Hole River. Article XXXV of the DPS (formerly 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 in *Title 75. Environmental Protection, MCA*. In addition, a revised 2008 *Planning Guide for Protecting Montana's Wetlands and Riparian Areas* can be accessed on-line at *http://mtaudubon.org/conservation-policy/streams-wetlands/land-use-planning-and-protection-of-streams-wetlands/a-planning-guide-for-protecting-montanas-wetlands-and-riparian-areas/.* (Note to reader: This reference does not constitute an endorsement by ADLC of The Audubon Society or of Montana Audubon, or of any of their publications and positions on environmental and other issues. The document cited is simply a convenient, readily available resource for environmental planning applications.) These types of regulations, whether they are called stream bank 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 Anaconda-Deer Lodge County portion of Georgetown Lake, set forth as Appendix B, Chapter 24, Development Permit System. These standards apply to water-born appurtenances such as docks, and to other improvements within 20 horizontal feet landward from the lake's mean high water level, consistent with *Title 75, Chapter 7, Part 2 Lakeshores, MCA.*

Table 3-4 is an updated compilation of all streams on the 303(d) list along with the specific threat or impairment, and the probable cause. From the types of probable causes of stream impairment, it can be concluded that best management land use and agricultural practice could be very effective in reducing non-point pollution in these water bodies.

Aquatic invasive species (AIS) are non-native plant and animal species that impact water bodies and wetlands. Whether they are transported on the trailers or hulls of recreational boats, or from the water of an angler's bait bucket, several non-native invasive species such as Eurasian watermilfoil and New Zealand mud snails have found their way into Montana's water bodies. Most recently, zebra mussels have been found in some Montana lakes. The presence of aquatic invasive species can cause severe damage to local ecosystems, infrastructure, industry, and tourism. AIS' are a particular concern for Georgetown Lake.

Watercraft inspections are a way of intercepting vessels and equipment that have the potential to spread aquatic invasive species (AIS), and to decontaminate them (if necessary) before launching into Montana waters. Data collected at watercraft inspection stations also provide valuable information on boater movement, cleaning habits, and bait use while providing information and education about invasive species to the public. In 2017, there was an inspection station located in Anaconda.
Source: http://fwp.mt.gov/fishAndWildlife/species/ais

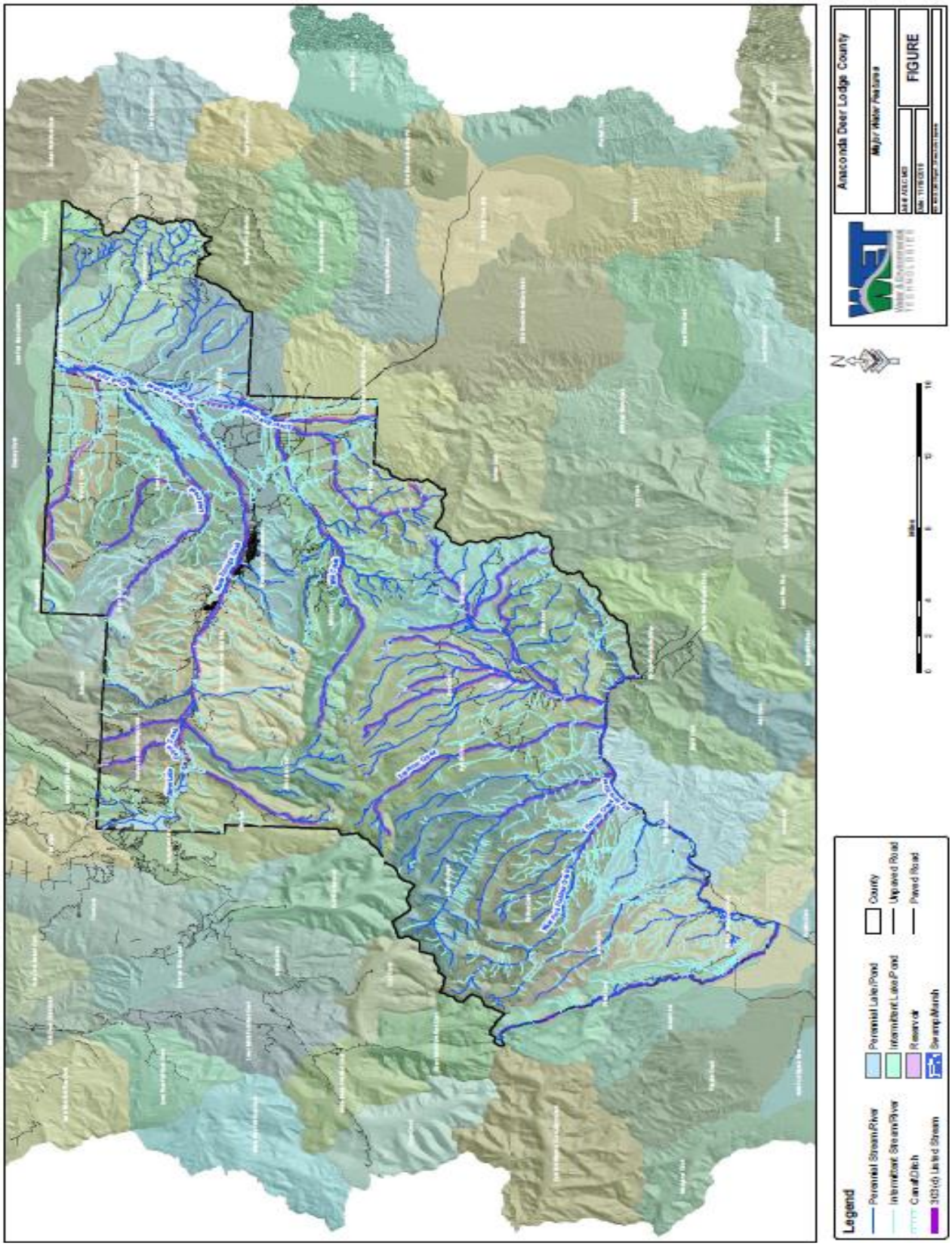
Table 3-4: List of Impaired Streams with Probable Causes and Sources.
Applicable basin in parentheses: Middle & Lower Big Hole (M&LBH); Upper Clark Fork (UCF)

Waterbody	Impairment - Probable Causes	Probable Sources
Antelope Creek (UCF)	Low Flow Alterations	Agriculture
Big Hole River (M&LBH)	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 (UCF)	Chlorophyll-a, Other anthropogenic substrate alterations, Habitat alterations, Sedimentation/siltation	Grazing in Riparian or Shoreline Zones, Impacts from Abandoned Mine Lands (Inactive)
California Creek (UCF)	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 (UCF)	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 Creek (M&LBH)	Alteration in Streamside/Littoral Vegetative Covers, Habitat alterations, Sedimentation/siltation	Rangeland Grazing, Silviculture Activities, Natural Sources
Deep Creek (M&LBH)	Alteration in Streamside/Littoral Vegetative Covers, Low Flow Alterations	Rangeland Grazing, Streambank Modifications/destablization, Irrigation
Fishtrap Creek (M&LBH)	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 (M&LBH)	Arsenic	Acid Mine Drainage, Atmospheric Deposition - Toxics, Contaminated Sediments, Impacts from Abandoned Mine Lands (Inactive)
Lost Creek-MT76G002_072 (UCF)	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 (UCF)	Arsenic, Cadmium, Chromium, Copper, Lead, Zinc	Contaminated Sediments, Mill Tailings, Mine Tailings
Mill Creek - MT76G002_052 (UCF)	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 (UCF)	Arsenic, Cadmium, Chromium, Copper, Lead, Zinc	Mill Tailings
Modesty Creek (UCF)	Arsenic, Low Flow Alterations	Agriculture
Oregon Creek (M&LBH)	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/destabilization, 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 (M&LBH)	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
Sawlog Creek (M&LBH)	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 (M&LBH)	Alteration in Streamside/Littoral Vegetative Covers, Sedimentation/Siltation	Rangeland Grazing, Streambank Modifications/Destablization, Natural Sources, Rangeland Grazing
Silver Bow Creek (UCF)	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 (M&LBH)	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 (UCF)	Physical substrate habitat alterations	Channelization, Highway/Road/Bridge Runoff (Non-construction Related)
Warm Springs Creek - MT76G002_012 (UCF)	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 (UCF)	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 (UCF)	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

Map 3-5: Water Bodies in Anaconda-Deer Lodge County



5. Groundwater

A. Anaconda Sourcewater Delineation and Assessment

The Safe Drinking Water Act (SDWA; Title XIV of The Public Health Service Act) 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 Delineation and Assessment Report", was completed in 2003 by Water & 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 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. Only recently has this area had access to a phase one central sewer system, and numerous individual septic drainfields still pose a potential threat to the Anaconda public water supply. The source water assessment recommended providing central sewer service into the area, 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 has been removed, tailings were hauled away, and the old railroad right-of-way has been remediated.

Past 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 Opportunity also relies on individual sewage disposal systems, this affects the area's ability to absorb additional growth. Some ground water monitoring has indicated that a contamination 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 long-term solution for Opportunity appears to be a central sewer and/or water system, 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 funded a study of groundwater resources by the Montana Bureau of Mines and Geology – Groundwater Investigation Program (GWIP). The rapid subdivision of private land around the Georgetown 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 federal Clean Air Act Amendments of 1990 (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. Butte and the surrounding area are classified as non-attainment 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 Montana 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. Facilities with air quality permits for stationary uses are the Northwestern Energy Mill Creek Generating Station and All Montana Crematory. The County Road Department and a number of other construction companies have portable air quality permits for excavation, crushing and asphalt plants.

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 include visible plumes, regional haze, and acid deposition which must also be evaluated.

