The following document, Chalk Creek Watershed Coordinated Resource Management Plan, was submitted by the Utah Division of Water Quality as a TMDL for sediment, phosphorus and stream habitat impairments to its cold water fisheries beneficial use. The document was approved by EPA, Region XIII on October 23, 1997. The plan calls for a 130,000 tons/year sediment reduction on rangelands, 8,200 tons/year sediment reduction from stream channel/stream banks, coliform counts of less than 5,000 per 100 ml, 195 lbs/acre fish production, and supportive macroinvertebrate indices.

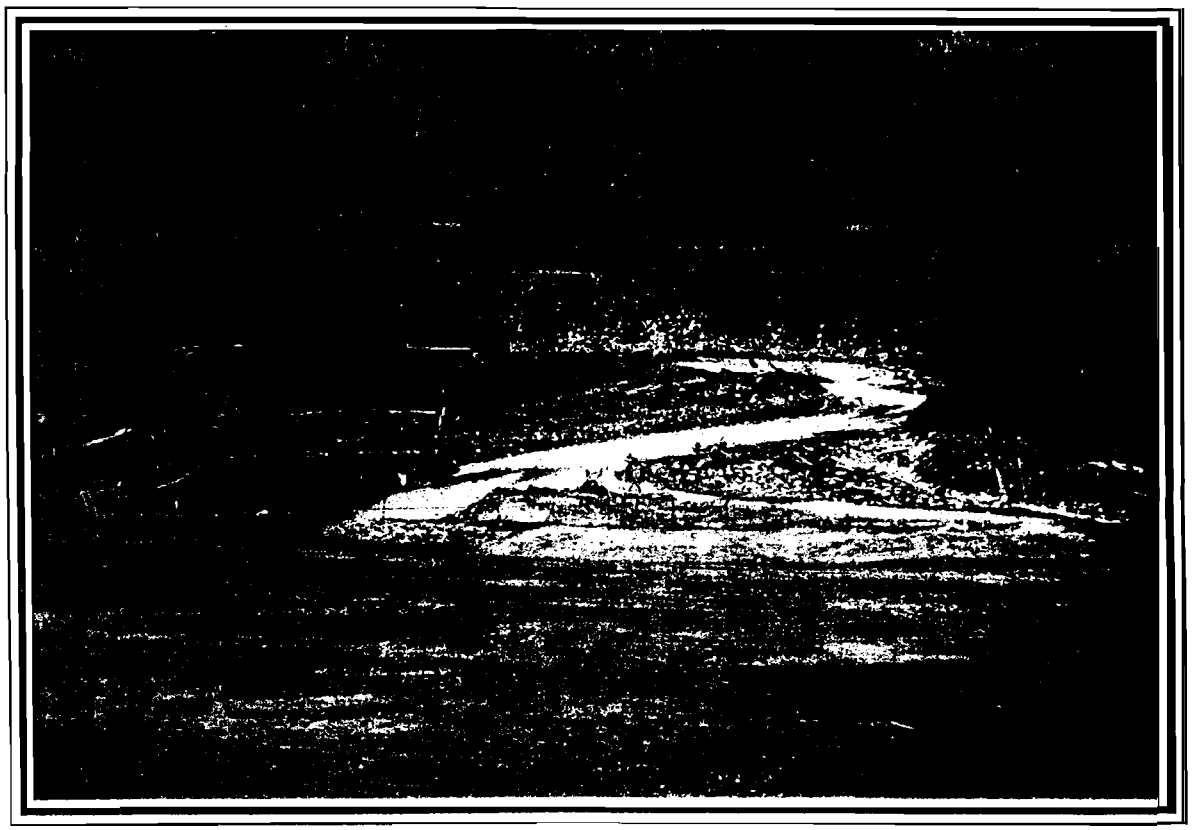
United State
Department of
Agriculture

Soil
Conservation
Service

May *1994*

Chalk Creek Watershed

Coordinated Resource Management Plan



CHALK CREEK WATERSHED

Coordinated Resource Management Plan

Summit County, Utah
and
Uinta County, Wyoming

Prepared as a Coordinated Resource Management Plan by:
Soil Conservation Service-USDA
Utah Department of Agriculture
Agricultural Stabilization and Conservation Service-USDA
Utah Department of Environmental Quality
Utah Division of Wildlife Resources
Utah State University Cooperative Extension Service
Utah Division of Water Rights
Utah Division of Water Resources
Weber Basin Water Conservancy District
U.S. Army Corps of Engineers
Summit Land Trust
United Sportsmen
Mountainland Association of Governments
Utah Division of Oil, Gas & Mining

In Cooperation With:

Summit County Soil Conservation District
Summit County
Coalville City
North Summit Hunting Club
Local Landowners
Irrigation Companies

May 1994

Preface

Appreciation is expressed to the many individuals representing local units of government, federal agencies, state agencies, and private interests who have cooperated to bring this document to completion. Members of the Chalk Creek Technical Advisory Committee (TAC) have completed inventories, analyzed data, prepared charts and graphs, and helped develop this Coordinated Resource Management Plan (CRMP). The coordinated planning effort is the result of a common interest in water quality and the attention generated by the Clean Water Act.

The Utah Division of Water Quality completed an assessment of water quality for streams and reservoirs in the state. This assessment identified the waters of Chalk Creek as being impacted by coliform, nitrates, phosphate, sediment and other elements that threaten water quality. These pollutants exceed state standards for the designated water uses of Chalk Creek at least once during the year.

The intent of this Coordinated Resource Management Plan is to provide direction and guidance for the development of individual cooperator treatment plans. These plans will identify specific problem areas and list the Best Management Practices (BMP) to implement that will improve water quality. Treatment of this watershed will help the State of Utah achieve its water quality improvement goals. Sponsors of this project expect the water quality within the watershed to meet state standards for the designated uses. They also expect enhanced recreational uses, increased fish production, increased livestock feed production, improved protective vegetation, improved aesthetic values, lower erosion rates and decreased sediment yields. State and federal agencies, local units of government, landowners, and donations will fund this work.

CHALK CREEK WATERSHED
COORDINATED RESOURCE MANAGEMENT PLAN

Executive Summary

Purpose of the Plan:

This plan presents feasible solutions that, when implemented, will improve water quality in the Chalk Creek drainage. The recommendations in this document will be implemented through voluntary participation in developing conservation plans with individual or groups of landowners. These plans will be tailored to the individual resource problems and funded through a variety of federal, state and local programs.

Situation:

Chalk Creek, near Coalville, Utah, is one of Utah's high priority watersheds. It is a major tributary to the Weber River, which supplies water to the heavily populated communities of Ogden, Roy and Layton. Chalk Creek contributes more sediment to the Weber River than any other tributary. Included in the watershed are 172,000 acres in the Chalk Creek drainage and 4,000 acres in Grass Creek drainage. The land is used primarily as pasture and range for livestock and wildlife production. However, oil, gas and coal mine operations are scattered throughout the watershed. Irrigated soils lie on the fan terraces and alluvial bottoms on either side of the creek.

