



The Mission Mountains

NATURAL RESOURCES

Executive Summary—Conditions and Trends

Water resources are immensely important throughout the west and Lake County is no exception. Surface water quality in the Flathead Basin is generally very good but is slowly deteriorating. The easy-to-identify point sources of pollution have been largely mitigated. Now local scientists estimate that 98 percent of the pollution entering Flathead Lake is from non-point sources such as forest burning, agricultural and urban runoff, precipitation, road dust and septic systems. This pollution usually consists of nitrogen and phosphorus, which foster algal growth and have negative impacts on lake and stream ecosystems.

Local groundwater resources are generally pure. Although the depth to groundwater varies throughout Lake County, the area is relatively water rich and no large-scale evidence of water mining has been found. Due to the porous soils and shallow depth to ground water, the aquifers in Lake County that appear to be most vulnerable to contamination are in the Arlee, Pablo and Ferndale areas.

The Flathead Irrigation Project provides water to a large portion of the Mission and Jocko valleys through an extensive, yet old and deteriorated, system of canals. Unimpeded access to this irrigation water is crucial to the viability of the local agricultural economy and culture. Water rights on the Flathead Indian Reservation are currently being adjudicated. The parties estimate that at least ten years will pass before an accord is reached. The lack of certainty regard-

ing water rights may be the single largest issue the citizens of Lake County currently face and the outcome of the adjudication process will have a substantial impact on how the area develops.

Air quality is relatively good, although inversions in the Mission Valley sometimes occur due to a combination of cold temperatures, little wind, wood burning and automobile traffic. In the summertime, the dust from county roads also negatively impacts air quality.

Fish and wildlife resources are a major asset to the people of Lake County. Flathead Lake, Flathead River and numerous other lakes, streams, and reservoirs support a valuable, diverse, cold-water fishery. Issues such as the proliferation of non-native species, relatively few public lake access points, and the values that draw people to the lakes and streams are ever present. Large areas of wild lands and stream corridors provide habitat for brown and black bears, mountain lions, waterfowl, upland game birds, bald eagles, deer and elk, among other wildlife. The ever-growing human population puts pressure on wildlife and inevitably leads to interaction and, in some cases, conflict.

One of the largest threats faced by landowners in Lake County is the proliferation of noxious weeds. The weeds tend to take over once-diverse rangelands and provide little nutrition for foragers, including cattle.

Sites of historical, cultural, and spiritual importance are found in Lake County and

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throughout the region. Preserving these sites and maintaining traditional practices in the face of the rapidly changing landscape is a challenge for many local people.

Some natural hazards exist in Lake County. The Mission Fault, which runs along the base of the Mission Mountains, is estimated to have last shifted 7,000 years ago, with an event the magnitude of 7.5 on the Richter Scale. Most of the interseismic period for that fault, estimated

to be between 5,000 and 8,000 years, has passed and another event could occur. Other hazards include wildfire, particularly where residences are located in wooded areas, and floods from local streams.

The scenic views found throughout Lake County are exceptional. Along with development comes that threat that the visual quality enjoyed by residents and that brings visitors to the region will be diminished.

Water Resources

Lake County is situated at the southern end of the Flathead Basin, a watershed that drains approximately six million acres of northwestern Montana and southeastern British Columbia. Waters from this basin flow into the Clark Fork River and eventually into the Columbia River. The waters of the Flathead Basin play a vital role in the lives of Lake County's citizens and visitors. They support fish and wildlife as well as domestic, municipal, irrigation, stock watering, manufacturing, and recreational uses. Average annual precipitation for the Mission and Jocko Valleys is about 17 inches and is about 29 inches in the Swan Valley. Up to 70 percent of this moisture falls from April to September (Soil Survey for Lake County, Montana, Natural Resources Conservation Service, 1997).

Water Quality

The natural surface and groundwater quality in Lake County is generally very good. Water for human use and consumption comes from surface waters such as Flathead Lake, Swan Lake and Crow Creek and subsurface glacial and non-glacial unconsolidated materials and bedrock deposits. As water is subject to human activity, the possibility of degradation exists. The Flathead Basin Commission, the Montana Bureau of Mines and Geology, the University of Montana's Flathead Lake Biological Station and the Tribes are among the organizations that con-

duct surface water quality monitoring in the Flathead Basin.

Some of the potential sources of ground water contamination in the Lake County are underground storage tanks (there are currently 51 known ones, 16 of which have "Do not fill" orders), storm water runoff, pesticide and fertilizer application, chemicals related to automobiles, septic systems, municipal sewage waste lines and lift stations and hazardous materials. Some of the potential routes of contamination are irrigation canals, sand and gravel operations, surface water bodies and water wells.

Absent some type of major spill incident, septic systems and urban and agricultural runoff appear to pose the greatest threats to ground water quality. Polson has a source water protection program for three of its five wells, all located on the south end of Flathead Lake. Pablo has completed work with Montana Rural Water Systems, Inc. to delineate its source water protection area. No other communities in Lake County have pursued source water protection, although the St. Ignatius Planning Board is considering it as an option to protect its groundwater wells.

The potential sources of contamination can be segregated into point sources and non-point sources. In the Flathead Basin, where most of the point sources have been mitigated, non-point source pollution is the more serious problem. Non-point source pollution enters Flathead Lake

primarily through underwater nutrient leaching and from the air in the form of fugitive road dust and particulates released from forest burning and precipitation. Other non-point sources of pollution include runoff from parking lots, streets and roads, shoreline construction activity, runoff from farms and timberlands and groundwater pollution from malfunctioning septic and drainfield systems.

Groundwater tests have shown that Clean

els of nitrates in the Arlee area.

The EPA permits sewage treatment facilities to discharge effluent into surface waters in Lake County. The Tribes are the governmental entity that establishes surface water quality standards for Flathead Indian Reservation waters under the Clean Water Act. Seven entities hold discharge permits within Lake County. Table 4-1 shows the permit holders, and the water body into which treated effluent is discharged.

Table 4-1: Selected Water Discharge Permits

Permit Holder	Water Body
Charlo Sewer District	Dublin Gulch
FWP Fish Hatchery	Jocko River
City of Polson	Flathead River
City of Ronan	Crow Creek
Town of St. Ignatius	Matt Creek
University of Montana, Flathead Lake Biological Station	Flathead Lake
Confederated Salish & Kootenai Tribes	Crow Creek

Source: Montana DEQ, MPDES Database, 1999, various phone interviews

Water Act safe drinking water standards have generally been met in the water that has been sampled (Slagle, Water-Investigations Reports, 1988). However, groundwater contamination has been detected in Lake County. In 1996-97, the Bureau of Mines sampled groundwater for nitrates in the Arlee area. Nitrates occur naturally in the area at low levels. The samples showed concentrations of three-to-five milligrams per liter (mg/l). Although none of the samples exceeded the 10 mg/l Environmental Protection Agency (EPA) standard for safe drinking water, values above three indicate contribution from human activities. According to the Bureau of Mines, septic systems and fertilizers are the most likely sources for the elevated lev-

Under Section 303D of the Clean Water Act, states are required to identify and evaluate impaired water bodies for the prioritization of restoration funds. In Montana, this work has been done by the Montana Department of Environmental Quality (DEQ) off of Indian reservations. On reservations, the individual tribal governments may compact with the EPA to maintain a list of impaired water bodies. As of December, 2002 the Confederated Salish & Kootenai Tribes had not formulated such an agreement with the EPA.

In the Swan watershed, six tributaries and Swan Lake have probable impaired uses for the trout fishery. The probable sources of impairment include forest practices, agriculture and

grazing (flow alteration, sedimentation and organic enrichment), road maintenance, and natural sources.

On the 1998 303(D) list (where water bodies on reservations were included) aquatic life support was designated as a probable impaired use in Flathead Lake due to flow alteration, elevated nutrient levels, siltation, suspended solids and noxious aquatic plants. In the Flathead River system, probable impaired uses include aquatic life support, recreation, drinking water supply, and industrial uses. Sources of the impairment may include forest management, grazing, agriculture, septic systems, channelization, stream bank alteration, removal of riparian vegetation, and industrial land treatment.

