6.4 Nonpoint Source Assessment

Nonpoint source pollution is defined as a degradation of water quality from diffuse sources. This section will cover the affects on groundwater and surface water from Agriculture-Silviculture, Hydrologic Modification, Land Disposal, Solid Water Disposal, Construction, Urban Runoff, Resource Extraction, ISDS and Recreation.

6.4.1 Agriculture and Silviculture

There is very limited agriculture in Park County and what exist are primarily cropland and cattle ranches. In the eastern portion of the watershed, agricultural lands consist primarily of riparian and mountain grasslands which are situated on private lands along the river. The total number of acres being farmed or ranched decreased by 30% from 1987 to 1997, from about 400,090 acres in 1987 to 311,182 acres in 1997 (Clarion Associates, 2001). These areas are used primarily for livestock grazing and a minor amount for hay production. Fertilizer runoff from hay meadows and pesticide runoff from noxious weed spraying are potential sources of pollution in the County but there is no documentation of the problem from these sources. The Conservation Districts and the Natural Resource Conservation Service are encouraged to continue their educational efforts to promote effective utilization of these products without damaging the receiving waters. Some Best Management Practices (BMPs) that have been found effective in minimizing the amount of erosion include grazing management techniques and strategies such as rotational grazing, deferred grazing, proper grazing use, critical area treatment, sediment basins, and grade stabilization structures (CDPHE-WQCD, 2000)

Erosion in riparian areas from overgrazing continues to be a problem on private and public lands. Many ranchers have instituted conservation measures such as rotation and deferment to decrease the erosion however, a problem still exists in some areas such as Spring Creek. Erosion also occurs through activities such as building roads. Best Management Practices (BMPs) suggest the use of vegetation and/or structures in-stream and on immediately adjacent areas of streams or to construct channels to stabilize and protect against erosion.

Silviculture is the practice of caring for forests with respect to the human objective. This is extremely important in the South Platte and Upper South Platte Watersheds due to the number of fires that have occurred recently within the region. Silviculture imitates a natural change--such as a beetle infestation or fire and these methods can be effective at reducing the severity and the possibility of fire in the future.

Wildfires

Due to the drought, wildfires have been an increasing concern in this Region. During the past three years there have been three wildfires within Park County or in the vicinity of Park County.

- June 2000, Hi Meadows Fire, south of Bailey, burned about 11,000 acres
- April 2002, Snaking Fire, near Bailey, burned about 2,500 acres
- May 2002, Schoonover Fire, Deckers, burned about 22,000 acres
- June 2002, Hayman Fire, burned about 137,000 acres within Park, Teller, Douglas and Jefferson Counties.

Most of the land that was consumed in these fires, to be specific, the Hayman fire, was within the Pike National Forest. Forest rehabilitation efforts are currently being conducted to minimize erosion that is caused by heavy rains, which can create flash floods. As experienced after the Buffalo Creek fire in 1996, this can result in heavy sediment and high pH readings. This is especially important since the Upper South Platte is a source of Drinking Water for Denver and this could affect the aquatic habitat in several of the streams and creeks. The US Forest Service will try several techniques which include seeding, planting trees, trenching to slow down and divert water, constructing temporary dams or placing straw bales in gullies to promote rehabilitation and restoration of the land.

The US Forest Service and Colorado State Forest Service have designated the Upper South Platte Watershed as a red zone (an area highly susceptible to large scale, catastrophic fires). Over 21% of the watershed's montane forest has been lost to catastrophic fires since 1996 (USPWPA, 2001a).

The Burned Area Emergency Response (BAER) Team is spending time seeding and mulching the burn areas which will help provide soil stability and to minimize erosion. The Hayman fire BAER team consists of hydrologists, soil scientists, biologists, engineers, and other resource specialists. They created a plan to stabilize the soil, control water flow, minimize runoff and protect the ecosystem and watershed. A team is being established to develop and implement a long-term restoration plan. This group will focus on long term strategies such as tree planting, hazard tree removal and campground refurbishment. The CUSP is currently coordinating the recovery effort.

6.4.2 Hydrologic Modification

Hydrologic modification in Park County has historically taken place for irrigation of agricultural land. However, most of the agricultural water rights have been bought by Front Range municipalities which are using hydrologic modification to provide drinking water. The effects of the diversions and reservoirs on the water chemistry of the stream basins have not been documented. This has become an extremely critical issue recently because of the drought.

Streamflow in the basin is driven by snowmelt with the majority of the runoff volume occurring in the late spring/early summer. Low flow for these streams happens in the late fall and winter and most rainfall runoff in the basin comes from summer convective storms and upslope rainstorms. The natural flow regime has been modified over the past hundred and fifty years due to irrigation, water diversions, introduction of transmountain water, and water storage reservoirs.