Non-Point Source Pollution Problems:

Several problems have been identified of which sediment is the most serious problem. The sediments are coming from bank erosion, down-cutting of the stream, deteriorating alluvial fans, steep shale and sandstone escarpments, irrigation induced erosion, sediment from eroding rangeland, oil pads and disturbances related to exploration and extraction of oil such as pipelines, roads, cuts and culverts. Other serious pollutants identified include phosphate (probably associated with sediment), coliform bacteria, irrigation drainage problems which overload Coalville's sewage treatment system, eutrophication of Echo Reservoir and a serious thermal pollution impairment for cold water fish production.

Echo Reservoir is a popular fishing spot; however, Chalk Creek and its tributaries are seldom used for sport fishery due to the deterioration of quality fish habitat and water quality. Chalk Creek is classified by the State of Utah for the following uses: Class 1C culinary use with some treatment; Class 3A, cold water fisheries including the food chain and proper spawning areas; and Class 4, agriculture and livestock watering uses.

Objectives:

Eight basic objectives have been identified by the Chalk Creek Technical Action Committee (TAC) for water quality improvement activities in the Chalk Creek Watershed:

1. Reduce sediment coming from rangeland by 130,000 tons/year.

2. Protect and stabilize 10 miles of eroding streambanks/stream channel to reduce sediment by 8,200 tons/year, improve stream function and reduce flood damage.

3. Improve the pollutant filtering capabilities of the riparian area and flood plains by restoring vegetation to an effective condition.

4. Reduce impacts to water quality caused by excess deep percolation, surface runoff of irrigation water, and irrigation diversion maintenance.

5. Reduce gully erosion associated with road construction and off-road vehicle use.

6. Control pollutants produced from oil, gas and mining activities.

7. Improve fishery habitat for game fish.

8. Facilitate the development of an acceptable plan that will protect the natural resources and balance the harvest of wild game animals and economic returns throughout the watershed.

Expected Results:

When this project plan is implemented, it is expected that Chalk Creek will meet Utah Water Quality Standards for its designated uses as found in the State Water Quality Plan.

Streambank and channel erosion will be reduced throughout Chalk Creek and its tributaries resulting in reduced sediment and nutrient impacts.

Excessive runoff of rainfall and snowmelt from rangeland will be greatly reduced, thus reducing sediment and nutrient input to Chalk Creek and Echo Reservoir.

Excessive irrigation runoff and deep percolation causing nutrient loading, coliform loading, streambank sloughing or collapse, and drainage overloading will be minimized.

Vegetation cover of the riparian corridor along Chalk Creek and its tributaries will be improved to the extent that it can function as a filtering system for the removal of sediment and other pollutants that impact water quality to filter out many impurities before they enter Echo Reservoir.

A greater number and variety of wildlife will utilize the entire watershed due to improved vegetative cover on rangeland, riparian areas, pastures and streambanks.

Increased quantity and quality of forage will be produced for both wildlife and livestock using the range.

Stream flows are expected to be less severe during peak flow periods while late summer and fall flows will be higher and more dependable.

Recreational use of the stream and reservoir will increase as the fishing and the beauty of the area improve.

Costs:

In order to implement the planned practices and to achieve the expected results an estimated $3,595,000 is needed from a variety of sources.

Purpose of **this** Plan

The purpose of this report is to serve as a guidance document for future treatment of resources in the Chalk Creek Watershed. Inventories have identified critical resource problems throughout the watershed. This report presents feasible solutions that, when implemented, will improve water quality in the Chalk Creek drainage. The recommendations in this document will be implemented through voluntary participation in developing conservation plans with individual or groups of landowners. These plans will be tailored to the individual resource problems, and funded through a variety of federal, state and local programs.

Authority

Chalk Creek has been identified by the Utah Department of Environmental Quality (DEQ) as a stream with a degraded water quality condition which impacts Echo Reservoir and the Weber River. The Utah NPS Task Force has established a "High Priority List" of streams and water bodies in Utah that are in need of immediate attention for treatment to control NPS pollution problems. Chalk Creek is ranked third on this list.

Section 319 of the Clean Water Act established provisions to control nonpoint sources (NPS) of water pollution. Nonpoint source pollution is generally associated with runoff from rain and snowmelt on land used for agriculture, construction, mining, urban, and silvicultural activities where a definite point of entry to the water system cannot be identified.

Congress, through the Clean Water Act, required all states to prepare two reports concerning NPS pollution impacts for all water bodies and navigable streams within the state. The first report was an assessment prepared by the Utah Department of Health, Bureau of Water Pollution Control. The second document was prepared by the Utah Department of Agriculture and is the management plan for improving and maintaining water quality that may be affected by nonpoint sources of pollution.

In November of 1990, supervisors of the Summit County Soil Conservation District (SCD) voted in favor of submitting an application to the United States Department of Agriculture (USDA) for the designation of Chalk Creek as a Hydrologic Unit Area (HUA). This application was prepared with the assistance and cooperation of the Utah Department of Agriculture and the USDA Soil Conservation Service (SCS).

Public Participation

In January of **1991,** a steering committee was organized to provide local planning guidance and direction for the Chalk Creek Watershed. The committee is composed of the following:

Name	Representing
Dean Rees (Chairman)	Summit Soil Conservation District
Kenneth Boyer	Coalville City
Sheldon Richins	Summit County
Harold Richins	ASC County Committee
Jerrold Richins	Landowner
David Wright	Irrigation Companies
Ronald Robinson	Landowner
John Paskett	Hunting Groups
Steve Boyden	Landowner
Lew Potter	Landowner
Sterling Banks	cooperative Extension Service
Mike Smith	Agriculture Cons. & Stabilization Serv.
Gerald Jorgenson	Utah Dept. of Agriculture/SCS
Lee Broadbent	Soil Conservation Service

A technical action committee (TAC) was formed to carry out the needed resource inventories and to formulate the recommended plan for the steering committee. Members of the TAC are:

Name	Representing
Lee Broadbent (project coordinator)	Soil Conservation Service
Kathy Trott	U.S. Army Corps of Engineers
Ray Loveless	Mountainland Assoc. of Gov.
Mark Anderson	Weber Basin Water Cons. Dist.
John Mann	Utah Div. of Water Rights
Joe Borgione	Utah Div. of Water Rights
Chad Gourley	Utah Div. of Water Rights
Robert King	Utah Div. of Water Res.
Kent Summers	Utah Div. of Wildlife Res.
Rory Reynolds	Utah Div. of Wildlife Res.
David Darby	Utah Div. of Wildlife Res.
Steve Kearl	Utah Div. of Wildlife Res.
Terry Thatcher	United Sportsman
Roy Gunnel1	Utah Dept. of Environ. Quality
Rick Summers	Utah Dept. of Environ. Quality
Tom Toole	Utah Dept. of Environ. Quality
Todd Nielson	Soil Conservation Service
Bob Sennett	Soil Conservation Service
Art Haggen	Soil Conservation Service
Jana Johnston	Soil Conservation Service
Norm Evenstad	Soil Conservation Service
Richard Vigil	Soil Conservation Service
Gerald Jorgenson	Soil conservation Service
Mark Petersen	Soil Conservation Service
Steve Rogers	Soil Conservation Service
Jim Weston	Soil Conservation Service
Janice Richardson	Soil conservation Service
David Somerville	Soil Conservation Service

Jack Young	Soil Conservation Service
W.D. Robinson	Utah Dept. of Agriculture
George Hopkins	Utah Dept. of Agriculture
Sterling Banks	Cooperative Extension Serv.
Gil Hunt	Utah Div. of Oil, Gas & Mining
Wendy Fisher	Summit Land Trust

On May 15, 1991, a public scoping meeting was held in Coalville to identify resource issues and concerns, and to determine the degree of public interest in the project. Sixty-two individuals participated in the meeting.

From 1991 through 1993 the TAC and steering committee have met as needed to review progress in planning, to analyze resource inventories and to develop this plan.

Detailed work group reports that have been prepared by the Technical Action Committee are available for use at the Soil Conservation Service office in Coalville, Utah.

Introduction

Location of Planning Area

Chalk Creek Watershed lies 40 miles southeast of Ogden, Utah. The watershed is located in Summit County with the exception of approximately 4,000 acres in Uinta County, Wyoming. The city of Coalville is located within the watershed on the western boundary at the point where Chalk Creek merges with the Weber River above Echo Reservoir. The Summit Soil Conservation District serves this area (see location map on page 7).

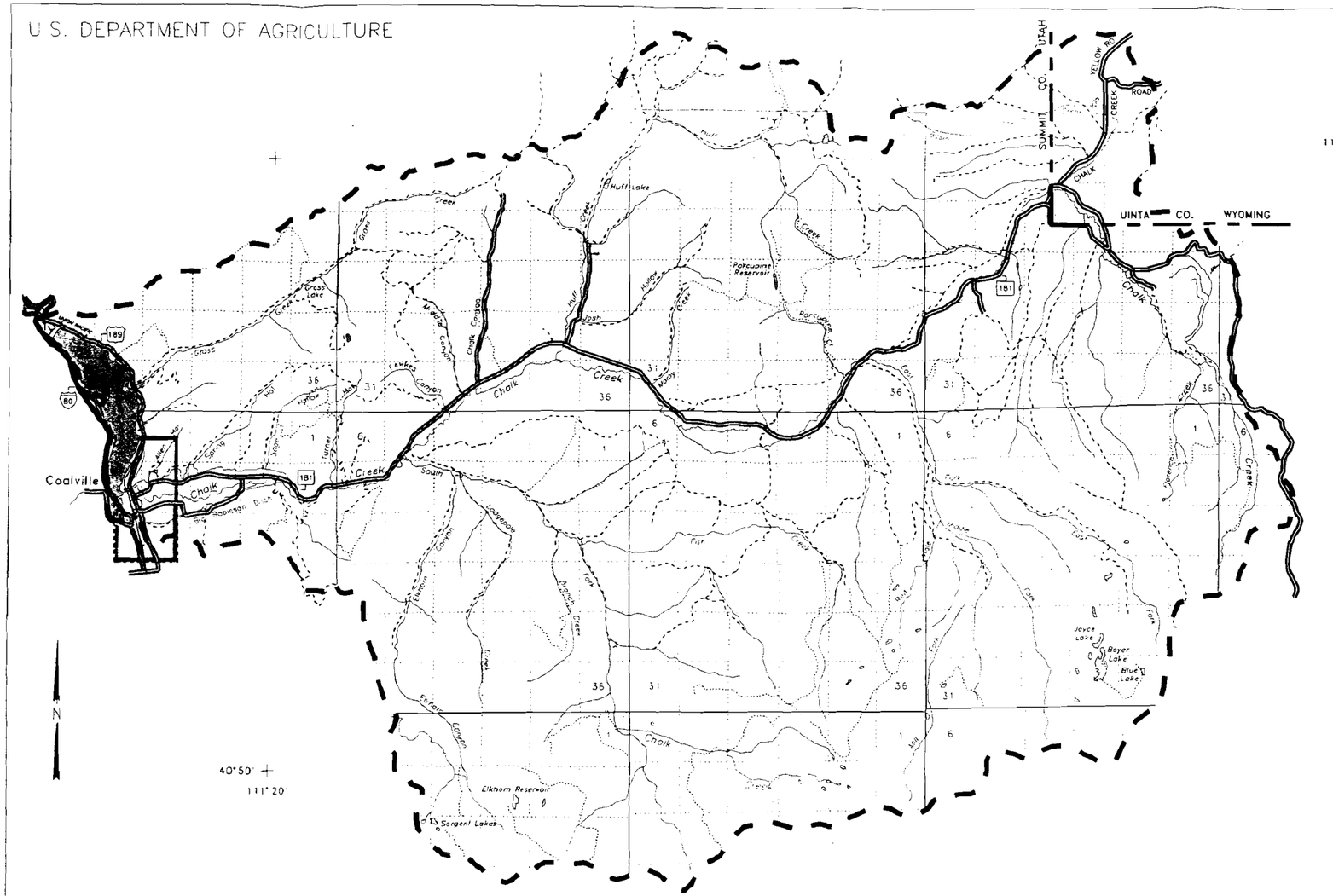
The watershed encompasses 176,000 acres (275 square miles) and is 24 miles long (east to west) by 16 miles wide (north to south) at its widest point. Elevations range from 5,560 feet to over 10,600 feet above sea level. Valley bottoms are relatively wide supporting good quality pasture and hayland. Alluvial fans occur at the mouths of many short side draws and canyons. The majority of the watershed is composed of mountainous rangeland.

Land Ownership

The majority of land within the watershed is privately owned. A few exceptions include: 40 acres of Bureau of Reclamation (USBR) land, and various small tracts of land adjacent to Echo Reservoir that are operated and maintained by the Weber River Water Users and the Utah Division of Parks and Recreation.