The University of Montana's Flathead Lake Biological Station at Yellow Bay monitors water quality in Flathead Lake. The Biological Station has been monitoring water quality in the lake for the past 100 years, with a comprehensive program ongoing since 1977. Through a citizen volunteer program, the Flathead Basin Commission also monitors water quality in select bays on Flathead Lake and on streams and lakes throughout the basin. The Tribes also monitor water quality on the Flathead Reservation. They have found that surface water quality declines as it traverses agricultural areas of Lake County.



Flathead Lake and the northern Mission Mountains in winter.

According to researchers at the Biological Station, nitrogen and phosphorus are the primary pollutants stimulating the growth of algae in Flathead Lake. Surface runoff, from the non-point sources described above, provides food for algae. The most sensitive indicator of water quality is primary productivity, which is the ability of the Lake to produce algae. The higher the primary productivity, the lower the water quality. The rate of primary productivity was the second highest value ever recorded in 1998, according to Station Director, Jack Stanford, in his *State of the Lake* address in July 1999.

This represents a 50 percent increase from the primary level measured in 1978. Nitrogen entering the Lake from the Stillwater and Flathead Rivers had been at high levels in recent years. In the late summer of 1998, dissolved oxygen values in the bottom waters of Big Arm Bay were 30 percent lower than in 1997 and the lowest yet recorded (Ellis et al. 1999). Lower dissolved oxygen is a bad sign, because bacteria decomposing the algae use up oxygen. "The more food, the more algae; the more algae, the poorer the water quality." (Missoulain, July 8, 1999). Lakes polluted with plant growth nutrients, particularly nitrogen and phosphorus, typically have high rates of primary production, poor water clarity due to blooms of algae, and can have bad tastes and odors associated with the decomposition of the blooms. The long-term decline in water quality may also be related to food web changes from the introduction of nonnative species such as the *Mysis* shrimp. The decline in water quality in 1998 is of serious concern to those monitoring water quality in the Lake, as well as recreationalists and property owners.

As stated above, water pollution comes from a number of diffuse non-point sources and only some of the sources may be controlled by people (e.g., stormwater and agricultural runoff, road dust and septic systems). As the Lake County area grows and develops, further deterioration of surface water may

result. Fortunately, there are a number of ways to halt (or at least slow) the deterioration of water quality and it will take a concerted and cooperative effort by individuals, agencies and organizations to maintain the area's high quality surface water resources.

Aquifers and Wells

Well yields in Lake County are unpredictable because of the heterogeneity of the subsurface deposits. Larger yielding wells are found in unconsolidated materials such as sands and gravels. Bedrock surface in the Mission Valley is very irregular due to episodes of faulting and folding. Bedrock aquifers are the only source of water in the mountains or areas without glacial deposits. The quantity of water yielded from bedrock aquifers is variable depending on the fracturing, but is usually less than 10 gallons per minute. Deposits left by glaciers, commonly found in the valley bottoms, generally produce good wells while bedrock formations do not. The relationship between the aquifers and the confining layers is complex in the Mission Valley, making predictions about water yield for any given location difficult (Boettcher, MBMG, 1982 and MBMG, August 1999).

Aquifer recharge, water that flows into aquifers, comes from numerous sources throughout Lake County including precipitation infiltration, runoff from surrounding mountains, leakage from reservoirs and canals and return flow from fields. Recharge in the Mission Valley occurs on the east side of the valley along the Mission Mountain front. Discharge from aquifers happens due to groundwater inflow into rivers and lakes, evaporation, and losses to wells and springs (Polson Wellhead Protection Plan, 1994). Groundwater in Lake County generally flows in the direction of the trends of the valleys. In the Mission Valley, groundwater flows from the Mission front west to the Flathead River and north toward Flathead Lake (Soil Survey of Lake County, Montana, NRCS, 1997, CS&KT, 1996, and Montana Bureau of Mines and Geology, August 1999).

The Montana Department of Natural Resources and Conservation maintains a database of wells. The database contains information on well locations, depths and yields, use of the water, and ownership. Well depths change by individual location and range from 40 feet to over 600 feet deep. Many of the wells in Lake County cluster between 100 and 200 feet in depth, but wells to 400 feet are not uncommon. Water yields vary considerably across Lake County, depending on the aquifer. Yields of between 10 and 50 gallons per minute (gpm) are relatively common, yet there are over 200 wells yielding at least 100 gpm, and two wells in the west half of Lake County that yield 3000 gpm. Municipal wells at Polson and Ronan yield 1400 and 1000 gallons per minute respectively (DNRC Water Resources Data Base, June 1999).

Most of the wells in Lake County are in valley-fill aquifers. In many of these wells, water levels fluctuate seasonally in response to recharge from streams and irrigation in addition to discharge to wells. Water levels in wells in the Jocko Valley have fluctuated as much as 30 feet annually (Kendy, USGS Water-Resources Investigations Reports, 1996). In areas with irrigation canals such as the Jocko and Mission Valleys, water levels rise during the summer and decline during the winter. Where irrigation water does not contribute to the aquifer recharge, in the Swan Valley for example, well water levels are highest during the winter and spring, and decline during summer months (Slagle, 1988). In the Little Bitterroot Valley, water levels in wells decline during the summer probably also due to irrigation. Northwest of Polson, declining water levels in wells as of the late 1970s show that water was being used faster than it was being recharged (Boettcher, MBMG, 1982).

Large capacity wells (greater than 200 gpm) are found in four areas of the Mission Valley: Irvine Flats, northwest of Polson, a three-mile wide strip from east of Polson south through Pablo and Ronan, and in the southern part of the Valley between St. Ignatius, Moiese, and Charlo. According to Slagle, "Wells capable of large discharge are present throughout the east-

ern and southern parts of the Mission Valley, but their occurrence is scattered.” Illustrating this heterogeneity is the fact that an area west of Ronan is essentially devoid of accessible groundwater. Well discharge in the Jocko and Lower Flathead River Valleys ranges from 7-400 gpm, with most wells producing between 20 and 60 gpm (Slagle, 1988).

The Mission Valley as a whole did not show evidence of de-watering the aquifer system when analyzed by Boettcher in the late 1970s. It is the opinion of both the Tribal Hydrologist and the Montana Bureau of Mines and Geology that on the whole, groundwater is not being mined in the Mission Valley. In this case, the term mined means that groundwater is being drawn out faster than it is being recharged. The Bureau of Mines and Geology reports that although there could be a limited number of localized draw down situations, they have not seen the physical evidence of water mining, which would consist of cones of depression around existing wells. Although there may be seasonal fluctuations in well water levels in response to irrigation pumping, the amount of recharge appears adequate to replace the current use.

The Swan Valley is characterized by numerous lakes, ponds, streams and wetlands left by melting ice in poorly drained soils. The Swan valley-fill aquifer is a reliable one. In past years, residents relied on springs for domestic water. Most have now completed wells. These wells are rarely deeper than 60 feet. It is a common situation to have neighboring wells at different depths and with different water levels. This indicates that productive parts of the aquifer are not necessarily horizontally connected. The lack of flood irrigation in the Swan Valley means that unlike the Jocko and Mission Valleys, irrigation is not a significant factor in aquifer recharge.

As stated above, depth to the water table varies across Lake County. According to data obtained from the Natural Resources Conservation Service, there are numerous areas where the water table is at the surface. These areas are scattered primarily throughout the southern and western areas. The more concentrated areas of

high water table include the Ninepipe and Kicking Horse Reservoir areas south of Ronan, the Jocko Valley bottom and some of the uplands to the east, areas east and southwest of Pablo along Mud Creek, and uplands in the western part of the County that drain into the Little Bitterroot River.

Due to relatively porous soils and shallow depth to groundwater, the aquifers in the Ferndale, Pablo and Arlee area have been characterized as potentially vulnerable to contamination. Many residents in the areas use shallow wells for potable water. These are also areas where a good deal of the population growth is occurring. Population growth brings with it the potential to contaminate groundwater through chemical spills, septic systems and concentrated urban runoff. Unless steps are taken to limit groundwater contamination in these urbanizing areas, a decrease in the quality of water in these aquifers is likely to result.