D. Particulates

Because airborne contaminants have been deposited on the soil, fine particulates (dust) that become airborne when winds scour the areas of Anaconda that have been denuded of vegetation can contain contaminants as well. Because windy conditions occur often in Anaconda, substantial amounts of dust can also come from gravel and paved roadways as well. This means that contaminated particles have been deposited over time far from where original deposition may have taken place.

Historically, the Opportunity Ponds, which is a repository for contaminated soils, has been a primary source of contaminated dust in the area. With so much open and barren land lying between Anaconda and I-90, blowing dust was often a safety hazard as well as a health hazard. In 2006, the Atlantic Richfield Corporation (ARCO) submitted a dust control plan to be implemented as each contaminated area was remediated. At this time, the Opportunity Ponds have been almost completely remediated and covered with vegetation. Only the soil repositories and haul roads remain as sources of blowing dust.

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, but it was discontinued in about 2011. The County program used portable air monitors which collect data on a continuous 24-hour/7day-a-week basis. The monitors were co-located with ARCO's to compare the data collected by each, and the results from both sets of monitors were similar.

Dust control measures are routinely implemented when a Superfund remedy is being applied, whether in conjunction with development or not. In instances where disturbed soil will not be covered by vegetation over the winter, a polymer is added to the top soil layer to control dust until vegetation can be planted in the spring.

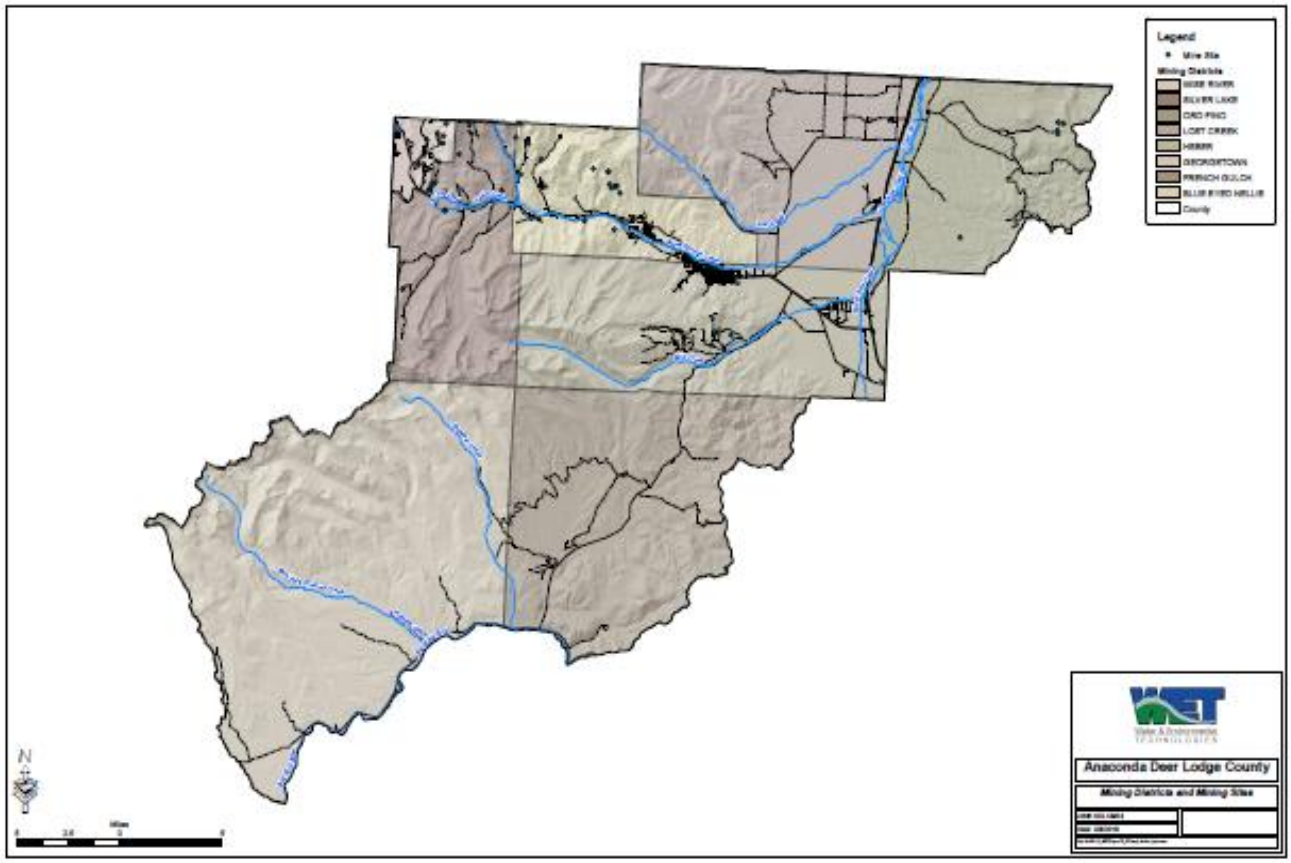
Dust is regularly blown into Anaconda area homes and may have accumulated over decades in isolated areas such as attics, basements, utility rooms, and even closets. This dust may contain contaminants such as arsenic. However, dust has been added to the Community Soils residential remedy, and residents can have their attics sampled for contaminants, and remediated if contaminents are present. In addition, the Superfund program offers interior renovation starter kits and loans out HEPA filter vacuum cleaners to help residents manage dust safely during home improvement projects.

7. Mineral Resources

A. Mining

Anaconda-Deer Lodge County has a long history of mining. According to data supplied by the federal Bureau of Land Management (BLM), there are 286 total (active and inactive) mining claims in the county. Of those, 258 are lode claims and 28 are placer claims. Lode mining is the taking of a mineral directly from a vein surrounded by rock formations, such as in a mine. Placer 'mining' involves removing the mineral that has accumulated in a stream bed due to erosion and deposition. Most claims are in the northwest part of the county and they tend to be small in size. The 258 lode claims account for less than 21 acres, and the placer claims total less than 68 acres. Active mines are extracting primarily gold, silver, and some gems. According to the U.S. Census, County Business Patterns, mining does not account for significant employment in 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. Map 3-6 depicts the county's mining districts and the location of individual mines.

Map 3-6: Mining Districts



B. Gravel Resources

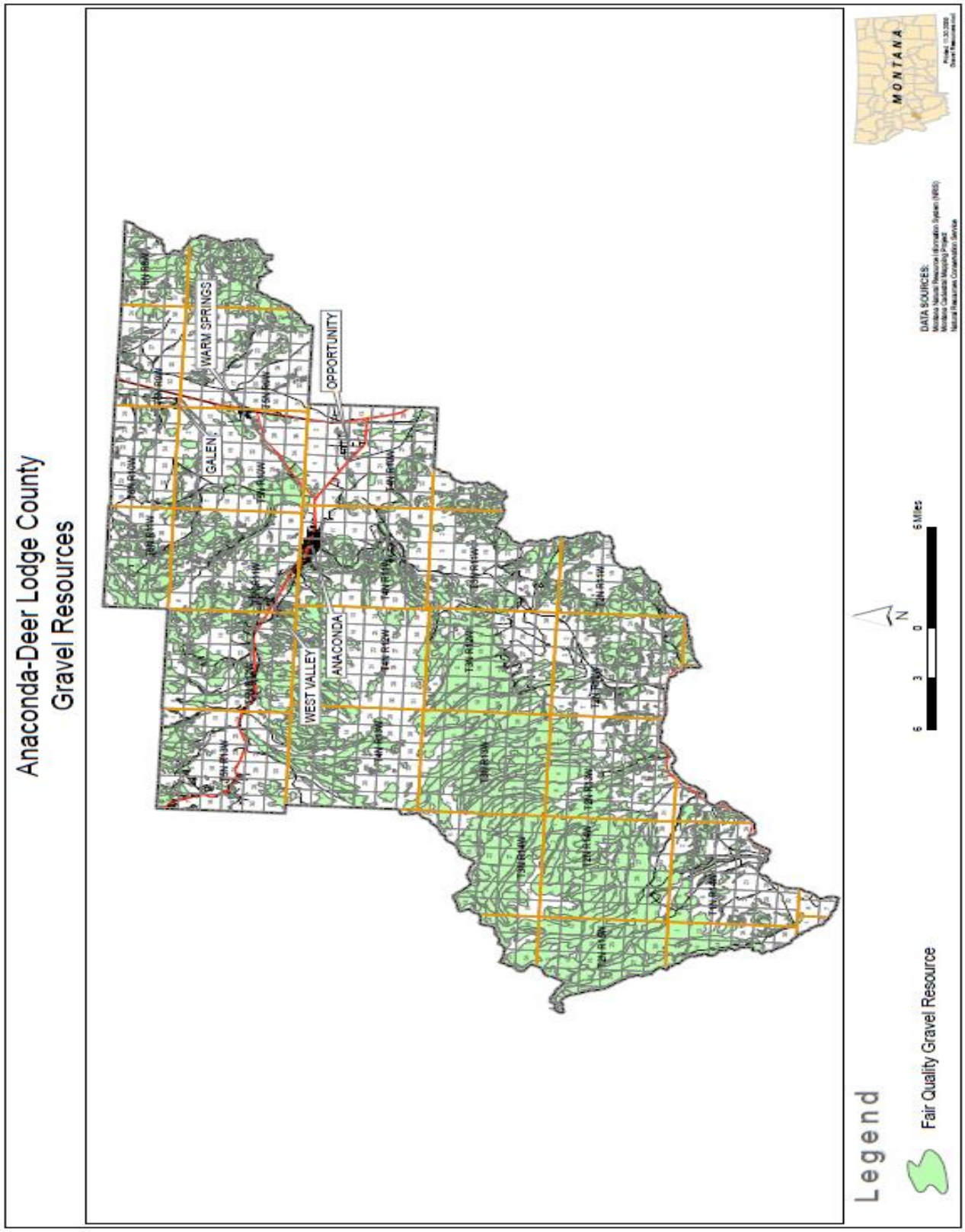
Aggregate rock, such as sand and gravel, is an important construction and road maintenance resource for the County. At the same time, mining sand and gravel have environmental impacts and it is important to develop this resource without comprising the quality of the life in the county. Common issues with the locating of gravel quarries include:

- Traffic- especially haul trucks
- Noise
- Dust
- Water quality
- Restricting river, stream, and flood plain functions
- Visual buffers
- Impact on adjacent or nearby residential uses

Because gravel mining is often controversial, Montana law now requires that gravel resources be addressed in the growth policy. The U.S. Department of Agriculture (USDA) Soil Survey rates soils as a potential gravel resource based on the following criteria.