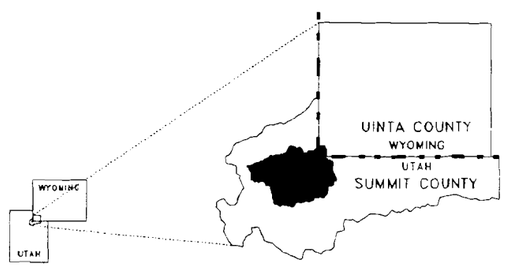
U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE



LEGEND

- WATERSHED BOUNDARY
- STATE LINE
- TOWNSHIP LINE
- SECTION LINE
- CITY LIMITS
- TOWN
- INTERSTATE ROUTE
- U.S. ROUTE
- STATE ROUTE
- PRIMARY ROAD
- SECONDARY ROAD
- LIGHT DUTY ROAD
- UNIMPROVED ROAD
- 4WD TRAIL
- RAILROAD
- DRAINAGE
- LAKE



VICINITY MAP

CHALK CREEK WATERSHED

PORTIONS OF

SUMMIT COUNTY, UTAH

AND

UINTA COUNTY, WYOMING

MILES

0 1 2 3 4 5

SOURCE
BUREAU OF THE CENSUS 1990 TIGER LINE DATA AND INFORMATION FROM SCS
FIELD PERSONNEL LATITUDE AND LONGITUDE GEOGRAPHICAL COORDINATE SYSTEM

REVISED APRIL 1994 1005347

SCS, NATIONAL CARTOGRAPHY & U.S. CENTER FORT WORTH TX 1994

Land Use

Resource inventories identified seven significant land uses within the study area. The land is 71 percent mountain rangeland, 25 percent woodland used for grazing, 2.5 percent pasture and hayland, 0.5 percent roads and dwellings and 1 percent oil and mining sites.

Rangeland	124,530 ac.
Irrigated Pasture/hayland	2,820 ac.
Wet Meadows/Riparian	1,800 ac.
Dry cropland	700 ac.
Roads/Dwellings	650 ac.
Oil and Mining Sites	1,500 ac.
Forest	44,000 ac.
TOTAL	176,000 ac.

Description of Planning Area and Major Resource Uses

The Chalk Creek Watershed is a tributary to the Weber River System which provides municipal, industrial, agricultural and recreational water to several hundred thousand water users. Chalk Creek is approximately 24 miles in length and flows from east to west the length of the watershed. In addition, Chalk Creek receives water from three major tributaries: South Fork, Huff Creek, and East Fork.

According to the State of Utah, the quality of water in Chalk Creek is to be protected for the following uses:

(Class 1C) - Domestic purposes with prior treatment as required by the Utah Department of Environmental Quality (DEQ).

(Class 3A) - Cold water species of game fish and other cold water aquatic life including the necessary aquatic organisms in their food chain.

(Class 4) - Agricultural uses including irrigation of crops and for livestock watering.

Chalk Creek has also been identified as a potential Class I trout fishery by the Division of Wildlife Resources (DWR). The criteria set by DWR for a Class I Trout Fishery consists of the following: 1) an area that is outstanding in natural beauty, 2) is readily accessible, 3) supports natural reproduction of trout, and 4) supports high fish population and production (200 lbs or more per acre). In addition, the state has classified Chalk Creek and its tributaries as anti-degradation segments.

Climate in the watershed is temperate. Temperatures range between -40 degrees (F) to 100 degrees (F). Winter daytime temperatures are around 20 degrees F and summer daytime temperatures are about 80 degrees F. Mean annual precipitation is 20.8 inches, with 13.9 inches occurring from October through April and 6.9 inches from May through September.

The soils in the watershed range from loams to clay loams. Most soils have a moderate clay content. They range from deep to shallow, but well over 80 percent are deep and occur on mountain side slopes. Alluvial bottoms have scattered patches of poorly drained wetland soils.

Two major geologic formations are found in the project area. The Wasatch Mountain formation covering 85 to 90 percent of the land; and a mixture of Upton sandstone and Arapein shale, which is a very weathered and eroded formation.

Based upon available data, the only known threatened or endangered species in the watershed is the bald eagle that winters in the area using cottonwood trees along the stream for roosting sites.

This watershed contains varieties of fish and wildlife which are generally common to the Rocky Mountain Great Basin. Mammals found in the watershed include: shrews, hares, rabbits, squirrels, marmots, gophers, mice, rats, beaver, muskrat, porcupine, foxes, coyotes, black bear, raccoon, weasels, mink, martens, badgers, skunks, otters, bobcats, mountain lions, mule deer, elk and moose. Some of the most common birds are forest grouse, sage grouse, and mourning doves. Many birds of prey occur in the area including the Golden Eagle, Bald Eagle, various hawks, falcons and owls. Riparian areas provide important nesting and foraging habitat for neotropical migrating birds.

The mountainous areas within the Chalk Creek drainage require about seven acres to produce one animal unit month (AUM) of available forage. The irrigated pastures and wet meadows require about 0.2 ac/AUM. The riparian pastures require an average of 2 ac/AUM. Farm yields are about 1 ton of alfalfa hay per acre on the dry farms while the irrigated fields yield 2 tons/acre plus about 1 AUM/ac of aftermath forage.

An average of 8,900 acre-feet of water is diverted annually from Chalk Creek for irrigation. Irrigated crops grown in the area include alfalfa hay, oats, barley, and irrigated pasture. Alfalfa yield under wild flood irrigation is estimated at 2 tons per acre. Fields that have been converted to sprinkler irrigation can yield 4.5 tons per acre with proper irrigation water management and fertilization.

There is little evidence that the deep water wells are affected by agricultural activities of the region. However, the shallow uncontained groundwater system in the area is affected. Inefficient flood irrigation tends to aggravate and overload this system. Excess irrigation water percolates and eventually causes banks along the creek to slump into the channel as the water exits the soil. Excess irrigation water also seeps into Coalville City sewer lines and often overloads the collection system and treatment plant.

Some groundwater recharge in the upper mountain area is lost due to excessive surface runoff from poor hydrologic condition rangelands.

According to water quality monitoring studies, Echo Reservoir is eutrophic due to excessive nutrient input (nitrogen and phosphorus). Based upon the Pacific Southwest Interagency Committee Sediment Yielding Modeling Procedure (PSIAC), Chalk Creek delivers an estimated 143 acre-feet of sediment to Echo Reservoir each year. About 58 acre-feet of this sediment is released into the Weber River each year. This sediment load seriously impacts downstream water treatment facilities and irrigation systems.

The watershed is significantly impacted by the "Uinta Over-Thrust Belt" oil field. Exploration, drilling and pumping activities associated with oil production have left many scars on the landscape. In 1992, according to oil, gas and mining records, 408,000 barrels of oil and 948 million cubic feet of natural gas were extracted from the Chalk Creek area. The Kern River and Questar natural gas pipelines traverse the watershed.

All of the farms in the watershed are livestock operations including one dairy and two mink farms, 12 large sheep and cattle operations, 33 smaller part-time operations, and 34 smaller full-time operations. Livestock summer on a combination of irrigated pastures, wet meadows, and high mountain summer ranges. The area supports more sheep than cattle but the percent of forage used by each is about equal. Most of the owners keep 4 to 5 horses either to work their stock or for recreational uses. One 320 acre tract of land is used to keep goats for making Greek cheeses.

