Prepared for:

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT/ WATER QUALITY CONTROL DIVISION

and

YAMPA RIVER BASIN PARTNERSHIP

YAMPA BASIN WATERSHED PLAN

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Prepared by:

MONTGOMERY WATSON HARZA
1475 Pine Grove Road, Suite 109
P.O. Box 774018
Steamboat Springs, Colorado 80477
(970) 879-6260

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EXECUTIVE SUMMARY

This *Yampa Basin Watershed Plan (Yampa 208Plan)* is the result of a cooperative effort between the Colorado Department of Public Health and Environment, Water Quality Control Division (WQCD) and the Yampa River Basin Partnership (YRBP). Over the past two years, the WQCD, YRBP, Moffat County, Routt County, City of Craig, and City of Steamboat Springs have actively participated in the preparation and review of this document. Through a joint agreement between WQCD, Routt County, and Moffat County, Montgomery Watson Harza was retained to compile this plan.

The *Yampa 208 Plan* encompasses both Routt and Moffat Counties and updates plans previously prepared in Routt County in 1996 and Moffat County in 1986. The updated *Yampa 208 Plan* is consistent with the requirements of Section 208 of the *Clean Water Act,* administered by the WQCD for this basin. The main goals of the plan are to address water quality concerns and provide for the maintenance of high quality water in the Yampa Basin.

The *Yampa 208 Plan* includes summaries of:

- Watershed characteristics
- Population and land use
- Stream classifications and standards
- General basin water quality characteristics
- Point and nonpoint source discharges
- Watershed management policies and recommendations

The document is organized into eight sections and supporting appendices, as follows.

- **Section 1.0 – Introduction:** This section describes the project background, scope, and general organization of the *Yampa 208 Plan.*

- **Section 2.0 - Regional Overview of Yampa Watershed**: This section presents a brief description of the Yampa River watershed, noting the key tributaries and lakes in the basin. It also contains general descriptive information regarding geography, hydrology, land use, and water quality management. In addition, this section describes general water quality issues identified in the basin.

- **Section 3.0 - Population Projections:** This section documents population figures for Routt and Moffat Counties and for municipalities within the counties, including Yampa, Oak Creek, Steamboat Springs, Hayden, Craig, and Dinosaur. Significant unincorporated enclaves are included, where data are available. Census data for 1980, 1990, and 2000 are also presented.

- **Section 4.0 - Water Quality Assessment:** This section discusses Yampa Basin stream classifications and standards. It includes an assessment of available water quality data to determine if there are water quality or related watershed concerns. Water quality data are assessed to determine if applicable standards are being met. Recommendations pertaining to the continued collection of water quality data and the development of a comprehensive basin water quality database are summarized.

- **Section 5.0 – Water and Wastewater Facilities:** This section includes an inventory of public water systems and domestic and industrial wastewater facilities. Recommendations pertaining to basin facilities are presented.

- **Section 6.0 - Nonpoint Source Pollution:** This section assesses current sources of nonpoint pollution, using existing information. It includes a brief description of current ordinances and criteria used by county and city governments for erosion control and stormwater management. Recommendations are presented for practices to control nonpoint sources.

- **Section 7.0 - Water Quality Management Designations:** This section identifies "management agencies" designated to implement the plan. A table outlining management and operating responsibilities for the watershed plan is presented.

- **Section 8.0 – Water Quality Management Policy Summary for the Yampa River Basin:** This section, based on Volume 1 of the 1996 Northwest Colorado Council of Government's 208 Plan, summarizes six general water quality policies and their applicability to the Yampa River Basin.

- **References:** This section lists references cited in the *Yampa 208 Plan*.

- **Appendices:** The appendices include relevant information, such as adopted water quality standards for the Yampa Basin, references to documents containing water quality information and guidelines, information about the endangered fish recovery program, and the Colorado Division of Wildlife Aquatic Management Plan. Acronyms and a glossary of terms are included in Appendix A.

As a result of the planning process, six general water quality policies were developed, as follows.

Policy 1: Water Quality: The surface water and groundwater of the region will be protected to maintain the present uses of those waters. The physical, chemical, and biological conditions will be maintained for the benefit of the environment and present and future generations of residents and visitors to the region. Waters of the region not currently supporting classified uses (refer to Section 4.2) will be restored as soon as is financially and technically practicable. Policy 1 objectives are as follows.

- To meet the adopted water quality standards for the State of Colorado, including the applicable antidegradation standards.

- To assist local governments, as well as Federal and State agencies, with land use management responsibilities to implement water quality goals.

- To encourage private land owners in the region to implement water quality goals.

- To improve public awareness of water quality conditions in the region and how individual actions can protect and improve water quality.

Policy 2: Water Use and Development: The use and development of the waters of the region will maintain the quality necessary to protect present uses. Policy 2 objectives are as follows.

- To ensure that water development or transfer activities do not have a significant adverse effect upon the region's water resources.

- To protect existing local, State, and Federal investments in wastewater treatment facilities by mitigating additional treatment costs caused by hydrologic modification.

- To ensure, through participation in the planning and approval processes of reservoirs, that the quality of impounded water will be suitable for its intended use and that discharge will not significantly degrade downstream water quality.

- To encourage that water is used efficiently for the benefit and advantage of the people and natural resources of the Yampa River Basin.

- To encourage water conservation throughout the Yampa River Basin.

Policy 3: Land Use and Disturbance: The surface water and groundwater of the region will be protected from land uses and management practices which could cause significant degradation of water quality or impairment of the natural protection and/or treatment processes provided by wetlands, floodplains, shorelines, and riparian areas. Policy 3 objectives are as follows.

- To minimize the site disturbance on lands adjacent to surface waters, wetlands, and riparian environments in order to protect water quality.

- To encourage responsible land development (including logging, mineral extraction, solid waste disposal, agriculture, and other land use practices) such that it does not cause significant deterioration of water quality or significantly degrade the region's surface water and groundwater.

- To encourage protection of wetlands and riparian areas, through use of best management practices (BMPs), good stewardship, and such voluntary programs as land purchase, conservation easements, or other available programs.

- To enhance public knowledge of the importance of maintaining vegetative cover and streamside setbacks to protect water quality.

- To promote water quality as an important consideration in making decisions on the location and extent of areas to be served by public facilities and services.

- To discourage the proliferation of onsite wastewater disposal facilities.

- To encourage connection to community water and wastewater facilities within designated service areas.

- To assist local governments in guiding future growth, infrastructure, and development activities to areas where impacts on water quality will be minimized and/or controllable.

- To encourage land management practices (which include appropriate fire fuel management) and manage wildfire, disease and insect infestations as a viable long-term water quality management strategy.

- To encourage compatibility of investment policies for public facilities with other environmental protection programs (e.g. floodplain protection).

- To encourage local governments in managing soil disturbance and earth movement where significant water quality impacts may occur.

- To maintain historical runoff quantities by minimizing the creation of directly connected impervious surfaces and promoting detention and other controlled runoff measures.

- To encourage that the cumulative impacts of development activities in the region will not cause storm drainage and floodwater patterns to exceed the capacity of natural or constructed drainage ways.

- To recognize and protect irrigated agriculture as an important groundwater recharge mechanism for sustaining stream flows during critical low flow periods and to encourage the minimization of pollutants returning to the stream.

- To encourage that future development activities provide for the storage, treatment, and removal of pollutants to control their transport by storm runoff into streams, river and lakes.

- To encourage the use of non-structural controls in managing stormwater.

Policy 4: Domestic, Municipal, and Industrial Waste Treatment: Decisions to locate water supplies and wastewater treatment systems, and to extend utilities will be made in a manner that protects water quality. Decisions regarding facility location will also recognize the protection of floodplains, geologic hazard areas, wildlife habitats, wetlands, shorelines, and agricultural land. Plans for facilities that divert water or discharge wastes, will be consolidated, wherever appropriate, with existing facilities to protect water quality. Policy 4 objectives are as follows.

- To ensure that land use activities have adequate facilities to collect, treat, and dispose of anticipated types and quantities of wastewater.

- To recognize the vulnerability of regional and local groundwater aquifers to potential impacts from waste discharges or seepage from waste disposal sites and septic system leachate.

- To encourage the avoidance of "proliferation of treatment facilities" where practical alternatives exist.

- To ensure treatment facilities are properly operated and maintained by a qualified operating entity.

Policy 5: Chemical Management: The surface water and groundwater of the region will be protected from the use of pesticides, fertilizers, algaecides, road deicing and friction materials, and other chemicals which would temporarily or permanently cause a significant degradation of water quality conditions or impair present uses. Policy 5 objectives are as follows.

- To encourage that the appropriate volume, rate, and scheduling of pesticide, fertilizer, and road deicing and friction applications are determined and applied to protect the region's water quality while protecting public health and safety.

- To encourage that pesticides, fertilizers, road sanding materials, and hazardous chemicals used in the region are properly stored, transported, and handled during both normal and emergency operations.

- To encourage that hazardous wastes are disposed of in a manner that will minimize risk to the region's water resources.

Policy 6: Management System: The surface water and groundwater of the region will be protected by a management agency structure, which recognizes the existing governmental and regulatory framework and allows decisions and management at the most appropriate level of control. Especially with respect to nonpoint source pollution prevention, the recommended level of management is at the watershed level (municipality and county driven). Policy 6 objectives are as follows.

- To address water quality pollution issues at the most appropriate level of authority.
- To address water quality pollution issues using existing governmental and regulatory structure where it is appropriate.

Development of these policies resulted in the following plan implementation recommendations.

- Investigate potential intergovernmental agreements/vehicles for continued water quality programs and evaluations in the basin.
- Encourage local land use agencies and governmental entities to investigate funding sources for water quality evaluations.
- Encourage citizen-based monitoring programs (e.g.- River Watch) and work with interested entities/agencies to promote such programs throughout the community.
- Prepare a comprehensive inventory of sites and compile data for the Yampa River Basin.
- Provide a database/geographic information system (GIS) that is readily available and usable.
- Establish a mechanism to develop and continually update the database/GIS, as new data are collected though continued water quality evaluations and citizen-based monitoring programs.
- Establish a program where data are evaluated on an ongoing basis (in conjunction with monitoring and database maintenance). Evaluate data, indicate trends, and assess information gathered. Include narrative discussions of changes noted in water quality.
- Develop a long-range plan for collecting and assessing data.
- Coordinate monitoring and data compilation/evaluation to avoid duplication of efforts and ensure compatibility of data collection.
- Evaluate nutrient sources in the Upper Yampa and further characterize algae problems in the Yampa from the headwaters through Steamboat Springs, including Stagecoach Reservoir and Lake Catamount. Seek funding and participation from upper basin towns, cities, districts, Routt County, Upper Yampa Water Conservancy District, Colorado River Water Conservation District, and State and Federal agencies such as the Colorado Department of Public Health and Environment, Colorado Division of Wildlife, Colorado Water Conservation Board, U.S. Geological Survey, U.S. Forest Service, and U.S. Environmental Protection Agency.
- Encourage the Water Quality Control Commission to review the Yampa Basin in its entirety during the triennial review process. The upper and lower basin are currently reviewed separately (with the upper basin last reviewed in 1999 and the lower basin in 2001). As

discussed in the plan, this change has already been decided by the Commission, with the next hearing for the entire basin scheduled for July 2003.

- Work with the State to ensure that sufficient data are provided for sites proposed for reclassification.

- Evaluate stream flow (water quantity), as well as water quality in consideration of reclassification.

- Encourage reclassification if data indicate that streams have been misclassified, based on actual beneficial uses.

- Assure that adequate water quality data are obtained to determine whether numeric standards for stream segments are met.

- Work with the State to assure that reclassification will not have adverse impact on existing land use, where appropriate BMPs and control technologies are currently being used.

- Encourage the balance between existing practices and standards, with implementation of appropriate BMPs and control technologies.

- Look for opportunities to incorporate environmental stewardship with land-use activities.

- If a government entity is party to a stream diversion, consider potential impacts to in-stream flow.

- Consider the economic impact of activities affecting streamflow.

- Encourage basin-wide water conservation efforts.

- Consider the desire to balance area "customs and culture" (agriculture, mining, recreation, etc.), water quality, streamflow, and economic stability.

- Encourage that stream restoration be incorporated in land-use/construction projects.

- Incorporate water quality protection features (BMPs) into new development/review process.

- Discourage storage of potentially contaminating materials in the floodplain.

- Encourage local entities to provide inspection/enforcement assistance, where possible.

- Continue to address urban and construction water quality impacts through public education and local land use programs, through the continued efforts of Routt and Moffat Counties and the Yampa River Basin Partnership.

- Continue to address agricultural BMPs through the Natural Resources Conservation Service, BLM, local Stock Growers Association, and other appropriate groups. Funding for these types of projects can be pursued through the State's Section 319 Nonpoint Source Grant Program.

- Continue local nonpoint source water quality improvement projects.

- Ensure that the recommendations of the facility plan for the Steamboat Springs regional facility are implemented. This includes the service area delineations for treatment systems in the area.

- Ensure that the recommendations of the facility plan for the Craig wastewater treatment facility are implemented. This includes the service area delineations for treatment systems in the area.

Implementation items recommended by this *Yampa 208 Plan* are, in part, a continuation of previous point and nonpoint source control measures. Additional implementation recommendations emphasize continued water quality monitoring and evaluation, as well as development of a comprehensive basin-wide database/GIS system.

A high priority recommendation identified by the WQCD is to "evaluate nutrient sources in the Upper Yampa and further characterize algae problems in the Yampa from the headwaters through Steamboat Springs, including Stagecoach Reservoir and Lake Catamount and to seek funding and participation from upper basin towns, cities, districts, Routt County, Upper Yampa Water Conservancy District, Colorado River Water Conservation District, and State and Federal agencies such as the Colorado Department of Public Health and Environment, Colorado Division of Wildlife, Colorado Water Conservation Board, U.S. Geological Survey, U.S. Forest Service, and U.S. Environmental Protection Agency". The WQCD and the City of Steamboat Springs have initiated nutrient evaluations, as further discussed in Sections 4.3.4, 6.5.1, and 6.5.5 of this plan.

1.O INTRODUCTION

1.1 GENERAL

This *Yampa Basin Watershed Plan* (*Yampa 208 Plan*) is an effort to gather and organize current information on water quality in the Yampa River Basin in Routt and Moffat Counties and update previous 208 planning efforts in the basin. The primary goal of the updated *Yampa 208 Plan* is to address existing facilities, practices, and impacts to water quality and to identify the necessary actions and responsible entities to carry out actions to protect the integrity of the watershed. The general location of the basin is presented in Figure 1, *Yampa River Watershed General Location.*

The Colorado Department of Public Health and Environment - Water Quality Control Division (WQCD), in cooperation with the Yampa River Basin Partnership (YRBP), is preparing the *Yampa 208 Plan* through a joint agreement between the WQCD, Routt County, and Moffat County.

1.2 BACKGROUND

In 1972, Congress overrode a presidential veto to pass the Federal Water Pollution Control Act Amendments of 1972 (PL92-500), also known as the Clean Water Act. This Act has been further amended with significant changes in 1977 (PL95-217) and 1987 (PL 100-4). The Clean Water Act states that the ultimate objective of the Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters". In beginning the process to improve water quality, the Clean Water Act identified a number of planning programs to be initiated at various levels of government, outlined in Section 208.

To maximize efficient use of resources and provide regional coordination, Section 208 of the Clean Water Act established an areawide approach to planning for the abatement of pollution. Section 208 (titled "Areawide Waste Treatment Plans") provides criteria to design local plans, based on an integrated and comprehensive planning process.

The Continuing Planning Process for Water Quality Management in Colorado, adopted by the Colorado Water Quality Control Commission (Commission) in 1983, requires annual updates of the Areawide Water Quality Management Plans prepared under Section 208 of the Clean Water Act. The main objectives of this 208 Plan are to: 1) update the previous plans to reflect the progress that has been made in plan implementation, and 2) address the region's shift in focus to a watershed perspective.

Under Section 208 of the Federal Clean Water Act, planning regions within each state are required to develop and update water quality management plans. Based on the regions designated by the Governor in 1973, Routt County was included in Region 12, along with Eagle, Grand, Jackson, Pitkin, and Summit Counties. Northwest Colorado Council of Governments (NWCCOG) was designated as the water quality planning agency for Region 12. The Region 12 208 Plan was developed in the late 1970s and has been updated several times since, most recently in 1996 by NWCCOG.

Moffat County was included in Region 11, along with Garfield, Mesa, and Rio Blanco Counties. The Colorado West Area Council of Governments (Colorado West Area COG) was designated by the Governor as the water quality planning agency for Region 11. The Region 11 208 Plan was also developed in the late 1970s. In 1984, the Colorado West Area COG decided to disband and requested that the State "de-designate" their agency for water quality planning responsibilities. Under Environmental Protection Agency (EPA) regulations and State guidelines for 208 planning, the WQCD is responsible for developing and updating 208 plans for non-designated regions of the State. Non-designated regions are those where no regional agency (such as a council of governments or

Insert Figure 1, *Yampa River Watershed General Location.*

planning association) is designated and active. After the Colorado West Area COG disbanded in 1984, the WQCD updated the Region 11 208 Plan in 1986.

In 1997, Routt County officially requested to become a part of Planning Region 11 and received approval from the Governor. With Routt and Moffat Counties both in Region 11 and both sharing the Yampa watershed, the WQCD recommended preparation of a water quality plan with a Yampa Basin watershed focus. The WQCD suggested that a cooperative effort between communities and agencies would serve to protect water quality and river system health from potential degradation from the following major activities:

- Increasing rates of population growth and land development;
- Growth in tourism and recreation; and
- Associated pressures on public infrastructure and community resources.

1.3 *YAMPA 208 PLAN* GOALS AND OBJECTIVES

The *Yampa 208 Plan* encompasses both Routt and Moffat Counties and updates plans previously prepared in Routt County in 1996 and Moffat County in 1986. The updated *Yampa 208 Plan* is consistent with the requirements of Section 208 of the Clean Water Act, administered by the WQCD for this basin. Issues addressed in the *Yampa 208 Plan* include the following:

- Water and wastewater facility needs;
- Point source discharges to the river system;
- Nonpoint source pollution control and prevention strategies, emphasizing the implementation of best management practices (BMPs); and
- Responsibilities and roles of various agencies to protect water quality in the Yampa Basin.

The major watershed planning goals and objectives are summarized below.

- **Water Resources**: To prepare an overview of the Yampa Basin, describing major water bodies and waterways, as well as land use, socioeconomic, and population characteristics.
- **Water Quality**: To review existing water quality data and assess the location and extent of water quality and watershed concerns. To evaluate issues such as impacts to habitat, erosion, and sediment load and provide recommendations for further action.
- **Facility Planning/Design**: To prepare an inventory of public water systems and domestic and industrial wastewater facilities, including a description of activities, treatment processes, and waterway discharge location, volume, and limits.

In summary, the main goals of the *Yampa 208 Plan* are to address water quality concerns and provide for the maintenance of high quality water in the Yampa Basin.

1.4 *YAMPA 208 PLAN* SCOPE AND ORGANIZATION

The *Yampa 208 Plan* scope and organization follows.

- **Section 1.0 – Introduction:** This section describes the project background, scope, and general organization of the *Yampa 208 Plan.*

- **Section 2.0 - Regional Overview of Yampa Watershed**: This section presents a brief description of the Yampa River watershed, noting the key tributaries and lakes in the basin. It also contains general descriptive information regarding geography, hydrology, land use, and water quality management. In addition, this section describes general water quality issues identified in the basin.

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- **References:** This section lists references cited in the *Yampa 208 Plan.*

- **Appendices:** The appendices include relevant information, such as adopted water quality standards for the Yampa Basin, references to documents containing water quality information and guidelines, information about the endangered fish recovery program, and the Colorado Division of Wildlife (CDOW) Aquatic Management Plan. Acronyms and a glossary of terms are included in Appendix A.

2.0 REGIONAL OVERVIEW OF YAMPA WATERSHED

2.1 INTRODUCTION

This section presents a brief description of the Yampa River watershed, noting the key tributaries and lakes in the basin. It also contains general descriptive information regarding geography, hydrology, land use, and water quality management. In addition, this section describes general water quality issues identified in the basin.

2.2 GEOGRAPHY AND HYDROLOGY

The Yampa River watershed is located in northwestern Colorado, as shown in Figure 2, *Yampa River Basin*. The Yampa River primarily flows from east to west through the City of Steamboat Springs and Town of Craig to its confluence with the Green River in Dinosaur National Monument. The Elk River drainage (approximately 425 square miles) originates in the Mount Zirkel Wilderness and flows southward to its confluence with the Yampa River below Steamboat Springs. The Williams Fork drainage (approximately 342 square miles) originates in the Flat Tops and flows northwest to its confluence with the Yampa River below Craig. As indicated in Figure 2, several areas within Moffat County and Routt County are not located within the Yampa River Basin. These areas include the following:

- The northwest portion of Moffat County is located within the Green River Basin;
- The southwest portion of Moffat County is located within the White River Basin; and
- The southeast portion of Routt County is located within the Upper Colorado River Basin.

While these areas are not technically within the Yampa River Basin, the issues, policies, objectives, and recommendations contained within this *Yampa 208 Plan* are considered applicable throughout Moffat County and Routt County. Inquiries were made to several agencies about potential water quality issues in these areas, but none were specifically identified. Future updates to this *Yampa 208 Plan* may address specific water quality concerns for these areas adjacent to the Yampa Basin if pertinent information becomes available.

Altitudes in the Yampa River watershed range from 5,000 feet near the confluence with the Green River to 12,354 feet on the Flat Tops. As a result of large altitude differences, the climate varies from semiarid with as little as eight inches of precipitation annually, mostly as summer rains, to as much as 60 inches of precipitation annually, mostly as winter snowfall (NWCCOG, 1996).

Winter snow in the mountains serves as the principal source of streamflow. Steamboat Springs receives nearly one-half of its annual precipitation as snow during December through April, while Craig receives more than one-third of its precipitation as snow during the same period. Steamboat Springs receives only one-fifth of its precipitation during the peak growing season (July and August), while Craig receives greater than one-third of its total precipitation during the same period. Summer precipitation throughout the watershed occurs as rain showers, which contribute little to overall water availability. These storms seldom yield more than one inch of rain (NWCCOG, 1996).

The streamflow in the Yampa River watershed has marked seasonal variations. Average annual stream flows at the Yampa River above Maybell are 1,543 cubic feet per second (cfs), and range from 200 cfs (September through February), to 6,100 cfs in May. Man has an effect on streamflow through diversions for irrigation in the summer months and reservoir storage (NWCCOG, 1996).

Steamboat Lake, Elkhead Reservoir, Pearl Lake, Fish Creek Reservoir, Lake Catamount, Stagecoach Reservoir, Stillwater Reservoir, and Yamcolo Reservoir are the major impoundments in the basin,

Insert Figure 2, *Yampa River Basin.*

having a total storage capacity of approximately 99,300 acre-feet. Fish Creek Reservoir was recently expanded (1994) and currently has a capacity of 4,122 acre feet and a surface area of 140 acres (from 1,842 acre feet and 90 surface acres). Stagecoach Reservoir construction was completed 1988, and has a capacity of 33,275 acre feet and a surface area of 720 acres. Lake Catamount is a 495 surface acre man-made reservoir with a storage capacity of 7,830 acre feet, which maintains a constant surface level (NWCCOG, 1996).

Water Division 6 administers river flows in the Yampa, White, and North Platte River Basins. This area encompasses approximately 11,000 square miles in the northwest corner of the State. Most annual streamflow is from snowmelt runoff during spring and early summer and irrigation diversions affect streamflow during the summer growing season. Nearly 8,000 individual decreed water rights are administered by the Division, distributing some 902,000 acre-feet of water for irrigation. The predominant crops are grass hay and alfalfa hay used for the maintenance of large herds of cattle and sheep (NWCCOG, 1996).

2.3 LAND USES AND POPULATION CHARACTERISTICS

The Yampa River watershed is encompassed primarily by Routt and Moffat Counties, and small portions of Rio Blanco and Garfield Counties. A small southern portion of Routt County is in the Upper Colorado River Basin, and an area in the north end of the county drains northwest into Wyoming (Little Snake River). In addition, the northwest portion of Moffat County is located within the Green River Basin and the southwest portion of Moffat County is located within the White River Basin. While these areas are not technically within the Yampa River Basin, the issues, policies, objectives, and recommendations contained within this *Yampa 208 Plan* are considered applicable throughout Moffat and Routt Counties.

Approximately 49% of the land in Routt County is publicly owned. There are three national forests in Routt County. These include the Arapaho National Forest, with 5,406 acres in Routt County, the Routt National Forest, with 572,805 acres of land in Routt County, and the White River National Forest, with 6,128 acres of land in Routt County. The Bureau of Land Management (BLM) manages 79,902 acres in the county. The State Land Board, CDOW and State Parks own approximately 71,070 acres.

Approximately 61 % of the land in Moffat County is publicly owned. There are two national forests in Moffat County: the Routt National Forest (encompassing 38,000 acres) and the White River National Forest (encompassing 3,840 acres). The BLM manages approximately 1,672,000 acres in the county. There is one national monument in Moffat County (Dinosaur National Monument). Brown's Park National Wildlife refuge is also located in the northwest corner of the county.