> "Gravel consists of natural aggregates (2 to 75 millimeters in diameter) suitable for commercial use with a minimum of processing. It is used in many kinds of construction. Specifications for each use vary widely. The properties used to evaluate the soil as a source of gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains gravel, the soil is considered a likely source regardless of thickness. The assumption is that the gravel layer below the depth of observation exceeds the minimum thickness. The ratings are for the whole soil, from the surface to a depth of about 6 feet. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be gravel. The soils are rated "good," "fair," or "poor" as potential sources of gravel. A rating of "good" or "fair" means that the source material is likely to be in or below the soil."
> *Source: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm*

Map 3-7: Soil Rating for Gravel Resources



8. Soils

A. Overview

Soil surveys can help public officials make decisions regarding building permits, septic permits, road alignments, and design of public infrastructure. Zoning areas for housing, recreation, commercial, and other kinds of development should take account of the suitability and limitations of soils for such uses. Soil surveys typically describe the activities and land development types for which soils are best suited, and describe limitations for other uses. Some specific applications for soil surveys include:

- Planners and other officials can use soil maps and soil data to identify sources of sediment and to develop plans for controlling erosion and sedimentation.
- Septic tank absorption fields do not work in wet or impermeable soils. Slow permeability may be caused by high clay content or the presence of a high-water table. Excessive permeability may allow effluent to pollute ground water.
- The properties that affect road and building construction include depth to bedrock, depth to a water table, ponding, flooding, amount of large stones, slope, subsidence, shrink-swell potential, and the potential for frost action.

B. Opportunity

Within the Opportunity area, soils are characterized by high groundwater and underlying hardpan clay. This clay layer impedes percolation of wastewater through the soil. The Montana Department of Environmental Quality (DEQ) requires four feet of suitable soils between the bottom of drainfield trenches and the depth of seasonally high groundwater. When this criterion is not met, inadequately treated wastewater may reach individual domestic wells in the area and contaminate the water.

C. Soils Remediation

Soils remediation continues throughout the Anaconda area on both residential and rural properties, including uplands and valley floors. EPA implemented a Record of Decision (ROD) Amendment in 2013 for the Community Soils Operable Unit. This amendment applies to any residential property within the Superfund overlay. The amendment added lead as a contaminate of concern, and established an action level of 400 parts per million. Soil sampling methods were altered so that all soil would be sampled to a 12-inch depth, and attic dust sampling and remediation was added to the process for the first time. The action levels for arsenic remained the same: 250 ppm for residential properties, 500 ppm for commercial properties, and 1000 ppm for open space.

According to data supplied by the ADLC Superfund Program, some residential properties were sampled in late 2015, and with another 500 being sampled in 2016. Some remediation started in 2016, but a more robust effort began in 2017, in which 318 yards were remediated. Another 500 yards were sampled in 2017 as well, and sampling and remediation will continue into the future until as many properties as possible have been addressed.

Prior to the 2013 ROD Amendment, more than 1,500 yards were sampled, and approximately 300 yards in the east Anaconda focus area were remediated at various depths between 2002 and 2009, as well as another 50 yards outside Anaconda. However, many of these yards were resampled after sampling for lead was added and soil sample depths were changed. The result is that many more yards are being remediated than in the original effort, and most are being cleaned up to a greater depth.

Elsewhere, extensive soil remediation and construction of storm water controls on Smelter Hill is expected to be completed in 2018 or 2019. Work on Stuckey Ridge above the golf course could begin as early as 2018, and continue moving west in subsequent years. Large tracts of properties in the uplands and valley floor between Warm Springs, Anaconda, and Fairmont continue to be remediated as private landowners approve work plans and grant access to Atlantic Richfield. This remediation work could continue another 10 to 15 years.

In the meantime, the County has the Development Permit System (DPS) and Institutional Controls Work Plans to guide landowners and developers with soils handling and protect them from incurring any Superfund liabilities. This guidance applies to all properties in the Superfund Overlay, regardless of whether or not they have been remediated. The guidance also helps projects move forward in the most expeditious and efficient ways possible. The County is sensitive to the issues that owners of contaminated properties face, and does not want Superfund to hinder development.

D. Farmland

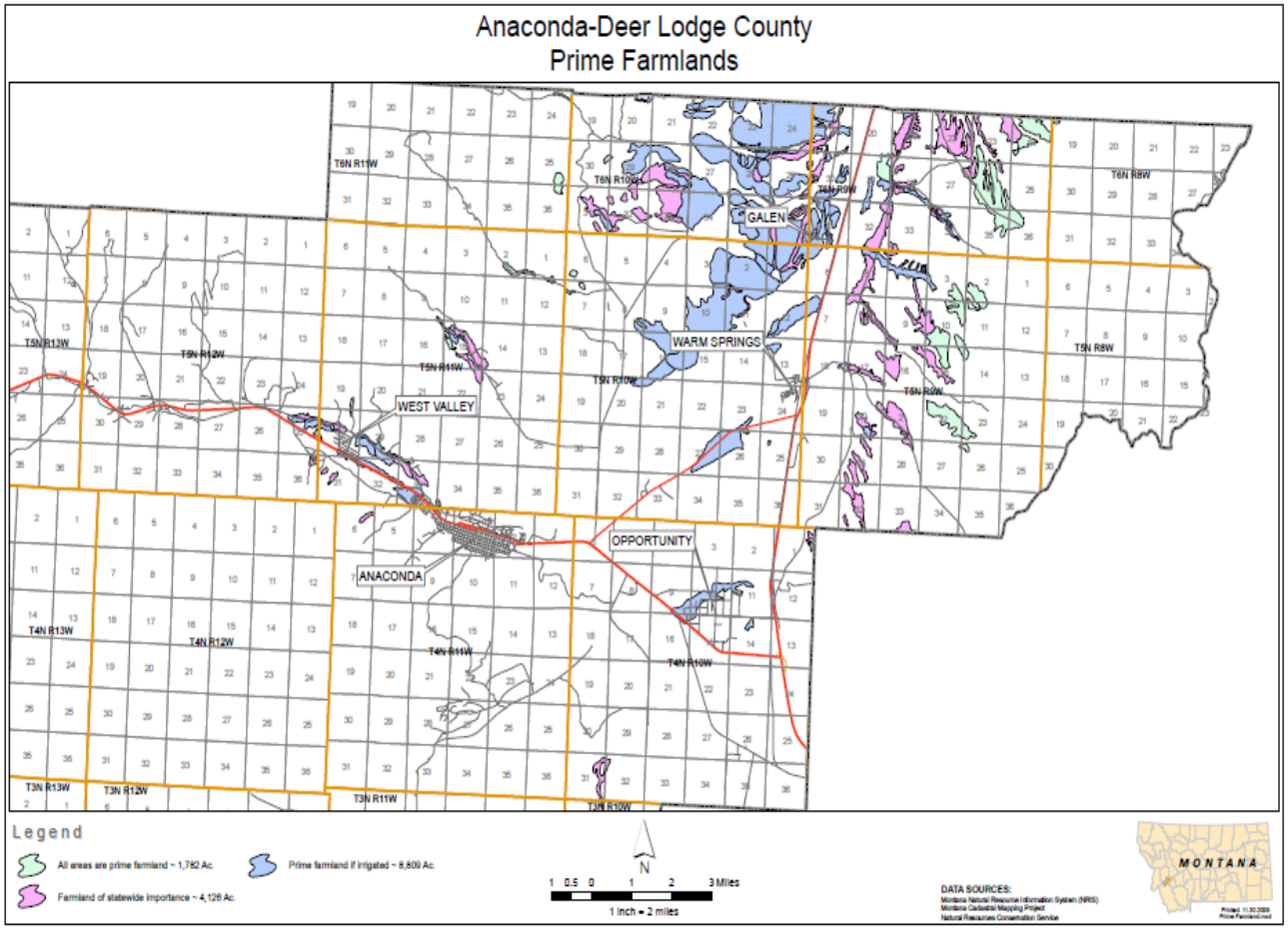
The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the nation's food supply. A summary of farmland definitions from the USDA follows:

- **Prime farmland** - Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. For some of the soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

  Farmland of statewide importance - These are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

- **Farmland of local importance** - This farmland is identified by the appropriate local agencies for the "production of food, feed, fiber, forage, and oilseed crops."
  Source: USDA, Soil Survey http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

Map 3-8: Soil Rating for Farmland



9. Critical Areas

A. Floodplains

Floodplains are lowlands adjacent to water bodies such as rivers, streams, and lakes that have been or may be inundated with water. The size of the floodplain depends largely on topography with flat terrain along major rivers resulting in wide floodplains, and mountainous and hilly areas having narrow or more confined floodways. Riverine flooding that occurs after prolonged periods of rain or rapid snowmelt are the most common source of flooding in ADLC. Ice jams may also result in flooding, as they often do on the Clark Fork and Big Hole rivers.