Lakes and Streams

Lakes and streams cover approximately 100,000 acres of Lake County, or just under 10 percent of the total area.

The most prominent surface water features in Lake County are the southern two-thirds of Flathead Lake, the Flathead River, Swan Lake, the Swan River, Mission Creek, Post Creek, the Jocko River and Lake Mary Ronan. Other sizeable lakes include McDonald, Loon and St. Mary’s Lakes. Lake County also contains several large reservoirs, including Pablo, Kicking Horse, Lower Crow, Mission and Ninepipe, and numerous small reservoirs which are important for wildlife and agriculture. The map titled Water Features shows the prominent surface waters of Lake County.

Wetlands

Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water (CS&KT, 1999). Wetlands include marshes, bogs, the shallow



One of the Mission Valley's pothole wetlands.

portions and shorelines of lakes, ponds, and reservoirs, and the floodplain and shoreline of streams. They are the most biologically productive of all ecosystems and perform many useful functions including providing rich wildlife habitat, reducing sediment loading to water bodies, absorbing flood energy and water and processing chemical and organic wastes.

Some 50 percent of the more than 800 species of migratory birds in the United States depend to some degree on wetlands (USFWS Refuges 2003, DEIS, 1993). Locally, wetlands are used by resident, transitory and wintering migratory birds, as well as small beavers, mink, and muskrats, amphibians, bald eagles and grizzly bears. According to the Confederated Salish & Kootenai Tribes' Wetlands Coordinator, all native amphibian species are at risk due to documented declines in population. Habitat loss is considered to be a factor contributing to the decline. Bald eagles and grizzly bears, which are listed as threatened under the Endangered Species Act, use wetlands as habitat (Mary Price, personal correspondence 2/00). A large percentage of the sensitive plant species in Lake County are also associated with wetlands, including water howellia (*Howellia aquatillis*), which occurs in the Swan Valley and may occur in the Mission Valley.

The region has many wetland areas, including the pothole areas in the center of the Mission Valley in the Charlo area and the wetlands complex at the southern end of Swan Lake.

These wetlands have been targeted for acquisition or have had conservation easements purchased by public agencies and private conservation groups. Equally important, and probably more threatened, are the wetlands along the densely developed shore of Flathead Lake. According to the Tribes' Wetlands Conservation Plan, the raised seasonal lake level that resulted from the construction and operation of Kerr Dam flooded more than 500 acres of wetlands, most of which occurred on East Bay and Polson Bay. This extended inundation resulted in large expanses of unvegetated mudflats where wetlands once existed. According to research performed by the Tribes' Natural Resources Department staff, wetlands are decreasing in size and complexity throughout the Mission Valley, and certain types of wetlands have been depleted to only 10 percent of their historic size.

The U.S. Fish and Wildlife Service (USFWS) is developing a National Wetlands Inventory (NWI) to produce information on the characteristics, extent, status and trends regarding the nation's wetlands and deepwater habitats. A component of the NWI is the digital mapping of wetland areas. The wetlands map of Lake County included with this text is based on the most recent NWI data available to date.

Work in navigable waters and jurisdictional wetland areas of Lake County is permitted by the U.S. Army Corp of Engineers (USACE). Work in all Flathead Reservation waters is permitted by the Tribes. The jurisdictions overlap

on the Reservation and both have permitting authority. The USACE was involved in 69 projects in Lake County from 1995 through April of 1999. The most common activities requiring “404 permits” in Lake County have been, in descending order, irrigation structure work, construction and repair of roads and bridges, utility work, fisheries and stream rehabilitation, work on ponds and springs, and lakeshore boat ramps/docks (USACE Data Base, June 1999).

On the Flathead Reservation, the Tribes regulate waterway construction through the Shoreline Protection Office and a seven-member Shoreline Protection board. The Office issued 3,000 construction permits and 2,000 repair permits from November 1982 through April 1999 on the lower Flathead River and the south half of Flathead Lake under Tribal Ordinance 64A (Revised). The Office issued 533 wetlands permits from January 1995 through April 1999 under the Aquatic Lands Conservation Ordinance (ALCO) 87A. All proposed ALCO projects are copied to the USACE for their information and determination as to whether the projects meet the criteria for a USACE-regulated project.

Irrigation Systems

Irrigation water is delivered users in Lake County by the U.S. Bureau of Indian Affairs Flathead Agency Irrigation Division (FAID), a federally owned and operated irrigation project. FAID has over 1,200 miles of canals and laterals, and 17 reservoirs. The reservoirs in the system are small and allow for only one season of water storage. Most of the system is 70 to 80 years old and is in a deteriorated condition. The number and size of private irrigation systems in Lake County is unknown.

Irrigation systems have changed natural watercourses and altered flow regimes. Return water from fields has increased temperatures, nutrient, sediment and pesticide loads. Canal leakage results in the loss of large amounts of water from the irrigation canals; however, this water is not lost. It remains a part of the basin

system by recharging aquifers, returning to streams and/or contributing to the surface wetlands. Any large-scale project to line or repair leaky canals should consider the present contribution of water lost from the canals to the overall hydrologic function of the area, especially the aquifer recharge implications.

Sources available for funding irrigation system work depend on whether the applicant has taxing power. Private land owners can receive assistance through the Natural Resource Conservation Service. Counties may be eligible for funding through the 223 or 319 grant programs administered by the Montana Department of Natural Resources and Conservation (DNRC) and Montana Department of Environmental Quality. User assessments are an additional way to fund system improvements.

The irrigated farmland in Lake County is the most productive of all local agricultural lands. However, local farmers and ranchers face numerous obstacles including depressed and fluctuating markets and the pressures of development. Some of the development pressures include disrupted irrigation flows, the spread of noxious weeds, pets from residential subdivisions harassing livestock and landowners who are generally unfamiliar with the customs of rural Montana. When subdivisions are created on land within the FAID, the land with the greatest potential for agricultural production is no longer available and is unlikely to ever be reclaimed as farm ground. While the amount of irrigated acreage lost to residential subdivision within recent years is unknown, subdivision requests on properties within the irrigation project are common. If the farm economy continues to fluctuate and farmers can provide a better future for themselves and their families by subdividing than by farming, many farmers will leave the trade, development pressures will increase on those farmers who remain and the culture of the Mission Valley will change. A further discussion of local agriculture is presented in the Land Use chapter of this document.

Dams

Most of the dams in Lake County were constructed for irrigation purposes many years ago. The average age of the dams in Lake County is over 58 years. The flagship dam in Lake County is Kerr Dam, which controls the outflows of Flathead Lake. Ownership of the Kerr Hydro Facility recently passed from Montana Power Company to PP&L Global, a subsidiary of Pennsylvania Power and Light. The Tribes are co-license holders with the utility on Kerr Dam with an option to assume operations of the dam in the year 2015.

The Bureau of Reclamation, in cooperation with the Tribes and the BIA, recently prioritized the dams on the Flathead Reservation based on risk. Excluding Kerr Dam, which is under the jurisdiction of Federal Energy Regulatory Commission and was not included in the risk analysis, the dams in the county are not considered to be “high risk.” The Tribes have completed, and provided to Lake County Office of Emergency Management, maps of downstream inundation in the event of dam failures. They have also installed an early warning system at each dam, which is monitored remotely 24 hours a day.

Water Rights

Water rights are a sensitive issue throughout the west and Lake County is no exception. Water rights are currently being negotiated on Flathead Indian Reservation. In Montana, federal agencies and Indian nations, such as the Confederated Salish and Kootenai Tribes, negotiate water rights compacts with the state, which are then ratified by the Montana Legislature and U.S. Congress. The negotiations are predicted to take ten years or more before a compact is reached. If extensive litigation ensues, the process could take significantly longer. At this time, no new water rights or water use permits are being appropriated to wells and no change-in-use applications are being processed on the Flathead Reservation. However, water sources are continually being developed.