The major population centers in Routt County are the City of Steamboat Springs, and Towns of Hayden, Oak Creek, and Yampa. According to the 2000 census data, the permanent population of Routt County in 2000 was 19,690, an increase of 39.8% since 1990. Peak population during ski season has been estimated at almost twice the permanent population (Routt County Government, 1995 – from 1996 NWCCOG 208 Plan). The average number of visitors to the Steamboat area is 325,000 in the winter and 230,000 in the summer.

The major population centers in Moffat County are the City of Craig, Community of Maybell, and Town of Dinosaur. According to the 2000 census data, the permanent population of Moffat County in 2000 was 13,184, an increase of 16.1% since 1990.

The major land uses in the watershed include livestock grazing, timber harvesting, farming, mineral production, residential use, and recreational use. The primary land use is for livestock grazing. Cattle and sheep generally summer on ranges on the higher and more remote federally owned lands and

winter on ranges on lower and more accessible private lands. In recent years some land use has changed from grazing to mineral production or residential use. In the Steamboat Springs area, mountain forest and rangeland have been developed into recreational homesites due to the popularity of skiing in the area.

The economic base in the watershed has traditionally been agriculture, primarily dominated by cattle and sheep ranching. Crop production includes wheat, oats, barley, rye, hay, and potatoes. In the early 1960s, mining was the most important economic activity in northwestern Colorado according to the Soil Conservation Service (SCS, 1966). Routt County is currently Colorado's leading coal producing county. Increasingly, recreational activities such as skiing, hunting, camping, and rafting have stimulated the local economy. Timber harvesting and, in recent years, coal and petroleum production have also contributed to the local economy.

The largest economic sector in Moffat County is coal, oil and natural gas mining, with 19.8% of the population working in these industries. Tourism follows closely behind with 19.6% of the population working in tourism-related professions. Other employment sectors include regional and national services, agriculture, and manufacturing. Routt County relies heavily on the tourism industry for employment, with 66.9% of the population working in tourism-related professions. Other substantial employment sectors include coal mining and regional and government jobs.

2.4 WATERSHED WATER QUALITY MANAGEMENT

The Yampa River Basin Partnership, a group composed of Federal, State, local officials, businesses, nonprofit organizations, and local citizens has been established to start basin-wide cooperative communication, planning and project implementation. The group focuses on water quality and water rights issues and concerns in the valley.

In addition, Routt County established a Water Quality Committee with an open membership and participation by approximately 35 interested citizens. This committee was established to review county land use regulations and advise the county on appropriate water quality management options and other appropriate methods for protecting and enhancing water quality in Routt County.

Moffat County has been actively involved in land use issues and has recently completed a series of public meetings pertaining to land use goals and priorities within the county.

This *Yampa 208 Plan* was developed by the WQCD with the assistance of the Yampa River Basin Partnership and Routt and Moffat Counties. In addition, the Cities of Craig and Steamboat Springs participated in plan development and review.

2.5 GENERAL WATER QUALITY ISSUES

Most of the streams in the Yampa River Basin are very high quality, supporting desired uses. The emphasis of water quality planning in the basin, therefore, is largely directed toward preserving this existing high quality. There are some areas, however, where improvement to water quality is desired, including the following:

- **Drainage from historic mining areas**: Drainage from mined areas can impede attainment of water quality standards. Several streams in the Yampa watershed have been impacted from historic mining activities, as described in the Colorado Inactive Mine Reclamation Plan produced by the Colorado Division of Minerals and Geology. Of particular concern is Oak Creek in Routt County, which has been impacted by acid rock drainage (ARD) from previously mined areas.

- **Nonpoint source pollutants from development areas**: Nonpoint source pollution from development areas is a significant issue in the watershed. Water pollutants in nonpoint source runoff from urbanizing areas can include nutrients (nitrogen and phosphorus), sediment, heavy metals, petroleum products, and organic pesticides. As the rural West Slope continues to grow, the areas contributing to construction-related erosion and urban runoff will also increase.

- **Point source discharges from developed areas**: Point source discharges in the basin are typically well managed. Advanced wastewater treatment is often required for ammonia removal to protect fisheries and advanced phosphorus removal is required in some mountain watersheds. Continued attention to point sources is needed to ensure that the region's high quality water streams are protected.

- **Hydrologic modifications from water projects**: Hydrologic modifications include changes in stream channels, stream flows or the timing of those flows, often resulting from water projects. Water quality concerns can accompany major water use and development projects. Included in these concerns are: conversion of agricultural water to municipal use (loss of groundwater recharge); change in timing of return flows (specifically related to snow making); and "dewatering" stream segments between water diversion and wastewater return flows; and the "consumptive use" of various beneficial water uses. In-basin consumption can be calculated using general figures of 10% consumption for municipal use, 20-25% consumption for snow making, and approximately 1.8 acre-feet per acre irrigated for agriculture (NWCCOG, 1996).

- **Large area soil disturbance activities**: Large area soil disturbance activities such as mining, agriculture, timber harvesting, and ski area expansion present the potential for water quality impacts, when conducted improperly. The US Forest Service (USFS) has identified areas where excessive soil loss from existing timber harvest operations require remedial actions to protect water quality. In addition, large area surface mining operations can contribute excessive soil loss, if improperly managed. At present, these operations are well controlled under permits from the Colorado Division of Minerals and Geology and the USFS. All watersheds, however, are potentially vulnerable to water quality impacts resulting from large area soil disturbances.

- **Roadways and pavements**: Water quality problems associated with roadways and pavements include sediment and associated nutrients resulting from road cuts and fills, continuing erosion of unstable slopes adjacent to roads, erosion of unpaved road and parking surfaces, and road sanding operations. To a lesser degree, heavy metals, petroleum products, and hazardous materials spills along roadways near water bodies also have been documented to impact water quality. The Colorado Department of Transportation (CDOT) has a program underway to address these concerns while also considering public driving safety and existing funds and needs. All watersheds, however, are potentially vulnerable to water quality impacts from this type of activity, although the major areas of concern are in those areas where development has or is occurring.

Five of these water quality issues are nonpoint source issues. Point source controls will continue to be applied to prevent damage to the stream segments within the valley. The real challenge for water quality management, however, lies in the area of nonpoint source management and control. Point source issues are further described in Section 5.0 and nonpoint source issues are discussed in Section 6.0 of this plan.

3.0 POPULATION PROJECTIONS

3.1 INTRODUCTION

This section documents population figures for Routt and Moffat Counties and for municipalities within the counties, including Yampa, Oak Creek, Steamboat Springs, Hayden, Craig, and Dinosaur. Significant unincorporated enclaves such as Phippsburg, Lake Catamount, Milner, and Morrison are included in the discussion, where data are available. The population tables include actual data for the years 1980, 1990 and 2000, and projections for the years 2005, 2010, 2015, 2020, and 2025. The purpose of population projections is to provide perspective on local/regional trends and to gauge population impact on water quality and related facilities. Population data are included in Appendix B.

3.2 SUMMARY OF PREVIOUS DATA

Previous population evaluations have been conducted by several entities for the Yampa River Basin. Three recent evaluations are described, along with 2000 census data, to provide population projections for this *Yampa 208 Plan.*

3.2.1 1996 NWCCOG Population Statistics and Projections

Projections of the permanent and peak populations, from the 1996 NWCCOG 208 Plan, for Routt County and municipalities in the upper Yampa River watershed are listed in Table 3.1, *NWCCOG Population Projections*. These projections are based on the 1980 and 1990 populations, and may substantially underestimate actual numbers, based on the 2000 census results described below in Section 3.3.

TABLE 3.1
1996 NWCCOG POPULATION PROJECTIONS

		2000*	2005*	2010*	2015*
Hayden	Permanent	1,575	1,704	1,882	
	Peak	1,645	1,780	1,984	
Lake Catamount	Permanent	Na	Na	Na	
	Peak	6,500	9,300		
Milner	Permanent	220	243	270	
	Peak	220	243	270	
Morrison	Permanent	625	724	840	
	Peak	625	724	840	
Oak Creek	Permanent	808	892	985	
	Peak	836	920	1,013	
Phippsburg	Permanent	193	213	235	
	Peak	Na	Na	Na	
Steamboat Springs	Permanent	8,404	9,750	11,300	
	Peak	26,000	30,000	34,700	
Yampa	Permanent	385	415	507	
	Peak	385	415	507	
Routt County Total	Permanent	17,100	18,900	20,900	26,160
	Peak	34,000	37,500	41,400	

*Population projections are from Routt County Department of Environmental Health.
Na = Not available

3.2.2 BBC Population Projection Summary

BBC Research and Consulting prepared the *Yampa Valley Water Demand Study* in March 1998. One objective of the study was to project water demands in the Yampa River Basin for approximately 25 years into the future. The study's population projections were based on the 1945 and 1995 permanent populations of both counties and were tailored to fit specific foreseeable changes in the Yampa Valley

economic base. The following table, Table 3.2, *BBC Population Projections*, presents the 2045 high and low population projections for both counties.

TABLE 3.2
BBC POPULATION PROJECTIONS

	1945	1995	2045* – Low	2045* – High
Moffat	5,500	12,100	22,300	27,500
Routt	9,700	16,600	40,200	49,500
*Population projection				

3.2.3 Colorado Demography Office Projections

The Colorado State Demographer's office has released population projections for all Colorado counties. Table 3.3, *Demographer Population Projections*, presents State Demographer's data for 1990, 1995, and 2000 and projections to 2025, at five-year increments, for Routt and Moffat Counties. The population projection methodology used by the State Demographer's office include the following factors: survival rates by age and sex; fertility rates for women 15-49; age-sex distribution of migrants; base year population disaggregated by age and sex; the age and sex of special populations of military, prisoners, college students, and temporary ski-employee population; and labor force participation rates by age and sex. The model allows for changes in survival, fertility, and labor force participation rates as well as migration rates.

TABLE 3.3
DEMOGRAPHER POPULATION PROJECTIONS

	1990	1995	2000	2005*	2010*	2015*	2020*	2025*
Moffat	11,354	12,187	13,257	14,149	14,996	15,847	16,795	17,709
Routt	14,172	17,254	19,798	22,416	25,058	27,901	30,220	32,143
*population projection								

3.3 YEAR 2000 CENSUS POPULATION/PROJECTIONS

The permanent population of Routt County was 13,404 in 1980, 14,088 in 1990, and 19,690 in 2000 (Census Bureau), as indicated in Table 3.4, *Census Population Data/Population Projections*. This represents a 39.8% increase from 1990 to 2000. The major population centers are the City of Steamboat Springs (2000 permanent population: 9,815), and Towns of Hayden (1,634 in 2000), Oak Creek (849 in 2000), and Yampa (443 in 2000.) Compared to population estimates projected by both NWCCOG and the Demographer's office, the current county population has increased more substantially than projected. All municipalities' populations were higher than projected as well.

The permanent population of Moffat County was 13,133 in 1980, 11,357 in 1990, and 13,184 in 2000 (Census Bureau.) This represents a 16.1% increase from 1990 to 2000. The major population centers are the City of Craig (2000 permanent population: 9,189) and the Town of Dinosaur (319 in 2000). Compared to population estimates projected in the Moffat County 208 Plan (1986), the current population has not increased as substantially as projected. In the 1986 Plan, the permanent population for Moffat County was projected to be between 15,149 and 41,589 in the year 2000. The actual shortfall is most likely attributed to the area's dependence on the energy industry boom/bust cycles.

Moffat County population projections for 2010 and 2020, based on the most recent census data are 15,011 and 16,833, respectively. Routt County population projections for 2010 and 2020, based on the most recent census data are 25,058 and 30,220, respectively.

TABLE 3.4
CENSUS POPULATION DATA/POPULATION PROJECTIONS
ROUTT AND MOFFAT COUNTIES[1]

	1980	1990	2000	2010	2020
Moffat County	**13,133**	**11,357**	**13,184**	**15,011**	**16,833**
Craig[2]		8,091	9,189	10,287	11,385
Dinosaur[2]		324	319	314	304
Unincorporated[2]		2,942	3,676	4,410	5,144
Routt County	**13,404**	**14,088**	**19,690**	**25,058**	**30,220**
Hayden[3]		1,444	1,634	1,953	2,334
Oak Creek[4]		673	849	960	1,100
Steamboat Springs[5]		6,695	9,815	14,060	19,570
Yampa[6]		317	443	501	604
Unincorporated		4,959	6,949		

Notes:
1. Data compiled from Colorado Department of Local Affairs website unless noted otherwise.
2. Craig, Dinosaur, and unincorporated Moffat County projections provided by Moffat County.
3. Hayden projections based on 1.8% annual growth rate from Town of Hayden Comprehensive Plan Update (2000)
4. Oak Creek projections developed by Routt County Planning staff.
5. Steamboat Springs projections based on the wastewater treatment plant population estimates (2000)
6. Yampa projections developed by Routt County Planning staff.

3.4 LAND USE AND DEVELOPMENT PLANS

General basin-wide land use characteristics were described previously in Section 2.3. More detailed information is provided in numerous land use and development plans, which document current and future land uses in various areas of the counties. The following land use documents provide detailed information on areas of future growth, land disturbance and land preservation.

- Routt County Master Plan Update (draft, February 2001)
- Sarvis Creek Area Plan (September 1996)
- Stagecoach Community Plan (September 1999)
- Upper Elk River Valley Community Plan (February 1999)
- West of Steamboat Springs Area Plan (November 1999)
- Routt County Open Lands Plan (June 1995)
- Emerald Mountain Management Plan (draft, June 1999)
- Steamboat Springs Area Community Plan (1995)
- Town of Yampa Master Plan (November 1997)
- Oak Creek Comprehensive Plan (1996)
- Town of Hayden Comprehensive Plan Update (2000)
- Moffat County Land Use Plan (September 2001)
- Moffat County Master Plan (1982 – being updated in 2002)
- City of Craig Master Drainage Plan (May 1984)

In addition to these community plans, the USFS, National Park Service, BLM, U.S. Fish and Wildlife Service (USFWS), and State Land Board also maintain land use plans. Development plans are also prepared by major area industries, including the power plants, mines, and ski areas.

4.0 WATER QUALITY ASSESSMENT

4.1 INTRODUCTION

This section includes an overview of stream classifications and standards and an assessment of available water quality data to determine if there are water quality and related watershed concerns. Water quality data are evaluated to determine if provisions of the Colorado Water Quality Control Act are being met.

Primary sources of information include:

- WQCD data from the Upper Colorado standards review in 1999
- WQCD data from the Lower Colorado standards review in 2001
- Water quality data from EPA's Storage and Retrieval (STORET) Database
- United States Geological Survey (USGS) data and studies
- *Status of Water Quality in Colorado* (305(b) Report)
- WQCD 303(d) List
- Data from previous 208 plans

In addition, reports/data from resource agencies such as USFWS, USFS, BLM, U.S. Bureau of Reclamation, CDOW, Colorado Division of Parks & Recreation, and local agencies such as cities, towns, water conservancy districts, counties, water & sanitation districts are discussed.

4.2 STREAM CLASSIFICATIONS AND STANDARDS

In Colorado, the Colorado Water Quality Control Commission (Commission) and WQCD are responsible for regulating water quality through the establishment of water quality classifications, designations, standards, and control regulations to protect the beneficial uses of State waters including rivers, streams and lakes. In addition, the Commission and WQCD are responsible for the issuance of discharge permits, water quality certifications, and enforcement actions. An overview of the water quality management and drinking water protection system in Colorado is included in Appendix C.

4.2.1 Overview of Colorado's Classifications and Standards System

General

The system for assigning surface water and groundwater classifications and standards is administered by the Commission and WQCD. It is based on adopting use classifications that identify those uses to be protected on a stream segment and then adopting numerical standards for specific pollutants to protect those uses.

Use classifications and numeric water quality standards have been adopted for streams, lakes, and reservoirs throughout each of the State's river basins. Within each basin, waters are divided into individual stream segments for classification and standard setting purposes. Water quality standards are applied in a regulatory context principally through the Colorado Discharge Permit System (CDPS) where point source dischargers are regulated to ensure that water quality standards are met.

Site-specific water quality classifications are intended to protect existing uses of State waters, and any additional uses for which waters are suitable or are intended to become suitable. The current use classification categories are:

- Recreation (Class 1a, 1b, or 2);
- Agriculture;
- Aquatic life (Cold or warm water, Class 1 or 2);
- Water supply; and,
- Wetlands.

For each classified stream segment, numeric water quality standards are adopted that are intended to maintain water quality at a level sufficient to protect the classified uses. There are three potential approaches to the adoption of site-specific numeric standards. First, table value standards (TVS) are based on criteria set forth in three tables contained in the Commission's Basic Standards and Methodologies for Surface Waters (3.1.0 5 CCR1002-8). These are levels of pollutants determined to be generally protective of the corresponding use classifications, and are applied in most circumstances, unless site-specific information indicates that one of the following approaches is more appropriate. Second, ambient quality-based standards (i.e. standards based on the existing instream quality) may be adopted where natural or irreversible pollutant levels are higher than would be allowed by table value standards, but are determined adequate to protect classified uses. The third option is to adopt site specific standards where a bioassay or other site-specific analysis indicates that alternative numeric standards are appropriate for protection of classified uses.

Outstanding and Use-Protected Waters

In addition to water quality classifications and standards, either of two water quality based designations may be adopted in appropriate circumstances. An "Outstanding Waters" designation may be applied to certain high quality waters that constitute an outstanding natural resource. No degradation of outstanding waters by regulated activities is allowed. A "Use-Protected" designation may be applied to waters with existing quality that is not better than necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. The quality of these waters may be altered so long as applicable water quality classifications and standards are met. Waters that are not given one of these designations are subject to the State's Antidegradation Review requirements before any new or increased permitted water quality impacts are allowed.

Antidegradation Review

The activities that are subject to antidegradation review requirements are those that:

- Require a discharge permit
- Require water quality certification under Section 401 of the Clean Water Act
- Are subject to control regulations (WQCC, 1998)

The first step in the antidegradation review process is a determination, in accordance with criteria specified in the regulation, of whether "significant degradation" would result from the activity. If not, the review ceases. If significant degradation would result, a determination is made of whether the degradation is necessary to accommodate important economic or social development in the area in which the waters are located. The determination is based on an assessment of whether there are water quality control alternatives available that would result in less degradation of State waters and which are economically, environmentally, and technologically reasonable. The proposed degradation is allowed only if no such alternatives are available (WQCC, 1998).

303(d) List

Section 303(d) of the Clean Water Act requires each state to identify waters for which technology-based effluent limitations and other required controls are not adequate to attain water quality

standards. Those stream segments or water bodies require Total Maximum Daily Load (TMDL) allocations in order for the segment to attain or maintain water quality standards. A TMDL is the estimated assimilative capacity of a waterbody, which indicates how much of a pollutant may enter a waterbody without impairing its designated uses. The TMDL represents the sum of the point sources, the nonpoint sources, and a margin of safety (which can include anticipated future pollutant loading). The current 303(d) List is presented in the *Status of Water Quality in Colorado 2000* (the State's 2000 305(b) Report) (WQCD, 2000). As of 2000, there were no 303(d) listed waters in the Yampa River Basin. However, the 305(b) Report did indicate that several segments needed additional assessment. Those segments are on the "monitoring and evaluation" list to determine if water quality standards are met and if any impairment to beneficial uses is evident.

4.2.2 Yampa Basin Classifications and Standards

The Basic Standards and Classifications, including the basis and purpose for the standards and classifications can also be found in Appendix D.1. Water quality standards for stream segments in the Yampa Basin are presented in Appendix D.2 (upper basin) and Appendix D.3 (lower basin).

The Yampa Basin has been divided into an upper and lower basin. The Upper Yampa River Basin extends from the headwaters located in eastern and southern Routt County downstream to the confluence with Elkhead Creek and generally coincides with Routt County. The lower basin extends from immediately below the confluence of Elkhead Creek and the Yampa River to the confluence with the Green River. Portions of the Green River, Beaver Creek and Vermillion Creek within Moffat County are also included in the Lower Yampa River Basin. The lower basin includes Moffat County.

Upper Basin

Streams in the upper basin are classified for protection of cold water aquatic life (Class 1), recreation (Class 1 and 2), water supply and agricultural uses, as indicated in Appendix D.2.

The following segment is designated as "Outstanding Waters", and thus, does not allow degradation of water quality:

- Yampa River Segment 1: Tributaries to the Yampa River, including all wetlands, lakes, and reservoirs, which are within the Mount Zirkel Wilderness Area.

Two segments in the upper basin are classified "Use Protected" which indicates waters which do not require the special protection of antidegradation review. The two segments are:

- Yampa River Segment 4: Mainstem of the Little White Snake Creek, from the source to the confluence with the Yampa River.

- Yampa River Segment 12: All tributaries to the Yampa River, including all wetlands, lakes and reservoirs, from the confluence with the Elk River to the confluence with the Elkhead River, which are not on National Forest lands, except for the specific listings in Segments 13a (Trout Creek), 13b (Foidel Creek), 13c (Trout Creek), and 13d (Sage and Dry Creeks).

The remaining waterbody segments are subject to the State's antidegradation review as it is applied to discharge permit holders and 401 certification. Stream classifications and standards for stream segments within the Upper Yampa Basin are included in Appendix D.2.

Lower Basin

Streams in the lower basin are classified for protection of cold water aquatic life (Class 1), warm water aquatic life (Class 1 and 2), recreation (Class 1a, 1b, and 2), water supply and agricultural uses, as indicated in Appendix D.3.

There are no segments with "Outstanding Waters" designation within the lower basin.

At the start of this *Yampa 208 Plan* update process, twelve segments were classified as "Use Protected" (in Regulation No. 37, Classifications and Numeric Standards for Lower Colorado River Basin – August 30, 1997), which indicates waters that do not require the special protection of antidegradation review. It should be noted, however, that a number of these designations were approved for modification by the Commission in the triennial review rule-making hearing in July 2001, discussed further in Section 4.2.4. The nine segments currently classified as "Use Protected" are:

- Lower Yampa River Segment 3a: All tributaries to the Yampa River from a point immediately below the confluence with Elkhead Creek to a point immediately below the confluence with Lay Creek, except for the specific listings in Segments 3b through 15.

- Lower Yampa River Segment 3b: Mainstems of Johnson Gulch, Pyeatt Gulch, Ute Gulch, and Castor Gulch, No Name Gulch, Flume Gulch, Buzzard Gulch, Coyote Gulch, Deal Gulch, Elk Gulch, Ben Morgan Creek, Boxelder Gulch, Collom Gulch, Hale Gulch, and Jubb Creek, including all tributaries from their sources to their mouths.

- Lower Yampa Segment 3e (new): Mainstem of Good Spring Creek above Wilson Reservoir and Wilson Creek, and their tributaries, except for Jubb Creek.

- Lower Yampa River Segment 6a: All tributaries to Fortification Creek, including the North Fork of Fortification Creek and all wetlands, lakes, and reservoirs, from the confluence of the North and South Forks to the confluence with the Yampa River, except for the specific listings in Segments 6b and 7.

- Lower Yampa River Segments 13a: Mainstem of the Williams Fork River from the confluence of the East Fork and South Fork to Highway 13/789 bridge at Hamilton.

- Lower Yampa River Segments 13b: Mainstem of the Williams Fork River from the Highway 13/789 bridge at Hamilton to the confluence with the Yampa River.

- Lower Yampa River Segment 14: All tributaries to the Yampa River, including all wetlands, lakes, and reservoirs from a point immediately below the confluence with Lay Creek to a point immediately below the confluence with the Little Snake River.

- Lower Yampa River Segment 17b: All tributaries to the Little Snake River from a point immediately below the confluence with the Yampa River, except for the specific listings in Segment 18.

- Lower Yampa River Segment 20: All tributaries to the Green River in Colorado, including all wetlands, lakes, and reservoirs, except for specific listings in Segments 21 and 22; all tributaries to the Yampa River from a point immediately below the confluence with the Little Snake River, except the listings in Segments 15 through 18.

The remaining waterbody segments are subject to the State's antidegradation review as it applied to discharge permit holders and 401 certification. Stream classifications and standards for stream segments within the Lower Yampa Basin are included in Appendix D.3.

4.2.3 Lower Yampa River Basin Triennial Review

Every three years, the Commission reviews classifications and standards within each basin. The review process is commonly referred to as the "triennial review". The Upper Colorado was reviewed in 1999 (refer to Appendix E.1). The Lower Colorado classifications and standards have just been reviewed, as discussed in the following paragraphs. Further documentation is included in Appendix E.2.

The WQCC conducted a hearing in Grand Junction, July 9 and 10, 2001, to consider revisions to water quality standards for the Lower Colorado regulations. The Lower Yampa Basin from Elkhead Creek confluence with the Yampa River to the Green River and the Green River Basin in Colorado were part of this rule-making hearing. The significant changes to water quality standards that were adopted by the Commission are summarized as follows:

- Lower Yampa River Segment 3a: Big Gulch. Recreation Class 1a was adopted with a fecal coliform standard of 200 per 100ml and E coli of 126 per 100 ml. Metal standards to protect agricultural uses were also adopted (such as cadmium, chromium, copper, and manganese that could affect livestock drinking water and irrigation use). The mainstem of Big Gulch is now Segment 3f (the tributaries are still Segment 3a).