Over 60 percent of the land is held by eight large operators. The average holding for the rest of the operators is about 1,000 acres.

List of Major Problems/Issues/Opportunities

Several resource problems have been identified in the Chalk Creek Watershed which are impacting water quality. A brief explanation of these problems and opportunities is listed below.

Range/Wildlife Land Erosion and Sediment Yield

A preliminary assessment of the Weber River Basin conducted in 1987 and in 1992, utilizing the Pacific Southwest Interagency Committee Sediment Yield Modeling Procedure (PSIAC), identified that the Chalk Creek drainage was contributing 143 acre-feet of sediment to Echo Reservoir each year. In addition to the sediment load there are significant amounts of nitrogen, phosphate and coliform bacteria that enter Echo Reservoir from Chalk Creek.

Historically wildlife and livestock have heavily used this watershed. Approximately 96,000 acres of range/wildlife land within the watershed are in need of treatment to restore vegetative cover and to reduce the rate of erosion to acceptable levels. About 2,000 acres of alluvial fans are in a degraded condition and do not provide their natural buffering and filtering function.

By applying Best Management practices (BMPs) to 12,000 acres of excessively eroding rangeland, sediment loading can be reduced by at least 48 acre-feet per year. On-site benefits would also be derived from increased forage production, improved nutrient management and reduced maintenance costs. Sediment yields from eroding rangeland accounts for approximately 30 percent of the total sediment produced annually from the watershed.

Stream Channel Instability

Stream channels throughout the watershed are very unstable due to years of excessive livestock and wildlife use of the riparian zone. Efforts to control musk thistle with chemicals have compounded the problem by killing willows, cottonwoods, aspen, hawthorns and other valuable riverside vegetation that is needed to stabilize the streambanks. Some irrigation diversion maintenance activities and flood control efforts such as straightening and confining the channel have contributed to channel instability.

In 1983 and again in 1984, huge floods ripped through this already weakened system and cut deep into the banks of Chalk Creek leaving the entire system in a degraded condition. Due to down-cutting during these floods, many riparian plants died from lack of water. Some areas of the stream channel have become braided due to high sediment loads. Without changes in management and physical help, many areas will continue to degrade. Natural healing will be a very slow process.

Eroding streambanks and channels account for approximately 50 percent of the sediment problem.

Stream Corridor & Riparian Zone Condition

Riparian areas within the watershed are in very poor to poor condition. Over the years there has been a serious decline in the quality and quantity of vegetation that is necessary to stabilize soils, prevent erosion, and foster desirable vegetative growth that will allow the riparian area to perform its pollution filtering function.

Excessive grazing, noxious weed control efforts, fires, cropping, and lack of woodland management have all had a negative impact on the Chalk Creek riparian zone.

The riparian corridor is critical for protecting water quality. A healthy riparian zone with well vegetated streambanks not only controls stream and channel erosion but also serves as a filtering system to control pollutants from reaching the creek. A healthy riparian zone also provides shade which reduces instream temperatures and enhances the fishery habitat.

A restored and well-managed stream corridor and riparian area will do a great deal to protect the quality of water in Chalk Creek, improve fishery habitat, reduce flood damage, and enhance the general aesthetic value of the entire watershed.

Pasture and Wet Meadow Utilization

There are an estimated 2,820 acres of irrigated pasture/hayland and 1,800 acres of wet meadow/riparian land located adjacent to Chalk Creek.

Livestock concentrations along with inefficient flood irrigation methods have caused a decline in streambank and stream channel stability. Sediment, nutrient, and coliform contaminants coming from the degraded riparian and meadow areas have had a detrimental affect on the quality of water in Chalk Creek, Weber River and Echo Reservoir.

Pasture management practices and streambank protection practices are needed to reduce water quality impacts from this source.

Oil, Gas, and Mining Activities and Roadside Erosion

Gully erosion and sediment deposition generated by oil, gas and mining development activities and road side erosion create approximately 5 percent of the sediment problem.

Irrigation Associated Problems

A seasonal high water table created by irrigation water causes additional nutrient input into Chalk Creek and ultimately into Echo Reservoir. Not only are nutrients leached from the soil but some of the excess groundwater enters the town sewer system resulting in higher treatment costs and reduced system capacity. The excess groundwater has also caused basement flooding in some of the homes in Coalville.

Annual maintenance efforts of poorly constructed irrigation diversions causes substantial amounts of sediment movement by the stream.

Irrigation return flows add to streambank instability by eroding streambanks and carry sediment and other pollutants into the stream.

Sediment From Geologic Sources

Geologic erosion from land slides, escarpments and other sources accounts for approximately 15 percent of the sediment problem.

Planning Goal and Objectives

The overall goals of this watershed project are to achieve water quality standards that meet the criteria set for the designated water uses for Chalk Creek and to restore Chalk Creek to a stable, naturally reproducing, trout fishery.

Objectives:

I. Reduce sediment coming from rangeland by 130,000 tons/year by applying Best Management Practices on 96,000 acres of eroding rangeland.

II. Protect and stabilize 10 miles of eroding streambanks/stream channel by applying BMPs that will result in the reduction of 8,200 tons/year of sediment and improvements in stream channel function and reduced flood damage.

III. Improve the pollutant filtering capabilities of 500 acres of riparian area and flood plains by implementing BMPs that will improve and restore vegetation to an effective condition as determined by the State Riparian Coalition.

IV. Reduce impacts to water quality caused by excess deep percolation, by surface runoff of irrigation water, and irrigation diversion maintenance by improving irrigation efficiencies.

V. Implement BMPs that will reduce gully erosion associated with road construction and off-road vehicle use.

VI. Implement BMPs that will control pollutants produced from oil, gas and mining activities.

VII. Implement BMPs that will improve fishery habitat and will result in at least 200 lb/acre production of game fish.

VIII. Facilitate the development of an acceptable plan which protects the natural resources and balances the harvest of wild game animals with economic returns throughout the watershed.

Activities Needed to Achieve Planning Objectives

Action items to achieve each planning objective will be implemented through voluntary participation in developing and implementing conservation plans with individual or groups of landowners. These plans will be tailored to address the specific resource problems and opportunities that pertain to each particular land unit.

Objective I: Reduce sediment coming from rangeland by 130,000 tons/year by applying Best Management Practices on 96,000 acres of eroding rangeland.

Action Item 1: Reseed 2,000 to 3,000 acres of eroding poor condition rangeland. This land is generally found on the south facing slopes.

Some chemical control of cheatgrass may be necessary where there are heavy infestations.

