

## **8. NATURAL AND CULTURAL RESOURCES**

### **Water Resource**

#### Surface water, floodplains and wetlands

All surface waters in Richland County flow either directly or indirectly into the Missouri River. The northern boundary of Richland County is defined by the Missouri. The Yellowstone River flows in a northeasterly direction across the southeast corner of the county. The confluence of the Yellowstone and Missouri Rivers is located just over the Montana-North Dakota state line from Richland County. Numerous other creeks and drainages cross the county.

Fox Lake and Kuester Reservoir, both in the south half of the county are the largest bodies of surface water. There are 80 dams in Richland County included in the National Inventory of Dams. (National Inventory of Dams)

#### Floodplains

River, ice jam and flash flooding can occur throughout the county. Maps prepared by the Federal Emergency Management Agency (FEMA) indicate the area of the 100-year flood designation. The 100-year flood designation applies to the area that has a 1% chance on average of flooding in any given year. The geographic extent of the 100-year flood has been mapped for the Missouri and Yellowstone Rivers in Richland County, for the town of Fairview, and for the portion of Lone Tree Creek that flows through Sidney. Late winter flooding due to high flow and ice occurs on a regular basis in the Sidney area. Flash flooding can occur throughout the county. (Richland County Pre-Disaster Mitigation Plan, 2005)

Richland County and the incorporated communities of Fairview and Sidney participate in the national flood insurance program, and as such these jurisdictions have floodplain management programs. Also as part of the program, FEMA has prepared flood insurance studies and prepared Flood Insurance Rate Maps (FIRMs) showing special flood hazard areas. (Richland County Pre-Disaster Mitigation Plan, 2005)

Lone Tree Creek is the primary cause of flooding in Sidney. Based on information for a new map being developed by FEMA for the floodplain, development in the floodplain includes residences, commercial, and government facilities. The flood plain area is in an established portion of town with some potential for in-fill development in the future. Most recent development has taken place in the northwest area of town, outside of the Lone Tree Creek floodplain. (Richland County Pre-Disaster Mitigation Plan, 2005)

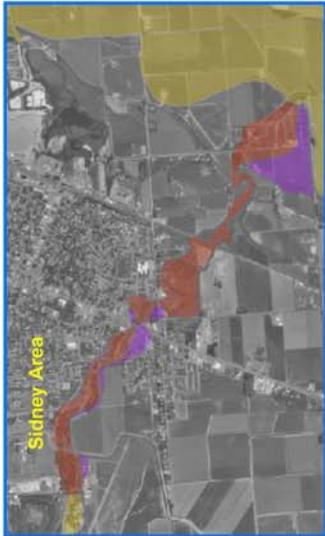
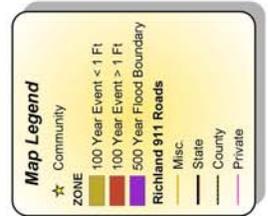
# Richland County Flood Reach Boundaries



Projection:  
 State Plane Montana FIPS 2500  
 NAD83, in meters  
 November, 2005

Data Source:  
 Natural Resource Information System  
 \*Montana Towns  
 \*Montana 1:24,000 scale Quadrangles  
 \*Digital Vector Quadrangles for Montana  
 \*FEMA 03 Digital Flood Data  
 \*Richland County  
 \*Richland 911 Roads

This map was created for fire and disaster planning only. Neither the county or the contractor will be responsible for any data inaccuracies associated herein.



Groundwater

In addition to the riverine aquifers, the two major water bearing formations in the county are Fort Union—found at the 100-400 foot level and typically yields 2-12 gallons per minute (gpm), often with high sodium levels. Water from the Fox Hills-Lower Hell Creek formation is typically found at 600-1,000 foot depth. (CEDS, 2002)

The Montana Bureau of Mines and Geology maintains a Groundwater Information Center (GWIC) data base of water rights in the state. The data base contains 3,852 records for Richland County with filings on wells, springs, boreholes, and coalbed methane wells. No coalbed methane wells were listed in the GWIC data base. Water uses listed in the county included; domestic, fire protection, geotech, industrial, injection, monitoring, public water supply, research, and stockwater. Most of the wells in the county are used for either domestic or stockwater. The deepest well in the county is one of the City of Sidney’s wells at 1471 feet. Several other wells were in the 400-700 foot range, but most wells in the county are quite shallow, less than 40 feet. To protect groundwater, state and federal regulations require that the surface casing for oil wells is run to a depth of 1000 feet and that drilling water be fresh water.