Transbasin Diversions

Denver Water's, Roberts Tunnel and Aurora's Otero pipeline are the two major transbasin imports into the Upper South Platte River. The Roberts Tunnel delivers water from the Lake Dillon collection system to the North Fork of the South Platte just upstream of Grant, Colorado. The City of Aurora imports water from the Homestake Project and other Colorado and Arkansas water supplies via the Otero Pipeline into Spinney Reservoir. Aurora and the City of Colorado Springs equally own the Otero Pipeline. Roberts Tunnel is discussed in Section 6.3, South Platte and Upper South Platte Point Source Discharge Facilities.

Other transbasin imports include the Boreas Pass Ditch and Colorado Springs Blue River Tunnel. Both of these are minor inputs into the Upper South Platte River. Colorado Springs will usually take Blue River water via a pipeline but can release water into the South Platte.

The City of Aurora lost the conjunctive use case. This project would have pumped groundwater from the South Park aquifer for use by the City of Aurora to maintain its existing needs and to meet future needs. Park County however, continues to meet with Aurora on possible options in the future to transfer water. Aurora, Denver and Park County may share the cost of hiring an engineering firm to assess Park County's future water needs and to identify possible storage sites (Fairplay Flume, 2003). The future

storage needs of Aurora are 35,000 – 40,000 acre feet; Denver needs 80,000 acre feet and Park County needs 1,000 – 1,500 acre feet.

Roberts Tunnel

The Roberts Tunnel, owned and operated by the Denver Water Department, diverts high quality water from Dillon Reservoir in Summit County and discharges it into the North Fork of the South Platte as part of its water supply for the Denver area. A 1985 agreement between Summit County and the Denver Board of Water Commissioners, allows tertiary treated effluent from wastewater treatment facilities discharging to Dillon Reservoir, to be discharged directly to the Roberts Tunnel when Denver is transporting a minimum of 50 cubic feet per second through the tunnel.

The Snake River Wastewater Treatment Plant, owned and operated by Summit County, has received approval from the Northwest Colorado Council of Governments for the potential future direct discharge to the Roberts Tunnel. Northwest Council of Governments' water quality and quantity efforts are involved in Technical Assistance (TA) programs dealing with water resource development and water quality protection. They are currently involved in water quality with regard to phosphorous load allocations from the Roberts Tunnel; regulations which might indirectly affect Park County land use; and setbacks to ISDS.

The State's Water Quality Control Division has stated that the water quality standards for Dillon Reservoir are more stringent than those for the South Platte River, and that this is part of the reason for Summit County's agreement with the Denver Water Department (i.e. to reduce the phosphorus load to Dillon Reservoir). The high water quality standards that the wastewater treatment plants are required to meet for discharges to Dillon Reservoir serve as assurance that the North Fork should not be impacted by wastewater discharges if the facilities continue to treat to the current levels.

Residents of Park County, however, are very concerned about this potential discharge. Communities in Park County that utilize the South Platte as a water supply include, Grant, Santa Maria, Bailey, Insmont, Mooredale, Glen Isle, Shawnee, and Estabrook.

Reservoirs

Reservoirs are a major factor in the modified hydrology regime. The principal reservoirs in the Upper South Platte Basin are Antero, Eleven Mile, Cheesman, Spinney Mountain, Tarryall, and Strontia Springs. Denver Water owns and operates Antero, Eleven Mile and Cheesman reservoirs. The City of Aurora owns and operates Spinney Mountain

Reservoir. Denver and Aurora jointly operate Strontia Springs Reservoir. Tarryall Reservoir is owned and maintained by the DOW. Other reservoirs include, but are not limited to, Jefferson Lake, Wellington Lake, Montgomery Reservoir, and Lake George.

In August of 2002, due to the drought, Denver had to drain Antero Reservoir and if the drought persists Elevenmile reservoir may have to be drained again and Aurora may need to drain Spinney Reservoir. Tarryall Reservoir was drained in 2003 due to a crack in the dam.

Heavy erosion as a result of the Buffalo Creek fire is causing high sediment loads and is creating problems for Strontia Springs Reservoir; similar problems are also a possibility as a result of the Hayman fire at the Cheesman Reservoir.