Floodplains perform valuable functions including groundwater recharge, water quality maintenance, and sediment control, as well as meeting needs for wildlife habitat, recreation, aesthetics, open space, and scientific study. Development in flood plains usually reduces, modifies, or eliminates their ecological functions.

Past Federal Emergency Management Agency (FEMA) floodplain policies focused on reducing flooding through structural measures to redirect flood waters and on reducing danger and property loss by imposing minimum building requirements in floodplains. Although the minimum standards provide a great deal of flood protection,

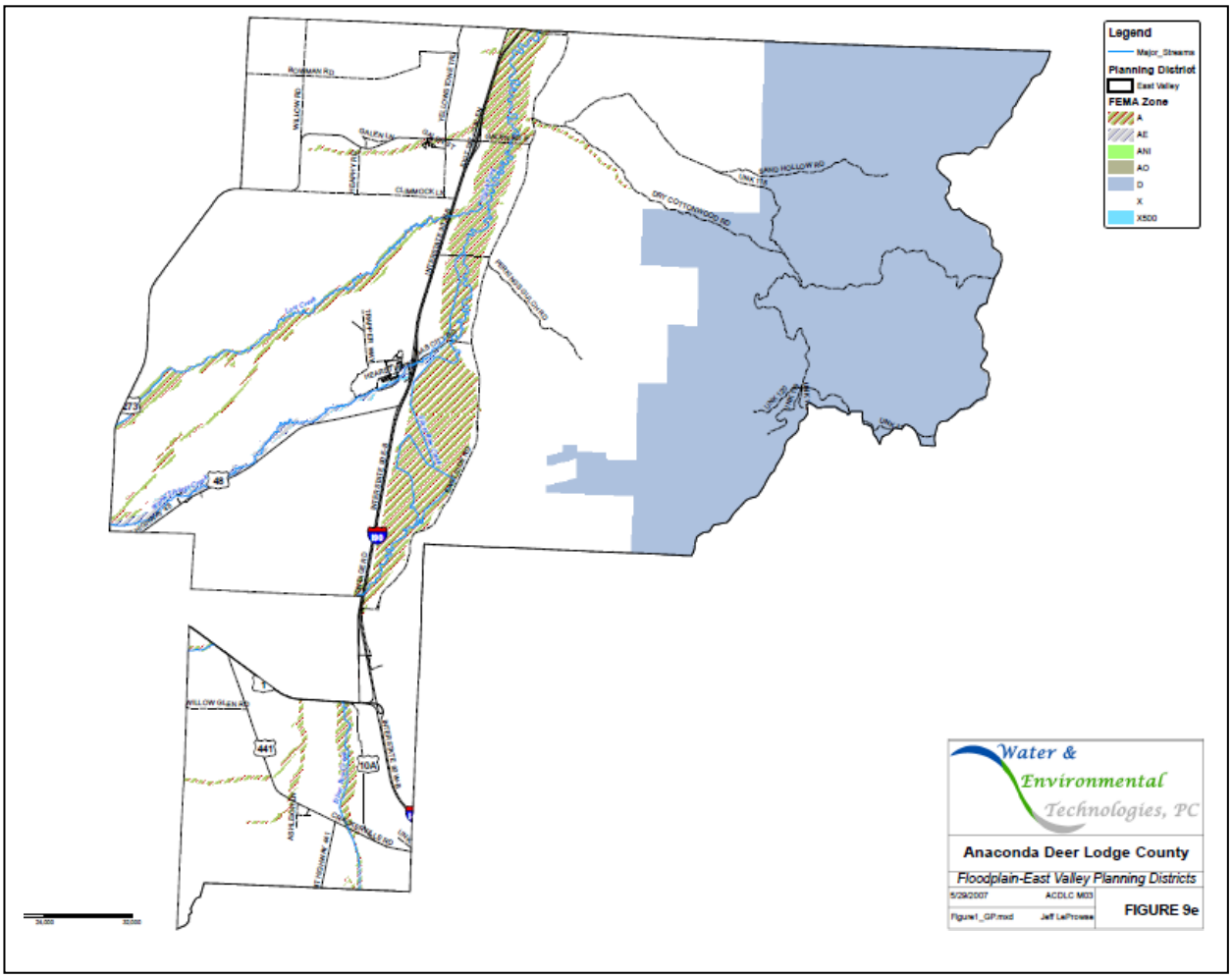
damage can still result when floods exceed the predicted 100-year level or when estimates are inaccurate. Urbanization, filling, and other development can alter flood hazards and increase risks of flooding.

In response to these issues, in the late 1990's, FEMA shifted its emphasis to protect the natural resources and functions of floodplains. FEMA now has a voluntary Community Rating System (CRS) that offers incentives in the form of discounts on flood insurance in localities that go beyond the minimum floodplain management requirements. Activities related to development that can result in CRS credits include open space preservation, land development criteria, and higher regulatory standards.

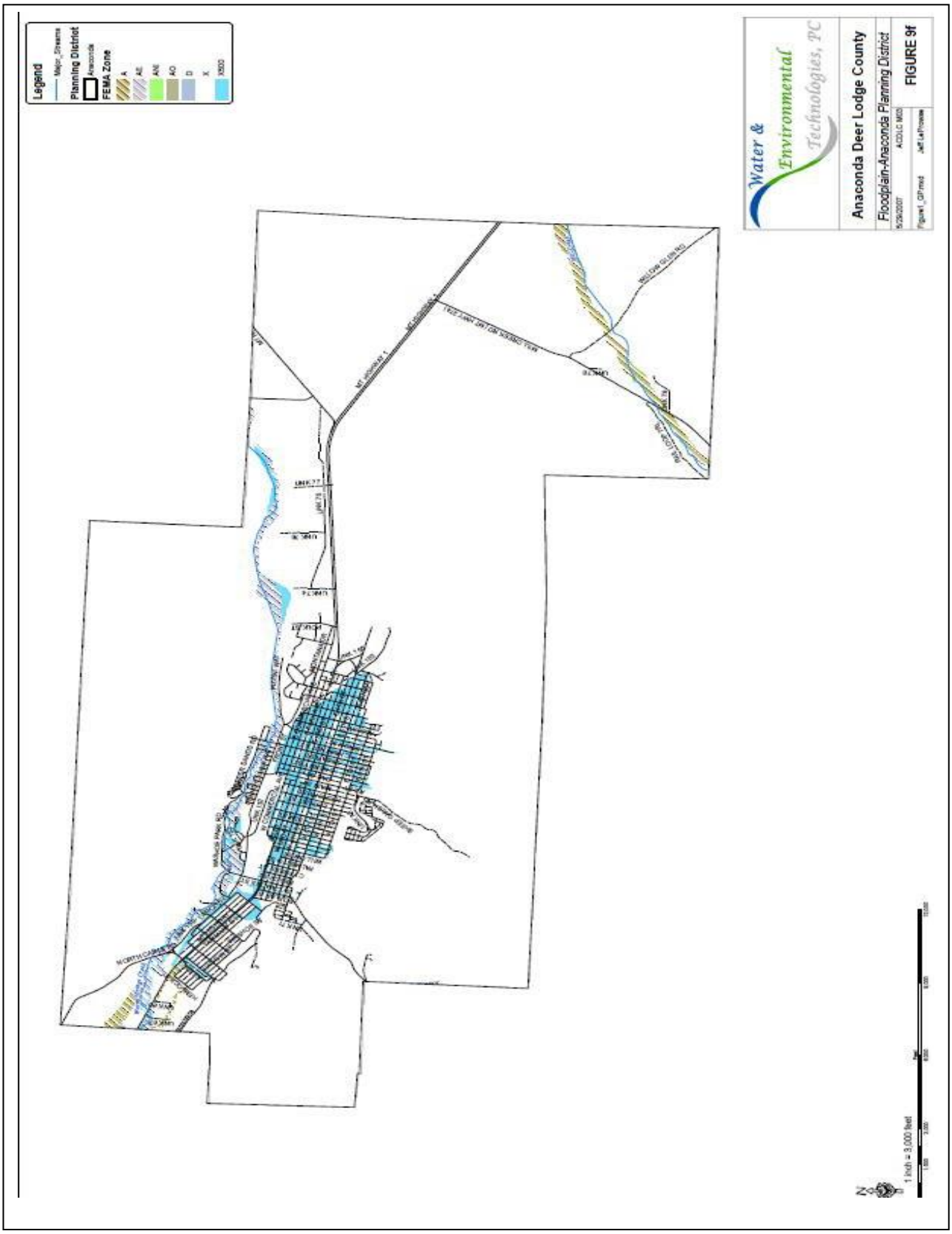
Flooding in the county normally occurs during periods of excessive rainfall or snowmelt. FEMA Flood Insurance Rate Maps (FIRM) distinguish floodplains, floodways and floodway fringes. The floodway is the highest risk area consisting of stream channels and banks where the most damage and destruction occurs. Residential and commercial development, mobile homes and septic systems are prohibited in this area. The floodway fringe is a lower hazard area that would be inundated by a 100-year flood. Construction is allowed in the floodway fringe by special permit and must meet established regulations. A FEMA Flood Insurance Study analyzed 23.5 miles of Warm Springs Creek from its confluence with the Clark Fork River, one mile east of Warm Springs to ten miles west of Anaconda. The floodway fringe (Zone A) is primarily located along Warm Springs Creek, Lost Creek and Silver Bow Creek with a narrow strip along Mill Creek.