- Lower Yampa River Segments 3b,c,d,e: Gulches south of Craig, Milk Creek below Thornsburg, Good Spring, Wilson Creek, Temple Gulch, Morgan Gulch, and Lay Creek. Standards to protect aquatic life (small fish and macroinvertebrates) were adopted for these streams. The recreation standards were changed from Class 2 to Class 1b (325 fecal coliform and 205 E coli). Prior standard for Class 2 was 2,000 fecal coliform and 630 E coli.

- Lower Yampa River Segment 5: Fortification Creek. Recreation Class 1a was adopted for the mainstem and Freeman Reservoir (Segment 6b) and Class 1b for other Fortification tributaries. Previously, all Recreation Class 2. Aquatic Life Class 1 Cold adopted for Freeman Reservoir.

- Lower Yampa River Segments 9, 10, 11, 12, and 13: Williams Fork of the Yampa. Previous classification of Recreation 2 for all segments. Recreation Class 1a adopted for East Fork of Williams below USFS land, and for mainstem segments from Pagoda to Hamilton and to Yampa confluence. South Fork of Williams, Beaver Creek, Milk Creek to Thornsburg, and Morapos Creek were classified Recreation 1b. Aldrich Lakes, Segment 12b, classified Recreation 1a.

- Lower Yampa River Segment 14: Tributaries to Yampa below Lay Creek to Green River confluence. Streams within Dinosaur National Monument, some of which have Recreation 1a uses, were moved to Segment 20 and were changed to Recreation 1a. Remaining streams in Segment 14 are still classified as Recreation 2. Agriculture standards were adopted for livestock and/or irrigation use.

- Lower Yampa River/Green River Segments 15, 16, 17, 18 – Little Snake River: Mainstem of Little Snake from headwaters to Yampa was changed from Recreation Class 2 to Class 1a. Tributaries to Little Snake, from headwaters to Fourmile Creek, changed to Recreation Class 1b and aquatic life standards were adopted. Little Snake tributaries below Fourmile Creek to

Yampa, remain Recreation Class 2 with agriculture standards adopted. Slater Creek Basin changed to Recreation 1b from previous Class 2.

- Lower Yampa River/Green River Segment 20: Tributaries to Green River. Streams within Dinosaur National Monument changed to Recreation Class 1a from Class 2. Other streams in this segment not in the Monument are moved to Segment 14 and remain Class 2. Agriculture standards were adopted for Segment 20.

- Lower Yampa River Segment 21: Beaver Creek (Browns Park) changed to Recreation Class 1b from Class 2.

- Lower Yampa River Segment 22 – Vermillion Creek. Seasonal recreation classification from June 1 to August 31 of Class 1b. Recreation Class 2 during the rest of the year.

Regulation No. 37, Classifications and Numeric Standards for Lower Colorado River Basin was revised on October 9, 2001 and became effective on February 20, 2002.

The Colorado Water Quality Control Commission has decided to combine the Upper Colorado standards review and the Lower Colorado (Lower Yampa/Green, White River, and Colorado Basin from Glenwood Springs to stateline) for the next hearing, scheduled for July 2003. The Upper Yampa and Lower Yampa/Green will be part of the same hearing and rule-making revisions in the future. This arrangement is favored by the Yampa 208 watershed plan steering committee.

4.2.4 Recommendations on Water Quality Standards

Water quality standards (including use designations and criteria) for the Yampa River Basin are generally adequate to protect the existing uses under current conditions. During the 1996 208 planning process, however, several specific areas of concern were identified (including consideration of protection of streams and lakes that were of higher quality than required by the existing standards). Since that time, portions of the Elk River in the Mount Zirkel Wilderness have been designated as Outstanding Waters. The Little Snake River, within the National Forest was not reassigned to the High Quality Waters designation, as recommended, since that designation no longer exists.

In addition, the 1996 208 Plan recommended that the State's 305(b) report Designated Use Impairment Table for the Yampa River be revised to reflect the following: Yampa River Segment 2A (Yampa River above Elkhead Creek) is not impacted by metals. The 305(b) report was revised in 2000, and the referenced Table no longer exists.

This *Yampa 208 Plan* makes no specific recommendations with regard to water quality standards. However, the following general recommendations are made:

- Encourage the Commission to review the Yampa Basin in its entirety during the triennial review process. The upper and lower basin are currently reviewed separately (with the upper basin last reviewed in 1999 and the lower basin in 2001). This change has already been decided by the Commission, with the next hearing for the entire basin scheduled for July 2003.

- Work with the State to ensure that sufficient data are provided for sites proposed for reclassification.

- Evaluate stream flow (water quantity), as well as water quality in consideration of reclassification.

- Encourage reclassification if data indicate that streams have been mis-classified, based on actual beneficial uses.

- Assure that adequate water quality data are obtained to determine whether numeric standards for stream segments are met.

- Work with the State to assure that reclassification will not have adverse impact on existing land use, where appropriate BMPs and control technologies are currently being used.

4.3 WATER QUALITY DATA

4.3.1 Introduction

This section outlines water quality data available in the basin. To date, a comprehensive basin-wide water quality database and geographic information system (GIS) are not available for the Yampa River Basin. The primary sources of water quality data for the basin include the following:

- WQCD data from the Upper Colorado standards review in 1999 (Refer to Appendix E.1)
- WQCD data from the Lower Colorado standards review in 2001 (Refer to Appendix E.2)
- WQCD 303(d) List (Refer to Appendix F)
- *Status of Water Quality in Colorado* (305(b) Report – Refer to Appendix G)
- USGS data and studies (Refer to Appendix H.1)
- Water quality data from EPA's STORET database (Refer to Appendix H.2)
- Data from previous 208 plans

In addition, historic evaluations are summarized and reports/data from resource agencies such as USFWS, USFS, BLM, U.S. Bureau of Reclamation, CDOW, Colorado Division of Parks & Recreation, and local agencies such as cities, towns, water conservancy districts, counties, water & sanitation districts are evaluated, as appropriate.

4.3.2 Historic Evaluations

A number of historic water quality evaluations are summarized in the 1996 208 Plan. These include:

- Moran and Wentz (1974): studied acid mine drainage in 18 areas of Colorado. Oak Creek was included to assess coal mine drainage. The report concluded that hardness, lead and manganese concentrations in downstream waters were slightly elevated when compared against upstream concentrations. However, they indicated that additional work in the area was warranted.

- Eddy (1975): in cooperation with the Yampa River Watershed Assessment Program completed an analysis of the effect of point source discharges on Yampa River benthic macroinvertebrate communities during the fall of 1975. The study concluded that there was a marked effect on benthic organism diversity because of point source discharges. There generally was less diversity downstream from a known point source discharge, as compared to a natural stream site. The lowest mean diversity was analyzed downstream from the Steamboat Springs wastewater treatment plant, the KOA Campground, and the Sleepy Bear Trailer Park. It should be noted that the Steamboat Springs Regional Wastewater Treatment Facility was completed in 1981 which consolidated five wastewater treatment plants in the Steamboat Springs area (Mount Werner, Sleepy Bear, KOA, Steamboat Springs and Steamboat II).

- Wentz and Steele (1976): summarized assessment data collected for the Yampa River Basin. The Yampa River Basin assessment project conducted a reconnaissance of 82 stream sites in the watershed during low flow in August - September 1975; 45 sites were in Routt County and the remaining 37 sites were in Moffat County. A quarterly sampling program was carried out at 42 of the 82 stream sites in the watershed.

- Ames (1977): evaluated aquatic insects of the Yampa River as part of a monitoring study completed prior to coal and oil shale development. The conclusions were that the Yampa River supports a diverse and complex aquatic community with species diversity for the Yampa River being relatively high, which indicates a "clean healthy river".

Other researchers have reported on the status of water quality in the Yampa River Basin including:

- The USGS, in cooperation with the Northwest Colorado Council of Governments, prepared the report, *Reconnaissance Evaluation of Surface-Water Quality in Eagle, Grand, Jackson, Pitkin, Routt, and Summit Counties, Colorado* (Britton, 1979).

- Wentz and Steele (1980) prepared a report analyzing stream water quality in the Yampa River Basin.

- The USGS completed the report, *Hydrology of Area 53, Northern Great Plains and Rocky Mountain Coal Provinces, Colorado, Wyoming, and Utah* (Driver, et al., 1984).

- The WQCD summarized water quality information in several of its reports including the *Colorado Nonpoint Source Assessment* (1989).

The majority of data for the Yampa Basin has been collected by the USGS. Data collection started in the upper basin in 1944 at the Yampa River site below Hayden (USGS ID 9244410) and in the lower basin in 1947 at the Yampa River site near Maybell (USGS ID 9251000). The period between the late 1950's and late 1980's was the most active for water quality monitoring. As indicated in the following section, the are currently several USGS stations that are routinely monitored for water quality and additional that are monitored infrequently.

4.3.3 Ongoing Routine Data Collection

Several State and Federal agencies conduct routine monitoring of water quality and stream health in the Yampa Basin. The USGS, as part of the National Water Information System (NWIS) and National Stream Water-Quality Monitoring Network (WQN) programs, routinely collects stream water quality data in the basin. USGS stations on the mainstem Yampa that are currently being routinely monitored include:

- Yampa River at Steamboat Springs (USGS ID 9239500)
- Yampa River below Craig (USGS ID 9247600)
- Yampa River near Maybell (USGS ID 9251000)
- Yampa River at Deer Lodge Park (USGS ID 9260050)

Other mainstem locations that have been recently monitored, or are currently monitored on an infrequent basis by the USGS include:

- Yampa River above Stagecoach Reservoir (USGS ID 9237450)
- Yampa River below Stagecoach Reservoir (USGS ID 9237500)

- Yampa River below diversion near Hayden (USGS ID 9233310)
- Yampa River above Little Snake River near Maybell (USGS ID 9251100)

Tributary stations monitored routinely include:

- Elkhead Creek above Long Gulch near Hayden (USGS ID 9246200)
- Elkhead Creek below Maynard Gulch near Craig (USGS ID 9246400)

Other tributary locations that have been recently monitored, or are currently monitored on an infrequent basis by the USGS include:

- Fish Creek at Upper Station near Steamboat (USGS ID 9238900)
- Foidel Creek at mouth near Oak Creek (USGS ID 9243900)
- Middle Creek near Oak Creek (USGS ID 9243700)
- Elk River above Clark (USGS ID 9240900)
- Elk River at Clark (USGS ID 9241000)
- Elk River near Milner (USGS ID 9242500)
- North Fork Elk River above mouth near Clark (USGS ID 40462106461900)
- English Creek above mouth near Clark (USGS ID 404727106453700)
- Lost Dog Creek above mouth near Clark (USGS ID 404750106454200)
- North Fork Elk River above Trail Creek near Clark (USGS ID 4409500106462700)
- Slater Creek near Slater (USGS ID 9255000)
- Little Snake River near Lily (USGS ID 9260000)
- Little Snake River near Slater (USGS ID 9253000)
- Williams Fork at mouth near Hamilton (USGS ID 9249750)

USGS monitoring stations are shown on Figure 3, *Yampa River Basin USGS Monitoring Stations.* Water quality data collected by the USGS in Routt and Moffat Counties since 1996 is summarized in Appendix H.1.

The WQCD has collected water quality data in the Yampa Basin for over twenty-five years. However, the numbers of sites and monitoring frequencies have changed due to staffing and laboratory budget constraints. In anticipation of the review of state water quality standards by the WQCC for the Lower Yampa, the WQCD monitored over 20 sites on a quarterly to monthly schedule in 1999/2000. For review of standards for the Upper Yampa, the WQCD increased monitoring to 30 sites in 2001/2002 (Appendix E.1), ranging from quarterly to monthly, depending on weather and accessibility. As priorities for water quality data shift to other watersheds in the state, the WQCD will reduce sites but maintain limited coverage. The WQCD has maintained a routine station at Milner on the Yampa mainstem for over twenty years and will continue that station. In addition, special studies are conducted, as dictated by water quality characteristics. For further discussion, refer to Section 4.3.4.

The CDOW's River Watch program, conducted through Routt and Moffat County schools, maintains a number of water quality monitoring stations in the Yampa River watershed. Stations monitored include:

- Yampa River at the Willow Cabin Bridge (South Routt County High School)
- Oak Creek at Habro Bridge (South Routt County High School and Middle School.)
- Oak Creek at Decker Park (South Routt County Middle School)
- Yampa River at Cattle Guard above Stagecoach Reservoir (South Routt County High School)
- Yampa River below Stagecoach Reservoir (South Routt County High School)

Insert Figure 3, *Yampa River Basin USGS Monitoring Locations.*

- Yampa River below Lake Catamount (Steamboat Springs High School)
- Yampa River at Treehaus (Steamboat Springs High School)
- Yampa River at the library (Steamboat Springs High School)
- Yampa River at Hayden - East Bridge (Hayden Middle School)
- Yampa River at Hayden - West Bridge (Hayden Middle School)
- Fortification Creek above Craig (Craig Middle School)
- Fortification Creek below Craig (Craig Middle School)
- Yampa River at the Craig Golf Course (Craig Middle School)
- South Beach at Highway 13 (where it crosses the Highway) (Craig Middle School)
- Williams Fork at Hamilton (Craig Middle School)
- Little Snake at County Road 10 (Craig Middle School)
- Green River Intersection at Swinging Bridge (Craig Middle School)

River Watch data has been collected in the Yampa Basin since 1990. General water quality parameters and nutrient data are collected. The 1999 report summarizing River Watch data in the Yampa Basin is included in Appendix H.3, along with a map indicating the primary monitoring locations (CDOW, 1999). Additional information can be obtained from the CDOW website at www.wildlife.state.co.us/riverwatch/.

The EPA, maintains water quality, biological and physical data for the Yampa River Basin in its STORET database. A search of EPA's STORET website indicated that there are 58 and 79 sites in Routt and Moffat Counties, respectively, for which data has been collected. A data summary of select stations is included in Appendix H.2.

4.3.4 Ongoing Special Projects

In addition to the routine data collection efforts, there are several special data collection projects that are ongoing. These projects are being conducted by various local, State and Federal agencies, as well as non-governmental organizations, including:

- City of Steamboat Springs Yampa River Management Study
- WQCD's Upper Yampa River Nutrient Enrichment Study
- The Nature Conservancy's Baseline Survey of Yampa River Morphology
- USGS Basin-wide pH Study, Selenium Evaluation, and Blowdown Investigation
- CDOW Aquatic Wildlife Management Plan
- Data Collection on Coalbed Methane Projects
- USFS Routt National Forest Blowdown Monitoring and Little Snake River Monitoring

These studies are briefly discussed below.

The City of Steamboat Springs is conducting a study on a four-mile segment of the Yampa River from the mouth of Walton Creek to the County Road 129 Bridge. The objective of the study is to define the physical, biological, and chemical conditions of the river along this reach and to identify policy issues associated with river use. The study is being conducted in cooperation with the Steamboat Springs Trails and River Committee. Field data collection is to include wetland, geomorphic, habitat, fish population, macroinvertebrate, and water quality data. In addition, river use data will be collected and floodplain delineation, land use planning, geomorphic stability, wetlands, vegetation, soils, and critical wildlife habitat will be mapped. Recommendations regarding river health and present and future land use and river use practices will be developed and a river management plan prepared.

The WQCD conducted an investigation of nutrient enrichment in the upper Yampa River during 2001. Nutrient enrichment had been identified as one of the leading causes of water pollution in the United States (WQCD, 2001). Sampling was conducted at 29 sites, and including the mainstem Yampa River and tributaries located between Yampa and State Highway 13 and wastewater treatment plant discharges. It is anticipated that the study will be available in late 2002 or early 2003. The study will present data that will be used for assessing enrichment problems for streams and rivers in the Yampa Basin.

The Nature Conservancy conducted a baseline morphology study of the Yampa River in September 2000 to document present-day morphology of the Morgan Bottoms reach near Hayden, and to allow a frame of reference for direct comparisons against future studies. General river survey methods and analytical techniques were identified. The Nature Conservancy prepared a summary report, which indicates there are both stable and unstable reaches in Morgan Bottom. The report discusses the importance of riparian vegetation and suggests that previous evaluations indicating that the stream was moving towards a braided system were invalid.

The USGS has recently conducted a basin-wide pH study, which has not yet been published. The study was conducted along the Yampa River from Stagecoach to the Green River, and evaluated key locations along 230 river miles. The study noted that there has been a change in pH at Maybell between the 1960s and 1990s from approximately 7.6 to 8.3. The objectives of the study were as follows:

- Evaluate historical water quality data near Maybell
- Determine if the pH change noted was real or the result of sampling/evaluation bias
- Assess potential causes of the increase in river pH
- Project a potential "maximum" pH that might be supported

The study noted that a change in pH monitoring protocol occurred in approximately 1983/84 and that data prior to that was likely suspect. The change in pH noted along the river was attributed to production of algae in the river system, (perhaps resulting from discharge of wastewater effluent and increased nutrient availability). The study indicated that pH was a function of the river alkalinity and pCO_2 (partial pressure of CO_2) and that the variables controlling pCO_2 included photosynthesis, respiration/oxidation, and atmospheric exchange. The study further evaluated diurnal fluctuation of pH along the Yampa River above Elk River and indicated a peak pH during the day at approximately 4:00 pm (period of algae photosynthesis), with pH dropping by 1.15 units during the night (period of algae respiration). The study concluded that algae production in the river has played a major role in river system pH modifications since 1984 and also in diurnal pH fluctuations.

The USGS is also evaluating selenium concentrations in the basin, and in consultation with the USFS, is collecting data associated with the blowdown area on the Routt National Forest, discussed further below.

The CDOW has collected water and aquatic resources data in the basin in the development of the Aquatic Wildlife Management Plan for the Yampa River Basin (CDOW, 1998). The management plan provides guidance and recommendations for protecting the aquatic resource in lakes and streams in the basin. As part of the plan, the CDOW routinely assesses stream and lake habitat and aquatic populations.

There are several active coalbed methane projects in the basin, located in both Routt and Moffat Counties. The project operators are collecting water quality information along tributary streams to develop a database that will be used to assess potential water quality impacts. Concern has been expressed within the Yampa basin regarding the potential impact of such projects on water quality.

The USFS, Routt National Forest, through an agreement with the USGS, is collecting flow and water quality data to document conditions associated with the Routt Divide Blowdown. The blowdown occurred on October 25, 1997 when winds in excess of 120 miles per hour blew from the east over the Continental Divide and downed approximately 13,000 acres of Engelmann spruce and subalpine fir along the western boundary of the Mount Zirkel Wilderness on the Routt National Forest. Since that time, the USFS has initiated a water monitoring program in the Elk River Basin, primarily along the North Fork of the Elk River, through an agreement with the USGS. The cooperative program is funded through 2003 and the USGS is currently evaluating the data collected to date. The USFS is conducting extensive monitoring and research associated with the blowdown, as documented on their website (www.fs.fed.us/r2/mbr/). Erosion control programs conducted by the USFS in the blowdown area, are described in Section 6.5.11.

The USFS has also conducted stream surveys on the Routt National Forest in the Little Snake River Basin since 1998, as discussed further in Section 6.5.11. Surveys were completed on the South Fork of Slater Creek, Silver City Creek, South Fork Little Snake, Johnson Creek, and Oliver Creek. Surveys on the South Fork Little Snake, Johnson Creek, and Oliver Creek consisted primarily of pebble counts and macroinvertebrate samples. Surveys on Silver City Creek and the South Fork Slater Creek have been more intensive and have included pebble counts, channel cross-sections, longitudinal profiles, channel pattern, riparian condition, and soil health. An extensive survey including stream channel, riparian, and soil health surveys have also been conducted on the Middle Fork Little Snake immediately above its confluence with Silver City Creek. The Middle Fork Little Snake was chosen as a reference reach for Silver City Creek. Analysis of the survey data will not be completed until spring of 2003.

4.4 DATA EVALUATION

4.4.1 Introduction

As discussed previously, water quality in the Yampa River watershed is generally considered excellent. Headwaters are generally neutral to slightly acidic in pH and of relatively low alkalinity, indicative of regional Rocky Mountain snowmelt sources. The WQCC designated uses in the basin are generally: aquatic life cold water (Class 1); aquatic life warm water (Class 1 and 2); recreation (Class 1a, 1b, and 2); water supply; and agriculture. As described previously, several Yampa River segments have been designated by the Commission as "Use Protected", indicating that water quality criteria are not consistently met or that the stream segments are subject to significant existing point source discharges. All other stream segments in the watershed are reviewable under the State's antidegradation regulations, except for waters within the Mount Zirkel Wilderness Area, which are designated "Outstanding Waters" and are required to be maintained and protected at their existing water quality.

The data used in this update of the *Yampa 208 Plan* are data collected primarily by the USGS and WQCD. These programs offer relatively long-term water quality data with appropriate quality assurance/quality control. The following discussion focuses on data collected since the adoption of the 1996 208 Plan and describes general basin-wide water quality issues.

4.4.2 Water Quality Discussion

The Yampa river headwaters originate in the high alpine forests of the Flat Tops Wilderness Area. The natural quality of the water is good, with high mountain headwaters generally extremely good. The upper basin has relatively pristine water quality typical of high-elevation cold-water trout streams and portions of the headwaters have been designated as "Outstanding Waters". There are, however, water quality concerns in the basin and lower elevation water bodies in the more arid regions have experienced impacts from naturally occurring salts and accelerated sedimentation. Large portions of

the basin are federally owned lands, with livestock grazing and recreation as predominant land uses. Steamboat Springs, a destination ski resort, is likely to continue to experience population growth for years to come. Routt County has experienced more than a 35% population growth in the past 10 years. Significant coal and oil shale reserves are located in the Yampa watershed and the potential for additional energy resource development may represent a major water quality issue in the future (WQCD, 2000).

While no segments in the basin have been included on the most current 303(d), list a number of segments have been identified on the State's "Monitoring and Evaluation List" by the USFS as potentially subject to excessive sediment deposition. Assessments in these areas have been initiated and will likely continue through 2008 (WQCD, 2000).

The WQCD 305(b) Report (2000) indicated that no water bodies or stream segments in the Yampa basin were found to be in non-attainment of the assigned standards. Review of available data, however, indicated several areas of concern, as described briefly below.

- Dissolved oxygen: Dissolved oxygen (DO), a measurement of the oxygen available to fish and aquatic life, is affected by many factors and varies with elevation, temperature, and depth of sample. It is further influenced by in-stream processes (such as photosynthesis, respiration, decay of organic material, and flow) as well as watershed activities (such as inflows from point and nonpoint sources). Oxygen demanding substances or processes may deplete the oxygen supply necessary for fish and aquatic life. Oxygen levels may show seasonal, as well as diurnal trends. In a number of instances, DO in the Yampa Basin has been reported at concentrations lower than the standard. This has been noted particularly at Stagecoach Reservoir and Steamboat Lake, as discussed further below in Section 4.4.3. Occasional low concentrations have also been noted on the Yampa River downstream of Stagecoach Reservoir, as well as on the Yampa River at Steamboat Springs. Concentrations less than the standard are generally noted during the summer months when stream levels are low and water temperatures relatively high. A recent evaluation conducted by the City of Steamboat Springs (AWC, 2001) indicates that DO levels fluctuate according to seasonal flow and water levels, with concentrations typically greater that 10.0 mg/l in the spring and steadily decreasing concentrations as flow decreases and temperatures rise. A recent USGS study supports these findings and further indicates that diurnal fluctuations may be due to algal photosynthesis/respiration activities (USGS, 2001).

- Iron and/or manganese: Iron and manganese are often found in relatively high concentrations in Colorado streams and are generally indicative of naturally occurring mineralization. Elevated levels of iron and manganese are also possible indicators of runoff from mining operations. These parameters, naturally occurring in many areas within the watershed, have been reported at elevated levels or concentrations exceeding the stream standards at several monitoring locations in the basin including: Yampa River upstream of Stagecoach Reservoir, Yampa River downstream of Stagecoach Reservoir, Oak Creek (just upstream of its confluence with the Yampa River), Yampa River at Steamboat Springs, Elk River near Milner, Lost Dog Creek above mouth near Clark, Trout Creek, Yampa River near Hayden, Elkhead Creek, Little Bear Creek near Craig, Yampa River below Craig, Morapos Creek near Hamilton, Good Spring Creek, Milk Creek, Yampa River near Maybell, Little Snake River downstream of the Colorado/Wyoming border, and Yampa River at Deer Lodge Park.

- Total Dissolved Solids: Total dissolved solids (TDS) provides a general measure of salinity or matter (major ions) dissolved in a water sample. It may used as an indicator of the extent of mineralization or erosional releases in a basin and is often used as a general indicator of water quality. TDS has been reported at elevated concentrations at several locations in the basin

(including Oak Creek upstream of its confluence with the Yampa River and Trout Creek) and may be associated with mining activities in the basin.

- pH: pH is a measurement used to determine the relative acidity of water. In the Yampa River Basin, pH is generally between 6 and 9 standard units. On occasion, however, a pH value less than 6 is measured. High in the watershed, this is typically due to snowmelt conditions in waters of extremely low alkalinity (low buffering capacity). In other situations, it may be indicative of ARD from historic mine sites. Low pH measurements resulting from historic mining activities have been recorded in the Oak Creek drain.