Wetlands and Peatlands

Other areas that have experienced the effects from hydrologic modifications include the peat fens and wetlands. Wetlands and peat fens provide important wildlife habitat and water filtration functions. Park County has some very unique peat fens with species not found anywhere else in the Lower 48 states. The unique beneficial water quality features of these fens are discussed in the water quality analysis section of this report. The High Creek Fen has been nationally recognized for its unique species and has been acquired by the Nature Conservancy. Unfortunately, some of the lesser fens have been mined and have suffered irreversible damage to their filtering capacity. A report entitled An Evaluation of the Effects of Peat Mining on Wetlands in Park County, Colorado was completed in February 1990. In addition, an inventory of the calcareous fens was completed (Johnson, 1998; Johnson, 1996) and is described in more detail in the Surface Water Section for the South Platte Basin.

The Colorado Natural Heritage Program (CNHP) completed the Park County inventory of Critical Biological Resources in April 2001. CNHP uses a multidisciplinary team of scientists and information managers to gather information on rare, threatened and endangered species and significant plant communities in Colorado. Scientists study life history, status and location of the species, and then information is entered into the Biological and Conservation Data System and is then mapped using GIS technology. The final job is to rank the most sensitive or imperiled Potential Conservation Areas (PCA).

In Park County, the CNHP team identified 35 PCAs that are home to over 115 rare or imperiled plant species, animal species, or significant planning communities. There were nine recommendations for protecting Park County's Biological Resources.

Through a Great Outdoors Colorado Legacy grant, the Colorado Division of Wildlife initiated a program called the Colorado Wetlands Initiative. The focus of the program is to preserve, enhance or develop wetlands across the state and create wildlife habitat. Ten regions, including the South Park area, were identified as having critical wetland resources. In addition, Governor Roy Romer designated the South Park Heritage Resource Area as one of Colorado's first two official State Heritage Areas in 1997. The vision for the South Park was to "*ensure the conservation and enhancement of significant natural, cultural, visual and recreational resources while developing a sustainable economy that preserves historic economies and provides for resource-based tourism and managed growth*." (Shapins Associates, 1996, p.2) Through this project, local landowners are provided incentives for implementing land and water conservation practices.

South Park Heritage Resource Area (SPHRA) Study

The purpose of the South Park Heritage Resource Area Study, conducted in 1996 is to identify key resources that express South Park's heritage through time. The study area was located in the 900 square mile basin of South Park and included surrounding upland areas, and the Mosquito Range, the Tarryall Range and the Thirty-Nine Mile Mountain Volcanic area. In this Study, South Park was identified as having more "fens" than any other region in the lower forty-eight states and has over 50,000 acres of wetlands (Shapins Associates, 1996).

Priority actions were developed to build support for heritage conservation, to help traditional industries remain in production, and to conserve heritage resources having the highest value and greatest impact potential. The Study contains strategies that provide a basis for future efforts such as partnership building, cooperative planning, tourism management, resource conservation, environmental education, and resource interpretation. This effort was the first step towards acquiring conservation easements and retaining high priority ranch lands as productive agriculture areas.

Development of Conservation Easements

The Heritage Resource Study provided the impetus for conserving the highest priority property in South Park (Wahl-Coleman Ranch) in 1999. Following this, Park County

received an EPA Regional Geographic Initiatives Grant in 2000 to initiate the Upper South Platte River Conservation Planning Project. This Plan targeted stream corridor properties that contain significant agricultural, riparian and/or wetland resources. In 2001, Park County received grants to purchase conservation easements of four ranch properties which will protect 7,500 acres of prime habitat and eight miles of stream corridor.

In December 2002, Park County was awarded grants by GOCO ($3.5 million) for the long-term conservation and restoration of South Park's outstanding natural resources, including river corridors, rare wetlands and working cattle ranches. The project will involve as many as 16 participating landowners, to ensure the conservation of more than 13,000 acres and over 28 miles of stream corridor. The funds will be used to purchase conservation easements (acquire the rights to develop land, but do not actually purchase the land) on targeted properties that have wetland and riparian habitats in South Park. The funds will provide stewardship endowments for the easements along the South Fork of the South Platte River, Fourmile Creek and Agate Creek. The lands included in this study are wetland and upland habitats that support rare or imperiled species. Among the resources preserved are one of the largest concentrations of rare or imperiled plant communities in the lower 48 and the most Gold Medal trout water in Colorado (Fairplay Flume, 2002).

The same process utilized in South Park will be used for Tarryall Creek where future restoration and protection options are now being developed for areas along the Creek. A Report entitled Tarryall Creek Restoration Overview Report (2002) has already been completed exploring these options.

6.4.3 Solid Waste Disposal

The primary method for solid waste disposal in the county is the use of transfer stations. The designated transfer stations collect solid waste for transport to landfills outside of the county. No landfills are expected to be built in Park County in the near future. Illegal dumping into ditches and ravines is a growing problem in the county. Most of the transfer stations and a non-profit organization, called Recycle the Park, collect recyclable glass, newspaper, aluminum, plastic, magazines and office paper. The recycling of these items results in a reduced load to the landfills.