Zone B – These areas lie between the limits of the 100-year flood and 500-year flood, or areas subject to 100-year flooding with average depth of less than (1) foot. A large portion of Anaconda is in Zone B. According to the "Deer Lodge County Hazard Mitigation Plan" the FEMA study determined that Anaconda sits on an alluvial fan and generally floods from gulches on the southern end of the city, namely the Sheep, Glover, Fifer, and three smaller gulches. Typically, Sheep Gulch floods onto Oak Street, Glover Gulch onto Poplar Street, and Fifer Gulch onto Evergreen Street. The smaller gulches flood onto Birch, Larch, and Spruce Streets, sometimes resulting in shallow flooding of streets, basements, and first floor levels of downtown Anaconda.

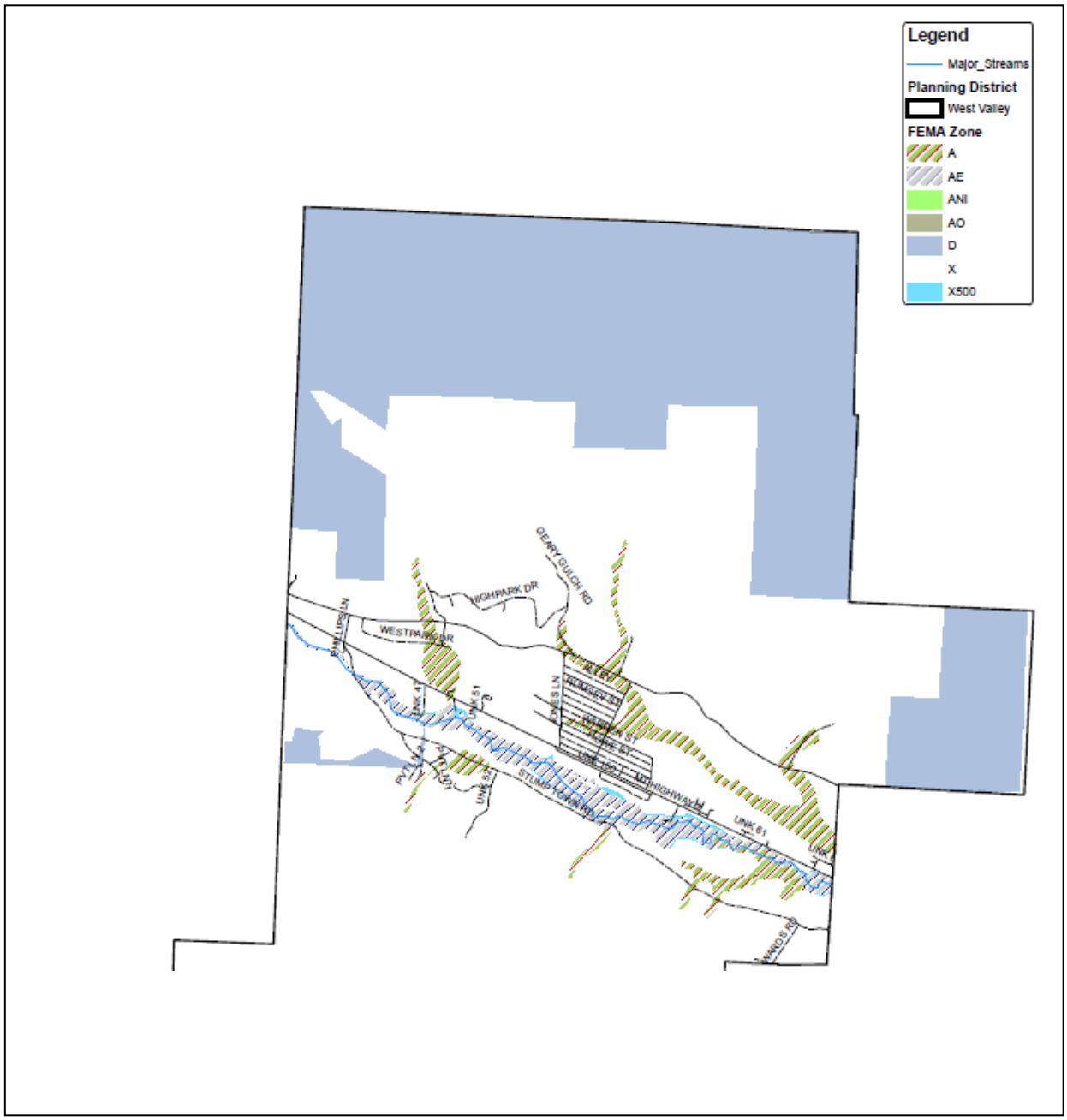
Map 3-9: East Valley Flood Map



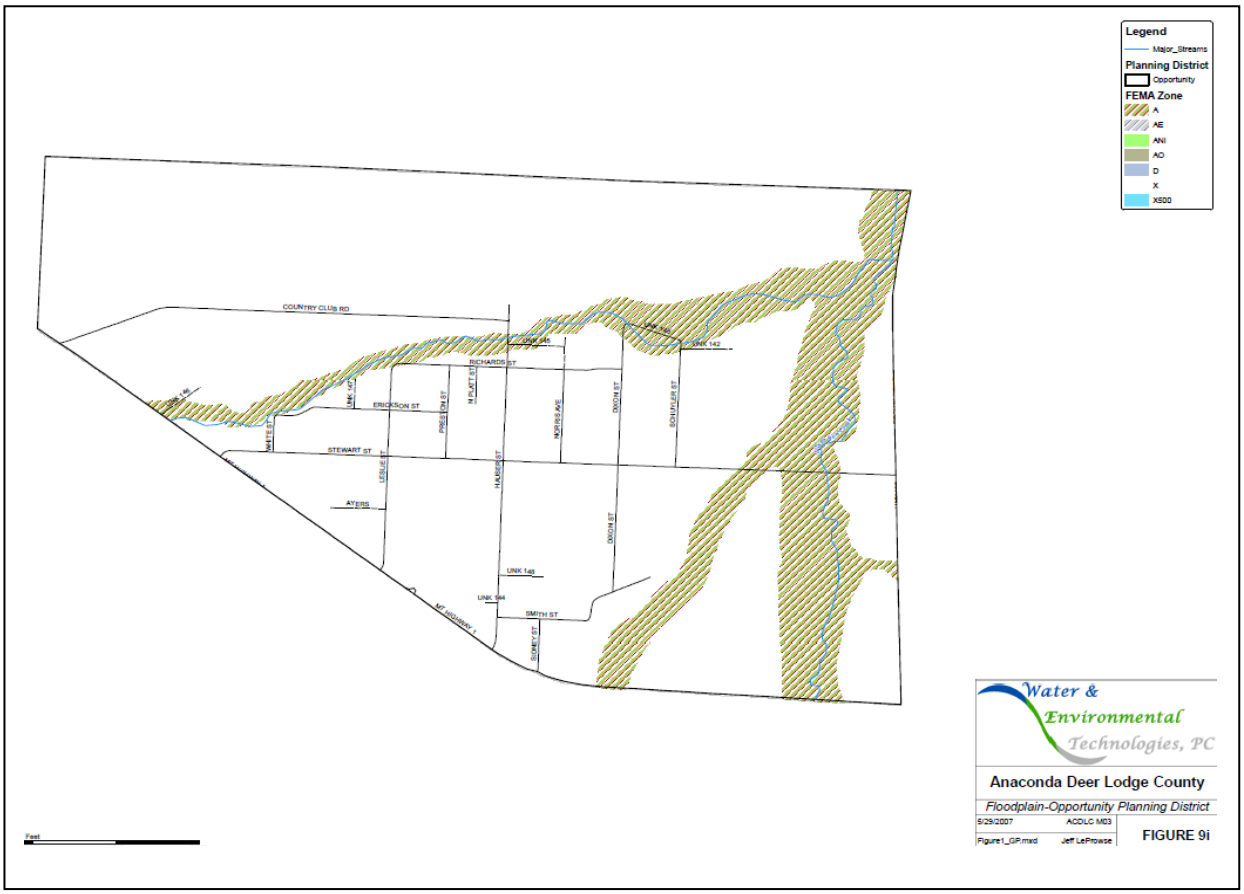
Map 3-10: Anaconda Urban Area – Flood Map



Map 3-11: West Valley Flood Map



Map 3-12: Opportunity Flood Map



B. Wetlands

Once, wetlands were considered wastelands that should be drained and filled. Today, wetlands are valued for providing wildlife habitat, improving water quality, recharging aquifers, and storing potential flood waters. In ADLC wetlands are limited, but the most common type is associated with swamps or bogs, and are not necessarily "tributary" to a stream of any kind. Wetlands are defined as follows:

> "Wetlands are those areas that are inundated or saturated by surface or groundwater 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.
>
> *Source: Army Corps of Engineers (ACOE) and Environmental Protection Agency (EPA), in "The Wetlands Delineation Manual of 1987*

Table 3-6: Wetlands at Risk in Anaconda-Deer Lodge County

Wetland Type	Acres	% of Total
Palustrine (marsh, swamp, bog, or tundra)	191.61	83.8%
Reverie (feed by water flowing through a channel)	20.07	8.8%
Lacustrine (associated with a lake)	17.06	7.5%

Source: Montana Natural Information Resource System

The federal Clean Water Act (CWA) administered by the Environmental Protection Agency (EPA), the Army Corps of Engineers, and state agencies, regulates activities regarding wetlands. States review and certify permits that may result in pollution or fill discharges to surface waters and wetlands and established a permit system for this process. Section 404 of the CWA is jointly administered by the ACOE and EPA and governs dredging and filling of land. The Montana Environmental Policy Act (MEPA) and the Endangered Species Act (ESA) also have provisions regarding wetlands.