The parties involved are currently trying to work out an interim management agreement

that will allow water development to continue until a final agreement is reached. At this point no one knows if an interim agreement will be reached and there is a great deal of uncertainty regarding water development. Municipal wells and individual ones are included, and the cities and towns are currently not allowed to drill new wells, which effectively limits their ability to grow and pushes new development into the countryside, where other values may be compromised. The lack of certainty regarding water rights may be the single largest issue the citizens of Lake County currently face and the outcome of the adjudication process will have a substantial impact on how the area develops.

A temporary preliminary decree has been issued in the Swan River Sub-basin, Watershed 76K. This means that no new water rights will also be appropriated until all existing claims and documents have been examined. The issuance of a final decree will eventually follow, once the water court resolves the conflicts and discrepancies in claims.

The total number of claims to water in the DNRC database for Lake County is 3,563. Of these, most are held by private individuals for domestic and lawn and garden uses. Public entities holding claims to water are the State of Montana, the United States Government, and the communities of Polson, St. Ignatius, Ronan, Pablo, Charlo, Elmo, Swan Lake, and Lake County. The Tribes also have claims to water through wells in Lake County. Commercial enterprises such as Plum Creek, Burlington Northern, Montana Naturals, and others also have claims in Lake County.

Air Quality

Lake County lies within State Airshed Two. Airshed Two encompasses all of Lake and Flathead Counties, and portions of Sanders, Missoula, and Powell Counties. The EPA is responsible for administering the federal Clean Air Act on the portion of Lake County that overlaps with the Flathead Reservation. Air quality is important to area residents for both health and

quality-of-life reasons. Meteorological conditions such as the presence or absence of wind, wind speed, precipitation and temperature inversions-which the Mission Valley is subject to in the winter-can affect air quality positively or negatively.

Impacts to air quality come from a number of sources both inside and outside of the area. These sources and their impacts vary regionally. Some of the impacts are related to commercial activities. In the more populated areas, residential wood stoves, road dust and vehicle emissions are major contributors to air pollution. The Ronan and Polson areas have had minor particulate problems which have caused them to be designated “non-attainment” areas. The air quality has exceeded ambient air standards for Pm-10. (Pm-10 is a particulate size standard.) The exceedence in 1998 was only 1-2 days, due to an “exceptional event,” the smoke from Canadian forest fires. If these areas continue to be designated as non-attainment, an implementation plan will have to be developed to look at ways to reduce the particulate pollution.

The Clean Air Act of 1970 provided three designations of air quality, with Class One be-

ing the most stringent and pristine. Lake County and the Flathead Reservation were initially designated as Class Two. In 1977, the Clean Air Act was amended to grant Indian tribes the opportunity to reclassify reservation airsheds to protect air quality. The Confederated Salish & Kootenai Tribes requested that the EPA reclassify the Flathead Reservation from a Class Two to a Class One airshed. In 1980, the EPA approved the change. The Tribes are eligible under the Clean Air Act to apply for EPA approval of a clean air program, just as states do. The Tribes are developing such a program but have not as yet made application for a grant of full programmatic authority from the EPA. Before taking over the air quality program from the EPA, the Tribes must meet four eligibility criteria related to their ability to carry out the requirements of the Clean Air Act. If the application is approved, the Tribes will have the regulatory authority for air quality within the Reservation boundaries. The Tribes currently have a functioning air quality monitoring program on the Reservation, which has been in place since the 1970s.

The Class One air quality designation of-



Winter temperature inversions in the Mission Valley can affect air quality.

fers an area greater protection from future deterioration by limiting ambient pollution and setting up a system for review of potential new sources of air pollution. Outside of the Reservation, Montana DEQ permits stationary sources which discharge at least 25 tons per year. On the Reservation, the EPA has this authority. Larger projects or activities (those that produce 100 tons or greater per year) must undergo a PSD Review (prevention of significant deterioration) by the EPA. In the review process, a model estimates what the ambient air quality would be after development and compares that to the current ambient air quality. The permit for a Class One airshed would allow only a very small increase in deterioration of air quality. All entities, whether governmental or private, are subject to an EPA review if they can reach the threshold of 100 tons per year. The EPA reports that there are currently no “Title V” dischargers (major dischargers) in Lake County, however, the Plum Creek Timber Co. plant at Pablo submitted an application in the spring of 2000. All major new projects within 100 kilometers of the Class One airshed are subject to review, since they could affect the air quality within the designated airshed.

In areas with agricultural operations, air quality is affected by tillage practices, pesticide spraying, and burning. In forested areas, logging produces dust and smoke. Travel on unpaved roads throughout the area raises dust. Industrial uses, which affect air quality, are primarily caused by construction activities. Although “stationary sources” of particulate are regulated by the DEQ and EPA, non-point sources can fall under regulation as well. For example, if a gravel road system or agricultural operation contributes enough dust to exceed the ambient air standards, development of a control strategy could be required. Emission sources from outside of the county that affect local air quality include wildfires and prescribed burning associated with forests, and agricultural burning in western Montana, north Idaho, and eastern Washington. Although some things like climate, air movement and wildfires are out of our con-

trol, as more and more people move into the area and use wood burning stoves and drive automobiles, air quality will degrade unless substantial steps are taken.

It is estimated that up to 40 percent of the total amount of phosphorus entering Flathead Lake each year comes from the airshed (Stanford et al. 1997). Phosphorus associated with dust particles and ash can lead to reduced water quality in surface water bodies. Air inversions further exacerbate the potential for pollution of water bodies by concentrating the particulates in the region, allowing for greater deposition. According to the EPA, most of the particulate in Lake County is the result of dust from gravel roads, residential wood burning and slash burning associated with forest practices. The EPA is currently developing a permitting process for these sources. Implications for development in areas with existing particulate concerns, especially in the Class One airshed, may mean addressing current contributors of particulate.

Fish and Wildlife Resources

Within Lake County are a large number of resident and migratory fish and wildlife species occupying a diversity of habitats. Fish and wildlife habitat falls under a variety of land ownerships in Lake County, including small tracts of privately owned lands, commercial timberlands, state and federal government lands and tribal lands. Fishing and bird hunting within the Flathead Reservation have been jointly managed by the Tribes and Montana Department of Fish, Wildlife and Parks (FWP) since 1994. Both the Tribes and FWP are active in research and monitoring fish and wildlife in Lake County.

Fish Species

Numerous cold water sport and game fish and ecologically important native species are found in the lakes, rivers, and reservoirs in Lake County. Flathead Lake has populations of lake, bull, cutthroat and rainbow trout, kokanee

salmon, lake whitefish and yellow perch. The lower Flathead River contains northern pike, largemouth bass, mountain whitefish and the four species of trout also found in the lake (Identification of Montana's Most Common Game and Sport Fishes, Holton, 1981). A committee comprised of government agency and private stakeholders has formed a long-range management strategy for the Flathead Lake fishery that was recently adopted by the Tribes and Montana FWP.

Fisheries habitat has experienced degradation in Lake County. In the Mission and Jocko Valleys, some irrigation structures block fish movements, while others result in fish being trapped in canals and fields. Return irrigation water also typically has elevated temperatures and contains sediment and chemicals that adversely affect reproductive success. Spawning habitat for some native species was blocked by the construction of Hungry Horse Dam and alteration of lake levels by Kerr Dam affected spawning habitat of the non-native kokanee salmon. Increased siltation as a result of logging and road building has also degraded fishery habitats.

Non-native fish species, which have been introduced into local rivers and lakes, compete with and sometimes prey on native species. A local example of this is lake trout, which prey heavily on bull trout. Non-native species can also hybridize native stocks, resulting in a degradation of the gene pool. Competition from non-native species is a problem from a genetic diversity standpoint, because when native populations are out-competed and eliminated from an ecosystem, the entire system becomes less complex and therefore more prone to catastrophic loss.