The Water Quality Control Commission's 1998 Water Quality Report lists a total of 30 waste lagoons at 12 sites throughout Park County. These are municipal or animal waste

lagoons, or mine ponds. It is not known how many, if any, of these are potential threats to the groundwater near them.

6.4.4 Construction

Nonpoint source pollution from road and residential construction includes erosion and pesticide runoff. Erosion and weed control plans are required for these activities. State of Colorado highway crews currently apply pesticides to control noxious weeds along the state highways and on county roads and it is believed that there is little degradation to the water quality from this activity. The road maintenance, however, is increasing the sediment loads in some area streams.

High density and an increase in the number of residential lots in Park and Teller Counties will make nonpoint sources such as urban runoff and contamination of groundwater, issues to contend with in the future.

Land Use

Park County recently completed making major revisions to their Land Use Regulations (http://www.co.park.co.us/lurs.htm). Revisions to the land use codes address some of the major current and probable future anthropogenic impacts to surface water and groundwater quality. Major changes that could affect water quality management in the future are:

- Floodplain setbacks that are 100 feet in all zones for new lots and will be measured from the middle points of the streams.
- Wetlands protection – a 200 foot setback in wetland areas (Army Corps uses 100 feet).
- Developers must be able to prove availability of surface water for a central water supply.
- Requirements for drainage control.
- Requirements for Erosion and Sedimentation Control Plan.
- Requirements for Wildfire Mitigation.

1041 permits

The request for 1041 Permits has increased in Park County, especially wildlife habitat permits. These permits are designed to facilitate identification, designation, and administration of matters of state and local interest that are beyond the scope of traditional zoning or subdivision regulations. One of the purposes of the act is to ensure that the environmental impacts of new development are considered and mitigated.

Through 1041 Permits, local government can designate areas of state interest, which include mineral areas; natural hazard areas; areas containing historical, natural or archeological resources of statewide importance; and areas around key facilities (airports, public utility facilities, and mass transit terminals). However, a developer does not have to agree on any conditions imposed in a 1041 permit.

6.4.5 Urban Runoff

Roadside erosion is also a serious problem in the more developed areas of the eastern section of the watershed. Increased potential for soil erosion occurs in areas of high human activity. When the soil's protective vegetative cover or topsoil is disturbed, on-site productivity is reduced and water quality is degraded by sedimentation. The amount of sediment, oils, and solvents, which are released through urban runoff, will increase as commercial and residential development continues in the two counties. Recent NPDES Phase II Stormwater Regulations have not affected Park or Teller Counties or any of the municipalities within them.

The Town of Alma is experiencing stormwater problems from State Highway 9 and streets within the Town and is seeking grants to construct stormwater detention ponds. These ponds along with the installation of a stormwater conveyance system and the Town's curb, gutter and sidewalk program are expected to reduce highway runoff pollutants to Buckskin Gulch and the Middle Fork.

6.4.6 Recreation

Mountain biking, camping, skiing, hiking, and fishing are the primary tourism activities in the area, but snowmobiling and use of off-road vehicles is growing rapidly. The number of people enjoying these activities is increasing yearly, with Highway 285 becoming congested during the weekends. In addition to vehicular emissions, the heavy use of the counties for tourism is adversely affecting the water-quality through erosion from overuse of unsurfaced roads, backcountry trails, campgrounds, and reservoirs. There may come a time when permits are needed to preserve some of these areas for everyone to use. Many of the abandoned logging roads become heavily used by tourists, resulting in washboard conditions, large ruts, and erosion.

6.4.7 Resource Extraction

Historically, lode mining for gold played a big role in Park County but operations have shifted towards surface mining of sand and gravel and other raw materials. Currently, there is a sand and gravel operation and one peat mine along the Middle Fork of the

South Platte. This shift is also evident by the decline of 76 jobs in mining in 1989 to 17 in 1998 (Clarion, 2001). Past mining activities and naturally occurring minerals jobs that have degraded portions of the South Platte River include Geneva Creek in Platte Canyon, Mosquito Creek and South Mosquito Creek near Fairplay, Tarryall Creek, Buckskin Creek near Alma, and the headwaters of the South Fork in the southwest section of the county. The impact of these mining activities is further discussed in the water quality analysis section.