The Montana Department of Environmental Quality (DEQ) Technical & Financial Assistance Bureau is responsible for coordinating wetland conservation activities state-wide, including staffing the Montana Wetland Council. The Council acts as a forum for all stakeholders to participate in wetland issues. The Council developed Priceless Resources: Strategic Framework for Wetland and Riparian Area Conservation and Restoration in Montana 2013-2017, to guide the Council in pursuing wetland conservation activities. *http://deq.mt.gov/Portals/112/Water/WPB/Wetlands/StategicFramework2013-2017.pdf*

In 2015 ADLC adopted the Critical Areas Development Standards, set forth as Division 1, Appendix C of the DPS. These standards require a "vegetated buffer" of at least 50 feet from the discernible boundary of the wetland, and a structure may be placed with a zero setback to the buffer. Language in the DPS prior to 2015 deferred to "state and federal wetlands requirements". However, the trend at the federal level has been for **less** wetland protection, not more. Generally, non-tributary wetlands, or palustrine wetlands, are not considered to be "jurisdictional" wetlands and are not protected by the federal government as they once were. But in Montana, these wetlands account for some of the most productive wildlife habitat, and as Table 3-6 above shows, these are by far the most prevalent type of wetland in the county.

C. Streambank and Lakeshore Protection

The Critical Areas Development Standards discussed in the previous sub-section also establish setbacks for streams and rivers. Vegetated buffer widths are 100 or 200 feet depending on the type of stream, and the structural setback from the buffer is 50 feet. Together, the setback and buffer help to keep human activity away from the stream, thereby leaving room for wildlife and reducing the introduction of siltation and chemical and organic pollutants into the stream. Stormwater runoff from fertilized lawns, roof tops, and parking areas can put significant amounts of pollutants into streams when allowed to locate in close proximity to the water body. In addition, a 150-foot structural setback applies along the Big Hole River via an ordinance adopted jointly by Anaconda-Deer Lodge, Madison, Beaverhead, and Butte-Silver Bow counties.

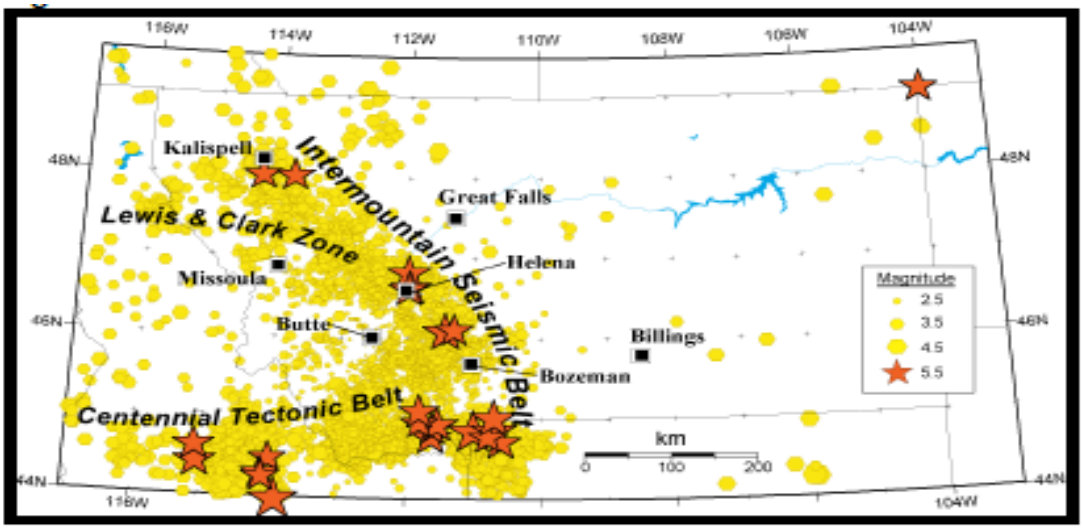
Montana law **requires** that every city and county having a lake of at least 160 acres in size adopt lakeshore protection standards and a permit system to regulate development 20 feet landward of mean high water. Development includes dredging and filling, docks, marinas, boat ramps, boat houses, and shore stations. The DPS contains lakeshore standards for Georgetown Lake that is consistent with state law and similar to large lakes in other parts of Montana, except that no permit is required for individual dock deployment.

D. Earthquake Hazards

An area of seismicity known as the Intermountain Seismic Belt extends through western Montana, from the Flathead Lake region in the northwest corner of the state to Yellowstone National Park. In western Montana, the Intermountain Seismic Belt is up to 100 km wide. Anaconda-Deer Lodge County is on the western edge of this belt and is located in an area generally rated in the low to mid range for earthquake hazards.

According to the "Deer Lodge County Hazard Mitigation Plan" there are no active faults in the region. However, significant earthquakes from as far away as Challis, ID and Hebgen Lake have been felt in Anaconda. For purposes of administering building codes, the county is located in Seismic Zone 3.

Figure 3-1: Intermountain Seismic Belt in Montana



Source: Montana Bureau of the Mines and Geology, 2001 per the Deer Lodge County Hazard Mitigation Plan (2013)

D. Slopes

There are more than just engineering issues involved with the development of steep slopes. Building in steep slope areas has potential environmental impacts such as impairing water quality and the loss and/or fragmentation of wildlife habitat. It raises public safety concerns including landslide hazard, slope failure, access, provision of emergency services, and wildfire hazards.

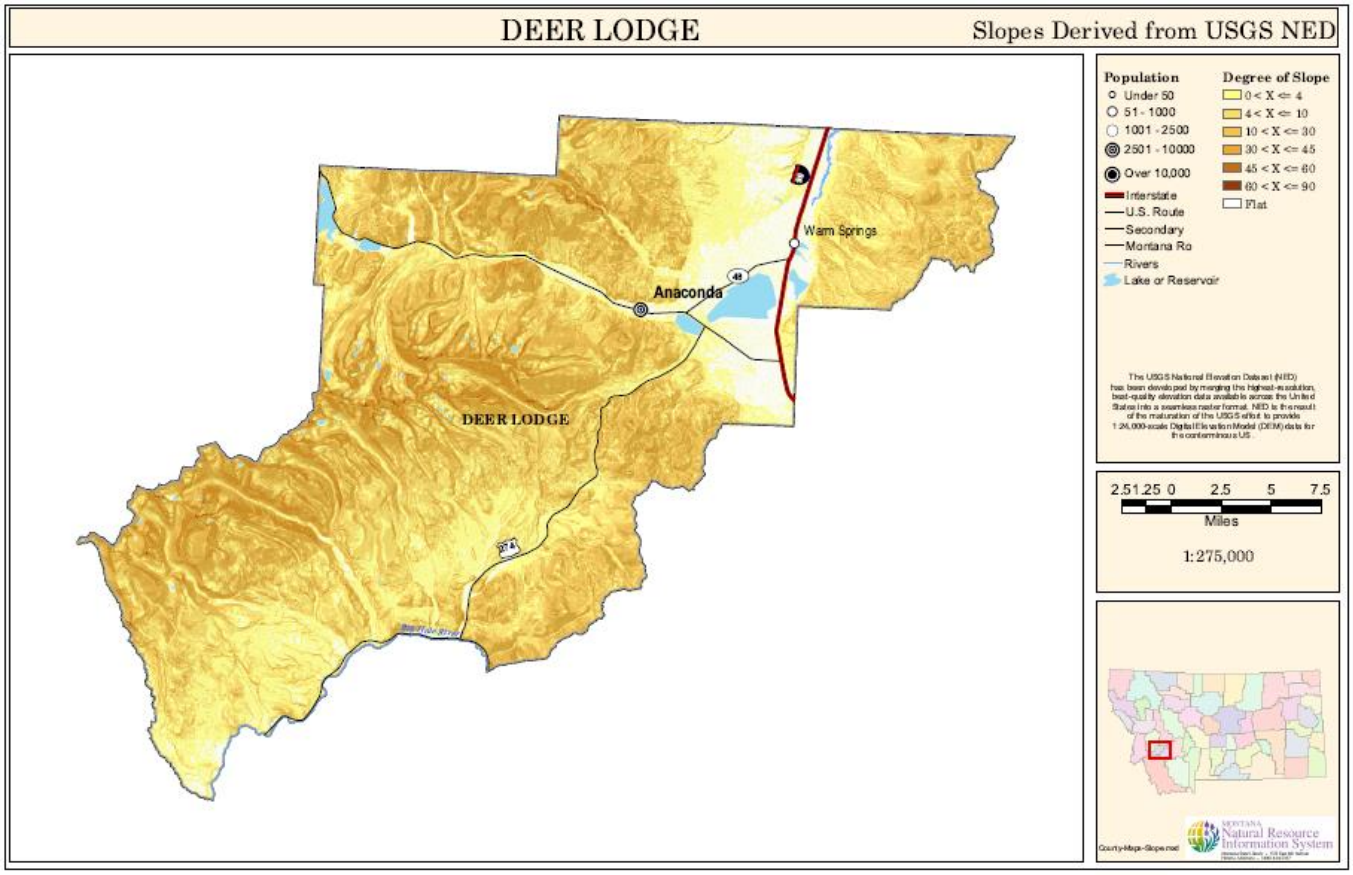
Landslide hazard areas include slopes that are underlain by weak, fine grained unconsolidated sediments, jointed bedrock, or landslide deposits, including the top and toe of such areas. It is often necessary to conduct a geotechnical analysis to assess potential danger from landslides. However, even when it is determined that a slope is stable, conditions may change due to road cuts, grading, excavation for foundations, or increased runoff and/or seepage into the soil as a result of increased development.

The relationship between slope and water quality has been thoroughly documented. When rain falls on flat ground, it either sinks into the ground or it ponds until it finally does sink in and/or evaporate. When rain falls or snow melts on slopes, the water that does not percolate into the ground will run downhill. When water runs down a steep slope, its velocity increases and it can pick up loose soil particles eventually causing erosion, and sedimentation. When natural terrain is disturbed, for development or other reasons, erosion and sedimentation can be accelerated dramatically.