At least 17 non-native species have been introduced into the Flathead Lake-River ecosystem since the late 1800s. Flathead Lake has populations of non-native lake trout, lake whitefish, rainbow trout, yellow perch and kokanee salmon, and declining populations of native bull and cutthroat trout. Other ecologically impor-

tant native species include pygmy whitefish, peamouth, redbside shiner, long fin and large scale suckers and sculpin. Trout are reared by the state at the Jocko Hatchery near Arlee. Fish raised in Creston (In Flathead County) by the U.S. Fish and Wildlife Service are planted on the Flathead Reservation under the direction of the Tribes.

Wildlife Species

Lake County and the region are home to numerous big game species, carnivores, upland game birds, waterfowl, furbearers, and non-game species including raptors, migratory songbirds, amphibians and reptiles. Certain game bird species are jointly managed within the reservation by the Tribes and Montana FWP, while the Tribes exercise authority over all big game species. Lake County contains 8,678 acres of the National Bison Range, over 4,000 acres of conservation easements and over 6,000 acres located within the three National Wildlife Refuges: the Swan River, Pablo and Ninepipes.

Big game species include elk, moose, mule deer, mountain goats, bighorn sheep and pronghorn antelope. Elk and deer use forested habitats throughout the area, while moose occupy wetland and riparian forested areas. Bighorn sheep and antelope are found in the southwestern area of the Lake County. Mountain goats are found in the Swan and Mission Ranges.

Due to the amount of rugged, wild country



National Bison Range entrance.

in the area, Lake County provides habitat for several large predators: black and grizzly bears, mountain lions, coyotes and wolves. Black bears and lions are distributed throughout the county. Grizzly bears may be found in and on the fringes of the Swan and Mission Ranges and often travel out into the Mission Valley by way of riparian corridors. There are currently no known resident wolf packs in Lake County. The Thompson River wolf pack occupies habitat just west of Lake County, making forays into western portions of the County (Gael Bissell, FWP). Wolf packs have also been reported to reside in Flathead County to the north.

Upland game birds include the introduced ring-necked pheasant, Hungarian partridge, wild turkeys, and three species of grouse. The pheasants and partridges prefer grassland habitats, the turkeys, low elevation pine forests, and the grouse occupy pine, spruce and deciduous forests (CS&KT Comprehensive Resources Plan, 1996).

The U.S. Fish and Wildlife Service, the

species of fur-bearers on the Reservation. The definition of a fur-bearer varies slightly between the state and the tribal agencies, but the species found on the Flathead Reservation would also be present in Lake County. These include: beaver, bobcat, coyote, fisher, long and short-tailed weasels, lynx, mink, marten, muskrat, gray wolf, raccoon, red fox, river otter, and wolverine.

Threatened and Endangered Species

Under the Endangered Species Act, the U.S. Fish and Wildlife Service maintains a listing of all species classified as endangered, threatened or candidate. Endangered species are those which are considered to be in danger of extinction throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Proposed or candidate species are those for which there is sufficient information on biological vulnerability and threats

Table 4-2: Endangered Species Act Listed Species Classification

Species Designation	Species Name
Endangered	None
Threatened	Grizzly bear, bald eagles, water howellia, bull trout, gray wolf, Canada lynx
Candidate	None

Source: U.S. Fish and Wildlife Service Endangered Species List, January 31, 2000

Tribes and Montana FWP all manage lands for waterfowl in the Mission Valley. Grasslands interspersed with pothole wetlands provide habitat for ducks, geese, hawks, bald eagles, osprey, owls, songbirds, cormorants, great blue herons, small mammals and sport fish. The Swan River National Wildlife Refuge was established for migratory birds. In addition to birds, this refuge provides habitat for big game, black bear, and during the spring season, grizzly bears.

According to the Confederated Tribes' Comprehensive Resources Plan, there are 14

to support a proposal to list as endangered or threatened.

Grizzly bears are found in the Mission and Swan Ranges and valley bottoms. In 1981, the Tribes and the BIA approved a grizzly bear management plan, which identifies bear management zones, establishes seasonal recreation closures for bears, restricts grazing, and places limitations on road construction in bear habitat on the reservation. No hunting of grizzly bears is allowed throughout the Rocky Mountains. Plum

Creek, along with the Flathead National Forest and the State of Montana, signed a conservation agreement with the U.S. Fish and Wildlife Service to coordinate timber harvest with grizzly bear management units in the Swan Valley. Grizzly bear survival is dependent upon maintaining good quality habitat and minimizing



Grizzly bears are found in the Mission and Swan Ranges and valley bottoms.

human-bear conflicts, which can result in destruction of the bear. As more people move into bear habitat, the likelihood of human-bear conflict will increase.

Water howellia, a threatened flowering plant species, occurs in 35 documented locations in the Swan Valley on corporate timberlands, the Flathead National Forest, the Nature Conservancy's Oxbow Preserve and private lands.

Bull trout have strict habitat requirements and many streams of the Swan Valley support healthy populations. Their presence is indicative of good water quality, aquatic ecosystem health, and suitable habitat. The adult fish reside in lakes and spawn in tributaries. After several years in the tributaries, juvenile fish migrate downstream to lakes where they mature. Bull trout are present in Flathead Lake, the Flathead River below Kerr Dam, Swan Lake, and the

Swan River upstream from Swan Lake, Mission and St. Mary's Reservoirs and the Jocko River. The Jocko River contains a stable, resident population being managed by the Tribes as a core area for bull trout. Major habitat concerns include the fluctuation of water levels in the reservoirs, which compromises spawning and rearing habitats, and the hydroelectric and irrigation dams which isolate various populations. Swan Lake is the only place in Montana with bull trout populations healthy enough that anglers are allowed to keep them (Hansen and DeSantos 1997, Flathead Basin Commission 1998).

The Canada lynx, found in Lake County's montane forests, is listed as threatened.

The formerly listed species that find habitat in Lake County include the bald eagle and the peregrine falcon. Both species frequent riparian habitats and are sensitive to human disturbance in nesting and foraging areas. The U.S. Fish and Wildlife Service recently considered the westslope cutthroat trout for listing but decided not to designate it as threatened.

Unique and Important Habitats

Research recently completed by the University of Montana has established the Mission Valley as world-class habitat for hawks. The largest concentration of rough-legged hawks in the world has been documented to winter in the Mission Valley. These hawks roost and hunt primarily in cottonwood stands along the east side of the valley. The Swan and Mission Ranges and valleys are extremely important areas for grizzly bear conservation and recovery. Grizzly bears, which range across large areas, can come into conflict with humans on the fringes of their habitat, as habitat is lost to development, or in travel corridors between primitive areas. Riparian habitats along the Flathead, Jocko, Mission, Post, Crow Creeks and others provide cover, nesting and foraging areas important for numerous species. Please see the wildlife habitat and management map for a depiction of recognized important habitats in Lake County.

Geology, Soil and Minerals

Geology

The topographic features of Lake County are the result of geological activity which began 150 million years ago when the Rocky Mountains were formed. Three million years ago, ice ages began in the northern Rockies which shaped the physical character of the land as it exists today. As the glaciers melted, they formed ice dams which impounded Glacial Lake Missoula. This lake covered the lowlands in the Mission Valley south to the Bitterroot Valley. Lake County is located at the south end of the Rocky Mountain Trench. Glaciers scoured this trench, trailing debris from north to south. The ice chunks melted and created the depressions which are the wetlands we see today in the central portion of the Mission Valley.

The eastern part of Lake County is characterized by the steeply sloping west face of the Swan Range and the Mission Mountains. The western reaches of Lake County contain the Salish Range, which is lower in elevation, and also has steep slopes. The central portion of Lake County is characterized by broad glaciated valleys with alluvial fans, stream terraces, rough badlands along the Flathead River and the west face of the Mission Mountains. Elevations range from 2,892 feet above sea level at Flathead Lake to 8,000 feet on the Swan Range divide.

Soils

Soil information is an important basis for a variety of land use planning decisions. It can be used to plan and manage crops and grazing, site commercial development, community facilities, infrastructure, and transportation systems and locate quality construction materials. Soil limitations can affect suitability for particular uses such as building site development, installation of septic systems or lagoons, construction materials and water management. Although engineers can frequently modify plans to compensate for soil limitations, these modifications may be costly in terms of design and maintenance.