Best Management Practices: 342-Critical Area Planting; 550-Range Seeding; 472-Livestock Exclusion; 352-Deferred Grazing; 382-Fencing; 574, 642, 614, 516-Livestock Water Development; and 645-Upland Wildlife Habitat Management.

Benefits: By applying this treatment sediment will be reduced by approximately 24,000 tons with an associated reduction in phosphorous. These south slopes are the key winter range for deer and elk in the area. Ample feed on these slopes is critical for the survival of these herds through the winter. Consultation with Division of Wildlife Resources will ensure an appropriate seed mix to improve this resource.

Estimated cost: $60,000 - $70,000.

Action Item 2: Restore approximately 2,000 acres of alluvial fans to their natural function as a filter between the uplands and the streams.

It is proposed to use low cost labor to hand cut juniper that has invaded onto the fans from adjacent upland shale sites. About 800 acres could be treated in this manner costing $10/acre; totaling $8,000.

Brush control and range seeding will be used to induce a better plant cover for sediment filtering purposes. DWR will be consulted to ensure proper consideration of game herds utilizing the area.

Gully erosion will be reduced by using a series of grade stabilization structures constructed from cut juniper trees or a woven wire and geotextile type of structure.

A series of water spreader ditches across the contour of the alluvial fans will be constructed to control concentrated over-land flows.

Best Management Practices: 314-Brush Management; 645 Upland Wildlife Habitat Management; 550-Range Seeding; 410-Grade Stabilization Structures (gully plugs); 548-Grazing Land Mechanical Treatment; 640-Waterspreading; 638-Water and Sediment Control Basins; 528-Proper Grazing Use; 556-Planned Grazing System; 472-Livestock Exclusion; 352-Deferred Grazing; 382-Fencing; 574, 642, 516, 614-Livestock Water Development.

Benefits: There will be 4,000 tons of sediment prevented from entering Chalk Creek each year by applying these practices. These treated acres will provide an estimated increase of 1,000 AUMs each year for livestock or wildlife.

Estimated cost: $75,000 - $80,000.

Action Item 3: Apply BMPs on 96,000 acres of upland rangelands to increase the infiltration of water into the soil, thus reducing soil erosion.

To accomplish this, it will be necessary to control sagebrush on 25,000 acres of mountain rangeland. The areas to be treated are located in scattered patches throughout the watershed. No seeding is recommended on these sites because the existing understory will be released by the proposed brush management.

Planned grazing systems will be implemented to shorten the time of animal impact on any given range area.

Best Management Practices: 314-Brush Management; 528-Proper Grazing Use; 556-Planned Grazing System; 352-Deferred Grazing; 645-Upland Wildlife Habitat Management; 575-Stock Trails and Walkways; 382-Fencing; 574, 642, 516, 614-Livestock Water Development.

Benefits: An estimated 68,000 tons per year of sediment will be saved along with its associated phosphorous as a result of implementing these measures.

Estimated cost: Approximately $250,000 for brush control and $500,000 for fencing and water developments.

Action Item 4: The upper Chalk Creek Basin is the most severely eroding part of the watershed, with estimated soil losses of up to 20 tons per acre per year coming from about 7,000 acres. Silty clay loam soils mixed with shales are responsible for these high erosion rates. A series of gullies dissect almost every hillside. It is not feasible to control all erosion from this site, but a significant improvement is possible.

This portion of Chalk Creek is quite small and meanders slowly through a nearly level flood plain. It is recommended that the creek be diked in several places, creating wetland pastures behind each dike. These wetlands will filter sediment coming from the surrounding hillsides.

Other recommended actions include grade stabilization control structures, reseeding with plants adapted to this soil type and proper grazing use. A few of the more severely eroding hillsides may be fenced out and excluded from grazing altogether.

Best Management Practices: 410-Grade Stabilization Structures (gully plugs); 528-Proper Grazing Use; 352-Deferred Grazing; 556-Planned Grazing System; 472-Livestock Exclusion; 342-Critical Area Planting; 314-Brush Management; 657-Wetland Development or Restoration; 382-Fencing; 574, 642, 516, 614, 644, 645-Livestock Water Development.

Benefits: Approximately 34,000 tons of sediment per year along with its associated nutrients will be kept on site. Forage increases are estimated to be near 2,100 AUMs per year.

Estimated Cost: $75,000.

Objective II: Protect and stabilize 10 miles of eroding streambanks/stream channel by applying BMPs that will result in the reduction of 8,200 tons/year of sediment and improvements in stream channel function and reduced flood damage.

Implementation of the following action items to achieve this Objective is also essential to achieve Objective VII with its associated benefits.

Action Item 1: Stabilize approximately 3 miles of stream channel bottom in reaches where downcutting is a problem. These are generally reaches that have been straightened (channelized) in the past and where meander reconstruction is not presently a viable alternative.

Best Management Practices: 410-Grade Stabilization Structure; 584-Stream Channel Stabilization; 587-Structure for Water Control; 328-Clearing and Snagging.

Benefits: This will keep an average of 800 tons of sediment out of Chalk Creek each year along with the high phosphorous and bacteria levels carried with this sediment. Trout fishing will improve through these reaches and downstream. Prevention of stream down-cutting will prevent the water table from dropping along the floodplain. This in turn will prevent drying out and dying of important streamside plants that are needed to protect the banks and filter flood waters across the flood-plain. A greener, healthy riparian-zone-is also better for the wildlife that frequent this region.

Estimated cost: Approximately 30 structures at $2,000 each equaling $60,000.

Action Item 2: Stabilize approximately 5 miles of steep eroding streambanks by applying structural measures as needed to stabilize bank toe slopes, establishing protective vegetation, and management measures to protect the areas from grazing and browsing damage.

Best Management Practices: 322-Channel Vegetation; 342-Critical Area Planting; 328-Clearing and Snagging; 393-Filter Strip (overflow system); 580-Streambank Protection; 528-Proper Grazing Use; 530-Proper Woodland Grazing; 352-Deferred Grazing; 472-Livestock Exclusion; 556-Planned Grazing System; 645-Wildlife Upland Habitat Management; 382-Fencing; 574, 516, 614, 642-Livestock Water Development.

Benefits: This action will reduce sediment loading with its associated phosphorus and coliform bacteria to Chalk Creek by about 2400 tons/year. It will also improve the fishing and prevent the flood damage losses that occur on pasture cropland, residential and other types of land during flood events. It will keep the creek flowing in its present course and prevent the continual channel shifting that causes so much damage.

Estimated cost: Streambank stabilization - $130,000. (See Objective III for measures needed to establish protective riparian vegetation and to protect the riparian areas and streambanks from grazing and browsing damage.)

Action Item 3: Reconstruct 5.2 miles of single, meandering channel in stream reaches that are currently braided and unstable.