Development on steep slopes in the wildland-urban interface (WUI) poses several public safety concerns. Access for firefighting equipment can be difficult on roads or driveways with steep grades. During adverse weather conditions, fire vehicles may not be able to travel steep slopes at all. Because fire travels in the direction of the ambient wind, which usually flows uphill, fires will travel uphill much faster than downhill. The steeper the slope, the faster the fire travels. Additionally, the fire is able to preheat the fuel farther up the hill because the smoke and heat are rising in that direction. Due to these fire characteristics, building on steep slopes in the WUI is highly discouraged.

Once again as pointed out in previous sub-sections, ADLC adopted the Critical Areas Development Standards in 2015. With regard to steep slopes, this provision states that “All land with a slope greater than 25% shall remain in a natural and vegetated state to the extent possible to accommodate a proposed ***Development***.” When development is proposed on slopes in excess of 25%, a grading plan, slope stabilization, and revegetation plan are required. Through the development permit or subdivision process, as applicable, a geo-technical investigation may be required, and all environmental factors and potential impacts associated with development on steep slopes can be addressed, including access and public safety considerations.

Map 3-13: Slope



10. Wildlife

Wildlife is dependent on the environment for food, water, shelter, and nesting and breeding areas. Wildlife in turn, provides an economic, aesthetic, educational, ecological, and recreational resource for the region. Anaconda-Deer Lodge County contains high quality habitat for a wide variety of game and non-game animals, birds, and fish.

Generally, public lands in ADLC are managed to meet a multitude of objectives, including habitat for fish and wildlife and recreational opportunities for people. Some areas will provide reference landscapes as well as large, relatively undisturbed blocks of important aquatic and terrestrial habitat. However, public lands do not provide all the habitats required by wildlife. Some of the County's signature wildlife species depend on low elevation wetland/riparian areas (moose), rivers and streams (bull trout), or forested foothills on private lands (big game winter range). While wildlife management areas in the county meet some of the habitat requirements of the wildlife they support, new management strategies must contain additional measures for managing habitats at a much broader scale, including on private lands. These biodiversity and ecosystem management strategies have evolved to a point where they are now being incorporated into planning for public lands and in local land use planning all across the country.

A. Wildlife Management Areas

Montana Fish Wildlife and Parks (FWP) manages the following Wildlife Management Areas in the County:

Table 3-7: Montana FWP Wildlife Management Areas in ADLC

Name	Location	Acres	Management Goals
Mt. Haggin	Ten miles south of Anaconda	58,800	To provide year-round habitat for wildlife, emphasizing elk, moose, mule deer, and to provide public outdoor recreational opportunities.
Lost Creek	Lost Creek Rd. – four miles north of Anaconda	1,405	To provide winter range for elk, mule deer and bighorn sheep and to provide outdoor recreational opportunities.
Warm Springs	Interstate 90 at exit 201	4,180	To improve the waterfowl production potential of the land and to provide recreational opportunities. It also provides habitat for non-game species.
Garrity Mountain	Eight miles west of Anaconda	10,106	To manage the land for highly productive, diverse vegetative communities that will provide high quality forage and cover for native wildlife species, with an emphasis on bighorn sheep, elk, mule deer, and white-tail deer, winter/spring forage supplies, and manage for hunting and other recreational opportunities for the public and access to National Forest Lands.
Blue Eyed Nellie	Four miles west of Anaconda	194	To provide winter range for bighorn sheep and opportunities for wildlife observation.
Stucky Ridge	Four miles NW of Anaconda	294	To provide hunting access and critical winter range for big horn sheep, elk, and mule deer.

Source: Montana Department of Fish Wildlife and Parks *www.fwp.mt.gov*

B. Human –Wildlife Conflicts

Many species of wildlife can become attracted to development, especially residential development with its attendant garbage cans, bird feeders, fruit trees, and pet and livestock food bins. For this reason, ADLC always requires that Montana Fish, Wildlife, and Parks' "Living with Wildlife" principles be incorporated into the Covenants, Conditions & Restrictions (CC&Rs) of rural and Wildland Urban Interface (WUI) subdivisions. Common measures include requiring bear-proof refuse and pet food containers, and landscaping that does not attract deer. Bears can actually break into a home or cabin, and once habituated to a food source associated with humans, these animals are usually removed from the population.

C. Building with Wildlife

Developments that incorporate ecological principles and build with wildlife in mind are becoming more attractive to home buyers. Consideration of wildlife use and movement through a property should occur in the earliest planning stages, ideally before the proposal is even submitted to the local governing body for review. Both the Montana Subdivision and Platting Act and the ADLC Subdivision Regulations require that impacts to wildlife and wildlife habitat be taken into account in the local subdivision decision making process. The most effective way to minimize adverse impacts on wildlife is to avoid them entirely by clustering development in more appropriate

areas. Many of the principles for wildlife consideration are basic conservation practices that also have other environmental benefits. According to the National Science Foundation, "Building with Wildlife: A Guide to Conservation Oriented Development" major principles include:

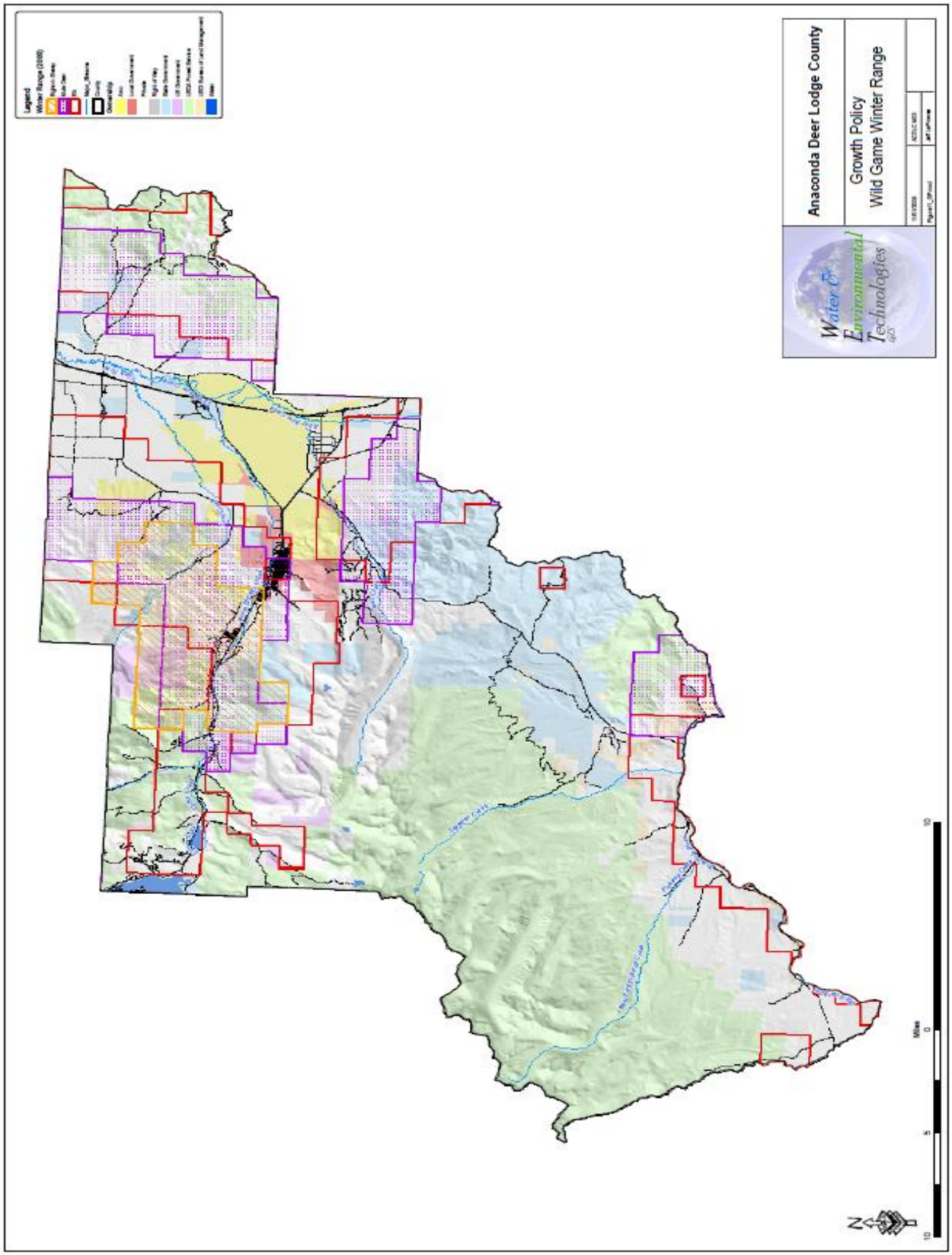
- Maintain natural habitat patterns.
- Allow natural processes to continue.
- Enable wildlife movement between natural areas.
- Plan development according to the land's capacity.
- Maintain key plants and animals.
- Minimize the extent of disturbance.

Many development techniques that have already been discussed in this element and are effective for protecting water quality and wetlands are also valuable in protecting wildlife habitat. Streamside setbacks provide areas for wildlife cover, movement, and access to water. The same is true of wetlands setbacks and the requirement for wetland buffers, as wetlands comprise some of the most valuable wildlife habitat in Montana. Restricting or prohibiting development on steep slopes can prevent the fragmenting of wildlife habitat and protect critical winter range. As discussed above, clustering and planned unit development options can also preserve valuable open spaces that wildlife use for migration, daily movement, winter range, and even calving.