Consideration of the soil properties prior to development can minimize the potential for future construction and environmental problems.

Soil character is determined by parent material, relief, vegetation, climate and age of the soil. In Lake County there is a great deal of variation in these soil forming factors and thus, many distinct types of soils. Variation in elevation and climate are the primary contributing factors to differences in soils. High elevations in the Mission and Swan Ranges are barren rock with little or no soil. Valley soils were formed either by glacial lacustrine deposits or from glacial till (or alluvial deposits) on fans, terraces and bottomlands.

Lacustrine deposits are formed on lake bottoms and exposed when the water level drops or the land is raised. Glacial Lake Missoula covered much of Lake County at one time. The lacustrine deposits are characterized by the presence of clay and clay loam, which is found throughout much of the central part of Lake County. Glacial till is unsorted material consisting of clay, silt, sand, gravel, cobbles and boulders transported and deposited by glacial ice. Glacial till and alluvial materials have clay loam as well, but also have gravel, cobbles and stones in various amounts and sizes. It is this till that provides the plentiful sand and gravel sources in Lake County (Soil Survey of Lake County, Montana, NRCS, 1997).

Prime farmland soils are found in a number of areas. According to the Natural Resources Conservation Service, prime farmland soils are defined as “soils that are best suited to food, feed, forage, fiber, and oilseed crops.” These soils have properties that favor the economic production of sustained high yields of crops. In the case of Lake County, these soils are irrigated, given that average annual precipitation would be inadequate to grow the majority of crops currently produced in Lake County, with the exception of dryland hay.

The irrigated sandy and silty loams that constitute the prime farmland soils in Lake County are found primarily in the center of the Mission Valley, in a ten-mile wide band starting

at Polson and stretching to about three miles south of Ronan. Small amounts of prime soils are also found in the Jocko Valley, in the Irvine Flats area, along the Flathead River, and along and between Dayton and Ronan Creeks in the Proctor Valley. Lake County is losing prime farmland soils to residential development and will continue to do so as the population grows unless serious efforts are made to retain it. The loss of these soils is of great concern because it changes the character of the Mission Valley and because some of the best soils are lost from production; they are unlikely to be returned to grow crops again for the foreseeable future.

Water erosion and soil blowing are also potential problems on the cropland in Lake County. Lost topsoil through erosion is damaging because productivity is lost and because this can result in pollution of streams and lakes by sediment. The sandy soils used to grow potatoes are very susceptible to soil blowing. Conservation practices such as maintaining plant coverage, establishing wind breaks, or minimizing tilling are necessary to protect these soils.

Minerals

No significant reserves of metallic minerals are known to exist in Lake County as there is an absence of igneous rock, from which metallic minerals are typically derived. Non-metallic mineral resources in Lake County consist of sand, gravel, clay and building stone found throughout the Mission and other valleys. The only metals production has come from two lead and silver mines, the Chief Cliff and Silverstone Mines, both of which are now closed (Water Resources Survey, Lake County, Montana, 1963).

Lake County lies in an overthrust belt. This formation is known to contain oil and gas reserves elsewhere. One exploration well was drilled in 1958 and one in 1980. Both were dry. Speculators acquired oil and gas leases on the Reservation in the 1980s however, variable oil prices have discouraged domestic exploration. There is no record of oil production in the County and there are currently no producing oil

wells (Bureau of Land Management, Fluid Minerals Branch, June 1999) .

Vegetation

Lake County has a diverse vegetative cover due to the variety of soil types, landforms and differences in elevation. The highest elevations in the Mission and Swan Ranges that are covered by snow, ice fields, and rock are devoid of vegetation. The eastern one third of Lake County (the Swan Valley, Swan Range, and the Mission Range) at lower to mid elevations are covered primarily with evergreen forests. Approximately 50 percent of Lake County is forested. Commercial forest lands are owned and managed by the Tribes, the state and federal governments, Plum Creek, and small private land owners. The Tribes recently finalized a Forest Management Plan which emphasizes “modified restoration” to pre-settlement conditions on their commercial timberlands.

In the Jocko and Mission valley bottoms, most of the land is either in agricultural production or grassland. Grasslands cover the southeastern portion of Lake County and large areas north and west of Polson. The grasslands support significant numbers of domestic stock, waterfowl, upland game birds and a variety of wildlife species. Shrubland occurs primarily in the west central portions of Lake County.

Noxious Weeds

Noxious weeds threaten native plant species, agricultural and forage production and wildlife habitat. Lake County and the Tribes have active weed management programs. The county program is funded by 1.219 mills, profits from the sale of herbicides, grant dollars from the Noxious Weed Trust Fund, subdivision review fees and funds from contract spraying. The Lake County Weed Program Director certifies weed seed free hay on both Tribal and private producers’ lands. Chemical, biological and cultural control methods such as grazing are used on weeds in Lake County. The county continues to experience problems getting small tract

Table 4-3: Weed Species in Lake County

Weed Species	Approximate Number of Acres
Whitetop	5,000
Spotted knapweed	5,000
Sulphur cinquefoil	2,000
Purple loosestrife	200
Leafy spurge	100-200
Tall buttercup, meadow hawkweed	New, unknown

Source: Lake County Weed Supervisor, December 2002

owners to treat their weeds, and sprays approximately 50 noncompliant properties a year. Lake County also sprays and/or mows 190 miles of highway, 1200 miles of road ways, 200 miles of irrigation canals and 28 miles of railroad rights-of-ways.

Opportunities for noxious weeds to spread are increased by ground disturbing activities such as road and home construction and sand and gravel operations (Lake County Weed Supervisor, June 1999). Noxious weeds can spread at a rapid rate and the situation in Lake County is likely to get worse as subdivisions replace farm ground and more people who are unfamiliar with the weeds are responsible for their management.

Cultural Resources

Cultural resources in Lake County include sites of historical, cultural or spiritual importance. Cultural resource inventories to locate these sites have been carried out in Lake County by the Confederated Salish & Kootenai Tribes, the Forest Service, the U.S. Fish and Wildlife Service, the Montana Department of Transportation, the Department of State Lands and contractors to these entities. Inventories are frequently conducted in areas prior to ground disturbing projects, such as timber sales or road construction, to locate and protect cultural resources. While certain areas of Lake County have been surveyed for cultural resources, no systematic county-wide inventory has been conducted.

Federal historic preservation law is grounded in the concepts of conserving cultural resources for the benefit of future generations and focuses on the identification, designation, and protection of historic districts, sites, structures, and objects. Within the exterior boundaries of the Flathead Indian Reservation and in all dependent communities, the Tribal Historic Preservation Officer is the official conservator of culturally significant sites. In other areas of the state, the State Historic Preservation Officer investigates sites and maintains cultural site records.

The Tribal Preservation Office (TPO) is responsible for the protection, preservation, survey, and documentation of Tribal and historic cultural resources on the sites under its jurisdiction. The TPO works closely with both the Salish and Kootenai Culture and Elders Committees, which focus on the preservation, documentation, enhancement, and research on the intangible cultural resources of the Tribes. These include languages, stories and local knowledge that Tribal elders pass on to groups and individuals while conducting traditional activities and participating in culture camps. In the Tribes' world-view, the intangible or ideology cannot be separated from the cultural sites, so they look to the elders and the Culture Committees for guidance on the best management and protection of these non-renewable resources (CS&KT 2000).

As of June 1999, a total of 235 sites had been recorded in Lake County. This number

reflects the vast majority, but not necessarily every site, which has been recorded by the Tribes. Once a site has been recorded as culturally significant, it must be evaluated to determine if it is to be listed on the National Register of Historic Places. Most of the sites recorded in Lake County have not yet been evaluated for listing. Of the 235 sites recorded, six have been found eligible and nominated to the National Register. These sites are Fort Connah, the Kootenai Lodge Historic District, the Frank Bird Linderman House, the Polson Feed Mill, the St. Ignatius Mission and the Swan Lake Rock House Historic District.