Best Management Practices: 582-Open Channel; 580-Streambank Protection; 322-Channel Vegetation; 393-Filter Strip (overflow system); 472-Livestock Exclusion; 528-Proper Grazing Use; 530-Proper Woodland Grazing; 352-Deferred Grazing; 556-Planned Grazing System; 645-Wildlife Upland Habitat Management; 382-Fencing; 516, 574, 614, 642-Livestock Water Development; 342-Critical Area Planting.

Benefits: This action will restore the water table to its former level allowing the flood plain vegetation to grow. Better vegetation will restore the hydrologic function of the flood plains allowing them to slow, filter and dissipate flood waters. Both wildlife habitat and fish stream habitat will improve. Approximately 3,000 tons of sediment with its associated phosphorus and coliform bacteria will be kept out of Chalk Creek annually.

Estimated cost: Meander reconstruction - $520,000. (See Objective III for measures needed to establish protective vegetation and to protect riparian areas from grazing and browsing damage.)

Action Item 4: Construct approximately 0.8 miles of meandering channel to move the stream away from the toe of active landslide areas.

Best Management Practices: 582-Open Channel; 580-Streambank Protection; 322-Channel Vegetation; 393-Filter Strip (overflow system); 472-Livestock Exclusion; 528-Proper Grazing Use; 530-Proper Woodland Grazing; 352-Deferred Grazing; 556-Planned Grazing System; 645-Wildlife Upland Habitat Management; 382-Fencing; 516, 574, 614, 642-Livestock Water Development; 342-Critical Area Planting.

Benefits: There are an estimated 800 tons of sediment carrying phosphorus and other pollutants that will be kept out of the creek and Echo Reservoir each year. The downstream spawning grounds and other fish habitat factors will improve.

Estimated cost: Meander construction - $42,000. (See Objective III for measures needed to establish protective vegetation and to protect riparian areas from grazing and browsing damage.)

Action Item 5: There are eight bridges where streambank erosion is caused by flow restrictions. Streambank protection and/or bridge reconstruction with proper flow design is needed.

Best Management Practices: 580-Streambank Protection; 584-Stream Channel Stabilization; 322-Channel Vegetation; 342-Critical Area Planting; 472-Livestock Exclusion; 352-Deferred Grazing; 382-Fencing; (UN) Bridge Reconstruction or Modification.

Benefits: About 400 tons of sediment with its associated phosphorous and coliform bacteria will be kept from entering Chalk Creek each year. Downstream fisheries will improve.

Estimated cost: Treatment of eight sites at $4,000 each equals $32,000.

Action Item 6: Headcutting has been identified in 14 small tributary side channels. These represent a large potential source of sediment pollution and need to be stabilized.

Best Management Practices: 410-Grade Stabilization Structure; 378-Pond; 580-Streambank Protection; 584-Stream Channel Stabilization; 382-Fencing; 574, 642, 516, 614-Livestock Water Development; 472-Livestock Exclusion; 352-Deferred Grazing; 556-Planned Grazing System; 520-Proper Grazing Use; 530-Proper Woodland Grazing; 645-Wildlife Upland Habitat Management; 640-Waterspreading; 322-Channel Vegetation; 342-Critical Area Planting.

Benefits: Headcutting of these side channels causes the water table to drop and riparian vegetation to die. Wildlife habitat is lost and downstream fisheries suffer from sediment loading. This action will prevent or reduce the extent of these losses. Sediment and its associated phosphorous and bacteria will be reduced by about 400 tons/year.

Estimated cost: $28,000

Action-Item 7: Irrigation return flows are contributing to bank instability and erosion along approximately 1.5 miles of streambanks. Best management practice measures to stabilize these banks include pasture management, irrigation water management, proper management of irrigation return flows and tailwater disposal structures. These measures are included in action items under Objective IV.

Best Management Practices: 587-Structure for Water Control; 388-Irrigation Field Ditch; 430-Irrigation Water Conveyance Pipeline; 442-Irrigation System, Sprinkler; 443-Irrigation System, Surface or Subsurface; 447-Irrigation System, Tailwater Recovery; 449-Irrigation Water Management; 446-Land Smoothing; 468-Lined Waterway or Outlet; 620-Underground Outlet; 552-Irrigation Regulating Reservoir; 393-Filter Strip; 382-Fencing; 472-Livestock Exclusion; 352-Deferred Grazing; 512-Pasture and Hayland Planting; 510-Pasture and Hayland Management.

Benefits: Some 400 tons of sediment carrying phosphorous and coliform will be prevented annually. Leaching and delivery of nutrients such as Nitrogen to Echo Lake will be greatly reduced. The banks along Chalk Creek will be less susceptible to severe flood damage. Also, less excess water will enter Coa'lville City's sewer system, which occasionally overloads the plant's treatment capacity.

Estimated Cost: These costs are included under Objective IV.

objective III: Improve the pollutant filtering capabilities of 500 acres of riparian area and flood plains by implementing BMPs that will improve and restore vegetation to an effective condition as determined by the State Riparian Coalition.

Action Item 1: The over-grazed and often abused riparian zone will be treated to restore its hydrologic integrity. There are scattered areas totalling 50 acres where little understory cover exists. These areas will be seeded and some shrubs, grasses and sedges will be transplanted into the critical areas. Using a dormant pole planting method, cottonwood, willows and other important riparian shrub species will be restored to the flood plain as well as at the water's edge. Some nursery root stock of other species will be planted on areas to add diversity and provide wildlife food and cover.

Livestock exclusion will be used in two ways. First, on some very fragile areas no grazing will be recommended to landowners. These locations will be taken out of the grazing rotation and permanently rested. second, livestock will be kept out of the area long enough to allow the riparian vegetation to fully recover and perform its proper functions. An estimated 100 acres will be permanently closed from livestock use. Another 400 acres will be rested long enough to allow the system to recover and then returned to grazing. Special riparian pasture management plans will be implemented to insure careful and proper use of this zone.

Management objectives of riparian pastures will include keeping riparian shrubs healthy, maintaining adequate vegetative cover to protect the soil and filter sediments, managing weeds, protecting nesting areas for birds, improving or maintaining wildlife cover and feed, and any other objectives outlined in individual conservation plans. For the most part, the best season for grazing is midsummer. This period is after the nesting season of most birds. Also the streambanks are dry enough that trampling by livestock will not cave them in. It also comes before cattle begin eating willows and other important shrubbery.

Best Management Practices: 322-Channel Vegetation; 342-Critical Area Planting; 472-Livestock Exclusion; 556-Planned Grazing System; 352-Deferred Grazing; 528-Proper Grazing Use; 530-Proper Woodland Grazing; 382-Fencing; 574, 642, 516, 614-Livestock Water Development (off-stream water sources); 644-Wildlife Wetland Habitat Management; 645-Wildlife Upland Habitat Management; 595-Pest Management; 510-Pasture and Hayland Management.