- Sulfate: Sulfate is widely distributed in nature and may be present in natural waters in concentrations up to several thousand mg/l. Mine drainage wastes may contribute high sulfate by virtue of pyrite oxidation (APHA-AWWA-WEF, 1995). Occasional elevated levels or exceedences of sulfate standards have been noted in Elkhead Creek, Yampa River below Craig, Morapos Creek near Hamilton, Yampa River near Maybell, and Little Snake River downstream of the Colorado/Wyoming border.

- Selenium: Selenium, an element occurring naturally in soils, can be bioaccumulated in some organisms and can be toxic at higher concentrations. Selenium has been noted at elevated concentrations in several monitoring locations in the basin, including the following: Yampa upstream of Phippsburg, Elkhead Creek upstream of Long Gulch, Mainstem of Fortification Creek, Good Spring Creek, Milk Creek, Yampa River near Maybell, and Little Snake River downstream of the Colorado/Wyoming border. The USGS is currently conducting an evaluation of selenium concentrations in the Yampa Basin.

- Fecal Coliform: The coliform group consists of several genera of bacteria that belong to the family Enterobacteriaceae. The most common source or "pathway" of fecal coliform in water systems is waste from mammals. Fecal coliforms are indicator organisms that may be associated with wastewater or animal grazing. In the Yampa Basin, coliform can be indicative of effluent from wastewater treatment facilities or grazing animals such as deer, elk, and cattle. Elevated levels of coliform have been detected in several monitoring locations in the valley, including Lost Dog Creek above mouth near Clark, Little Bear Creek near Craig, Morapos Creek near Hamilton, Johnson Gulch, Little Snake River downstream of the Colorado/Wyoming border, and the Yampa River at Deer Lodge Park.

- Sediment: Sediment load is used as an indicator of the extent of erosional release to a stream. Sediment has been described as affecting more river miles than any other pollutant in the nation (WQCD, 1986). Human activities can accelerate natural sediment production, depending on the inherent erodibility of soils. Sediment is also an important consideration in the control of other pollutants (such as nutrients and heavy metals), since it may transport them into the aquatic environment. The USFS has expressed concern regarding potential releases in a number of areas. Several tributary streams upstream of Stagecoach Reservoir, as well as on the Little Snake River on National Forest lands were identified by the USFS for further assessment of sediment, as summarized in Table 4.1, *Colorado 1998 Monitoring and Evaluation List.* In addition, the USFS, in conjunction with the USGS is conducting evaluations of sediment load, as well as general water quality characteristics, in the blowdown area on the Routt-Medicine Bow National Forest

4.4.3 Lakes and Reservoirs

The water quality assessment presented in the WQCD 305(b) Report (2000) indicated a potential problem associated with the DO levels in Stagecoach Reservoir and Steamboat Lake. Stagecoach

Reservoir and the Yampa River below the reservoir were placed on the *Colorado 1998 Monitoring and Evaluation List* (refer to Table 4.1) for further evaluation. Additional monitoring is anticipated after 2001 to further evaluate the problem (WQCD, 2000).

As indicated previously, dissolved oxygen remains a problem in Stagecoach Reservoir (Upper Yampa Segment 2b). The WQCD reported significant blooms of *Aphanizomenon* sp. (a blue-green algae) in 1996. DO concentrations were typically less than 6.0 mg/l. Total phosphorus concentrations ranged from 0.031 mg/l in the epilimnion to 0.14 mg/l in the hypolimnion. Total manganese and sulfide concentrations were slightly elevated in the hypolimnion. The trophic state index for total phosphorus concentrations and secchi disk transparencies indicate that the reservoir is eutrophic, as indicated in Table 4.2, *Trophic Assessment for Monitored Colorado Lakes, 1992-1997*. This classification is consistent with the 1991 assessment of the reservoir.

The WQCD sampled Steamboat Lake in August 1996 and the results also indicated a potential DO issue. Moderate algal blooms of *Aphanizomenon* sp. and *Gloetrichia* sp. were noted. Dissolved oxygen concentrations in the epilimnion were greater than 6.0 mg/l. Below 7 meters, less than 0.7 mg/l of oxygen was available to aquatic life (based on limited sample size). Total recoverable iron and dissolved manganese were elevated in the hypolimnion. Other monitored parameters were less than water quality standards. The trophic state indices for chlorophyll *a* concentrations and secchi disk transparencies indicate that the reservoir is mesotrophic. The trophic state index for total phosphorus concentrations indicates the lake is eutrophic, as shown in Table 4.2. This classification is consistent with the 1991 assessment of the lake.

4.4.4 General Trends

Temporal Trends

A number of temporal trends have been noted in the basin, as reported in the WQCD 305(b) Report (2000) and by the USGS (unpublished, 2001).

In evaluating trends in the basin, the WQCD indicated that, due to lack of data on the Green and Yampa Rivers, trend analysis in the basin relied upon data collected on the White River close to the State boundary, near Rangely. According to the 305(b) Report, forty-six parameters were evaluated for the period of record between 1982 and 1996, with seven showing trends. Many of the parameters evaluated (including most of the metals), however, lacked sufficient data to demonstrate significant trends. The seven parameters showing statistically significant trends include conductivity and the following six nutrients:

- Total $NH_3 + NH_4$
- Total Phosphorus
- Total Kjeldahl Nitrogen
- Dissolved Kjeldahl Nitrogen
- Unionized NH_3-N
- Unionized NH_3 - NH_3

The statistically significant trends were defined as "slight downward" to "downward", indicating improved water quality between 1982 and 1996. The WQCD (2000) indicated that these downward trends may be attributed to improved point source controls, as well as improved agricultural practices over that period of time.

TABLE 4.1
COLORADO 1998 MONITORING AND EVALUATION LIST

WBID	Segment Name	Portion	Basis	Impairment	Additional information
COUCYA02	Yampa R., Bear R. to Elkhead Ck.	Below Stagecoach Res.	Res. Release WQ Data reservoir releases	DO	Additional data needed
COUCYA02	Stagecoach Res.	All	Water Qual. Data	DO	Additional data needed
COUCYA03	All tribs to Yampa R. exc. Specific listings, on USFS land	Beaver Ck.	Assess	Sediment	Identified by USFS
COUCYA03	All tribs to Yampa R. exc. Specific listings, on USFS land	First Ck. in Elkhead Watershed	Assess	Sediment	Identified by USFS
COUCYA03	All tribs to Yampa R. exc. Specific listings, on USFS land	Muddy & Bushy Cks., Morrison Ck. Watershed	Assess	Sediment	Identified by USFS
COUCYA03	All tribs to Yampa R. exc. Specific listings, on USFS land	Puppy Dog Ck. in Fish Cr. Watershed	Assess	Sediment	Identified by USFS
COUCYA03	All tribs to Yampa R. exc. Specific listings, on USFS land	S. Fk. Slater Ck.	Assess	Sediment	Identified by USFS
COUCYA03	All tribs to Yampa R. exc. Specific listings, on USFS land	Spronks Ck., Middle Hunt Cr. Watershed	Assess	Sediment	Identified by USFS
COUCYA19	All tribs to L. Snake R. on NF lands in Routt County	Johnson Ck.	Assess	Sediment	Identified by USFS
COUCYA19	All tribs to L. Snake R. on NF lands in Routt County	Oliver Ck.	Assess	Sediment	Identified by USFS
COUCYA19	All tribs to L. Snake R. on NF lands in Routt County	S. Fk. Little Snake	Assess	Sediment	Identified by USFS
COUCYA19	All tribs to L. Snake R. on NF lands in Routt County	Silver City Ck., U. Mid. Fk. Little Snake Watershed	Assess	Sediment	Identified by USFS

Source: *Status of Water Quality in Colorado – 2000*

TABLE 4.2
TROPHIC ASSESSMENT FOR MONITORED COLORADO LAKES, 1992-1997

Lakes	County	Surface Area	Recreational Uses	Chlorophyll *a* µg/L	ISI Chlorophyll	Total Phosphorous µg/L	ISI Phos.	Secchi Depth (meters)	ISI Secchi Depth (meters)	Estimated Trophic Status	Elevation	Year Assessed
Stagecoach Res.	Routt	780	B,F,S	107	77	46	59	1.5	54	Eutrophic	7160	1996
Steamboat Lake	Routt	1011	B,F,SK,S	5	46	162	78	3.1	44	Eutrophic	8000	1996

Notes 1 B = Boating
F = Fishing
Sk = Skiing
S = Swimming

Source: *Status of Water Quality in Colorado – 2000*

An unpublished USGS study (2001), described previously in Section 4.3.4, noted an upward trend in pH in the basin, using data collected between 1984 and 2000. The study was conducted along the Yampa River from Stagecoach to the Green River, and evaluated key locations along 230 river miles. The study noted that there has been a change in pH at Maybell between the 1960s and 1990s from approximately 7.6 to 8.3, but that data collected prior to 1984 was considered suspect. The change in pH noted along the river was attributed to production of algae in the river system (perhaps resulting from discharge of wastewater effluent and increased nutrient availability). The study concluded that algae production in the river has played a major role in river system pH modifications since 1984.

Spatial Trends

A number of spatial trends have also been noted in the valley, and are currently being investigated by the USGS and the City of Steamboat Springs. General spatial trends are described in the following paragraphs.

As discussed previously, USGS monitors a number of stations along the Yampa River and maintains a database of water quality data. Yampa River and tributary data were retrieved in April 2001 for available data starting in 1996. These data are included in Appendix H-1. In order to assess potential trends, summary statistics for the following 5 stations along the Yampa River were evaluated:

- Yampa River above Stagecoach (USGS 9237450)
- Yampa River at Steamboat Springs (USGS 9239500)
- Yampa River below Craig (USGS 9247600)
- Yampa River near Maybell (USGS 9251000)
- Yampa River at Deer Lodge Park (USGS ID 9260050)

Data for parameters of interest are presented in Table 4.3, *USGS Water Quality Database Summary – Yampa River*. While the data are adequate to evaluate general trends, it should be noted that at several key monitoring locations, only minimal data are available. It should be further noted that monitoring consistency, with regard to frequency and location, is generally lacking in the Yampa Basin (please refer to recommendations summarized below in Section 4.6).

In general, the data are characteristic of a high mountain snowmelt water source as it travels downstream through a naturally mineralized, nutrient rich valley. In addition, data are indicative of a river system progressively traversing through more agricultural and urbanized land uses, with their associated point source and nonpoint source discharges. General trends along the Yampa River include the following:

- Conductivity, alkalinity, and hardness (as measured by calcium and magnesium) generally increase from upstream to downstream; this is particularly evident on the Yampa River below Craig.

- While DO and pH are generally within the acceptable range, relatively low DO and relatively high pH values have been noted along the Yampa River at Steamboat.

- Fecal coliform, in general, has been noted at higher levels at the two stations furthest downstream (Yampa near Maybell and Yampa near Deerlodge Park).

- Nutrient levels (as measured by NH_3, NO_3/NO_2, and P) notably increase at Steamboat and remain elevated through the urbanized/agricultural portions of the valley (through Steamboat, Craig, and Maybell).

TABLE 4.3
USGS WATER QUALITY DATABASE SUMMARY
YAMPA RIVER
MOFFAT AND ROUTT COUNTIES
(1996-1999)

Site		Discharge cfs	Spec Cond us/cm	DO mg/l	pH Field su	Alk mg/l	Fecal Col col/100 ml	NH3 mg/l as N	NO3/NO2 mg/l as N	P (t) mg/l	P (d) mg/l	Ca (d) mg/l	Mg (d) mg/l	SO4 (d) mg/l	Fe (t) ug/l	Fe (d) Ug/l	Mn (t) ug/l	Mn (d) ug/l	Se (t) ug/l	Se (d) ug/l
9237450																				
Above Stagecoach	max	5980	473	9	8.5	29	70	0.085	0.136	0.115	0.051	55	17	92	1672	45	55	29	LD	LD
(1-4 data points)	min	16	94	7.6	7.7	29	7	LD (a)	LD	LD	LD	10	3	10	389	17	44	5	LD	LD
9239500																				
At Steamboat	max	4860	928	11.5	9.3	127	94	0.723	1.134	0.514	0.318	62	26	180	2950	151	133	68	3.7	4.9
(4-17 data points)	min	4	75	6.7	7.5	53	3	LD	LD	LD	LD	8	2	7	89	LD	13	LD	LD	LD
9247600																				
Below Craig	max	11580	1272 (b)	12.7	8.8	196	78	0.636	5.994	0.713	0.518	469	183	333 (b)	6460	97	197	93	3.7	5 (b)
(1-19 data points)	min	3	83	7.5	7.7	54	18	LD	LD	LD	LD	13	4	18	100	97	31	4	LD	LD
9251000																				
Near Maybell	max	14400	1130	12.5	8.8	159	200	0.073	2.269	1.034	0.25	75	52	288	19800	40	507	31	3.6	40
(3-33 data points)	min	10	133	7.1	7.7	54	12	LD	LD	LD	LD	12	3	16	149	LD	45	LD	LD	LD
9260050																				
At Deerlodge Park	max	17600	1140	13	8.8	210	230	0.03	0.7	0.23	0.05	60	35	225	36000	13	850	114	5.7	4.3
(2-18 data points)	min	20	67	7.2	7.4	12	11	LD	LD	LD	LD	14	2	15	115	LD	18	LD	LD	LD

Notes: a: LD = less than the detection limit
B: second high value; first high value considered outlier

- Sulfate, iron and manganese generally increase in concentration from upstream to downstream monitoring sites in the basin.

- The USGS is currently evaluating selenium concentrations in the valley, which tend to increase downstream, with several unusually high concentrations reported on the Yampa River below Craig and near Maybell.

Unpublished USGS data discussed above also indicate that pH increases spatially from upstream to downstream in the Yampa River Basin. The greatest increase was noted along the Yampa River, upstream of the confluence with the Elk River (USGS, 2001).

The City of Steamboat Springs is investigating spatial trends along the Yampa River through town. The data, unpublished to date, will be evaluated for trends along the Yampa River between Walton Creek upstream of town to the County Road 129 bridge downstream of town. Preliminary review of the data appear to indicate the presence of organisms with a greater tolerance for pollution downstream of town. This could be due to a number of factors, including hotspring activity in the area as well as a notable change in the streambed physical characteristics from a cobble streambed to a more sediment-laden streambed.

4.5 WATERSHED INSTREAM FLOWS

Colorado Water Conservation Board's (CWCB) instream flow filings in the upper Yampa River watershed are outlined in Appendix I, *CWCB Instream Flow Filings.*

Colorado statute (CRS 37-92-102(3) recognizes that preserving the natural environment to a reasonable degree, through the protection of instream flows and maintenance of natural lake levels in natural lakes, is a beneficial use of water. Under the same statute, the CWCB is declared the exclusive agent authorized to appropriate water rights for the purpose of preserving the natural environment. It is also stated that the acquisition of the water rights to protect minimum instream flows has to be made within the context of existing water rights appropriation regulations. Minimum instream flows are, therefore, subject to appropriation dates, and the CWCB can only call out water rights junior to their own for maintenance of those flows. Most of the appropriation dates for instream flow filings in the Yampa River watershed are in 1977.

The CWCB appropriation flows, determined in consultation with the CDOW and the Division of Parks and Outdoor Recreation, are the flows necessary "to preserve the natural environment to a reasonable degree" (CRS 37-92-102(3)). The fact that the CWCB has filings for these instream flows does not ensure that stream flows will always exceed the minimum necessary to protect the natural environment, as the water rights associated with these flows have relatively junior appropriation dates. Exercise of water rights that are senior in date to the CWCB instream flow appropriation dates can result in stream flows lower than the CWCB appropriation amount.

A study by the Colorado River Water Conservation District (CRWCD) entitled "Yampa River Basin Alternatives Feasibility Study Final Report" was completed in March 1993. In addition, a Memorandum of Understanding (MOU) between the CRWCD and the CWCB was completed in September 1994 concerning protection of instream flows in the Yampa River for endangered fishes. This MOU discusses the plan to enlarge Elkhead Reservoir from 13,700 acre feet of storage to 44,500 acre feet of storage for "municipal, domestic, agricultural, industrial, and other beneficial human uses and for endangered fish recovery and maintenance flows." While this expansion project was never completed, the CRWCD has been a participant with the USFWS, CWCB, CDOW, and other interested parties on the *Management Plan for the Yampa River Basin.* Under this plan, a smaller expansion of Elkhead is envisioned. The purpose of the plan is to promote recovery of downstream

endangered fishes while allowing current water depletions to continue and an additional increment of depletions to be developed in the future (USFWS, 2001). The plan is a product of extensive discussions and meetings over the past several years and reflects a consensus of a broad cross-section of local property owners; community leaders; municipal, industrial, agricultural, and recreational water users; Federal, State, and local governments; and other stakeholders (USFWS, 2001). The final draft was released in October 2001. Refer to Section 6.5.6 for further discussion of the *Management Plan for the Yampa River Basin.*

4.6 SUMMARY OF RECOMMENDATIONS

Stream Classifications and Standards

- Encourage the WQCC to review the Yampa Basin in its entirety during the triennial review process. The upper and lower basin are currently reviewed separately (with the upper basin last reviewed in 1999 and the lower basin in 2001). As discussed previously, this change has already been decided by the Commission, with the next hearing for the entire basin scheduled for July 2003.

- Work with the State to ensure that sufficient data are provided for sites proposed for reclassification.

- Evaluate stream flow (water quantity), as well as water quality in consideration of reclassification.

- Encourage reclassification if data indicate that streams have been mis-classified, based on actual beneficial uses.

- Assure that adequate water quality data are obtained to determine whether numeric standards for stream segments are met.

- Work with the State to assure that reclassification will not have adverse impact on existing land use, where appropriate BMPs and control technologies are currently being used.

Data Collection/Evaluation

- Investigate potential intergovernmental agreements/vehicles for continued water quality programs and evaluations in the basin.

- Encourage local land use agencies and governmental entities to investigate funding sources (e.g. 319, EPA, Natural Resource Conservation Service [NRCS], CWCB) for water quality evaluations.

- Encourage citizen-based monitoring programs (e.g.- River Watch) and work with interested entities/agencies (Nature Conservancy, NRCS, Colorado State University Extension Center [CSU], CDOW) to promote such programs throughout the community.

- Prepare a comprehensive inventory of sites and compile data for the Yampa River Basin.

- Provide a database/GIS system that is readily available and usable.

- Establish a mechanism to develop and continually update the database/GIS, as new data are collected though continued water quality evaluations and citizen-based monitoring programs.

- Establish a program where data are evaluated on an ongoing basis (in conjunction with monitoring and database maintenance). Evaluate data, indicate trends, and assess information gathered. Include narrative discussions of changes noted in water quality.

- Develop a long-range plan for collecting and assessing data.

- Coordinate monitoring and data compilation/evaluation to avoid duplication of efforts and ensure compatibility of data collected.

- Evaluate nutrient sources in the Upper Yampa and further characterize algae problems in the Yampa from the headwaters through Steamboat Springs, including Stagecoach Reservoir and Lake Catamount. Seek funding and participation from upper basin towns, cities, districts, Routt County, Upper Yampa Water Conservancy District, CRWCD, and State and Federal agencies such as the Colorado Department of Public Health & Environment, CDOW, CWCB, USGS, USFS, and EPA.

5.0 WATER AND WASTEWATER FACILITIES

5.1 INTRODUCTION

This section includes an inventory of public water systems and domestic and industrial wastewater facilities. It also contains recommendations for facility improvements and describes possible cooperative projects. Information pertaining to permitted wastewater treatment facilities and water supplies in the Yampa Basin are included in Appendix J and Appendix K, respectively.

5.2 POINT SOURCE DISCHARGE

A point source discharge can be defined as discharge of water from a discernible, confined, and discrete conveyance, such as a pipe, ditch, channel or conduit, from which pollutants are, or may be discharged. Point sources do not include irrigation return flows. Point sources within the watershed come from three types of sources, which are permitted by the WQCD under the CDPS. These sources are Municipal Dischargers, Industrial Dischargers, and Construction Activities. These are briefly described in the following subsections.

5.2.1 Municipal Dischargers

Municipal wastewater dischargers include both public and private dischargers that treat domestic and commercial wastewater. The general pollutants of concern from these facilities are: metals and ammonia, which are harmful to aquatic life; suspended material (mostly organic wastes), which consume oxygen in the water during decomposition; nutrients, such as nitrogen and phosphorus compounds, which cause algae growth; and pathogens (organisms which cause disease).

The WQCD has authority to permit facilities that discharge over 2,000 gallons per day. Domestic wastewater facility discharge permits are written by the State with EPA oversight. The State defines major municipal wastewater treatment plants as those discharging greater than 1 million gallons per day (MGD). In the area covered by this plan, there are two major municipal wastewater treatment plants (City of Craig and City of Steamboat Springs). Specific municipal dischargers are described in this section, with summary tables presented in Appendix J.

Most individual septic systems discharge less than this amount and are permitted under County regulations, which are required by the State to meet certain minimum State-wide standards.

5.2.2 Industrial Dischargers

Industrial point sources are those discharges generated from manufacturing or production. There are a limited number of industrial dischargers in the basin. They all hold valid discharge permits and they are all operated under the terms of their permits. For the most part, industrial dischargers within the region are mining related, including sand and gravel extraction. Discharges from these facilities are also permitted by the WQCD. Potential pollutants from industrial facilities in our region generally include sediment, heavy metals, and hazardous materials spills and leaks. Specific "major" industrial dischargers are listed in Appendix J. Industrial discharges are permitted by effluent and industry type. Permits are written by the State with EPA oversight.

5.2.3 Construction Activities

Construction activities, which disturb more than five acres of land, are considered to be an industrial activity under the Clean Water Act and require a stormwater discharge permit. As the activity is required to be permitted, it is considered a point source discharge, although the requirements of the

permit are generally BMPs directed towards controlling nonpoint source pollutants and hazardous materials spill prevention. These permits are issued by the WQCD. The potential pollutants of concern are similar to the other industrial pollutants: sediment and hazardous material spills. These permits are listed in Appendix J.

Phase II of the Federal EPA stormwater regulations require municipalities meeting the Phase II criteria (discussed further in Section 6.1.2) to apply for a stormwater permit by March 2003. There will be very few, if any, cities in the Yampa Basin that will be required to obtain a stormwater permit under those rules. However, construction sites of 1 acre in size or greater will be required to have coverage under the general (generic) permit for construction activities, issued by the WQCD, by July 2002. Under Phase I regulations, only construction sites over 5 acres needed coverage of the State permit. In most cases, it will be up to local governments, counties, Federal and State agencies that own/manage land, and private landowners whether they will adopt practices, or whether there are any local requirements, to control nonpoint sources of pollution.

Point sources from construction dewatering activities are also controlled through WQCD's permitting process.

5.3 FACILITY AND MASTER PLANNING

5.3.1 General

Point source issues were extensively evaluated by the WQCD in 1974 as part of the Green River Basin 303(e) Plan. The Green River Basin includes the Yampa River, with Routt County accounting for the headwaters portion. In addition, point sources were evaluated more recently in the 1996 NWCCOG 208 Plan and the 1986 WQCD Region 11 208 Plan. Point source treatment needs, consolidation of wastewater treatment facilities, treatment alternatives, and other related matters were addressed, including the need for expanded wastewater treatment facilities to serve the anticipated recreation and energy development. Since the adoption of the basin plan in 1974 and subsequent 208 Plans, the development of wastewater facilities has generally proceeded in accordance with its recommendations.

State regulations require that planning for wastewater treatment facility expansions be initiated when the plant influent reaches 80 percent of the rated capacity and that construction of new facilities be initiated when the plant influent reaches 95 percent of the rated capacity. Regulations require that facility plans be prepared, in accordance with Section 201 of the Clean Water Act. Facility planning and improvements have been completed for the Hayden, Oak Creek, Steamboat Springs, and Yampa areas (NWCCOG, 1996). These plans have defined the precise treatment mechanisms and locations for wastewater treatment and have implemented the recommendations of the 208 and basin plans. Recent facility plans for Steamboat Springs and Craig are discussed in the following paragraphs.

5.3.2 City of Steamboat Springs Facility Plan

Steamboat Springs Water prepared a Wastewater Facilities Plan in December 1999 (MWE, 1999). The purpose of the plan was to establish a long-range management tool for the wastewater facility. The plan identified necessary improvements to the existing treatment facilities and provided a master plan for implementing future improvements in order to continue to meet the applicable water quality standards and growth needs of the Steamboat Springs community. Improvements to the wastewater treatment facilities were established to meet the present and future needs of the community through the year 2018.

The Facility Plan identified an immediate need to upgrade the existing facilities at the regional wastewater treatment plant. Improvements to the clarifiers completed in 1987, which included the

addition of chemical feed equipment, increased the maximum allowable hydraulic capacity to 3.4 MGD for the months of July through February and 6.0 MGD for March through June. Although the plant has operated well and is in compliance with its effluent requirements, wastewater flows have exceeded 80% of the permitted design capacity. Accordingly, regulations required that the planning process be initiated for expansion of the plant. In addition to the need for increasing hydraulic capacity at the plant, the plant's Site Application established tiered ammonia effluent limits by month and flow rate.