Hazard Areas

Lake County maintains an Office of Emergency Management and an emergency operating plan, which is updated annually. The Tribes also have a Disaster Response Team that works with local, state and federal agencies. The primary concerns of the county related to hazards include earthquakes, wildfires, hazardous material spills, development in flood-prone areas and on steep slopes.

Seismic Activity

Lake County lies at the north end of the Intermountain Seismic Belt. Small earthquakes (up to 3.5 on the Richter Scale) are common locally and are prevalent in the Arlee and Polson areas. Earthquakes of this magnitude may be felt, but are not serious enough to cause damage.

In the early 1990s the Mission Fault was discovered. This fault runs along the Mission Front from St. Mary's Lake (southeast of St. Ignatius) to around the Pablo latitude. Trenches were excavated across the fault by the U.S. Bureau of Reclamation to determine the time when the fault last moved. Radio carbon and other dating techniques determined that this occurred approximately 7,000 years ago with an event the magnitude of 7.5 on the Richter Scale. Most of the interseismic period for that fault, estimated to be between 5,000 and 8,000 years, has passed

and a return event could occur.

There is also a fault scarp along the Jocko Front, named the Jocko Fault. This fault is believed to be relatively young. No trenches have been dug to determine the seismic intervals, but this is another potentially active fault. The Big Arm area experienced earthquakes of a 4.9 magnitude in 1969 and 1971. Some structural damage, although not widespread, resulted from these quakes. The Montana Bureau of Mines and Geology, which monitors seismic activity in Montana and beyond, reports a poor correlation between earthquake epicenters and known faults. Most of the quake activity is not associated with known faults (Michael Stickney, Montana Bureau of Mines and Geology, June 1999).

Only the incorporated cities of Polson and Ronan require structural building permits at this time.

Wildland Fires

Many areas of Lake County have wildland fuels in the form of grasses and trees. The number of new and existing homesites in the urban-wildland interface area (areas where development adjoins wildlands) is increasing the risk of destructive wildfire. Risks associated with wildfire relate to fuels, slope, orientation, access, the availability of an adequate water supply, the availability of trained personnel and fire apparatus and resource values (i.e., natural resources and property). The Lake County Subdivision Regulations contain standards that are designed to minimize the risk of destructive fire to life and residential property. They address issues like on-site water supply, access for emergency vehicles, minimum bridge standards and the availability of emergency response personnel.

In the Lake County area there are 13 volunteer fire districts (VFDs) and three wildland fire protection entities, the Forest Service, DNRC, and the Tribes. The VFD Chiefs, DNRC, the Tribes, and the Lake County Emergency Management Director are all members of the Lake County Rural Fire Association. Lake County also has a Fire Action Plan that is up-



Wildland fire protection has become an important part of planning for the urban interface.

dated annually. The action plan identifies fire fighting resources and who to call in the case of a fire. Lake County also has a Wildland Fire Management Plan, which contains information on fire history and direction on procedures. This plan is currently under revision by the DNRC. The DNRC has started inventorying fire risk in the Swan Valley and in interface areas around Lake Mary Ronan, along the east shore of Flathead Lake, and along the west shore of Flathead Lake in the Rollins area. Recent actions along the Mission Front and in the Jette area to reduce the likelihood of catastrophic wildfire include fuel thinning and controlled burns.

In the Swan Valley, the DNRC has primary responsibility for wildland fire protection, but some areas of the valley have no private property structure protection. In other areas of Lake County, either the appropriate municipality or the Rural Fire District is responsible for structure protection. Please see the Local Services chapter for a further discussion of fire fighting capabilities and limitations in Lake County.

Hazardous Materials

Several kinds of hazardous materials are regularly transported through Lake County. Thirty rail cars, each containing 33,000 gallons of gasoline, pass through the county daily along the 15 miles of railroad track. A problem with even one rail car filled with gasoline could cause

a significant spill affecting the Jocko and/or Clark Fork Rivers in the Arlee and Ravalli areas. In addition, semi trucks loaded with agricultural herbicides and pesticides travel the local highways. Lake County has an agreement with the Hazmat Team in Missoula County to assist in the event of any major incidents. The Tribes also have individuals trained in dealing with hazardous materials.

Lake County contains no federally designated superfund sites. One site, the Flathead Well, located one and a half miles northwest of Arlee, had a removal action completed in 1998. The DEQ maintains a database of generators, facilities and transporters of hazardous materials. Lake County has 17 entities listed in the database. Facilities that handle less than 220 pounds per month are conditionally exempt from registering with the DEQ, but may do so voluntarily. Lake County has 13 exempt entities that have chosen to register (2 in Ronan, 1 in Moiese, 1 in Pablo, and 9 in Polson.) In addition, there is one small generator, Don Aadsen Ford in Ronan, and one large generator, Mac Mont Warehouse in Polson. The majority of businesses (11) handling hazardous materials are located in Polson (DEQ RCRIS Data Base, July 1999).

Flood Prone Areas

The Natural Resource Conservation Service identifies four categories of flooding frequency: none, rare, occasional, and frequent. Areas designated as occasional flood hazard have a 5 to 50 percent probability of flooding in any given year. Areas with occasional flooding in Lake County include of East Bay on Flathead Lake, Post Creek, Crow Creek, Dry Creek and White Earth Creek. Areas with frequent flooding, defined as a 50 percent or greater chance of flooding in any year, include low lands along the Flathead River, Mission Creek at St. Ignatius and Moiese, the Jocko River at Ravalli and in the Jocko Valley north and south of Arlee and Dayton Creek.

The Federal Emergency Management Administration (FEMA) is responsible for delineating floodplains. Using topographic maps and

aerial photographs, FEMA has delineated the approximate 100-year floodplain for 25 lakes and streams in Lake County on lands held in fee status, as shown on Flood Insurance Rate Maps available through the Lake County Planning Department. The most recent round of mapping was completed in 1987. Lake County adopted floodplain regulations in 1991, which limit the development that can take place in the designated 100-year floodplains and floodway fringe areas of fee lands. More detailed, site-specific floodplain delineation work has been completed only on the Upper and Lower Swan River. The Tribes have developed an early warning system to warn residents of potential flooding in the event an irrigation system dam breaks. According to the Lake County Disaster Emergency Services Coordinator, the Flathead River and Flathead Lake are controlled so flooding has historically been limited to minor seasonal flooding of some tributaries with little or no property damage.

Steep Slopes

Slopes up to eight percent are generally the most suited for development. Slopes between 25-35 percent have extensive engineering limitations. Slopes over 35 percent are generally not suitable for development. Building on steep slopes must factor in soil erosion rates, falling rock and slope instability. Lake County has not experienced mudslides. Rain or ice on steep slopes presents additional safety concerns, particularly where emergency access is concerned. Lake County has many areas where slopes are too steep for development. These areas occur along the slopes of the Mission, Swan and Salish Ranges and along some parts of the shore of Flathead Lake. Steep slopes, including stretches of Highway 35 along the east side of Flathead Lake, are prone to falling rock.

Scenic Resources

Although no systematic county-wide visual resource inventory has been completed, much

of the area has been inventoried by the Tribes. Lake County has valuable scenic resources both adding to the quality of life for residents and serving as a draw for visitors. The scenery in the area is rich in variety. There are three mountain ranges, two of which, the Mission and Swan Ranges, offer spectacular, high elevation, rocky peaks for the viewing. The Salish Range rises along the western edge of Lake County, offering grassy flanks capped by scattered pine and fir. Flathead Lake, stretching 28 miles north to south, and up to 15 miles east to west, is visible from much of the north part of the County and is literally breath-taking when first seen while travelling toward Polson. From the Lake, there are views of the Salish and Mission Ranges, and the Lake forms the definitive north boundary of the City of Polson. Lake County has relatively permissive off-premise advertising regulations in place.

The Jocko and Mission Valleys provide views of the mountain ranges, foothills, agricultural and pastoral scenes, wildlife viewing, and a sense of open space. The corridor of Highway 93, which runs north-south through the Mission and Jocko Valleys, is the primary travel and viewing corridor. The Swan Valley, which is long and narrow, is defined by heavily forested slopes rising to the east and west. The viewshed opens over the water around Swan Lake and periodically throughout the length of the valley into small grassy meadows. Timber harvest units are visually evident on the slopes above the Swan and Jocko Valleys.