**Table 8.1 Overview of Wells in Richland County**

|  |           |
|--|-----------|
| Number of wells in County                          | 3750      |
| Deepest well on record (feet)                      | 1,945.00  |
| Shallowest well on record (feet)                   | 1         |
| Most recent well on record                         | 6/29/2006 |
| Oldest well on record                              | 1/1/1890  |
| <a href="#">Statewide Monitoring Network wells</a> | 9         |

Source: Ground-water Information Center, Montana Bureau of Mines and Geology, mbmggwic.mtech.edu

**Table 8.2 Well Depth**

| Depth of Wells | # of Wells |
|----------------|------------|
| 0 - 99         | 2283       |
| 100 - 199      | 760        |
| 200 - 299      | 318        |
| 300 - 399      | 138        |
| 400 - 499      | 63         |
| 500 - 599      | 20         |
| 600 - 699      | 12         |
| 700 - 799      | 7          |
| 800 - 899      | 18         |
| 900 - 999      | 4          |
| > 1000         | 127        |

Source: Ground-water Information Center, Montana Bureau of Mines and Geology, mbmggwic.mtech.edu

**Table 8.3. Number of Wells by Type**

| Well Type           | #    |
|---------------------|------|
| COMMERCIAL          | 11   |
| DOMESTIC            | 1575 |
| FIRE PROTECTION     | 2    |
| GEOTECH             | 71   |
| INDUSTRIAL          | 59   |
| INJECTION           | 4    |
| IRRIGATION          | 100  |
| MONITORING          | 165  |
| OTHER               | 24   |
| PUBLIC WATER SUPPLY | 82   |
| RESEARCH            | 24   |
| STOCKWATER          | 2215 |
| TEST WELL           | 55   |
| UNKNOWN             | 124  |
| UNUSED              | 191  |
| * Total             | 4702 |

Source: Ground-water Information Center, Montana Bureau of Mines and Geology, mbmggwic.mtech.edu

The Dry-Redwater Regional Water Authority has retained engineering expertise to study the feasibility of establishing and operating a rural water system. The approximately \$80 million dollar water system would provide good quantity and good quality domestic and livestock water to members across a multi-county large area that includes portions of Richland County. (Sidney Herald, 4/30/06)

During the interviews conducted for the Community Needs Assessment (spring 2006) “quality water” was identified as the number 8 priority out of a total of 19 concerns. The concern was especially high in the Lambert area with 46% of the respondents indicating they were very concerned about the quality of water. Thirty-eight percent of the individuals surveyed in Lambert were also very concerned with water quantity. Specific comments received about water during the interviews were related to the potential for oil and gas drilling and production to adversely impact water quality and monitoring of the dairy waste and lagoons in Crane. (Community Needs Assessment, 2006)

## **Soil Resource**

There are five major soil associations in Richland County.

- Soils on stream terraces, flood plains, and alluvial fans
- Soils on benches, fans, and terraces on uplands
- Soils on sedimentary plains
- Soils on dissected sedimentary plains
- Soils on glaciated plains

Sidney, Savage and Fairview are all located on soils of the Farnuf-Turner Association. These soils are deep, nearly level and gently sloping, well-drained loams and clay loams. Farnuf-Turner soils are located on benches and terraces, in the case of these three communities, the terraces of the Yellowstone River.

Permeability is moderate to a depth of about 26 inches and rapid after that in the Turner series. The Farnuf Series has high available water capacity. (Richland County Soil Survey, 1972)

## **Air Resource**

There are no permanent air quality-monitoring stations located in Richland County. For this reason the air quality is unknown and according to the DEQ, of concern. DEQ (Coefield) reports that county residents have recently been contacting them with complaints about odors related to energy exploration and production. In response, the DEQ has been sending out passive monitoring devices to gather additional information from which to determine whether one or more permanent monitoring sites needs to be established.

As of mid-May, 2006, the State had issued 47 air quality discharge permits to entities in the county. Two of the permittees--Sidney Sugar and Montana Dakota Utilities Lewis and Clark Plant--are Title V dischargers. Title V is a federal program administered by the State of Montana for entities that discharge 100 tons per year or more of “criteria” pollutants. Criteria pollutants are listed by the Environmental Protection Agency. (Walsh, DEQ) Most other air quality discharge permittees are minor and not subject to Title V requirements.

There are no federally-designated Class One airsheds in the county. Airsheds are classified as Class One, Two or Three with Class One being the most restrictive or protective. Major proposed development in Richland County would be evaluated for the potential to affect Class One airsheds. The Fort Peck Indian Reservation to the north of

Richland County is a Class One airshed.  
 (<http://www.deq.state.mt.us/AirMonitoring/citguide/understanding.asp>).