5.3.3 City of Craig Water and Wastewater Master Plan

In May 2000, the City of Craig completed the City of Craig Water and Wastewater Master Plan (RTW, 2000) outlining the water treatment and distribution and wastewater collection and treatment findings and recommendations. The Master Plan Executive Summary is included in Appendix J.4. Key recommendations for the water and wastewater systems include the following:

- Upgrade raw water supply and pretreatment chemical feed systems
- Improve water plant flocculation and sedimentation process
- Install new filters and polymer feed system at water plant
- Initiate wastewater treatment facility studies (odor control, biosolids disposal, disinfection)
- Implement miscellaneous distribution and collection system improvements

The Master Plan indicated that the City of Craig wastewater treatment facility has sufficient capacity to serve projected growth through 2020 and that 201 facility planning is not yet required.

5.4 MUNICIPAL WASTEWATER DISCHARGES

The major point source discharges in the Yampa River watershed include municipal or domestic wastewater treatment plants and industrial discharges. The larger municipal and domestic wastewater treatment plants (greater than 20,000 gallons per day discharge) are listed in Table 5.1, *Yampa River Watershed Domestic Wastewater Treatment Facilities*, along with their CDPS number, and their hydraulic capacity.

TABLE 5.1
YAMPA RIVER WATERSHED DOMESTIC WASTEWATER TREATMENT FACILITIES

CDPS #	Facility Name	Responsible Party	Hydraulic cap., MGD
CO-0040959	Hayden WWTP	Town of Hayden	0.75
COG-584037	Milner WVVTP	Routt Co., for Milner	0.03
CO-0022969	Morrison Creek WWTP	Morrison Creek Metro W&SD	0.35
CO-0041106	Oak Creek WWTP	Town of Oak Creek	0.25
COG-582020	Phippsburg WWTP	Routt Co, for Phippsburg	0.04
CO-0035556	Steamboat Lake	Steamboat Lake SD	
CO-0020834	Steamboat Springs RSA	City of Steamboat Springs	5.0/7.5 (with expansion)
CO-0044695	Timbers WWTP	Timbers W&SD (permit pending)	0.03
CO-0030635	Yampa VVWTP	Town of Yampa	0.11
	Lake Catamount	Lake Catamount #1 Metro Dist.	0.04
COG-581016	Maybell, Moffat County Imp.	Maybell	0.07
CO-0040037	Craig WWTP	City of Craig	2.45

5.4.1 Routt County

Steamboat Springs Regional Wastewater Treatment Facility

The Steamboat Springs regional wastewater treatment facility is currently a 3.4 million gallon per day (MGD) advanced treatment plant with peak capacity of 6.0 MGD. The plant is owned and operated by the city with financial participation by Mount Werner, Steamboat II, Sleepy Bear, Ski Town Camp Ground, and Treehaus. The plant has two permitted discharges: the Yampa River and land application. Ammonia effluent discharge limits have been established on a flow tiered basis to protect aquatic life. Infiltration and inflow has been identified as a problem and the city is pursuing an aggressive I/I reduction program. Biosolids are disposed of through land application.

An expansion and upgrade of the facility is currently under way to increase plant capacity and provide enhanced treatment to comply with the facility's CDPS discharge permit. Expansion includes construction of the following major facilities:

- New mechanical bar screen
- New aerated grit chamber
- Septage receiving station
- New aeration basin
- New clarifiers
- New aerated digestor
- New ultraviolet disinfection facility

Construction is anticipated to be complete in 2002. Final capacity will be 5 MGD dry weather flow and 7.5 MGD wet weather flow.

Lake Catamount #1 Metropolitan District

Lake Catamount #1 Metropolitan District has obtained Site Application approval for a 0.04 MGD hydraulic capacity plant consisting of three aerated lagoons with chlorination, effluent storage and land application, and a lift station and forced main. CDPS Permit #CO-0046051 was issued for this facility. Discharge limits associated with this permit are outlined in Appendix J.

Oak Creek Wastewater Treatment Plant

The Town of Oak Creek wastewater treatment plant is a 0.8 MGD activated sludge/aerated lagoon facility which discharges to Segment 7 of the Yampa River (Oak Creek). A reduced hydraulic capacity of 0.25 MGD is imposed from July through February, to protect the receiving stream from excessive ammonia discharges. A 0.25 MGD activated sludge facility is supplemented by a two celled aerated lagoon, which was built to address excessive infiltration/inflow in the collection system. Instream and effluent ammonia limits have been established, based on Oak Creek's stream standard of 0.05 mg/L (the usual ammonia stream standard is 0.02 mg/L). The effluent is chlorinated and dechlorinated prior to discharge. Biosolids disposal is not an issue, since biosolids are retained in the lagoons. This permit was renewed on June 11, 2001 and expires on July 31, 2006.

Hayden Wastewater Treatment Plant

The Town of Hayden wastewater treatment plant is an aerated lagoon type plant with a design capacity of 0.75 MGD, which discharges to Dry Creek, a tributary to the Yampa River, Segment 12. The effluent is chlorinated and dechlorinated prior to discharge or land application. In 1993 the permit was amended for ammonia limitations based on tiered effluent flows, as a result of a request

from the town. Biosolids disposal is not an issue, due to the lagoon treatment. Town of Hayden permit (CO-0040959) was renewed on March 1, 2001 and expires on February 28, 2006. The discharge is to Dry Creek, but it is very close to the confluence with the Yampa River, so discharge limits are based on standards for Segment 2 of the Yampa. There is an ammonia limit of 22.6 mg/l in November and 30.5 mg/l in December, for discharge point 001A, where the flow is limited to 0.25 MGD. At discharge point 001B, where the discharge flow is limited to 0.75 MGD, the ammonia limits are 7.7 mg/l in November, 10.6 mg/l for January, and 20 mg/l February - April. Monitoring and reporting are required for the other months, but no limits have been established. Fecal coliform limits are 2000/4000 per 100 ml.

Milner Wastewater Treatment Plant

Routt County is the permit holder for the community of Milner's wastewater treatment plant. This plant is an aerated lagoon type plant with a hydraulic capacity of 0.0325 MGD. The effluent is chlorinated prior to discharge to the Yampa River Segment 2a. No ammonia limits have been established for the plant. Biosolids disposal is not an issue, due to the lagoon treatment.

The Milner permit (COG-584037) is a general permit for domestic lagoon systems. Milner was certified to use the general permit as of January 1999. New de-chlorination equipment was installed in 2001. Low flow of the Yampa River in relation to the discharge flow at capacity indicates that secondary treatment for total ammonia is sufficient to meet the un-ionized ammonia standard.

Morrison Creek Wastewater Treatment Plant

Morrison Creek wastewater treatment plant is a mechanical plant with a hydraulic capacity of 0.35 MGD which discharges to Stagecoach Reservoir, Yampa River Segment 2. The facility consists of aeration and reaeration basins, a clarifier, chlorine contact chamber, aerobic digestion, and effluent measuring and recording device. Biosolids disposal has been accomplished in the past through land application.

Morrison Creek Metro Water & Sanitation District permit (CO-0022969) was renewed on September 1, 2000 and expires on August 31, 2005. It includes ammonia limits ranging from 2.3 mg/l for May - November, to 6.7 mg/l in January. Fecal coliform limits are 2172/4344 per 100 ml. Due to low dissolved oxygen measured in Stagecoach and related impact to the Yampa River below the reservoir, Morrison Creek is required to monitor dissolved oxygen in the effluent. They are also required to monitor total phosphorus in the discharge, but there is no standard for phosphorus in the reservoir to require a discharge limit.

Phippsburg Wastewater Treatment Facility

Routt County is the permit holder for the Phippsburg wastewater treatment facility. The plant is a lagoon type wastewater treatment facility with a hydraulic capacity of 0.04 MGD. The facility consists of three aerated lagoons, a polishing pond, chlorinator, and sand filter, prior to discharge into the Little White Snake Creek (Yampa River Segment 4b). No ammonia limits have been established for either the receiving stream or the plant. The plant is currently at approximately 60% capacity, serving 86 domestic and 7 commercial taps. The permit was renewed on July 26, 1999 and expires on July 31, 2004.

Steamboat Lake Sanitation District Wastewater Treatment Facility

Steamboat Lake Sanitation District has a mechanical activated sludge plant with a hydraulic capacity of 0.025 MGD which discharges to an unnamed tributary to the Elk River (Yampa River Segment 11). Steamboat Lake State Park is currently completing a Site Application for a 0.021 MGD two-celled

aerated lagoon non discharging system with land application. A permit for the facility has not yet been issued.

Timbers Wastewater Treatment Facility

The Timbers Water and Sanitation District system consists of a two-celled aerated lagoon, chlorination, unlined effluent storage pond, and a constructed wetland. The effluent pond exfiltrates to groundwater. The hydraulic capacity of the plant is 0.025 MGD. A discharge permit application has been submitted, however, issuance of the permit is pending until facility improvements are made. There are a number of improvements required in the design and operations of the lagoon system. Monitoring wells were installed to monitor water quality, but are in poor condition and the facility discharge has reached McKinnis Creek. The district is small and in need of financial assistance for facility improvements.

Town of Yampa Wastewater Treatment Plant

The Town of Yampa wastewater treatment plant is a 0.105 MGD aerated lagoon facility, which discharges to the Yampa River. The effluent is chlorinated prior to discharge to the Yampa River. Biosolids treatment and disposal is not an issue, since the treatment facility consists of aerated lagoons. The discharge permit was renewed on October 1, 1998 and expires on September 30, 2003. The plant is rated at 0.105 MGD and 285 lbs/day biochemical oxygen demand (BOD). No ammonia limit was established on the discharge, but monthly monitoring/reporting of total ammonia is required, as well as weekly pH and temperature monitoring of the effluent and the Yampa River upstream of the discharge. Using standard, default values for pH and temperature, the ammonia model used by the WQCD indicates that secondary treatment for ammonia (16 mg/l and higher) is sufficient to meet water quality standards. The required four years of pH and temperature data from 1998 - 2002 will provide site-specific data to use in the ammonia model for the next renewal of the permit.

5.4.2 Moffat County

There are only three municipally owned wastewater treatment facilities in Moffat County. These are located in the towns of Craig and Dinosaur and in the unincorporated area of Maybell. The Craig and Maybell facilities have adequate capacity to handle growth that may occur in their respective service areas. The City of Craig has an agreement with Moffat County to serve the projected future service area for the Craig urban influence area. Therefore, no future districts or resultant wastewater facilities will be necessary in the Craig area. The town of Dinosaur operates a non-discharging lagoon system, which also has adequate capacity to handle existing and future growth.

City of Craig Wastewater Treatment Plant

The existing City of Craig wastewater treatment plant is a secondary treatment facility consisting of an extended air oxidation ditch activated sludge process, secondary clarification, chlorine disinfection, and dechlorination. Existing solids handling processes include gravity thickening and biosolids storage and stabilization lagoons (RTW, 2000). The capacity of the plant is limited at 6.6 MGD peak hour flow, which corresponds to a maximum month flow of 2.7 MGD, hydraulic retention time in the chlorine contact basin (RTW, 2000). The rated capacity of the plant is 2.45 MGD.

As discussed previously, State regulations require that planning for treatment facility expansions be initiated when the plant influent reaches 80 percent of the rated capacity and that construction of new facilities be initiated when the plant influent reaches 95 percent of the rated capacity. According the Master Plan (RTW, 2000), the existing plant is adequate to treat the projected 2020 maximum month influent flow of 2.13 MGD (assuming a 1.6 percent annual growth rate) and 2.58 MGD (assuming a

2.5 percent annual growth rate). The limiting process at the plant is the chlorination/dechlorination facility, which has a maximum month capacity of 2.7 MGD. The City of Craig permit renewal (C0-0040037) was effective on August 1, 2001 and expires on July 31, 2006. The design capacity is rated at 2.45 MGD and 5885 lbs. BOD/day. The permit defines water quality-based effluent limits, including monthly ammonia limits ranging from 3.2 mg/l in September to 22 mg/l in March. Fecal coliform limits are 3936/7872 based on a low flow mass balance calculation. There is a condition in the renewal that a salinity study must be done, since monitoring reports indicate that the annual, average increase of TDS from the water intake to the wastewater discharge exceeds 400 mg/l. The study will focus on the feasibility of decreasing the salinity concentration within the Craig water and wastewater system.

Maybell

The Maybell treatment facility (Permit #COG-581016) operates under a General Permit for Lagoons. The Maybell lagoon facility was certified to use the general permit as of November 1999. Discharge is to an unnamed ditch tributary to the Yampa River. The design treatment capacity is .072 MGD and the organic capacity is 285lbs of BOD/day. Treatment includes two aerated lagoons with polishing pond and chlorine contact chamber. A V-notch weir is used for effluent flow measurement. Discharge limits are standard secondary treatment requirements of 30/45 BOD5, 75/110 TSS, 0.5 Total Residual Chlorine, 6000/12000 Fecal coliform, with monthly discharge monitoring and reporting.

Town of Dinosaur

The Town of Dinosaur (Permit #COG-630002) also operates under a General Permit for Lagoons. Dinosaur was certified to use the general permit for small, domestic wastewater lagoons in 1995, and the certification was renewed in November 2001. The facility discharges to groundwater, via seepage from the exfiltration pond. Due to the depth to groundwater and the Mancos Shale, Dinosaur is not required to have a monitoring well. An annual report is required, showing the average flows of the facility, data on influent and effluent quality, operational issues, and the handling/disposal of sludge, if any. Facility capacity is estimated at 0.144 MGD.

5.4.3 Colorado Water Pollution Control Revolving Fund 2002 Project Eligibility List

The Colorado Division of Local Government prepares a 'Sewer Needs List" of cities, towns, special districts, and unincorporated communities that operate and/or manage wastewater systems and have health or safety needs (refer to Appendix J.2). Needs are classified as "A" (immediate needs demonstrated by health hazard, CDPS permit violation, or projections of inadequate capacity within a five-year period) or "B" (longer term or emerging needs. Data for the list were obtained from various sources, including the files and District Engineers at the WQCD, as well as local input. The "Sewer Needs List" for the Yampa Basin was included in the *Draft Yampa 208 Plan*. Since issuance of the draft, however, the WQCD relies upon the *Water Pollution Control Revolving Fund 2002 Project Eligibility List* (refer to Appendix J.2) for a list of planned improvements to wastewater facilities. Table 5.2, *Water Pollution Control Revolving Fund 2002 Project Eligibility List* identifies planned wastewater facility projects in Routt and Moffat Counties.

5.5 INDUSTRIAL DISCHARGES

Industrial discharges in the Yampa River watershed include mines and power generating facilities. These facilities are also covered under the CDPS. Most of the industrial dischargers in the Yampa River watershed are related to sand and gravel or coal mining activities. Industrial dischargers are listed in Appendix J.

TABLE 5.2
WATER POLLUTION CONTROL REVOLVING FUND 2002 PROJECT ELIGIBILITY LIST
ROUTT AND MOFFAT COUNTIES

Project Number	Entity	City	County	Description	Project Cost
08122601	City of Craig	Craig	Moffat	Upgrade collection system to meet flows.	$ 230,000
08113301	Town of Dinosaur	Dinosaur	Moffat	Need flow measurement devise, power supply, and aeration	$ 78,000
08107201	Town of Hayden	Hayden	Routt	I/I problems, upgrade lines and manholes during road repair	$ 153,000
08115901	Morrison Creek Metro	Oak Creek	Routt	Upgrade for ammonia and phosphorus	$ 500,000
08124101	Mount Werner Water and Sanitation District	Steamboat Springs	Routt	Rehab/replace sewer line	$ 250,000
08122001	Town of Oak Creek	Oak Creek	Routt	Compliance problems - ammonia	$ 500,000
08103701	Routt County/Hahn's	Hahn's Peak	Routt	Connect to central system – public health and water quality problems	$1,000,000
08124401	Steamboat Lake Water and Sanitation District	Clark	Routt	Expand/upgrade wastewater treatment facility, repair outfall line	$ 750,000
08095102	City of Steamboat Springs	Steamboat Springs	Routt	Expand wastewater treatment facility and biosolids handling; service Mt. Werner	$4,935,636
08117301	Timbers Water and Sanitation District	Steamboat Springs	Routt	Upgrade wastewater treatment facility	$ 75,000

There had been a concern that air emissions from power generating facilities are impacting water quality in the Mount Zirkel Wilderness Area. Although the power generating facilities are fully meeting their discharge permits, air emissions may have been having an impact on the aquatic environment in the wilderness area, due to the low buffering capacity of the watershed in that area (NWCCOG, 1996). Hayden Power Plant has recently upgraded facility to improve air emissions from the plant and the Craig Power Plant is considering similar upgrades.

5.6 WATER TREATMENT FACILITIES

The WQCD also regulates a number of water treatment facilities in the Yampa Basin. A list of these facilities is included in Appendix K. A "community water system" is defined as a public water system that serves at least 15 service connections used by year-round residents of the area served by the system; or regularly serves at least 25 year-round residents. A "public water system" is defined as a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals (WQCD, 1999)

Primary water treatment facilities in the Yampa Basin, or those serving over a population of 500 (as indicated in the State Inventory of Public Water Supplies in Appendix K), include the following:

- Town of Hayden
- Mt. Werner Water and Sanitation District/City of Steamboat Springs
- Town of Oak Creek
- Stagecoach State Park
- Steamboat II Water and Sanitation District
- Steamboat Ski Corp (Rendezvous)
- Steamboat Ski Corp (Thunderhead)
- Town of Yampa
- City of Craig

The State also maintains a water needs list that outlines community water suppliers having health or safety needs fitting the "A" or "B" criteria (refer to Appendix K.2). Needs are classified as "A" (immediate needs demonstrated by health hazard, Colorado Primary Drinking Water regulation violation, or projections of inadequate supply) or "B" (longer term or emerging needs). The list represents needs developed by the ad hoc Colorado Water/Sewer Needs Committee formed in 1978. The Committee is composed of State agencies normally concerned with water and sewer issues, as well as representatives of the Colorado Municipal League, Special District Association of Colorado, Colorado Counties, Inc., USDA Rural Development, Colorado Rural Water Association, and the Colorado Water Resources and Power Development Authority. The List is coordinated by the Colorado Division of Local Government. Data for the list were obtained from various sources, including the files and District Engineers at the WQCD, as well as local input. The water needs list for the Yampa Basin is included in Table 5.3, *Water Needs List – Routt and Moffat Counties*.

5.7 POINT SOURCE RECOMMENDATIONS

No opportunities for consolidation of water or wastewater facilities were identified in the basin. The following point source recommendations are made:

- Ensure that the recommendations of the facility plans for the Craig wastewater treatment facility and the Steamboat Springs regional facility are implemented. This includes the service area delineations for treatment systems in the areas.

TABLE 5.3
WATER NEEDS LIST – ROUTT AND MOFFAT COUNTIES (NOVEMBER 2000)

Place	County	Funding Needs	Funding Provided	Category	Pub/Priv.	Problem Description	Number of Taps/EQR	Monthly Service Charge Revenue per Tap	MHI	Last Update
City of Craig	Moffat	$6,000,000		B1	Public	Plant upgrade. Replace water lines.	3,800	35.67	31,610	
Town of Dinosaur	Moffat	$75,000	Pending-$15,000	B2	Public	Expecting to need new well. Also need to extend casings on 3 wells above ground level.	171	18.81	26,250	4/01
Town of Hayden	Routt	$3,400,160		B1	Public	Need to upgrade treatment and distribution systems. Project will include the purchase of raw water pumps, clear well, high service pump station, and microfiltration system. Also need to replace 4,250 feet of water mains.	740	25.34	28,482	4/01
Town of Oak Creek	Routt	$1,550,000	IA -$185,000	B1	Public	Need to replace transmission lines, improve storage, install water meters, and upgrade treatment plant and chemical feed system. $185,000 for Parker addition water booster station. Project underway.	450	25.35	19,063	4/01
Steamboat Springs MD#2	Routt	$1,411,500		A3	Public	Planning to build 1 million gallon storage tank in cooperation with the City of Steamboat Springs to improve water pressure. IA app. Pending for $300,000.	253		31,409	4/01
Town of Yampa	Routt	$303,500		B3	Public	Improve Storage.	243		25,357	4/01
Phippsburg	Routt	$5,000		B3	UI	Treatment improvements.	94		31,409	4/97
Routt County - Community of Hahn's Peak	Routt	$500,000		B1	UI	Small lots with individual wells and septics. Wells not producing adequately in summer. Need to build central water treatment and distribution system.	40		31,409	4/99

6.0 NONPOINT SOURCE POLLUTION

6.1 INTRODUCTION

6.1.1 General

This section discusses current sources of nonpoint pollution, using existing information from the Colorado Nonpoint Source Management Program (WQCD, 2000), previous 208 plans, and other available basin information. It includes a brief description of current ordinances and/or criteria used by county and city governments for erosion control and stormwater management, and the BMPs required by agencies on public lands. From this information, recommendations to control nonpoint sources are presented. Relevant excerpts from the Colorado Nonpoint Source Management Program (WQCD, 2000) are included in Appendix L.

The Colorado Nonpoint Source Program is voluntary. The intent is to promote awareness of nonpoint impacts and encourage the use of BMPs, consistent with the management program, referenced above. There are ways to reduce nonpoint source pollution and impacts to water resources from activities such as urban runoff, irrigation practices, animal grazing, feedlots, abandoned/inactive mining sites, and hydrologic modifications. Phase II of the Federal EPA stormwater regulations take effect in 2002, but there will be very few, if any, cities in the Yampa Basin that will be required to get a stormwater permit under those rules. However, construction sites of 1 acre in size or greater will be required to have coverage under the general (generic) permit for construction activities, issued by the WQCD. The previous criteria under Phase I regulations was that only construction sites over 5 acres needed coverage of the State permit. In most cases, it will be up to local governments, counties, Federal and State agencies that own/manage land, and private landowners whether they will adopt practices or whether there are any local requirements to control nonpoint sources of pollution.

6.1.2 Phase II Stormwater Regulations

The Colorado Water Quality Control Commission revised the permit regulations for stormwater in 2001. Municipalities under 10,000 population are generally not required to apply for a stormwater permit, with some exceptions.

If a municipality is located outside of an urban area, but has a population density of 1,000 people per square mile, it can also be considered for coverage under a stormwater permit. If the WQCD determines that a stormwater discharge in the smaller municipalities contributes to a violation of water quality standards or is a significant contributor of pollutants, that entity can be required to apply for the Phase II permit. Factors to be considered in such determination are location of discharge and affected waters and volume and nature of pollutants. This can be done on an areawide or watershed area basis, if it is determined that stormwater controls are needed to comply with wasteload or nonpoint source load allocations that are part of a TMDL requirement.

Where the WQCD determines there is potential for stormwater discharges to impact sensitive waters, high growth or growth potential areas, or significant pollution to State waters, a stormwater permit may be required. Another part of the revised permit regulations provides that, " the Division will place a high priority on evaluating small municipal separate storm sewer systems with a permanent and seasonal population (as determined by the official Census population plus the number of commercially advertised bed accommodations that will allow for overnight stay...) of over 10,000." In the Yampa Valley, this provision provides authority to require a stormwater permit application from Steamboat Springs and the surrounding Mt. Werner resort area, but no determination had been made whether this will be required.

6.2 POTENTIAL BASIN NONPOINT SOURCE IMPACTS

Water pollution that occurs from dispersed or widespread sources is referred to as nonpoint. Nonpoint sources of pollution can be defined as those sources resulting from diffuse sheet flow of stormwater or snowmelt runoff or reduced stream flows. Nonpoint sources include: runoff from mine tailing piles, roads, parking lots, and residential and commercial land uses; irrigation return water and clear-cut areas; failing or inadequate septic systems; and hydrologic modifications. Hydrologic modifications are changes in water quality resultant from reservoirs, releases from reservoirs, or water diversions.

The most common nonpoint source constituents found in the basin are sediment, salinity, nutrients, bacteria, and heavy metals. Runoff from urban areas can contribute all of the above-mentioned constituents, and overland runoff from non-urbanized land will most commonly contribute sediment. As land is disturbed by agricultural or construction activities, the potential for nonpoint source pollution increases. Natural erosion accounts for substantial amounts of sediment, and runoff over highly mineralized soils can contribute metals to surface waters in the basin.

Many land management and soil conservation techniques that have been commonly used in agricultural areas have proven to be effective in controlling erosion and reducing the level of pollutants that reach surface waters. These conservation techniques, called BMPs, have also been applied to construction areas to control sedimentation, in mining operations to avoid excessive leaching and erosion of tailings and waste piles, and in silvicultural and road construction activities to control erosion. BMPs are abatement techniques and must be designed on a site-by-site basis depending on the nature of the soils, the geology and geography, and the nature and extent of land disturbance activities of the area. Local Natural Resource Conservation District (NRCD) representatives are an invaluable source of nonpoint source/erosion control technical assistance.

The State has a Nonpoint Source Management Program approved by the EPA in May of 1989 which is designed to address the problems identified in the State's "Nonpoint Assessment Report" (November 1989). This program has been recently updated by the WQCD in 2000, as presented in "Colorado's Nonpoint Source Management Program" (WQCD, 2000).

The 1986 WQCD 208 Plan for Region 11 and the 1996 NWCCOG 208 Plan for Region 12 identified control of salinity as a primary source of concern in both Region 11 and 12. Salinity issues are primarily associated with the Colorado River Basin, and are further discussed below in Section 6.2.7. In Routt and Moffat Counties, primary concerns include:

- Land use and disturbance
- Inactive mines
- Development
- Recreation
- Hydrologic modifications
- In-basin water usage

These are outlined in the following subsections and policy statements to address these potential sources are described in Section 8.0.