The highest sensitivity for visual quality exists from transportation corridors and communities. On the whole, the visual quality in Lake County is excellent, although the number of conflicts over lost views is increasing and is likely to continue to as more people develop properties in the area. A complaint often heard, particularly regarding lake views, is that new homes are built that obstruct the views of the owners of already-built homes. Lake County has no view protection regulation in place to prevent this from taking place.

Natural Resources

Goals and Objectives

Policy Statement

Lake County will strive to guide growth in a manner that seeks to protect and preserve clean water, air, wetlands, fish and wildlife habitat, farmland and scenery while promoting the use of local lands and resources.

The goals and objectives provided below were developed by comparing the conditions and trends described in the previous text with public input and the experience of local officials, planning board members and staff. The purpose of this section is to provide a vision of how the community intends to grow (goals) and state the specific steps Lake County intends to take to ensure the goals are achieved (objectives).

After each objective is a phrase or group of phrases in italic print. These phrases indicate the specific tools that Lake County intends to use to achieve the objectives. The tools are described in the implementation section of this document.

1. Goal

Protect surface and groundwater resources before, during and after development.

Objectives

- A. Encourage the formation, development and expansion of public sewer and water systems, particularly close to the vulnerable aquifers below Arlee and Pablo, and potentially in areas around the perimeter of area lakes and in the Ferndale area. (*Capital improvements planning {CIP} and intergovernmental coordination*)
- B. Investigate the relationship between public sewer systems along waterways, increased population density and increased pollution from stormwater runoff and take steps to limit such impacts when appropriate. (*Special projects*)
- C. Compile, distribute and implement best management practices for development projects along wetlands and water bodies to reduce impacts to water quality. Such measures may include minimum setback distances, vegetative buffers, the use of sedimentation barriers during construction, recommendations for native vegetation and other steps to protect surface water. (*Public education, subdivision review, floodplain permitting, lakeshore protection and zoning*)

- D. Require that sewage disposal systems meet minimum state and local environmental health standards. (*Subdivision review and zoning*)
- E. Work with public water districts, incorporated communities and others to develop source water protection areas and associated rules to protect municipal type wells from contamination. (*Intergovernmental coordination*)
- F. Require conceptual stormwater management plans during the review phase of development projects and ensure the approved containment structures are built through the permitting process. (*Subdivision review and zoning*)
- G. Continue to work with the Confederated Salish & Kootenai Tribes' Shoreline Protection Office and other resource managers to monitor and permit development along water bodies. (*Intergovernmental coordination*)
- H. Update the Lake County Lakeshore Protection and Floodplain Regulations periodically to respond to changes in technology and conditions. (*Lakeshore protection and floodplain permitting*)
- I. Develop rules that limit the disturbance of wetlands and riparian areas in order to maintain the services they provide including flood protection, maintenance of surface and groundwater quality and wildlife habitat. (*Subdivision review, zoning and lakeshore protection*)

2. Goal

Preserve and protect irrigation facilities and irrigated farm ground for future generations while allowing agricultural producers to develop land in an economically beneficial manner.

Objectives

- A. Develop and maintain policies in conjunction with the Flathead Irrigation Project and Joint Board of Control to ensure new residential developments do not compromise the rights of existing irrigators. (*Subdivision review*)
- B. Educate landowners new to the area about the nature of living near agricultural operations including developing a pamphlet describing the need to control noxious weeds, control pets, fence pastures, expect livestock moving down roadways and other issues. (*Public education*)
- C. Develop and implement policies that encourage high-density development within or near existing population centers and discourage the large scale

development of rural irrigated land. (*Density map, CIP, subdivision review*)

- D. Continue to require that rural subdivisions are adequately fenced, have minimum setback distances from agricultural operations, provide a means for the delivery of irrigation water, control noxious weeds and acknowledge the right to farm on adjoining parcels through the development of landowner covenants. (*Subdivision review*)
- E. Provide incentives for developers to cluster homes on the least productive portions of their property when agricultural parcels are to be developed. (*Density map, subdivision review*)
- F. Ensure that agricultural protection policies deal with the preservation of agricultural land as an economic resource and not simply as open space. (*Subdivision review and zoning*)
- G. Explore modifying subdivision review and density requirements for family members and employees seeking to live on farm and ranch land so long as environmental, health and safety concerns are addressed (*Subdivision review*)
- H. Modify existing zoning standards where appropriate to allow safe and sanitary temporary housing for orchard workers. (*Zoning*)

3. Goal
Encourage the fair and timely adjudication of water rights on the Flathead Indian Reservation.

Objectives

- A. Work with state, tribal and federal bodies to help form an equitable interim management agreement by communicating regularly, monitoring progress and offering suggestions when appropriate. (*Intergovernmental coordination*)
- B. Stay informed throughout the extended negotiation process, help to inform the public when necessary and offer the negotiators insight regarding local sentiment in order to help establish a far-sighted long range water rights agreement. (*Intergovernmental coordination and citizen participation*)

4. Goal
Limit the negative impacts of growth and development on air quality.

Objectives

- A. Annually prioritize and perform road-surfacing projects in order to reduce the amount of airborne dust generated from gravel-surfaced roads. *(CIP)*
- B. Develop criteria where developers would be required to chip-seal or pave road surfaces both within developments and connecting to chip-sealed and paved roads. *(Subdivision review)*
- C. Collaborate with the Confederated Salish & Kootenai Tribes and the Montana Department of Transportation to improve roads that impact air quality while not duplicating services. *(Intergovernmental coordination)*

5. Goal

Protect important wildlife habitat and migration corridors.

Objectives

- A. Work with land managers and natural resource professionals to identify important wildlife habitat areas and corridors and require that developers obtain a review of their plans from natural resource agency personnel when the project is located in or near significant wildlife habitat. *(Intergovernmental coordination)*
- B. Provide for low-density development in important grizzly bear and other wildlife habitat. *(Density map)*
- C. Develop a standard set of requirements for subdivisions in bear habitat designed to limit human-bear interaction and conflict. *(Subdivision review)*
- D. Compile, distribute and implement best management practices for development projects along riparian corridors to reduce impacts to important wildlife habitat. *(Public education, subdivision review and zoning)*

6. Goal

Limit the spread of noxious weeds.

Objectives

- A. Work with the Lake County Weed District, the Confederated Salish & Kootenai Tribes, the Montana Department of Transportation, the Flathead Irrigation Project and other public and private interests to manage noxious weeds on public and private lands in Lake County. *(Intergovernmental coordination)*
- B. Require minimum measures for the present and future control of noxious weeds on parcels created through subdivision. *(Subdivision review)*

7. Goal
Protect and encourage the prosperity of the area’s cultural resources.

Objectives

- A. Continue to inform the Confederated Salish & Kootenai Tribes of pending development projects so they may take steps to protect tribal cultural resources. (*Intergovernmental coordination*)
- B. Protect existing cultural resources and encourage the location and development of new cultural centers such as theaters, museums and other attractions. (*Subdivision review and Zoning*)

8. Goal
Protect lives and property from damage caused by wildfire.

Objectives

- A. Work with fire district personnel, land managers and the public to strengthen standards for residential development in the urban-wildland interface including requiring mitigation measures when appropriate. (*Subdivision review, intergovernmental coordination and citizen participation*).
- B. Compile and distribute best management practices to landowners. (*Public education*)

9. Goal
Protect the area’s scenic resources, which are an integral part of our high quality of life and an economic asset.

Objectives

- A. Work with local and tribal government personnel, business groups, and other stakeholders to develop guidelines that allow for outdoor advertising while retaining scenic views from roadways. (*Intergovernmental coordination, Highway 93 planning and citizen participation*)
- B. Recognize the value of scenic views from properties and incorporate measures to protect those values in zoning and subdivision documents. (*Zoning and subdivision review*)
- C. Develop standards for the location, height, access and design of wireless communication facilities. (*Wireless communication facility planning*)