**Table 8.4 Class One Airsheds within 150 miles of Richland County**

| Airshed                                | Distance as the Crow flies to closest point of Richland County | Direction |
|--|--|-----------|
| Ft. Peck Indian Reservation            | Across the Missouri River                                      | North     |
| Medicine Lake National Wildlife Refuge | 25 miles   | North     |
| Northern Cheyenne Indian Reservation   | 150 miles  | South     |
| Theodore Roosevelt National Park       | 35 miles   | East      |
| U.L. Bend National Wildlife Refuge     | 100 miles  | West      |

Source: John Coefield, Montana DEQ

Air quality was identified as the 10<sup>th</sup> priority concern out of 19 total concerns during the Community Needs Assessment, a statistically valid survey taken of county residents during the spring of 2006. Specific concerns stated by the interview subjects included air quality impacts from road dust, odors from the Sidney sugar plant, odors from unidentified sources, air pollution from aerial crop spraying, and impacts of poor air quality on health. (Community Needs Assessment, 2006)

## **Mineral Resources**

### Oil and Gas

Richland and surrounding counties are experiencing a major oil play at the present time. Oil has been produced in the county since 1951. The oil is coming from the 200,000-square mile Bakken Formation which produces very desirable oil with API (American Petroleum Institute) gravity in the 40's. The amount of oil in Bakken is not precisely known, but geologists who have studied the formation estimate the reserve at from 200 to 400 billion barrels. In 2005, the 18 million barrels of oil from Richland County accounted for 55% of the state's oil production. Advancements in drilling technology have made the oil in the Bakken economically viable. (Sidney Herald, Tappin the Bakken, April 30, 2006)

Some of these wells in the Bakken may produce from 500 to 1000 barrels per day. Natural gas production in the county is a by-product of the oil production. Salt water, relatively little at 10-20 barrels per day is also produced as a by-product of the oil. The salt water is transported to injection wells and returned underground. (Chuck Laakso, BLM Miles City)

In the last 18 months, from November 2004 to May 11, 2006, the state of Montana has permitted 1976 new energy wells. Of this number, 242 or just over 12% of the wells permitted during that time were located in Richland County. All of the wells permitted in the county during that time were oil wells. The permits were issued to a total of 18 different companies. The companies range in size from small to medium to large international corporations. (Montana Board of Oil and Gas, [www.mbog.dnrc.mt.gov](http://www.mbog.dnrc.mt.gov))

According to the CEO of Nance Petroleum, Bob Nance, "There are more wells being drilled, wells are bigger and are more wide spread" , than during previous booms. Nance went on to predict that demand for the oil would remain strong, lessening the probability of a bust following the boom. (Sidney Herald, Tappin the Bakken, April 30, 2006)

Oil exploration in the county started in the eastern areas but has steadily progressed to the west so that most of the county is either experiencing activity now or activity is planned in the near future. Several hundred additional wells are being proposed. The BLM estimates that the current exploration boom will last 3-4 years and production at each well will continue for approximately 15 years.

The primary surface impacts of this energy production include impacts at the drill site (pads of a couple of acres each and tanks), transportation system impacts (vehicles, transportation of water, salt water, and natural gas), and land use conversion for industrial purposes to stockpile and house equipment and supplies. These three types of land uses have the potential to affect all areas of the county with the equipment and supply yards most likely to be found on the edges of developed communities close to major transportation routes.

### Coal

Richland County is located over the Williston Basin coal field with the Fort Union formation at the surface. One coal mine, the Knife River Mine owned by Westmoreland Energy is in operation in the county west of Savage. The mine employs approximately 14 individuals and is one of the smallest producing coal mines in the state. (Comprehensive Economic Development Strategy, 2002)

According to information obtained from the Montana Bureau of Mines and Geology, there is strippable coal in three areas (including the Knife River Mine and east of Sidney) ranging from 6 to 11 feet, 9 to 25 feet, and 7 to 17 feet in depth. There are companies looking to start new coal mines in Montana at the present time. (John Wheaton, MBMG, personal communication, May 25, 2006)

Coal from the Williston Basin is desirable from the standpoint that it is low in sulphur and clean-burning. However, Williston Basin coal or lignite is also low in BTU's (British Thermal Units) and less desirable as a product for shipping than coal that produces more energy. Mine-mouth generation--a coal burning plant that converts coal to electricity and is located at the mine--makes sense for coal with these properties according to the Department of Commerce. (Todd Kastner, Montana Department of Commerce, personal communication, May 26, 2006)

The application process with the state for a mine-mouth generation project was initiated in May 2006. The project is being proposed in Nelson Creek, west-northwest of Circle in adjacent McCone County. The Department of Commerce forecasts that in four years, the Nelson Creek project could have a peak labor force of as many as 1800 individuals for up to an 18-month period. Following completion of plant construction, the project would employ approximately 200 people with an additional 400 support jobs for its 35-40-year operational life. Although not located in Richland County, the Nelson Creek project will affect the county with some percentage of the workers locating their families

and living elsewhere--including Richland County communities--and commuting to the project. (Todd Kastner, Department of Commerce, Circle)

Sources with the Bureau of Mines and Geology and Department of Commerce were unaware of any immediately forthcoming mine or mine-mouth generation projects in Richland County, but stated that the possibility existed for these types of projects and/or coal to synfuel projects in the county.