6.2.1 Land Use and Disturbance

Development of land for residential, commercial, agricultural, and industrial use can have significant water quality impacts, especially when viewed cumulatively. Some of the nonpoint source issues related to land development include stormwater runoff, impacts of septic systems, habitat disturbance

and loss, and recreational impacts. There are numerous pollutants, which come from general land use activities. Runoff pollutants include: sediment; nutrients; heavy metals such as zinc, lead, copper, cadmium and nickel; salt; PCBs; pesticides; and petroleum products.

6.2.2 Inactive Mines

Potential impacts associated with mining have been previously discussed and are generally a result of runoff, which comes in contact with mine tailings, waste rock, and other mine wastes. These remnants of mining activities may contain heavy metals, and sulfide products, which form sulfuric acid if exposed to water. Heavy metals are toxic to aquatic life at low concentrations and also act as "stressors" at sub-lethal concentrations. Acidity can also cause mortality and act as a stressor to aquatic life. Standards for pH in surface streams and lakes to protect aquatic life generally range from 6.0 to 9.0 standard units. A number of inactive mine sites have been identified in the watershed and Oak Creek has been impacted by historic activities.

6.2.3 Development

Land development practices can impact water quality through increased pollutant loads, increased runoff (both in quantity and velocity), and wetland and riparian habitat losses, as described below. Pollutants of concern include: sediment, dissolved solids (salt); petroleum compounds, nutrients, and heavy metals.

Development issues follow:

- Stormwater: Stormwater runoff concerns are not only limited to pollutants, but also to timing and quantity of water. Increases in impervious surfaces such as roads, parking lots, houses, etc., result in a greater volume of runoff and rate at which the runoff occurs. This can lead to more flooding, which impacts water quality by increasing sediment and nutrient inputs.

- Septic Systems: Another land use concern is an increase in density and design of septic systems, especially those constructed on marginal sites (poor soils, fractured bedrock, and high groundwater tables). These can lead to increased concentrations of nutrients (phosphorus and nitrate) and potential concern regarding transmission of water-borne pathogens.

- Wetland and Riparian Area Losses: Habitat disturbance and loss, another issue associated with land development, has secondary impacts to water quality. Wetland, riparian, floodplain, and shoreline habitats provide natural filtering of pollutants, floodwater buffering, and shading, which reduces water temperature and algae growth.

- Agriculture and Silviculture (Logging): These activities can cause increased sediment, nutrients, and dissolved solids from associated land disturbance and fertilizer applications. In addition, crop and forage production can be associated with water withdrawals for irrigation, and riparian and wetland disturbance and loss. It should be noted that agricultural BMPs, especially those related to livestock grazing, ranch management practices, and logging are being widely implemented throughout the watershed. The NRCS, BLM, USFS, and ranchers are actively involved in the use of BMPs.

6.2.4 Recreation Impacts

Another issue related to land development is potential recreation impact to water, such as stream bank erosion and lack of proper sanitation facilities. Increased population density generally results in

greater demand for recreational opportunities (often around water), especially in mountain communities. Water quality impacts associated with recreation are usually related to habitat disturbance, which, as previously stated, has secondary impacts. Water diversion for recreational uses, such as irrigation of golf courses and snowmaking can also impact water quality, as a result of runoff and consumptive water use at critical times.

6.2.5 Hydrologic Modifications

The term hydrologic modification refers to the spatial and temporal changes of the movement and circulation of flow of water due to man's actions on the natural environment. Changes to the natural hydrology of a watershed can occur from the construction and operation of reservoirs, diversions, and infiltration galleries. Water quality impacts can include changes in nutrient concentrations, dissolved oxygen, temperature, and turbidity. The State's Nonpoint Source Management Program includes a "Hydrologic Modification Nonpoint Source Management Program" which is intended to identify and develop programs for minimizing adverse nonpoint source water quality impacts associated with hydrologic modifications.

6.2.6 In-Basin Changes in Water Usage

Historically (and currently), the most significant water use in the region has been for irrigation purposes. The USGS report "Estimated Use of Water in Colorado, 1985" (USGS, 1989) estimated that approximately 950 MGD were used in our region for irrigation. The next highest usage was hydropower generation at approximately 500 MGD. Domestic and commercial usage was estimated to be approximately 12 and 5 MGD, respectively.

As indicated previously, water use can result in water quality impacts caused by reductions in stream flows. The principal consumptive uses in the region are: agricultural (irrigation and stock watering); domestic and municipal; snowmaking; and reservoir evaporation. Generally, water used for domestic or agricultural purposes is not fully consumed; some portion of the diverted water remains as "wastewater" or "return flow" which is directed back to a stream. For domestic use, the consumptive use is generally 10% of the diverted volume. For snowmaking, the consumptive use is generally considered 20-25% of the diverted volume and water is usually applied at a rate of one acre-foot per acre of terrain (Colorado Ski Country USA). Agricultural return flows are quite variable, but can range from 20 to 60% in consumptive use.

As the region becomes more developed, changes in land use from agricultural use to more urban use will likely result in corresponding changes in water usage in the basin, as outlined below.

- Municipal and Domestic Usage: Municipal water consumption is much less than that of agriculture. In other words, as water use shifts to municipal use, more of the water used is returned to the stream.

- Industrial Usage: Industrial use of water refers to the use of water for purposes of producing or processing non-agricultural products or services for sale, such as manufacturing, mining, milling, land reclamation, golf course irrigation, snowmaking, and non-hydroelectric power generation. The water quality concerns associated with snowmaking are generally the removal of water from streams during low flow periods. Snowmaking studies have indicated that the spring peak runoff is extended in time as a result of snowmaking activities, but that runoff rates are not increased.

In the Yampa Basin, most of the stream flow results from snowmelt, which is greatest during May, June, and July. There are two critical periods of low stream flows: late summer, and early to mid

winter. The late summer period coincides with higher stream temperatures, which can stress cold water fish. The winter period, especially December, can coincide with snow making water demands.

6.2.7 Colorado River Basin Salinity

The Colorado River Basin Salinity Control Program is designed to reduce salt loadings to the Colorado River Basin in order to maintain standards established in 1972. Both the US Department of Agriculture and Department of the Interior are involved in programs designed to control nonpoint sources of salt loading. State participation in the salinity control program is coordinated through the water quality management planning process for nonpoint sources and the CDPS permit program for point sources. The Colorado River Basin Salinity Control Forum provides a forum for the various basins to coordinate their activities, and provide guidance to the Federal agencies.

While salinity is of major concern in the Colorado River Basin, it has not, to date, been a major issue in the Yampa Basin. Recent concern, however, has been expressed over several coal bed methane projects in the basin and their potential impact on water quality and salinity. Monitoring within the basin will continue to assure that salinity (as measured by TDS) does not become a basin issue.

6.3 YAMPA BASIN NONPOINT SOURCE ISSUES

Colorado's Nonpoint Source Management Program and previous 208 planning efforts in the basin have identified nonpoint source issues most relevant to the Yampa River. The major nonpoint source activities in the Yampa River watershed that have the potential to impact water quality include: mining; urban and construction activities; hydrologic modifications; agriculture; and recreation. A brief discussion of these activities in the Yampa Basin follows:

- Historic Mining Activities: Excessive trace element concentrations have been documented in the Oak Creek Drain as a result of drainage from historic mining activities. Another area in the watershed which has been identified as fairly mineralized due to mining activities and natural geology is the Fish Creek drainage south of Milner.

- Urban and Construction Activities: Urban and construction activities have been documented as impacting water quality (including snow storage adjacent to water features, stormwater runoff, etc.). The pollutants of concern include: sediment; nutrients; heavy metals; petroleum and organic compounds, and salts. Although data specific to urbanized areas in Routt County are limited, appropriate data collected in other watersheds within the region (e.g. Blue and Eagle River watersheds) has shown water quality impacts as a result of urban and construction activities. National studies indicate that to the extent land area in a watershed is urbanized, with increasing impervious surface and lack of stormwater mitigation measures, water quality is adversely impacted.

- Hydrologic Modifications: As discussed previously, hydrologic modifications can impact water quality through changing chemical, physical, or biological characteristics of the waterbody. Eutrophication has been reported in both Stagecoach Reservoir and Steamboat Lake (refer to Section 4.4.3). In the Yampa River watershed, however, some hydrologic modifications have also been reported to improve water quality by enhancing late summer instream flows and decreasing sediment loads through settling in reservoirs. Additional storage opportunities are currently being evaluated in the basin as part of the *Management Plan for the Yampa River Basin,* discussed further in Section 6.5.6. The purpose of the plan is to promote recovery of its endangered fishes while allowing current water depletions to continue and an additional increment of depletions to be developed in the future (USFWS, 2001). In addition, the Yampa River watershed has not experienced the transbasin water

diversions, and associated issues, experienced in the Blue, Eagle, Roaring Fork, and upper Colorado River watershed.

- Agriculture: Water quality in the Yampa Basin may be impacted by agricultural activities, including grazing and crop production. These impacts are generally related to increased concentrations of nutrients and suspended and dissolved solids in the water. Standard BMPs to protect or improve stream function on grazing lands are to evaluate fencing and stock watering practices to reduce impacts on riparian areas and make use of upland grazing forage, where appropriate. Standard BMPs for crop production are to evaluate irrigation practices to use water as efficiently as practical, which tends to reduce suspended solids and nutrient transport to ditches and streams.

- Recreational Activities: Recreational activities can impact water quality, both directly and indirectly. Habitat disturbance, increased water diversion demands, as well as pollutant runoff from golf courses and parks can impact water quality. Increasing use of trails by mountain bikes, hiking, and all terrain vehicles has resulted in increased soil erosion in some areas. As stated previously, water quality concerns associated with snowmaking are generally related to the removal of water from streams during low flow periods.

6.4 GROUNDWATER ISSUES

In our region, groundwater has not received the attention that surface waters receive, although there are a number of community groundwater supply systems in the basin (WQCD, Colorado Wellhead Program, 1994). Consistent with the requirements of the Safe Drinking Water Act, data are collected by water providers relying on groundwater as a supply of potable water. Further data collection, evaluation, and compilation regarding groundwater quality and quantity would assist in future basin 208 planning efforts.

6.5 ONGOING WATERSHED IMPROVEMENT PROJECTS

Watershed improvement projects undertaken in the Yampa River watershed are briefly described in this section.

6.5.1 Steamboat Springs Projects

The City of Steamboat Springs and the NWCCOG developed a Water Conservation Model with the financial and staff assistance of the CWCB. This model was developed to assist water and sanitation providers develop water conservation programs, through the evaluation of various water conservation techniques and program costs versus the cost of developing additional facilities to provide the needed services. This model uses the providers own data on their systems in projecting the cost of water conservation programs versus the cost of developing additional facilities to meet the expanding needs.

In the 1990s, the City of Steamboat Springs conducted a water conservation program. It included a progressive rate structure; free home water efficiency audits including installation of free low volume showerheads and faucet aerators; $100 rebates for replacement of high volume toilets with low volume toilets; summer water efficiency seminars; xeriscaping contest; and xeriscaping demonstration garden. The program ended in approximately 1998 and there are no estimates available of demand reduction through the program.

As discussed previously in Section 4.3.4, The City of Steamboat Springs is conducting a study on a four-mile segment of the Yampa River from the mouth of Walton Creek to the County Road 129 Bridge. The objective of the study is to define the physical, biological, and chemical conditions of the

river along this reach and to identify policy issues associated with river use. The study is being conducted in cooperation with the Steamboat Springs Trails and River Committee. Field data collection in 2001 is to include wetland, geomorphic, habitat, fish population, macroinvertebrate, and water quality data. In addition, river use data will be collected and floodplain delineation, land use planning, geomorphic stability, wetlands, vegetation, soils, and critical wildlife habitat will be mapped. Recommendations regarding river health, present and future land use, and river use practices will be developed with the ultimate goal of adopting a river management plan. A brief project overview is included in Appendix M.

The City of Steamboat Springs has also developed a stormwater management program. All new developments within city limits must obtain development permits through the Planning Department. Since March 2000, permit applications have required submittal of a Construction Site Management Plan that must, at a minimum, include a site Drainage Plan and an Erosion and Sediment Control Plan. These plans must identify all on-site or adjacent water channels, describe erosion control plans or measures that will be taken to protect on-site and adjacent waterways and how the plan will be implemented for both construction and post-construction phases of development. Planning Department staff are charged with monitoring compliance with the plan through on-site inspections and have clearly defined enforcement powers including issuance of citations and stop-work orders. Regulations are codified in Section 5-2 of the Steamboat Springs Uniform Administrative Code as amended in March 2000.

6.5.2 City of Craig Projects

The City of Craig has several ongoing programs that are protective of water quality in the Yampa Basin. The City intends to continue with these practices, as follows:

- Continue used oil recycling program
- Continue to accept septic tank wastes at the wastewater treatment facility
- Continue with storm drainage improvements
- Continue with stream setback requirements

6.5.3 Routt County Projects

Routt County has been pro-active in addressing water quality issues in the upper basin. In July 1996, the Routt County Board of Commissioners adopted a resolution amending the Routt County Zoning Resolution to establish waterbody setback regulations. The resolution regulates construction within fifty feet of perennial and intermittent rivers, streams, lakes, reservoirs, and ponds in the county. The objectives of the setbacks are to:

- Provide adequate buffers around water bodies to protect water quality and reduce adverse impacts to wildlife habitat and visual quality surrounding such water bodies, thereby protecting the health, safety, and welfare of the inhabitants of Routt County;

- Avoid sedimentation, flood, and runoff impacts to private property resulting from development activity in and around water bodies; and

- Provide for the protection of water bodies by avoiding development activity in and around water bodies whenever possible, and minimizing the impacts of unavoidable development activity in and around water bodies.

A copy of the setback resolution is included in Appendix N.

Routt County also prepared the *Guide to Water Quality Protection and Erosion Control,* included in Appendix L.2. The guide presents principles of erosion and sediment control, discusses site planning, and describes BMPs for erosion and sediment control. In addition, the guide provides references on where contractors and interested parties can get assistance locally.

Routt County, in conjunction with the City of Steamboat Springs prepared an erosion control policy and BMP Manual, *Erosion and Sediment Control During Construction,* in response to Phase II Stormwater regulations. The manual is available through the city and county and a copy is included in Appendix N.

6.5.4 Moffat County Projects

Moffat County has been in the process of updating their 1994 Land Use Policy Statement. As part of this process, the Moffat County Land Use Plan - Chapter One: Public Lands, was adopted by the Moffat County Commissioners in September 2001. Chapter One of the Land Use Plan defines Moffat County's custom and culture, economics, multiple use, access, agriculture, cultural and archeological resources, law enforcement, minerals and industry, recreation and tourism, special land designations, weed management, and vegetation and wildlife. This Land Use Plan is meant to be a continually evolving document so it may address the current and future needs of the citizens and land users of Moffat County, Colorado.

In addition, the Moffat County Land Use Board and Moffat County Commissioners are currently prioritizing projects that have been identified as important in the community. These projects, which may directly or indirectly affect water quality include:

- Recreation: Moffat County has identified the need to investigate methods to determine appropriate carrying capacities for popular recreation activities in the County.

- Water Resources: Results from the Colorado River District Small Reservoir Study are supported by Moffat County on Federal, State and private lands. In addition, Moffat County supports the expansion of Elkhead Reservoir for increasing options for recreation, industry, municipal, and economic opportunities, as well as providing additional water to the endangered fish species.

- Vegetation: Moffat County supports identifying Desired Plant Communities for area within Moffat County.

Also, during the development review process, County staff assure that proposed developments are consistent with land use codes and planning documents, including those provisions that minimize erosion.

6.5.5 WQCD Projects

The WQCD is currently conducting an investigation of nutrient enrichment in the upper Yampa River during 2001. Nutrient enrichment has been identified as one of the leading causes of water pollution in the United States (WQCD, 2001). The study will generate data that will be used for assessing enrichment problems for streams and rivers in the Yampa Basin. Sampling will occur at 29 sites, and will include mainstem Yampa River and tributaries locations between Yampa and State Highway 13 and wastewater treatment plant discharges. The study work plan is included in Appendix O. It is anticipated that a report documenting the findings of this evaluation will be available in late 2002 or early 2003.

6.5.6 U.S. Fish and Wildlife Service

The USFWS, in participation with the CRWCD, CWCB, CDOW, and other interested parties has prepared the final draft *Management Plan for the Yampa River Basin* to promote recovery of its endangered fishes while allowing current water depletions to continue and an additional increment of depletions to be developed in the future (USFWS, 2001). The plan is a product of extensive discussions and meetings over the past several years and reflects a consensus of a broad cross-section of local property owners; community leaders; municipal, industrial, agricultural, and recreational water users; Federal, State, and local governments; and other stakeholders (USFWS, 2001).

The plan supports recovery of the downstream endangered fishes (Colorado pikeminnow, humpback chub, bonytail, and razorback sucker) while allowing for current depletions from the Yampa River Basin to continue to serve existing human needs in Colorado and Wyoming. In addition, it allows for an additional increment of depletions to be developed to meet future human needs through the year 2045. The plan further accomplishes the following:

- Quantifies current and projected future depletions;
- Describes measures to preserve the natural ecosystem as current depletions continue and future depletions are developed;
- Identifies specific actions to be taken to promote recovery of the listed species; and,
- Specifies criteria by which to measure the success of the recovery actions (USFWS, 2001).

In order to implement the plan, the USFWS will sign a Cooperative Agreement with the States of Colorado and Wyoming and will initiate consultation pursuant to Section 7 of the Endangered Species Act. The product of this consultation is anticipated to be a Programmatic Biological Opinion for the Yampa River Basin considering the impacts to listed species, including the downstream endangered fish species (USFWS, 2001). Refer to Appendix P for further details.

6.5.7 CDOW

The CDOW River Watch program is active in the Yampa Basin, as described previously in Section 4.3.3. Data have been collected in the Yampa Basin since 1990. General water quality parameters and nutrient data are collected. The 1999 report summarizing River Watch data in the Yampa Basin is included in Appendix H.3, along with a map indicating the primary monitoring locations (CDOW, 1999). Additional information can be obtained from the CDOW website at www.wildlife.state.co.us/riverwatch/.

The CDOW has also collected water and aquatic resources data in the basin in the development of the Aquatic Wildlife Management Plan for the Yampa River Basin (CDOW, 1998). The management plan (refer to Appendix P) provides guidance and recommendations for protecting the aquatic resource in lakes and streams in the basin. As part of the plan, the CDOW routinely assesses stream and lake habitat and aquatic populations.

6.5.8 Colorado River Water Conservation District

As indicated previously, the CRWCD has been working with the USFWS in preparation of the *Management Plan for the Yampa River Basin* described previously in Section 6.5.6. In addition, the CRWCD prepared a small reservoir study for the basin to investigate additional multi-purpose small storage alternatives for the valley and for consideration in the Management Plan.

The CRWCD is also preparing a basin-wide GIS system, which they hope to make available to the public through the internet. Future plans include the potential to link available water quality databases to the system.

6.5.9 USGS Projects

In addition to its routine water quality monitoring in the basin, the USGS has conducted a number of specific basin studies. As discussed previously in Section 4.3.4, the USGS has recently conducted a basin-wide pH study, which has not yet been published. The study was conducted along the Yampa River from Stagecoach to the Green River, and evaluated key locations along 230 river miles. The study noted that there has been a change in pH at Maybell between the 1960s and 1990s from approximately 7.6 to 8.3. Refer to Section 4.3.4 for further discussion and Appendix Q for copies of several previous USGS studies in the basin.

The USGS is also evaluating selenium concentrations in the basin, and in consultation with the USFS, is collecting data associated with the blowdown area on the Routt National Forest, discussed further below.

6.5.10 NRCS Projects

The NRCS monitors area-wide precipitation and snowpack and evaluates soil and erosion-related issues. They provide information regarding the use of BMPs and implement vegetation planting and erosion control programs.

6.5.11 U.S. Forest Service/BLM

Both the USFS and BLM maintain land use management plans that encourage the use of BMPs to maintain water quality. In addition, Environmental Impact Statements (EISs) or Environmental Assessments (EAs) are prepared to disclose site-specific impacts associated with development projects on lands under their jurisdiction. Mitigation and management strategies are also included in the EIS and EA documents.

As discussed previously in Section 4.3.4, the USFS, through an agreement with the USGS, is collecting flow and water quality data to document conditions associated with the Routt Divide Blowdown. The water monitoring program in the Elk River Basin is funded through 2003 and the USGS is currently evaluating the data collected to date. In addition to water monitoring activities, the USFS is implementing extensive erosion control BMPs in the area, including erosion control bridges, berms, and tree replanting. The USFS has also developed several permanent stream cross-sections to serve as a baseline for conducting future stream evaluations and has hired additional employees and graduate students to conduct soil and watershed improvement projects and investigations. Further information regarding the blowdown is documented on their website (www.fs.fed.us/r2/mbr/).

In addition, the USFS has recommended to the WQCD that a number of Yampa Basin stream segments be monitored, as indicated in Table 4.1, *Colorado 1998 Monitoring and Evaluation List*. The primary constituent of concern to the USFS on these segments is sediment. The *Colorado 1998 Monitoring and Evaluation List* identified five segments on the Routt National Forest in the Little Snake River Basin that may potentially be impaired for sediment. These stream reaches were among the list of reaches identified as degraded during the 1997 USFS Regional Watershed Reconnaissance effort. The Regional Office (USFS Region 2) forwarded the list of degraded segments to the State; from this list the State selected the five streams reaches in the Little Snake River Basin.

The State places streams on the Monitoring and Evaluation list in which there are reasons to suspect water quality problems, but uncertainty exists regarding one or more factors. The Routt National

Forest initiated a monitoring program in 1998 to evaluate these identified segments to determine if they should be placed on the 303(d) list for impairment, or removed from the monitoring and evaluation list.

Since 1998, stream surveys have been conducted on the South Fork of Slater Creek, Silver City Creek, South Fork Little Snake, Johnson Creek, and Oliver Creek. Surveys on the South Fork Little Snake, Johnson Creek, and Oliver Creek consist primarily of pebble counts and macroinvertebrate samples. Surveys on Silver City Creek and the South Fork Slater Creek have been more intensive and have included pebble counts, channel cross-sections, longitudinal profiles, channel pattern, riparian condition, and soil health. An extensive survey including stream channel, riparian, and soil health surveys have also been conducted on the Middle Fork Little Snake immediately above its confluence with Silver City Creek. The Middle Fork Little Snake was chosen as a reference reach for Silver City Creek. Analysis of the survey data will not be completed until spring of 2003.

6.5.12 CSU Extension Programs

The CSU Extension Offices maintain active programs to assist the local ranching and agricultural communities, as well as the general public with questions and concerns pertaining to land use, erosion control, and noxious weed control.

6.5.13 Colorado Cattlemen's Association

An education project has been developed by the Colorado Cattleman's Association which focuses on the relationship between cattle producers, grazing practices, and water quality. Funds have been awarded by the EPA Region VIII from Section 319 of the Clean Water Act, Nonpoint Source Grant Program, to the Department of Public Health and Environment, which administers these funds. The grant to Colorado Cattleman's is $94,358, with an in-kind matching requirement of $62,912. This education project will commence in 2001 and be completed in 2003.

The 319 project will distribute articles about water quality and cattle production to target audiences, develop a water quality guide book, offer assistance in identifying BMPs, and organize several outreach events. The goal of the project is to improve the awareness and level of watershed stewardship in Western Colorado in cattle producing areas. Information will be available from local cattlemen and stockgrower groups and resource agency offices on the Western Slope.

6.5.14 Nature Conservancy

The Nature Conservancy has recently completed a survey of the Yampa River morphology on the Morgan Bottoms Ranch in Routt County. The study, further discussed in Section 4.3.4 and included in Appendix R, serves as a baseline against which future conditions can be compared.

6.5.15 National Park Service – Dinosaur National Monument

The National Park Service provides educational opportunities to the general public to promote understanding of the delicate ecosystem at Dinosaur National Monument. In addition, the Park Service is actively involved in the evaluation of sediment impacts on the river ecosystem through the park. Their research reportedly indicates that "natural" sediment deposition may be necessary for sustained health of the ecosystem. This "natural" sedimentation, however, is differentiated from sedimentation associated with large land disturbance and construction activities.

6.5.16 Yampa Valley Legacy Education Initiative

This educational program gives students from kindergarten age through high school in the Steamboat, South Routt, Hayden and Craig school districts opportunities to participate in a wide variety of activities designed to expose them to river ecology and management issues. Volunteers from a variety of agencies and organizations concerned with the ecological health of the Yampa River work with school groups to implement field study programs, provide internships on conservation properties or projects, and provide a place-based science education camp. The intent of this program is to foster in Yampa Valley students an understanding of scientific concepts, familiarity with the cultural and ecological heritage of the valley and sense of stewardship toward the Yampa River and its tributaries.