D. Winter Range

Winter range serves the needs of animals that may migrate from hundreds of square miles from higher elevation "summer" ranges that are not habitable during the harsh winter months. Winter range also provides habitat for many species year-round. When critical winter range is of poor quality, or reduced as a result of development or grazing, the result is a diminished capacity to support big game populations. The impact of any single subdivision proposal is typically small, but the cumulative effects of subdivisions over time can be significant if critical winter range is not incorporated into land use planning. The following map indicates the winter range of large game animals in Anaconda-Deer Lodge County.

Map 3-14: Wild Game Winter Range



E. Threatened and/or Endangered Species and Species of Concern

Threatened or endangered species are defined as any species in danger of extinction throughout all or a significant portion of its range. Threatened species are any species that are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The 1973 Endangered Species Act requires that threatened or endangered species be protected from "taking", including "harm" and/or "harassment", wherever they occur, to promote the conservation and recovery' of threatened and endangered species and their habitat. Montana Species of Concern are native animals breeding in the state that are considered to be "at risk" due to declining population trends, threats to their habitats, and/or restricted distribution.

Table 3-8: Endangered/Threatened/Species of Concern in ADLC

Name	Classification	Habitat
Pygmy Rabbit	Species of Concern	Sagebrush
Wolverine	Species of Concern	Boreal forests & alpine habitat
Canada Lynx	Threatened	Subalpine conifer forest
Fisher - Weasels	Species of Concern	Mixed conifer forest
Fringed Myotis – Bats	Species of Concern	Riparian & mixed dry forests
Dwarf Shrew	Species of Concern	Rocky habitat
Northern Goshawk	Species of Concern	Mixed conifer forests
Golden Eagle	Species of Concern	Grasslands
Great Blue Heron	Species of Concern	Riparian forests
Cassin's Finch	Species of Concern	Conifer forests
Veery-Thrushes	Species of Concern	Riparian Forests
Greater Sage-Grouse	Species of Concern	Sagebrush
Brown Creeper	Species of Concern	Moist conifer forests
Peregrine Falcon	Species of Concern	Cliffs/canyons
Black Rosy-Finch	Species of Concern	Alpine
Lewis's Woodpecker	Species of Concern	Riparian Forest
Clark's Nutcracker	Species of Concern	Conifer Forest
Long-Billed Curlew – Sandpiper	Species of Concern	Grasslands
Brewer's Sparrow	Species of Concern	Sagebrush
Great Gray Owl	Species of Concern	Conifer Forest
Western Toad	Species of Concern	Wetlands, floodplain pools
Westslope Cutthroat Trout	Species of Concern	Mountain streams, rivers, lakes
Bull Trout	Threatened	Mountain streams, rivers, lakes
Artic Grayling	Species of Concern	Mountain rivers, lakes
Gillette's Checkerspot Butterfly	Species of Concern	Wet meadows
Boreal Whiteface Dragonfly	Species of Concern	Wetlands
Western Pearlshell mussels	Species of Concern	Mountain streams, rivers
Hoary bat	Species of Concern	Riparian and forest
Shiny tightcoil (mollusk)	Species of Concern	Mesic/moist conifer forest
Green-tailed towhee	Species of Concern	Shrub woodland
Black-crowned night heron	Species of Concern	Wetlands
Pileated woodpecker	Species of Concern	Moist conifer forests
Preble's shrew	Species of Concern	Sagebrush grassland
Little brown myotis	Species of Concern	Generalist

Source: Montana Natural Heritage Program http://mtnhp.org/

11. Beaverhead – Deer Lodge National Forest

The Beaverhead – Deer Lodge National Forest (BDNF) encompasses 3.38 million acres in Beaverhead, Butte-Silver Bow, Anaconda-Deer Lodge, Granite, Jefferson, Madison, Powell, and Gallatin counties. Approximately 207,503 acres of the forest area is in ADLC. The Forest Supervisor's office is located in Dillon, MT. The BDNF straddles the Continental Divide and provides the headwaters for rivers flowing throughout the western and central United States. This national forest includes patterns of forest lands, meadows, sagebrush, and grasslands, and offers outstanding scenery, wildlife habitat, and recreational activities. Timber harvesting and mineral extraction are traditional uses in the forest.

A revised "Land and Resource Management Plan" was adopted for the BDNF in 2008. This plan divides the BDNF into management areas with different programmatic objectives and standards for each area. The following summaries are for the management areas that lie wholly or partly within ADLC:

A. Anaconda–Pintler Wilderness

Contained within the Anaconda Mountain Range, this area is managed to protect wilderness characteristics and provide primitive recreational opportunities. The area was designated as wilderness in 1964 as part of the National Wilderness Preservation System. Vegetation is managed primarily through prescribed and natural fire. Scenic value is rated very high. Motorized vehicles and mountain bikes are prohibited and the harvesting of timber is not allowed. The Forest Plan recommends additions to this wilderness area.

B. Fishtrap-Mt. Haggin

This area is managed as a transition between the level of activity in the Big Hole Valley and the Anaconda-Pintler wilderness. There are non-motorized and undeveloped lands adjacent to the wilderness area and there is road access and developed recreation sites near the private lands in the valley. Snowmobiling is allowed in the lower terrain. Timber harvest and grazing may take place in the area. Deep Creek watershed is managed to conserve native fish populations along with active watershed restoration.

C. Warm Springs

This area is managed for recreation, wildlife, and native fish conservation. The Pintler Scenic Route goes through the area. Higher elevations are semi-primitive and non-motorized. South facing slopes at lower elevations are closed to winter motorized uses so as to provide winter range for bighorn sheep. Activities include timber production and harvest, grazing, road restoration and recreational residence tracts. Noxious weed management is a priority along the Hwy 1 corridor.

D. Georgetown Lake

This area is managed for developed water-based recreation, trail opportunities, and winter sports. It is the management area with the highest concentration of recreational development with an alpine ski area, developed campgrounds, fishing, picnic areas, boat launches, interpretive sites, cross-country skiing, and snowmobile trails. Ownership is mixed and includes private and public land. Issues include reducing risk of fire near private lands and managing nutrient input into Georgetown Lake from recreational activities and residential development.

PART 3: GOALS, POLICIES AND ACTIONS

GOALS:

Goal 1: Recognizing that water is an essential resource, and pure surface and ground water is paramount to the physical and economic well-being of the County, ADLC shall preserve and protect surface and ground water resources.

Goal 2: Ensure a clean, safe, and sanitary water supply for all residents, free from the threats of degradation or depletion.

Goal 3: Preserve and protect environmentally sensitive areas that contribute to water quality and/or fish and wildlife habitat.

Goal 4: Avoid risks to life and property associated with development and construction in hazardous areas.

Goal 5: Maintain, and where possible, increase access to public lands, lakes, and streams.

Goal 6: Preserve natural resource assets such as scenic vistas, healthy forests, and prime agricultural land.

POLICIES:

1. ADLC shall continue to promote Montana Highway 1 as a scenic corridor, and will protect the scenic qualities and vistas of this roadway.

2. ADLC shall carefully consider impacts to the natural environment, wildlife, and wildlife habitat when conducting subdivision review as set forth in Sec. 76-3-609, MCA, and in all development permit reviews.

3. ADLC shall continue to partner with the State of Montana, the federal government, and other local jurisdictions on natural resource conservation and preservation programs.

4. As a planning and development policy, ADLC shall not allow any public or private development to adversely impact endangered or threatened species, big game crucial winter range, spawning areas and sport fisheries, waterfowl nesting areas, and diverse riparian and forest habitat.

5. No development along lakes, rivers, streams, and adjacent banks shall be allowed to:
   - Diminish water quality
   - Diminish and/or degrade habitat for fish or wildlife
   - Interfere with navigation or other lawful recreation
   - Create a public nuisance
   - Create a visual impact discordant with predominant natural scenic values, or
   - Alter the physical and environmental characteristics and functions of the shoreline (except as may be permitted by proper regulating and permitting authorities).

6. Allow development of gravel resources consistent with ADLC natural resource goals and policies, including screening and buffering, noise and dust control, and reclamation.

7. As land is developed, ADLC shall maintain historic access to public lands, lakes, and streams.

8. ADLC shall make preservation and enhancement of environmentally sensitive areas a priority in the development and implementation of regulations, programs, and projects, and in capital facility planning and budgeting.

9. ADLC shall strive to remain in compliance with all ambient air quality standards.

10. ADLC shall support and encourage best management practices (BMPs) and other measures recommended in Total Maximum Daily Loading (TMDL) documents.

ACTIONS:

1. Conduct a study of the Warm Springs aquifer in the West Valley area to determine its capacity to provide potable water to existing and future wells and well fields.

2. Work with property owners and developers to provide additional access points to Georgetown Lake.

3. Establish drainage criteria requiring that no excessive siltation, parking/drive area runoff, chemicals, or pesticides make their way to rivers, lakes, and streams.

4. Work with the Big Hole Watershed Committee to provide even better protection for the Big Hole River and its riparian areas. Explore a bridge provision and aquatic habitat criteria for Article XXXV, DPS.

5. Partner with the Georgetown Lake Homeowners Association to conduct an education campaign on the handling and use of pesticides and fertilizers near the lakeshore.

6. Incorporate environmental standards and BMPs recommended in TMDL documents into the ADLC floodplain ordinance, and encourage floodplains to be retained in their natural state.

7. Continue to take advantage of natural resource restoration afforded by Superfund, Natural Resource Damage Program, and similar programs.

8. Coordinate with existing watershed groups on land use and critical areas planning.

9. Require BMPs and other recommended measures set forth in TMDL documents, as applicable, through the development review process.

10. Conduct a preliminary engineering report (PER) or similar investigation of the feasibility of providing central water and/or sewer service to Opportunity