**Vegetation**

Land cover maps reveal that the much of the land outside of the developed residential and commercial areas is either in small grain production or fallow. Row crops are planted along the Yellowstone River Valley. Woody wetlands and deciduous forests are found on the northern border of the county in the Missouri bottomlands and along the floodplains of the Yellowstone. Stands of evergreens are found primarily in the uplands south of the Missouri River, but also sporadically southeast of the Yellowstone. The remainder of the land in the county is grass and shrubland.

**Fish and Wildlife**

Richland County is home to a diverse population of ungulates, small mammals, fish, birds, and rodents. Featured terrestrial species include antelope, deer, mountain lions, and game birds. Game fish, all warm-water, include sauger, channel catfish, shovelnose sturgeon, walleye, and paddlefish. Other species of special interest are burbot and blue suckers. The native fish species component is significant in the Lower Yellowstone with many species doing well due to the natural hydrograph that still remains. The natural hydrograph produces peak flows with spring runoff due to the lack of major dams. Impacts to the fishery come from irrigation diversion dams (creating fish passage problems), irrigation canals (fish are lost to the system up the canals), and armoring of streambanks (impacts to flow characteristics and visual impacts.) (Victor Riggs, MDFWP) Road construction with stream crossings that hinder fish passage remains a concern.

The following species are listed as threatened or endangered in Richland County under the Endangered Species Act. Mitigation of potential impacts to threatened and endangered species may be required when development is proposed.

**Table 8.5 Threatened and Endangered Species**

| Status     | Species             | Comments   |
|------------|---------------------|--|
| Threatened | Bald Eagle          | Found primarily along rivers                     |
| Threatened | Piping Plover       | County also contains designated critical habitat |
| Endangered | Pallid Sturgeon     | Yellowstone River part of recovery program       |
| Endangered | Whooping Crane      |  |
| Endangered | Interior Least tern |  |

Source: www.fws.gov, Lou Hanebury (USFWS), Victor Riggs (MDFWP)

## **Scenic Resources**

Richland County has a variety of scenic features the most prominent of which are its big rivers, the Missouri and the Yellowstone. The Yellowstone river bottom is flat and open bordered alternately by riparian deciduous vegetation, pasture, and cultivated croplands. Highway 16 parallels the river through the county from its west terrace, offering scenic views of the valley bottom. Along the northern boundary of the county, the Missouri River is the pre-eminent scenic feature. County roads follow the river in some locations. The river is also viewed from its surface by floaters and anglers. Views in the rest of the county range from high plains grass and shrublands, to broken hilly country with small draws, to ridges with scattered timber, to pasture and cropland.

## **Cultural Resources**

There are two historic sites listed on the National Register of Historic Places in Richland County, the Peoples' Congregational Church and the Burgess Garage. A total of 181 historic and 146 prehistoric sites have been documented in the county. The archeological site types found in the county include one or more of each of the following: quarry, buffalo jump, chipping station, fire hearth, lithic (stone) scatter, petroglyph, processing area, rock cairns, and tipi rings. The historic site types include: agriculture, architecture, building foundation, Civilian Conservation Corp camp, coal mine, commercial development, dug-out, European-American site, homestead/farmstead, irrigation system, mining, out-buildings, railroad bridge, railroad/stage route, recreation/tourism, religion, residence, trash dump, vehicular bridge, and an historic district. (Murdo, Montana State Historic Preservation Office)

The majority of the sites were recorded by archeologists from the Bureau of Land Management, and Bureau of Reclamation, and the Montana Department of Transportation all of which are required by statute to conduct surveys prior to ground disturbance activities on land under their jurisdiction.

## **Conclusions and Projected Trends**

Domestic and global demand for energy resources is currently and will continue to affect Richland County and its communities in a myriad of ways. Development and production of oil and gas, and coal in eastern Montana will serve as significant economic drivers with corresponding changes to land use, population, demographics, and housing.

A new coal mine with mine-mouth generation or a synfuel plant located either in or near the county could bring many hundreds of additional permanent residents to communities in the county. These residents would need housing and all types of services, including utilities, transportation, water and wastewater treatment services and infrastructure, social services, and education.

The continuing oil and gas boom is bringing individuals to the county both on a short-term and long-term basis. In the short-term it is possible that there could be hundreds of employees needing housing and services. Once the new wells are producing and exploration has tapered off, the county could have one hundred additional permanent residents.

Energy exploration and production creates a demand for storage space for supplies and materials. Storage yards are likely to be sited in and around existing communities. Storage yards could be located next to residential areas that may or may not view them as compatible uses, or storage yards could be located on areas close to services that would be better used for residential development.