6.5.17 Yampa River Basin Partnership

The Yampa River Basin Partnership, a group composed of Federal, State, and local officials; businesses; nonprofit organizations; and local citizens has been established to start basin-wide cooperative communication, planning and project implementation. Water quality and water rights are the priorities of this group and they are currently actively involved in this 208 planning effort, as well as the Yampa River Endangered Fish Recovery and Water Management Plan. The Mission Statement encompasses the group's goal of "working with the citizens of the Yampa Basin to balance the natural resources and social issues to protect and enhance our quality of life through open communication, education, and coordination of efforts". The group meets quarterly to discuss water quality and water resource issues and to keep members updated on ongoing Yampa Basin projects.

6.6 NONPOINT SOURCE RECOMMENDATIONS

6.6.1 General Nonpoint Source Recommendations

Recommendations to reduce nonpoint source pollution in the basin include the following:

- Look for opportunities to incorporate environmental stewardship with land-use activities.
- Encourage that stream restoration be incorporated in land-use/construction projects.
- Incorporate water quality protection features (BMPs) into new development/review process.
- Discourage storage of hazardous materials in floodplain.
- If a government entity is party to a stream diversion, consider potential impacts to in-stream flow.
- Consider the economic impact of activities affecting streamflow.
- Encourage basin-wide water conservation efforts.
- Consider desire to balance area "customs and culture" (agriculture, mining, recreation, etc.) with water quality, streamflow, and economic stability.
- Work with the State to assure that reclassification will not have adverse impact on existing land use, where appropriate BMPs and control technologies are currently being used.
- Encourage the balance between existing practices and standards - with implementation of appropriate BMPs and control technologies.

- Continue to address urban and construction water quality impacts through public education and local land use programs, and through the continued efforts of Routt and Moffat Counties and the Yampa River Basin Partnership.

- Continue to address agricultural BMPs through the NRCS, BLM, local Stock Growers Association, and other appropriate groups. Funding for these types of projects can be pursued through the State's Section 319 Nonpoint Source Grant Program.

- Continue local nonpoint source water quality improvement projects.

6.6.2 Monitoring Recommendations

Monitoring recommendations include the following:

- Investigate potential intergovernmental agreements/vehicles for continued water quality programs and evaluations in the basin.

- Encourage local land use agencies and governmental entities to investigate funding sources (e.g. 319, EPA, NRCS, CWCB) for water quality evaluations.

- Encourage citizen-based monitoring programs (e.g.- River Watch) and work with interested entities/agencies (Nature Conservancy, NRCS, CSU, CDOW) to promote such programs throughout the community.

- Prepare a comprehensive inventory of sites and compile data for the Yampa River Basin.

- Provide a database/GIS system that is readily available and usable.

- Establish a mechanism to develop and continually update the database/GIS, as new data are collected though continued water quality evaluations and citizen-based monitoring programs.

- Establish a program where data are evaluated on an ongoing basis (in conjunction with monitoring and database maintenance). Evaluate data, indicate trends, and assess information gathered. Include narrative discussions of changes noted in water quality.

- Develop a long-range plan for collecting and assessing data.

- Coordinate monitoring and data compilation/evaluation to avoid duplication of efforts and ensure compatibility of data collection.

- Evaluate nutrient sources in the Upper Yampa and further characterize algae problems in the Yampa from the headwaters through Steamboat Springs, including Stagecoach Reservoir and Lake Catamount. Seek funding and participation from upper basin towns, cities, districts, Routt County, Upper Yampa Water Conservancy District, CRWCD, and State and Federal agencies such as the Colorado Department of Public Health & Environment, CDOW, Water Conservation Board, USGS, USFS, and EPA.

7.0 WATER QUALITY MANAGEMENT DESIGNATIONS

7.1 INTRODUCTION

All 208 plans are required by Federal regulations and the Colorado Continuing Planning Process to have "management agencies" designated as taking responsibility for implementing the plan. For example, a town or city that has a wastewater treatment facility is required to comply with the limits and conditions specified in their discharge permit. Since a town or city also has the capability to make land use decisions (i.e. how many residential or commercial units can be approved while staying within the wastewater facility capacity), they are considered a "management agency" for their point source discharge. They would also be considered a management agency for the nonpoint source pollution within their boundaries (construction runoff and stormwater), since the controls, or lack of required controls, is part of the land use approval process. Similarly, the USFS is a management agency for the lands they own and are responsible for seeing that BMPs are implemented to control pollution from activities on their land, such as silviculture, grazing leases, recreation, and water supply.

An "operating agency" is an entity that has responsibility for operating a facility to control pollution but does not have land use authority. A typical example would be a water and sanitation district, which controls the treatment facility but does not approve land use. Such an entity would be deemed an operating agency, with the management agency designation given to the town, city or county that has land use jurisdiction for the service area of that special district.

Designating management and operating agencies to carry out the recommendations and on-going responsibilities of the 208 watershed plan is the purview of the planning agency. For the purposes of this planning effort, the WQCD and the Yampa River Basin Partnership will determine the designations, in cooperation with the affected interests and entities in the Yampa Basin. A table showing proposed management and operating responsibilities is included in this section.

This section describes basin management systems, programs, and organizations and evaluates potential environmental, social, and economic impacts associated with plan implementation. Much of the discussion in this section is derived from the 1996 208 Plan (NWCCOG, 1996).

7.2 MANAGEMENT SYSTEMS, PROGRAMS, AND ORGANIZATIONS

The following is a brief discussion of the existing water quality management framework under which our basin operates. For further information, the 1994 Working Paper produced by the Colorado Water Quality Forum titled "Colorado Watershed Protection Approach" provides a more detailed explanation of the Federal and State programs related to water quality protection and restoration.

7.2.1 Clean Water Act

The Federal Clean Water Act (33 U.S.C. 1251, et. seq.) forms the Federal environment under which the State operates. Other related Federal environmental legislation includes:

- Safe Drinking Water Act;
- National Environmental Protection Act;
- Endangered Species Act;
- Wild and Scenic River Act;
- Resource Conservation and Recovery Act;
- Comprehensive Environmental Response, Compensation and Liability Act; and
- Clean Air Act.

7.2.2 Colorado Water Quality Control Commission Programs

The State has primacy (i.e. responsibility) for carrying out the State programs developed in the Clean Water Act. Existing State water quality laws and regulations include the following:

- Establishment of regional water quality management plans;
- Classification of State waters;
- Establishment of water quality standards designations and related regulations;
- Regulation of State agricultural practices;
- Issuance of discharge permits; and
- Certification of Federal licenses and permits.

Related State regulations and activities include:

- Water quantity laws and regulations;
- Solid and hazardous waste requirements;
- Fish and wildlife statutes; and
- Nonpoint Source Council activities.

7.2.3 Point Source Management

Point sources are regulated by the State's WQCD through its CDPS. There are essentially three broad types of permits: those for domestic wastewater discharges; those for industrial discharges; and stormwater permits. The State permits domestic wastewater discharges based on stream segment water quality standards and stream flow to establish discharge pollutant concentrations that will protect the designated uses. Specific information on the domestic wastewater treatment plants in the basin is included in Section 5.0 of this plan. The WQCD, under EPA oversight, also regulates industrial and stormwater dischargers holding discharge permits and operated under the terms of their permits. These are also described in Section 5.0.

"Wasteload allocation" is the process by which a portion of a receiving water's loading capacity is allocated to one of its existing or future point sources of pollution. Wasteload allocations are a means to ensure that pollutants of concern from various sources do not exceed the applicable water quality standard. Allocations are developed in those areas where a number of permitted sources are discharging to the same stream segment and the possibility exists for the stream to exceed the water quality standard for that pollutant. In our region, the pollutant that has been allocated to the greatest degree is ammonia. The wasteload allocations are developed to ensure that all permitted discharges are treated fairly with respect to setting limits for their discharges.

7.2.4 Wellhead Protection

The WQCD has developed a Wellhead Protection Program, which was approved by the EPA in 1994 as meeting and satisfying the Federal requirement of the Safe Drinking Water Act. This program is aimed at protecting public groundwater wells from contaminants. This goal is to be achieved through the installation of wellhead protection programs at the local level, with the WQCD assuming development and administration of the program. Although the program does not apply to private wells, well owners are invited and encouraged to use the wellhead protection approaches to protect their water sources (WQCD, 1998).

7.2.5 Nonpoint Source Management

The State has a Nonpoint Source Management Program approved by the EPA in May of 1989 which is designed to address the problems identified in the State's "Nonpoint Assessment Report" (November 1989). This program has been recently updated by the WQCD in 2000, as presented in "Colorado's Nonpoint Source Management Program" (WQCD, 2000).

It describes Federal assistance programs for nonpoint source pollution control, such as the Agricultural Conservation Program, Conservation Reserve Program, Watershed Protection and Flood Prevention Act, and Resource Conservation and Development. State financial assistance programs include the State Revolving Loan Fund, Section 319 grant funds administered by the CDPHE. Local programs, such as State enabling legislation (e.g. CRS 24-65.1-101 – HBI 041: protection of local resources; and CRS 29-20-1 01 – HB1034: land use controls) relate to nonpoint source control, since land use impacts nonpoint source pollution. Many communities throughout the State have some requirements on drainage impacts and erosion control in their review criteria and/or ordinances.

7.2.6 Colorado River Basin Salinity Control Forum

The Colorado River Basin Salinity Control Forum is composed of members from the seven states in the Colorado River Basin (Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming). The Forum was established for the purpose of interstate cooperation and to provide states with the information necessary to comply with EPA regulation 4OCFR, Part 120, entitled 'Water Quality Standards, Colorado River System, Salinity Control Policy and Standards Procedures", and Section 303(a) and (b) of the Clean Water Act. More information on this Forum can be obtained through the CWCB.

7.2.7 Colorado River Headwaters Forum

The Colorado River Headwaters Forum was initiated by the NWCCOG Quality/Quantity Committee in November 1991 to facilitate the informal, non-adversarial discussion of water issues associated with the Colorado River headwaters. The Forum, open to "interested stakeholders", meets several times a year. Important outcomes of the Forum included the development of proposed methods for developing water projects allowing for public comment prior to formal submission of a 1041 permit application and revision of the 208 Plan. Another important benefit is to provide various interests a mechanism to discuss policy issues and perspectives and to promote understanding and cooperation as an alternative to pursuing legislation and/or litigation on key water resource issues.

7.2.8 Yampa River Basin Partnership

The Yampa River Basin Partnership, a group composed of Federal, State, and local officials; businesses; nonprofit organizations; and local citizens has been established to start basin-wide cooperative communication, planning and project implementation. The group focuses on water quality and water rights issues and concerns in the valley.

7.2.9 Routt County Water Quality Committee

In addition, Routt County established a Water Quality Committee with an open membership and participation by approximately 35 interested citizens. This committee was established to review county land use regulations and advise the county on appropriate water quality management options and other appropriate methods for protecting and enhancing water quality in Routt County.

7.2.10 Moffat and Routt Counties

In addition, both Moffat and Routt Counties have been actively involved in land use and water quality issues. Moffat County has recently completed a series of public meetings pertaining to land use goals and priorities within the county and Routt County recently completed a BMP manual , as discussed previously in Section 6.5.

7.3 ENVIRONMENTAL, SOCIAL, AND ECONOMIC IMPACTS OF THIS PLAN

Continued implementation of the recommended plan will necessarily have environmental impacts as well as social and economic costs and benefits. In assessing the impacts of the plan, many of its policy recommendations (the implementation recommendations) have been in effect since the previous 208 Plans were approved. For point sources, wasteload allocations and treatment system recommendations have existed in substantially their present form since the adoption of the 303(e) basin plans in 1974.

There has been an extensive period of time during which the plans' recommendations have acted as policy guidance for water quality decisions within the basin. As a result of these decisions, a number of the recommendations have been implemented or are currently being implemented. This includes implementation of the point source discharge treatment levels and consolidation of municipal facilities through the recommended management agencies. It also includes implementation of nonpoint source controls for new sources of urban storm runoff, construction activities, silvicultural activities, stream encroachment, and water use and development activities.

Implementation items recommended by this *Yampa 208 Plan* are, in part, a continuation of these point and nonpoint source control measures. Additional implementation recommendations emphasize continued water quality monitoring and evaluation, as well as development of a comprehensive basin-wide database/GIS system.

7.3.1 Environmental Impacts

Overview

The Federal Clean Water Act has as its policy the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. This plan is intended to accomplish these goals throughout the region based on the current understanding of important cause-effect factors leading to either existing or projected water quality problems. As the body of knowledge with regard to these factors continues to grow, adjustments have been made in the plan to accomplish these broad objectives. Environmental impacts may occur upon implementation of the plan either as a result of adoption of the recommended controls on new potential sources of water quality degradation (preventative strategies) or as a result of recommended cleanup actions (remedial strategies).

The overall intent of the plan is to maintain the existing high quality of the basin's streams and lakes, while accommodating growth and development. A second intent is to improve water quality in degraded stream segments, which are unable to support the full range of potential uses. Each of the plan's recommendations is aimed towards one of these objectives. Maintaining and improving the basin's water quality has had, and will continue to have, a positive effect on aquatic life and fisheries, on the provision of adequate quality and quantity of water supplies for domestic, agricultural, commercial, and industrial use, and on the ability to support high quality recreational experiences. The implementation of the plan will indirectly benefit the wetland and wildlife resources by maintaining such areas, will result in positive impacts on aesthetic resources of the State, and will conserve soil resources. The implementation of the Plan has required, and will continue to require, energy and capital resources necessary to provide wastewater treatment to meet water quality standards.

Impact Discussion

Implementation items recommended by the plan will be accomplished through the continued use of point and nonpoint source control measures, as discussed further in the following paragraphs.

A major element of the plan is the continued implementation of point source controls. The establishment of effluent limitations, wasteload allocations, treatment service areas, and recommended areas of wastewater treatment consolidation have had a positive and negative impact upon the environment, as discussed further in this section. Generally, the identified treatment needs have been satisfied through grants from the EPA and the State Construction Grant and loans from the State Revolving Loan fund, along with local financing. Expansion and upgrading of collection and treatment systems were therefore subject to the National Environmental Policy Act (NEPA), and environmental impacts resulting from such impacts were addressed in either an EIS or EA.

A summary of the types of negative environmental impacts associated with meeting wastewater treatment requirements include: increased energy consumption where advanced wastewater treatment has been recommended for phosphorus and ammonia removal; land use impacts where additional land area is required to satisfy higher treatment levels; temporary local construction impacts on noise, dust, soil disturbance, and traffic; and impacts caused by the transportation and disposal of waste by-products resulting from higher sludge generation requirements of advanced waste treatment. Positive impacts include: improvement and maintenance of water quality in streams and lakes throughout the region; protection and enhancement of aquatic life and fishery resources; and protection and enhancement of recreational opportunities. Alternative configurations for service areas and treatment methods for wastewater facilities necessary to meet the higher recommended treatment standards and/or recommendations for consolidation were described in the EIS or EA for upgrading the individual treatment plants. These documents provide a thorough discussion of the impacts associated with providing wastewater treatment and consolidation of facilities.

In addition to point source controls, prevention strategies will continue to be implemented in order to meet the objectives of the Clean Water Act. These include controls on nonpoint sources of water quality degradation from water use and development activities; urban runoff; construction activities; agricultural activities; use of chemicals; and encroachment on wetlands, riparian areas, and waterbodies. Implementing these controls has, and will continue to have, a positive impact upon:

- wetland and riparian areas;
- protection of aquatic life and fisheries;
- protection of important wildlife habitat areas;
- stream channel stability;
- reduction of the potential damage to private property due to flooding and streambank loss;
- maintenance and improvement of recreational opportunities;
- reduction of eutrophication of lakes and streams;
- provision of safe domestic water supplies; and
- maintenance of water quality at existing high levels.

There are no identified negative environmental impacts associated with the implementation of these preventative water quality strategies.

Remedial water quality controls recommended by the USFS for past silvicultural activities have been assessed in EIS documents covering their proposed actions in their land management plans. The closure of roads, revegetation, and other measures recommended to reduce sediment loads form previously logged areas will have a positive impact on water quality, vegetation and water yields, and

will protect soil resources. Road closures are consistent with recommendations for recreational and other uses of forest lands recommended in forest plans.

7.3.2 Social and Economic Impacts

Overview

This plan is intended to serve the population and economic growth projected by local governments within the basin. The majority of the projected growth and development is associated with the growth of the tourism industry in the development of winter sports recreation areas and other year round outdoor recreational activities.

The existing demographic character of the region is influenced by rapid seasonal fluctuations in population and in the demand for public and private services, particularly in Steamboat Springs where the peak seasonal population occurs during the ski season. Local planning efforts have recognized the desirability of utilizing existing facilities, both public and private, over a longer timeframe to diversify economic activities, and provide a more stable base for residents of the region. The emphasis for diversification has included the maintenance of traditional industries in the basin, including agriculture, silviculture, and mining, with a major emphasis upon development of a year-round economy based upon expanded summer tourism.

Protection and enhancement of the environment is a key element to the potential for economic diversification and the provision of a stable economic community for residents of the region. Many examples of the potential for economic diversification relate to the protection and enhancement of water quality, such as tourism and recreation. Positive impacts of implementing this plan include the protection and enhancement of water quality, which leads to protecting the potential recreational resources for summer tourism activities. Negative impacts of this plan's implementation include increased levels of regulation and development costs associated with protecting water quality. These are described in more detail below.

Impact Discussion

The provision of advanced wastewater treatment for selected communities has had an impact associated with the construction and operation of these systems. Higher costs for construction and operation of these systems have been passed on to system users in the form of higher tap fees and service charges. Construction costs have been supported, in part, by Federal grant programs, State revolving loan fund and energy impact assistance programs.

The cost of these systems has been, in part, offset by water quality benefits, which are attributable to a broader population base than system users. This includes benefits to recreation and tourism opportunities in the region as a result of protection of fish and wildlife, and improved aesthetic qualities of streams and reservoirs. Recreational studies have demonstrated a strong correlation between the opportunity for water-based activities and the selection of a recreational destination. To the extent that improved water quality maintains the opportunity for recreation, there should be a continuing benefit to summer tourism with a social and economic benefit to the region in accordance with objectives for economic diversification.

Controls on nonpoint sources of water quality degradation have also had social and economic costs and benefits. Controls for construction and grading activities have increased the cost of new construction for housing and commercial development. The cost increase on a per unit basis is dependent on the type of development and may range from a few dollars to several hundred dollars. Controls implemented on water use and development activities to protect water quality and maintain the chemical, physical, and biological integrity of the region's lakes and streams has increased the cost

to water developers of providing new major water supplies utilizing water from the region. Additional development costs associated with provision of minimum streamflows, wastewater treatment, and water supply are examples of costs added to such projects as a result of local program requirements.

Locally adopted regulations to protect the basin's water quality have had a social impact in terms of increased levels of government involvement in water quality concerns. Implementation of the regulations for nonpoint source controls only where necessary to meet a specific water quality goal has limited this involvement. Adoption of local regulations (as opposed to State regulation) integrated into local development review has placed responsibility closest to those impacted by the increased level of regulation.

The continued implementation of this plan will continue to have both positive and negative social and economic impacts as previously described.

7.4 PLAN IMPLEMENTATION

The plan implementation strategy consists of the following approach:

- Public education;
- Local implementation of the policy recommendations;
- Consistent enforcement of local regulations; and
- Initiation of recommended watershed improvement projects.

In order for the implementation of this plan to be effective and efficient, communication between the various management agencies needs to be facilitated. Inherent in all of these efforts is the acknowledgement that there is a need to increase the awareness of individuals on water quality issues. This educational outreach must include the identification of issues, potential solutions, costs associated with solutions, and costs of inaction. Some of this information is currently available, and some still must be developed. Through the management agencies and watershed groups, local needs and solutions will be further refined.

The following excerpt from state *Water Quality Management and Drinking Water Handbook* (June 1998), also known as "Continuing Planning Process", summarizes the State policy for use of the 208 plan in State and local decision-making. "Water quality management plans are used to assist local, State, and Federal decision-makers focus on priority water quality issues and provide local input and guidance to Colorado's water quality program. This helps assure that decisions made at the State and local levels are consistent with pertinent statutory and planning requirements. The plan reviews the status of water quality in the region and reports on progress in meeting water quality goals and watershed management objectives. The plan can recommend revisions to water quality standards, stream classifications, and TMDLs, where appropriate. The plan should identify priorities, processes and possible solutions for addressing water quality problems."

Through the efforts outlined above, it is expected that the recommended approach will result in successful implementation of this plan.

7.5 PLAN ISSUES, POLICIES, AND RECOMMENDATIONS

Issues presented in this plan focus primarily on water quality, water use and development, land use and disturbance, wastewater treatment, and chemical management. As such, the following section, Section 8, develops a series of policy statements and objectives to guide in the implementation of this plan. In addition, it summarizes recommendations presented in previous sections of the plan.

7.6 MANAGEMENT AGENCY/ORGANIZATION RECOMMENDATIONS

The management structure identified to carry forth the recommendations are summarized in Table 7.1.

TABLE 7.1
MANAGEMENT AGENCY STRUCTURE

Activity and Policy	Management Agency
Areawide Water Quality Planning **Local Land Use Planning**	WQCD, Yampa River Basin Partnership (YRBP) Counties, Municipalities, Routt County Water Quality Committee
Policy 1. Water Quality	
Recommend Water Quality Standards Revisions	WQCD, YRBP, Counties, Municipalities, Special Districts, Routt County Water Quality Committee
Policy 2. Water Use and Development	
Issue Special Use Permits/Right of Ways Issue 404 Permits Issue 401 Certification	USFS, BLM, Counties US Army Corps of Engineers WQCD
Policy 3. Land Use and Disturbance	
Encroachment	Counties, Municipalities, Special Districts, Federal Land Management Agencies
Public Facilities	Counties, Municipalities, Special Districts, Federal Land Management Agencies, Colorado Department of Transportation (CDOT)
Vegetative Disturbance	Counties, Municipalities, Federal Land Management Agencies, Natural Resource Conservation Service
Soil Disturbance	Counties, Municipalities, Federal Land Management Agencies, Natural Resource Conservation Service
Impervious Cover	Counties, Municipalities
Stormwater	WQCD (Phase II Stormwater), Counties, Municipalities
Policy 4. Domestic, Municipal and Industrial Wastes	
Issue Colorado Discharge Permits	WQCD
Approve Site Applications	WQCD, Counties, Municipalities, Special Districts
Review Site Applications	Counties, Municipalities
Biosolids Applications	WQCD, Counties
Landfill Site Approval	Hazardous Materials Division
Policy 5. Chemical Management	
Spill Prevention and Cleanup	Colorado Department of Public Health and Environment, CDOT, Municipalities, Special Districts

8.0 WATER QUALITY MANAGEMENT POLICY SUMMARY FOR THE YAMPA RIVER BASIN

8.1 GENERAL POLICIES

This section is based upon policies presented in Volume 1 of the 1996 NWCCOG 208 Plan. Discussions are updated to encompass only the Yampa River Basin and to modify the 208 planning agency from NWCCOG to the WQCD, the current planning agency for the Yampa River Basin.

This section presents watershed policies and describes recommendations to protect and enhance the level of water quality, consistent with the requirements of the Clean Water Act. It provides a framework for water quality decisions relating to activities which have the potential to generate both point and nonpoint sources of water quality degradation in the basin. This section of the plan consists of six policies, which are intended to lead to maintaining and improving water quality in the basin. Under each policy, administrative guidelines are presented for use by water quality management agencies that will continue to implement the plan. These management agencies are identified in Policy 6, and the rationale for their selection is discussed in Section 7.0, Water Quality Management Designations, of this *Yampa 208 Plan*.

The six general policies encompass the following:

- Policy 1: Water Quality
- Policy 2: Water Use and Development
- Policy 3: Land Use and Disturbance
- Policy 4: Domestic, Municipal, and Industrial Waste Treatment
- Policy 5: Chemical Management
- Policy 6: Management System

The six policies are further defined in the following subsections.

8.1.1 Policy 1: Water Quality

Policy 1 Statement

The surface water and groundwater of the region will be protected to maintain the present uses of those waters. The physical, chemical, and biological conditions will be maintained for the benefit of the environment and present and future generations of residents and visitors to the region. Waters of the region not currently supporting classified uses (refer to Section 4.2) will be restored as soon as is financially and technically practicable.

Policy 1 Objectives

Policy 1 objectives are as follows.

- To meet the adopted water quality standards for the State of Colorado, including the applicable antidegradation standards.

- To assist local governments, as well as Federal and State agencies, with land use management responsibilities to implement water quality goals.

- To encourage private land owners in the region to implement water quality goals.

- To improve public awareness of water quality conditions in the region and how individual actions can protect and improve water quality.

Policy 1 Justification

Pollution of the region's waters may constitute a menace to public health and welfare, may create public nuisances, may be harmful to wildlife and aquatic life, and may impair beneficial uses of these waters. Colorado State Statutes have been written, "to protect, maintain, and improve where necessary and reasonable, water quality for public water supplies, for protection and propagation of wildlife and aquatic life, for domestic, agricultural, industrial, and recreational uses" (CRS 25-8-102).

High quality waters are valued by the citizens of the region who recognize the necessity of protecting the existing uses for the benefit of ourselves, our visitors, and future generations. The community recognizes that it is in the best interest to protect, maintain, and improve where necessary and reasonable, the waters of this region.