Abandoned mines and tailings are the primary sources of elevated metals in streams with natural mineral seeps as secondary sources. In general, surface water is greatly affected by resource extraction while aquifers are not. Water is acidified as it passes through areas affected by resource extraction causing pH readings sometimes as low as 3.2 (McBride and Cooper, 1991). Natural geologic conditions can also cause low pH levels and some metals are transported in the streams in the dissolved phase because of the low pH. As the pH of the water rises, the metals become attached to suspended sediment and travel further downstream until they are deposited along the riverbanks. The dissolved species are a primary indicator of potential drinking water problems, especially when shallow wells are drilled within these areas. In general, waters with high dissolved metal species tend to be devoid of aquatic life because of acute toxicity and can pose long-term problems for aquatic life.

6.4.8 Onsite Wastewater Systems (OWS)

Wastewater generated in densely populated areas is primarily treated at municipal wastewater treatment plants (WWTPs); however, septic systems are used in rural areas where wastewater treatment systems are not economically feasible. Septic systems have the potential to contaminate groundwater and surface water, either through percolation of wastewater through the soil into groundwater, which recharges surface water, or by surface runoff. If septic systems are improperly designed or installed in soils unsuitable for the disposal of wastewater, nitrate can leach into groundwater, and can seep into nearby surface waters. Surface water contamination from septic systems can also occur by system failure. When a septic system fails, the capacity of the soil to absorb effluent is exceeded and waste moves to the soil surface where it can be carried to surface water via overland flow. However, if septic tanks are not immediately adjacent to a surface water, the potential for nitrate to leach into the surface water is minimal.

A major concern of septic systems is that high density in one area can lead to ineffective treatment. Small parcel sizes cause septic systems to be placed closer together and

increase the possibility of groundwater contamination. Depending on the underlying soil, effluent can move faster or slower down to the groundwater as is evident in southeastern portions of the watershed.

There are very few community sewage disposal systems such as treatment plants and lagoons. For the majority of Park County citizens, the individual sewage disposal system (ISDS) is the method used for disposal. On average, Park County issues over 500 permits a year (Tom Eisenman, personnel communications, 2003). Regulations governing the ISDSs were revised and approved in 1996. Park County has 2.5 full time inspectors devoted to inspections and they are starting to conduct non-community groundwater inspections.

Many of the current systems are designed by engineering firms. These systems appear to be an effective means of sewage treatment on lots that are 3-5 acres or larger. Inadequate systems may be affecting groundwater in the county, particularly in the northeastern and northwestern sections, which have experienced phenomenal growth in the 1990s. The Park County Environmental Health Department collected samples in 1997, which indicated elevated nitrate concentrations in the northeastern section of the county around Bailey. Additional testing is being conducted as part of a groundwater quality study that was initiated in 2001 and will be completed in 2004.

There is evidence which implies that many homes that were constructed as summer homes and converted to year-round homes may have inadequate systems. The higher density of small developed lots, especially the 0.25 to 1 acre lots, combined with an inadequate distance between the leach field and household wells in fractured rock areas, which may be stressing the soil's adsorptive capacity and contributing to a degradation of groundwater in some areas.

Education regarding ISDS is becoming critical as the vast majority of the new citizens of Park County are people who have never lived in a rural setting before. The Park County Environmental Health Department released information in pamphlets and newspapers from 1994-1996 explaining the need for proper disposal, testing and monitoring of an ISDS. Many of these people do not realize the damage that can occur to an ISDS from disposal of household cleansers, paint and overuse of dishwashers and garbage disposals, which can prove damaging to wells, and there is the need for testing and monitoring. In addition to testing and monitoring, most do not realize that the systems need to be cleaned periodically. Owners of new systems currently receive a fact sheet from the

Environmental Health Department, but new owners of older homes do not receive this educational material

Teller and Park counties have both adopted regulations that require a 200 foot separation between a septic system and a well. This helps minimize the amount of contamination and will dilute the effluent before it gets picked up in the well. Setbacks are required to be 50 feet from wetlands and 30 feet from an irrigation ditch.

USGS has collected well samples over a two year period in the Bailey area. Several subdivisions showed levels that did not meet Safe Drinking Water Standards for total nitrogen and chloride. The revised study did not cover quantity, but would focus on alluvium aquifers in the Fairplay/Alma area and acid mine drainage in the residential wells. The studies cost for 2002 are close to $125,000 and the County Commissioners said they will consider approving the contract in the near future. A water quality study, approved in 2003, is going to be conducted in the northwestern part of Park County. Results from these studies are not yet available.

Ranch of the Rockies near Hartsel has committed $14,900 (matching funds) to USGS to help conduct a water well inventory of the subdivision. The inventory will locate and map wells and measure static water level. On May 2, 2002, the County Commissioners approved a $28,100 contract with the USGS for a groundwater level study for the southwestern part of Park County.