8.1.2 Policy 2: Water Use and Development

Policy 2 Statement

The use and development of the waters of the region will maintain the quality necessary to protect present uses.

Policy 2 Objectives

Policy 2 objectives are as follows.

- To ensure that water development or transfer activities do not have a significant adverse effect upon the region's water resources.

- To protect existing local, State, and Federal investments in wastewater treatment facilities by mitigating additional treatment costs caused by hydrologic modification.

- To ensure, through participation in the planning and approval processes of reservoirs, that the quality of impounded water will be suitable for its intended use and that discharge will not significantly degrade downstream water quality.

- To encourage that water is used efficiently for the benefit and advantage of the people and natural resources of the Yampa River Basin.

- To encourage water conservation throughout the Yampa River Basin.

Policy 2 Justification

The diversion of water and its application to beneficial use can have an impact on water quality. Water diverted and consumed or stored for later use decreases natural stream flows, which may result in:

- Increased agricultural and industrial productivity;
- Reduced flows available for dilution of natural pollutants;
- Diminished assimilative capacity of the stream;

- Modified shape and size of the stream channel;
- Maintenance of minimum stream flows;
- Improved habitat for downstream endangered fish species; and
- Benefits to municipal and recreational users.

The challenge is balancing current and future beneficial uses, which include domestic, agricultural, industrial, environmental, recreational and aesthetic considerations.

With respect to water and wastewater treatment plants, reduction in stream flow may affect treatment, as follows:

- By increasing the concentration of natural pollutants as they enter the plant; and
- By decreasing the assimilative capacity of the stream.

The instream flows in the region do not obviate the need to treat wastewater to a high level, and several wastewater treatment plants in the basin are advanced treatment plants, which treat wastewater to the highest level technically and financially possible.

In-basin water use may also raise water quality concerns. Included in these concerns are: conversion of agricultural water to municipal use (loss of groundwater recharge); change in timing of return flows (specifically related to snowmaking); "dewatering" stream segments between water diversion and wastewater return points; and the consumptive use of various beneficial water uses.

8.1.3 Policy 3: Land Use and Disturbance

Policy 3 Statement

The surface water and groundwater of the region will be protected from land uses and management practices which could cause significant degradation of water quality or impairment of the natural protection and/or treatment processes provided by wetlands, floodplains, shorelines, and riparian areas.

Policy 3 Objectives

Policy 3 objectives are as follows.

- To minimize the site disturbance on lands adjacent to surface waters, wetlands, and riparian environments in order to protect water quality.

- To encourage responsible land development (including logging, mineral extraction, solid waste disposal, agriculture, and other land use practices) such that it does not cause significant deterioration of water quality or significantly degrade the region's surface water and groundwater.

- To encourage protection of wetlands and riparian areas, through use of BMPs, good stewardship, and such voluntary programs as land purchase, conservation easements, or other available programs.

- To enhance public knowledge of the importance of maintaining vegetative cover and streamside setbacks to protect water quality.
- To promote water quality as an important consideration in making decisions on the location

and extent of areas to be served by public facilities and services.

- To discourage the proliferation of onsite wastewater disposal facilities.
- To encourage connection to community water and wastewater facilities within designated service areas.
- To assist local governments in guiding future growth, infrastructure, and development activities to areas where impacts on water quality will be minimized and/or controllable.
- To encourage land management practices (which include appropriate fire fuel management) and manage wildfire, disease and insect infestations as a viable long-term water quality management strategy.
- To encourage compatibility of investment policies for public facilities with other environmental protection programs (e.g. floodplain protection).
- To encourage local governments in managing soil disturbance and earth movement where significant water quality impacts may occur.
- To maintain historical runoff quantities by minimizing the creation of directly connected impervious surfaces and promoting detention and other controlled runoff measures.
- To encourage that the cumulative impacts of development activities in the region will not cause storm drainage and floodwater patterns to exceed the capacity of natural or constructed drainage ways.
- To recognize and protect irrigated agriculture as an important groundwater recharge mechanism for sustaining stream flows during critical low flow periods and to encourage the minimization of pollutants returning to the stream.
- To encourage that future development activities provide for the storage, treatment, and removal of pollutants to control their transport by storm runoff into streams, river and lakes.
- To encourage the use of non-structural controls in managing stormwater.

Policy 3 Justification

The purpose of this policy is to ensure that a balance exists between the protection of water quality and land use and development, and to minimize the conflicts between the two. Individuals exercising their private property rights should not endanger the public health, welfare, and right to enjoy and use our common natural resources, such as high quality water and aquatic life. It has been fundamentally established through the U.S. Court system that no individual has an absolute right to use their property to the detriment of others. Communities can legitimately insist that development be done in a manner that will not compromise their citizens' quality of life.

Land use practices have impacts on water quality. The water pollutants of concern with respect to land use practices include: sediment, nutrients, animal wastes, heavy metals, petroleum products, salts, pesticides, and the loss of natural protection from these pollutants (such as loss of wetlands and riparian vegetation). These pollutants are typically nonpoint source in origin, i.e. typically enter the waterbody via diffuse runoff.

Generally, it is more cost effective to prevent water quality impacts than to treat water quality impacts. This is especially true with respect to land use impacts on water quality. The most effective way of addressing land use impacts is through the development, consistent application, and enforcement of local regulations and incentives to minimize water quality problems from runoff. Most of the Implementation Recommendations encourage the use of BMPs, both structural and nonstructural. No single BMP can be applied to all land disturbance situations, and all BMP options require careful site assessment prior to design.

Provisions of this policy should be implemented as deemed locally appropriate through adoption and enforcement of development review procedures. Model local water quality protection codes are contained in Appendix N. Examples of BMPs for land use and disturbance activities (including agriculture) are contained in Appendix L and Appendix N.

8.1.4 Policy 4: Domestic, Municipal and Industrial Waste Treatment

Policy 4 Statement

Decisions to locate water supplies and wastewater treatment systems, and to extend utilities will be made in a manner that protects water quality. Decisions regarding facility location will also recognize the protection of floodplains, geologic hazard areas, wildlife habitats, wetlands, shorelines, and agricultural land. Plans for facilities that divert water or discharge wastes, will be consolidated, wherever appropriate, with existing facilities to protect water quality.

Policy 4 Objectives

Policy 4 objectives are as follows.

- To ensure that land use activities have adequate facilities to collect, treat, and dispose of anticipated types and quantities of wastewater.
- To recognize the vulnerability of regional and local groundwater aquifers to potential impacts from waste discharges or seepage from waste disposal sites and septic system leachate.
- To encourage the avoidance of "proliferation of treatment facilities" where practical alternatives exist.
- To ensure treatment facilities are properly operated and maintained by a qualified operating entity.

Policy 4 Justification

The purpose of this policy is to ensure that public facilities be sited and constructed with consideration of water quality impact minimization, while recognizing financial limitations.

The communities of the region have been extremely supportive of protection of water quality through the funding of well constructed, operated, and maintained wastewater treatment facilities. Careful planning of public infrastructure is needed to assure that maximum public benefit is attained with available funds. It is necessary to assure that the limited funds available for public projects be put to their best use while minimizing environmental impacts.

8.1.5 Policy 5: Chemical Management

Policy 5 Statement

The surface water and groundwater of the region will be protected from the use of pesticides, fertilizers, algaecides, road deicing and friction materials, and other chemicals which would temporarily or permanently cause a significant degradation of water quality conditions or impair present uses.

Policy 5 Objectives

Policy 5 objectives are as follows.

- To encourage that the appropriate volume, rate, and scheduling of pesticide, fertilizer, and road deicing and friction applications are determined and applied to protect the region's water quality while protecting public health and safety.

- To encourage that pesticides, fertilizers, road sanding materials, and hazardous chemicals used in the region are properly stored, transported, and handled during both normal and emergency operations.

- To encourage that hazardous wastes are disposed of in a manner that will minimize risk to the region's water resources.

Policy 5 Justification

Pollution prevention is acknowledged as being the most cost effective means for protecting water quality. Implementation of this policy focuses on BMPs, which prevent or minimize the entry of pollutants into the region's groundwater and surface waters. Most of these practices require planning and coordination, but reduce the long-term costs of chemical application and environmental remediation.

8.1.6 Policy 6: Management System

Policy 6 Statement

The surface water and groundwater of the region will be protected by a management agency structure, which recognizes the existing governmental and regulatory framework and allows decisions and management at the most appropriate level of control. Especially with respect to nonpoint source pollution prevention, the recommended level of management is at the watershed level (municipality and county driven).

Policy 6 Objectives

Policy 6 objectives are as follows.

- To address water quality pollution issues at the most appropriate level of authority.

- To address water quality pollution issues using existing governmental and regulatory structure where it is appropriate.

Policy Justification

The Federal Clean Water Act requires the governor of each state to designate management agencies responsible for carrying out the provisions of approved water quality management programs. Once designated by the governor and approved by the Regional Administrator of EPA, functional responsibility for carrying out the provisions of the water quality management plan is legally assigned to that entity.

Further, the Federal Clean Water Act specifies that:

- Future construction grants for wastewater treatment facilities under Section 201 of the Clean Water Act will be awarded only to entities that are designated as management agencies; and

- No discharge permit will be issued that is in conflict with the recommendations of an approved 208 Plan, as updated by the designated planning and management agencies.

The designation of management agencies establishes part of the legal basis for delegation of authorities necessary to carry out the recommendations of Water Quality Management Plans. Prior to submission of the current plan to the Governor and EPA, specific management agencies will be identified for each specific service area. Special districts may serve as management agencies only if acting cooperatively with a general purpose government, pursuant to identified intergovernmental agreements. The recommended management agency structure to carry out the recommendations of this plan is outlined in Table 8.1, *Management Agency Structure.*

8.2 IMPLEMENTATION RECOMMENDATIONS

A summary of the implementation recommendations included in this plan follows.

- Investigate potential intergovernmental agreements/vehicles for continued water quality programs and evaluations in the basin.

- Encourage local land use agencies and governmental entities to investigate funding sources (e.g. 319, EPA, NRCS, CWCB) for water quality evaluations.

- Encourage citizen-based monitoring programs (e.g.- River Watch) and work with interested entities/agencies (Nature Conservancy, NRCS, CSU, CDOW) to promote such programs throughout the community.

- Prepare a comprehensive inventory of sites and compile data for the Yampa River Basin.

- Provide a database/GIS system that is readily available and usable.

- Establish a mechanism to develop and continually update the database/GIS, as new data are collected though continued water quality evaluations and citizen-based monitoring programs.

- Establish a program where data are evaluated on an ongoing basis (in conjunction with monitoring and database maintenance). Evaluate data, indicate trends, and assess information gathered. Include narrative discussions of changes noted in water quality.

- Develop a long-range plan for collecting and assessing data.

TABLE 8.1 MANAGEMENT AGENCY STRUCTURE	
Activity and Policy	**Management Agency**
Areawide Water Quality Planning **Local Land Use Planning**	WQCD, Yampa River Basin Partnership (YRBP) Counties, Municipalities, Routt County Water Quality Committee
Policy 1. Water Quality	
Recommend Water Quality Standards Revisions	WQCD, YRBP, Counties, Municipalities, Special Districts, Routt County Water Quality Committee
Policy 2. Water Use and Development	
Issue Special Use Permits/Right of Ways	USFS, BLM, Counties
Issue 404 Permits	US Army Corps of Engineers
Issue 401 Certification	WQCD
Policy 3. Land Use and Disturbance	
Encroachment	Counties, Municipalities, Special Districts, Federal Land Management Agencies
Public Facilities	Counties, Municipalities, Special Districts, Federal Land Management Agencies, Colorado Department of Transportation (CDOT)
Vegetative Disturbance	Counties, Municipalities, Federal Land Management Agencies, Natural Resource Conservation Service
Soil Disturbance	Counties, Municipalities, Federal Land Management Agencies, Natural Resource Conservation Service
Impervious Cover	Counties, Municipalities
Stormwater	WQCD (Phase II Stormwater), Counties, Municipalities
Policy 4. Domestic, Municipal and Industrial Wastes	
Issue Colorado Discharge Permits	WQCD
Approve Site Applications	WQCD, Counties, Municipalities, Special Districts
Review Site Applications	Counties, Municipalities
Biosolids Applications	WQCD, Counties
Landfill Site Approval	Hazardous Materials Division
Policy 5. Chemical Management	
Spill Prevention and Cleanup	Colorado Department of Public Health and Environment, CDOT, Municipalities, Special Districts

- Coordinate monitoring and data compilation/evaluation to avoid duplication of efforts and ensure compatibility of data collection.

- Evaluate nutrient sources in the Upper Yampa and further characterize algae problems in the Yampa from the headwaters through Steamboat Springs, including Stagecoach Reservoir and Lake Catamount. Seek funding and participation from upper basin towns, cities, districts, Routt County, Upper Yampa Water Conservancy District, CRWCD, and State and Federal agencies such as the Colorado Department of Public Health & Environment, CDOW, CWCB, USGS, USFS, and EPA.

- Encourage the Commission to review the Yampa Basin in its entirety during the triennial review process. The upper and lower basin are currently reviewed separately (with the upper basin last reviewed in 1999 and the lower basin in 2001). As discussed previously, this change has already been decided by the Commission, with the next hearing for the entire basin scheduled for July 2003.

- Work with the State to ensure that sufficient data are provided for sites proposed for reclassification.

- Evaluate stream flow (water quantity), as well as water quality in consideration of reclassification.

- Encourage reclassification if data indicate that streams have been mis-classified, based on actual beneficial uses.

- Assure that adequate water quality data are obtained to determine whether numeric standards for stream segments are met.

- Work with the State to assure that reclassification will not have adverse impact on existing land use, where appropriate BMPs and control technologies are currently being used.

- Encourage the balance between existing practices and standards, with implementation of appropriate BMPs and control technologies.

- Look for opportunities to incorporate environmental stewardship with land-use activities.

- If a government entity is party to a stream diversion, consider potential impacts to in-stream flow.

- Consider the economic impact of activities affecting streamflow.

- Encourage basin-wide water conservation efforts.

- Consider the desire to balance area "customs and culture" (agriculture, mining, recreation, etc.), water quality, streamflow, and economic stability.

- Encourage that stream restoration be incorporated in land-use/construction projects.

- Incorporate water quality protection features (BMPs) into new development/review process.

- Discourage storage of potentially contaminating materials in the floodplain.

- Encourage local entities to provide inspection/enforcement assistance, where possible.

- Continue to address urban and construction water quality impacts through public education and local land use programs, through the continued efforts of Routt and Moffat Counties and the Yampa River Basin Partnership.

- Continue to address agricultural BMPs through the NRCS, BLM, local Stock Growers Association, and other appropriate groups. Funding for these types of projects can be pursued through the State's Section 319 Nonpoint Source Grant Program.

- Continue local nonpoint source water quality improvement projects.

- Ensure that the recommendations of the facility plan for the Steamboat Springs regional facility are implemented. This includes the service area delineations for treatment systems in the area.

- Ensure that the recommendations of the facility plan for the Craig wastewater treatment facility are implemented. This includes the service area delineations for treatment systems in the area.

8.3 MANAGEMENT STRUCTURE

The recommended management structure for the implementation of this watershed plan for the Yampa River Basin is portrayed in Table 8.1, *Management Agency Structure.*

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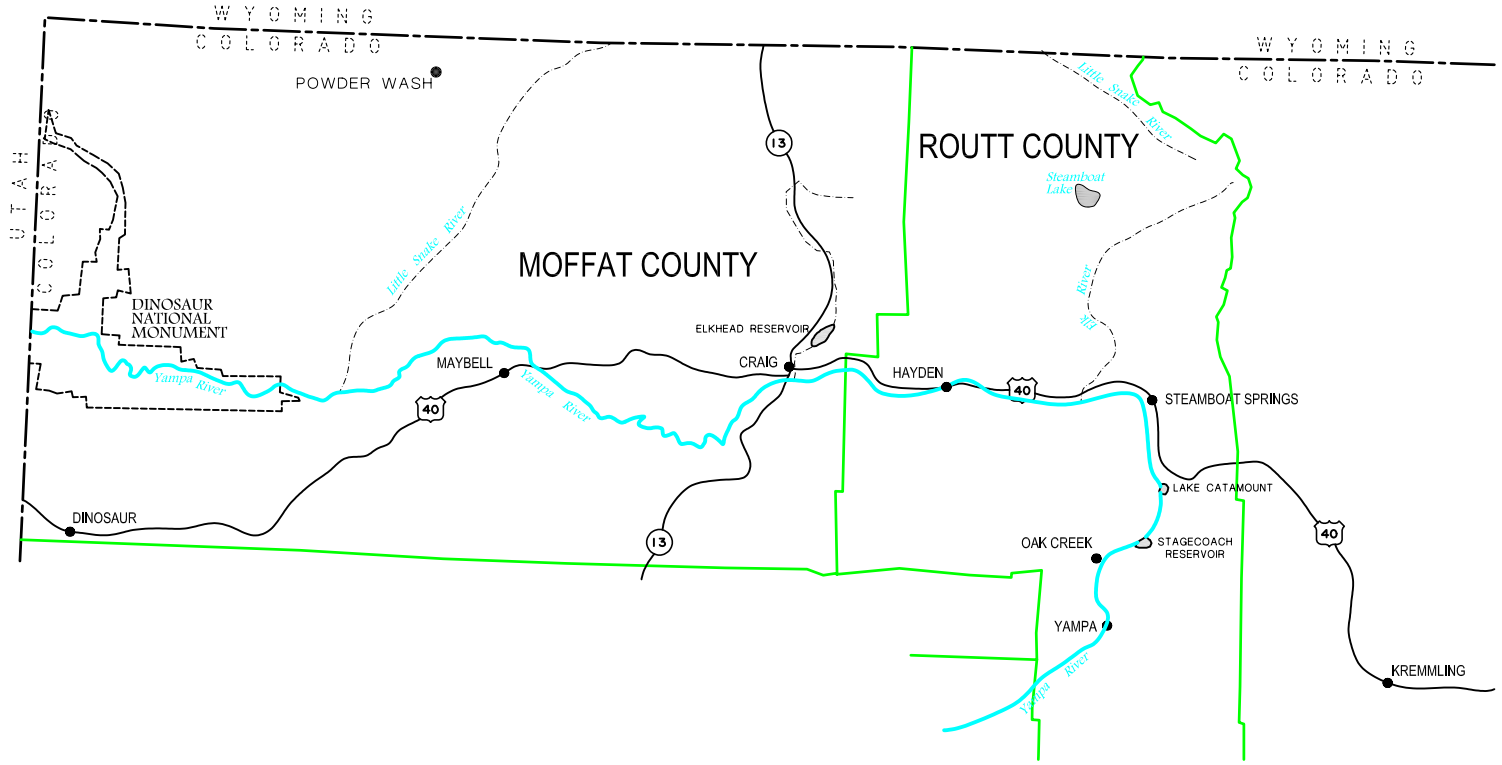

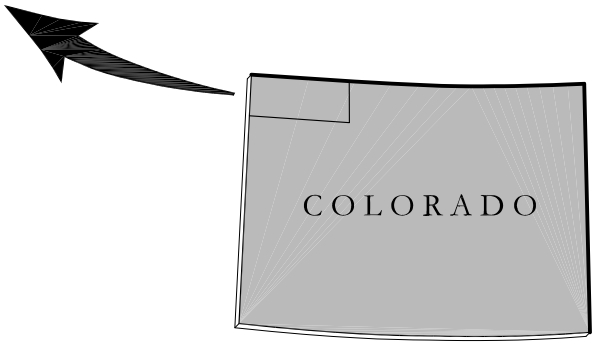

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0	Issued for Final Draft	05/02	J.Ray	J.Gates	J.Ray

MWH
MONTGOMERY WATSON HARZA

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AutoCAD FILE: 1-General Study.dwg
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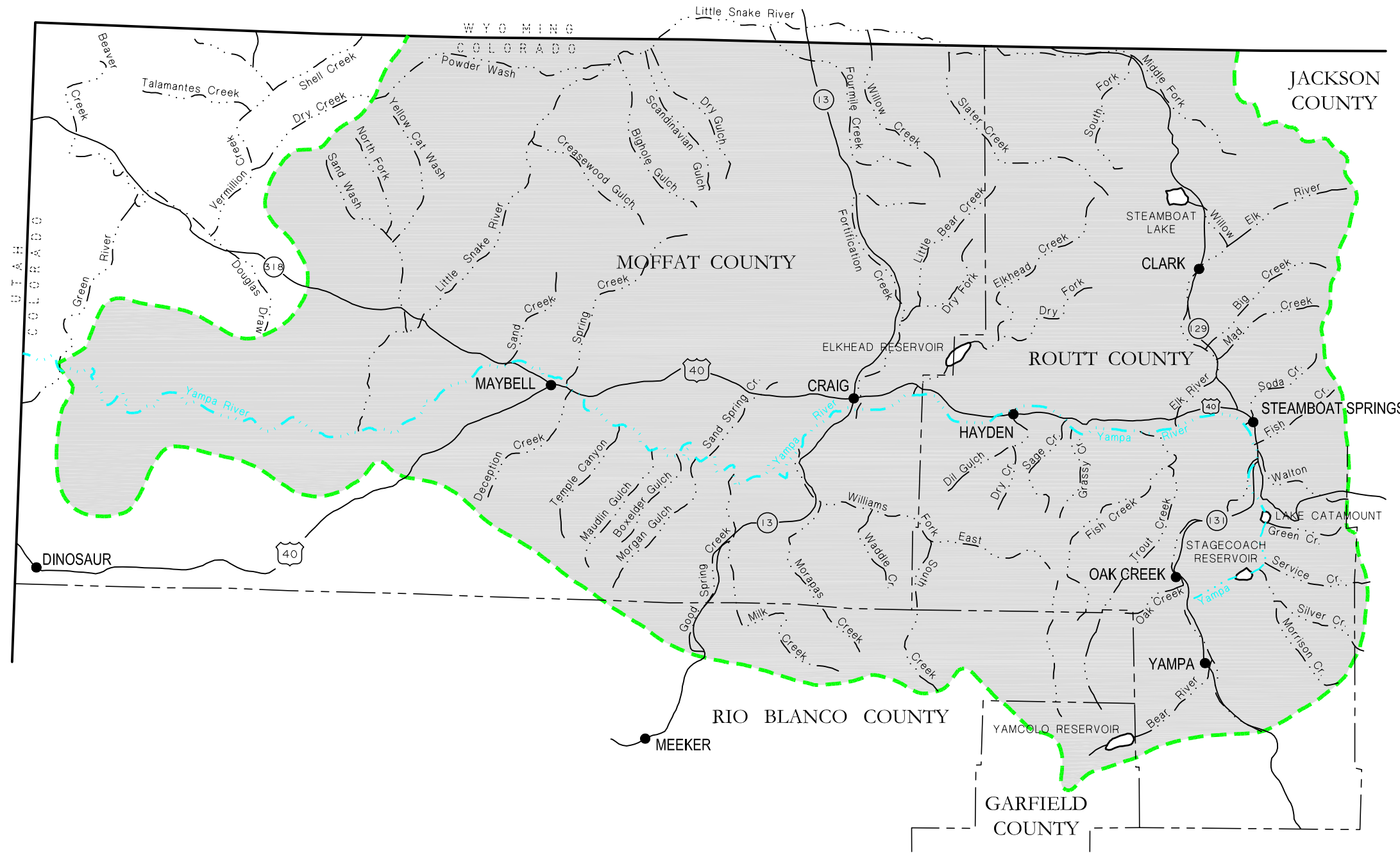
FIGURE No: 1

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

YAMPA RIVER WATERSHED
GENERAL LOCATION



LEGEND

- YAMPA RIVER BASIN BOUNDARY
- COUNTY LINE BOUNDARY
- CREEK (Mad Creek)
- RESERVOIRS
- YAMPA RIVER (Yampa River)

NOTE: The Little Snake River and Vermillion Creek drainages extend into Wyoming. This plan, however, only covers portions of the Yampa River Basin located within Colorado. While several areas of Moffat County and Routt County are not technically within the Yampa River Basin, the issues, policies, objectives, and recommendations contained within this plan are considered applicable throughout both counties.

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COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

PROJECT: ***YAMPA 208 PLAN***

DRAWING TITLE: ***YAMPA RIVER BASIN***

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Sheet 1 Of 1 Sheets

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DRAWING No. 2

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LEGEND

- COUNTY BOUNDARY
- MAJOR HIGHWAY
- YAMPA RIVER
- TOWN
- 09243800 USGS MONITORING STATION
- YAMPA RIVER BASIN BOUNDARY

Moffat

Routt

Jackson

Rio Blanco

Garfield

DINOSAUR

MAYBELL

CRAIG

HAYDEN

STEAMBOAT SPRINGS

OAK CREEK

YAMPA

09255000
09260000
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09243900
09243700
09243800
09237500
09237450

Powder Wash
Slater Creek
Elkhead Creek
Elk River
Little Snake River
Sand Wash
Great Divide
Yampa River
Milk Creek
Williams Fork
East Fork
Lake Creek
Family Creek

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SOURCE:
COLORADO RIVER WATER CONSERVATION DISTRICT

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COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

PROJECT: YAMPA 208 PLAN

DRAWING TITLE: YAMPA RIVER BASIN USGS MONITORING STATIONS

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Sheet 1 Of 1 Sheets
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