Benefits: Like the fan areas, the riparian zone should collect deposition, not yield sediment.. However, a special bank erosion study done for this project reveals that an average of 18,000 tons of bank material are transported out of Chalk Creek every year from these areas. Approximately 12,000 tons would be held in place.

Downstream water users will greatly benefit by a reduction in the amount of mud and silt plugging their treatment facilities. As vegetation grows and covers the streambanks it will evolve into a narrow, deep channel with undercut banks and cooler water temperatures, providing ideal trout habitat.

Additional benefits include cleaner water for use in irrigation systems, greater flood control with reduced overall damage and more rapid recovery of damaged areas.

Estimated cost: Applied conservation practices, including 90 miles of fencing for riparian pastures, will cost $270,000.

Livestock and wildlife water development including 10 miles of pipelines, 50 shallow wells, 10 ponds, livestock access points to the stream and water storage tanks equal $391,000. Another cost will be the loss of grazing for three years which equates to $36,000.

Total costs are estimated at $427,000.

Objective IV: Reduce impacts to water quality caused by deep percolation and by surface runoff of irrigation water.

Action Item 1: Twenty-two diversions for irrigation purposes exist along Chalk Creek. Of these 22 diversions, 16 are located in the upper watershed above the Narrows. Many modifications were made to the creek in order to facilitate the diversion of irrigation water. Some of the current diversions stabilize the channel since they are acting as grade control structures and are creating a stable channel bottom. A few of these diversions could be combined and improved.

There are many small diversions above the Narrows that could not economically be combined. These should be improved and made permanent thus eliminating the need to modify the creek each year to divert irrigation water. There are a total of four diversions that could be combined into two. Six diversions would need to be made permanent. An additional five diversions require maintenance, mainly consisting of adding more rock. The remainder of the diversions are located at and below the North Narrows diversion. These should be maintained whether or not they are used for diverting irrigation water, since they provide needed grade control along the creek.

Best Management Practices: 587-Structure for Water Control; 580-Streambank Protection; 584-Stream Channel Stabilization.

Benefits: The recommended improvements to the diversions would reduce sediment loading to the creek, enhance fisheries, increase stability of the creek banks around the diversions, and improve irrigation efficiencies thus reducing deep percolation.

Estimated cost: Diversion improvements - six structures at $10,000 per structure, Huff Creek diversions combined into one - $8,000. West of Ed Ames' property two diversions combined into one - $16,000. An estimated total cost of this work is $84,000, plus required maintenance on the remaining structures.

Action Item 2: In the lower watershed there is an opportunity to install a gravity pressure sprinkler system. This can be accomplished by combining all of the lower watershed ditches from the Narrows to Coalville City into one diversion and utilizing the existing North Narrows diversion. This would result in a conversion of 930 acres of flood irrigation to gravity sprinkler irrigation.

Best Management Practices: 587-Structure for Water Control; 430-Irrigation Water Conveyance Pipeline; 442-Irrigation System, Sprinkler; 449-Irrigation Water Management.

Benefits: Eliminate Chalk Creek bank sloughing due to poor irrigation water control. Retain applied animal wastes and fertilizers on the fields. Eliminate the overloading of Coalville sewer system by groundwater. Improve fisheries by keeping a more constant flow in the creek for a longer period of time. Increase the yield of alfalfa hay from 2.0 tons to 4.5 tons per acre per year.

Estimated cost: $1,190 per acre, totalling $1,106,700.

Action Item 3: Irrigation water management is needed on 2,820 acres of irrigated pasture and hayland. An active information and education program will be directed toward this conservation need. The Chalk Creek Water Quality Incentive Program (WQIP) will be used to encourage adoption of practices that improve irrigation water management.

Best Management practices: 449-Irrigation Water Management (facilitating practices in Actions 1 and 2).

Benefits: Loss of nutrients to deep percolation and surface runoff will be reduced. Sloughing of streambanks along irrigated fields will be reduced or eliminated. Reducing deep percolation of irrigation water will help eliminate the overloading of the Coalville sewer system by groundwater. This practice could result in more consistent streamflow levels that would benefit fish habitat and production.

Objective V: Implement BMPs that will reduce gully erosion associated with road construction and off-road vehicle use.

Action Item 1: Access roads and trails have been identified as a serious source of pollution throughout the project area due to the gullies they cause. Many of these roads are a result of intense oil and gas development activities.

Water bars will be constructed across the less used roads to intercept the water flow and prevent gully formation. To prevent erosion, diverted water would flow into ponds constructed near the roadside or spread onto an area with adequate vegetation. These ponds will act as both sediment settling ponds and temporary watering facilities for livestock and wildlife.

It is recommended that the summit County road supervisor and private landowners with support from the Utah Division of Oil, Gas and Mining and the oil/gas companies need to see that each culvert is properly set, regularly cleaned and maintained, and that the ground at the outflow is protected.

Best Management Practices: 570-Runoff management System; 378-Ponds; 393-Filter Strip; 640-Waterspreading.

Benefits: Annually, 10,000 tons are eroding as a result of road related problems in the watershed. About 6,000 tons could be saved on site. Waterholes scattered across the watershed will be used by both livestock and wildlife.

Estimated cost: To construct 300 bars at $100 each and 100 sediment ponds at $500 each, the total cost is estimated at $80,000.

objective VI: Implement BMPs that will control pollutants produced from oil, gas and mining activities.

Action Item 1: There are areas of bare ground caused by oil, gas and mining exploration and extraction activities. Most of these areas are small, but throughout the watershed they total about 1,500 acres and are a serious source of stream pollution. These open areas need to be seeded and other necessary measures such as land shaping, vegetative filter strips, contouring or controlled drainage outlets are needed to stop pollution from entering the streams.

Best Management Practices: 342-Critical Area Planting; 550-Range Seeding; 393-Filter Strip; 570-Runoff Management System; 472-Livestock Exclusion; 382-Fencing.

Benefits: There are about 1,500 disturbed acres losing 15,000 tons of soil yearly with oil and gas contaminants attached to soil particles; 10,000 tons could be saved. Downstream users and fisheries will receive the main benefit.

Estimated cost: $45,000.

Objective VII: Implement BMPs that will improve fishery habitat and will result in at least 200 lb/acre production of game fish.

Action Item 1: Approximately 40 miles of stream will be developed into a stable, naturally reproducing trout fishery. This can be accomplished in the following four ways:

-Reduce width/depth ratio in approximately 14 miles of stream channel by protecting streambanks and the stream channel from erosion (see Objective II for needed measures and estimated costs).

-Plant shrubby vegetation along 10-12 miles of streambank to provide shade and protection for fish (see Objective III for needed measures and estimated costs).

-Implement Irrigation Systems Improvements, and Irrigation Water Management Practices to allow for more efficient use of irrigation water and a more consistent supply of water (see Objective IV for needed measures and estimated costs).

-Protect approximately 500 acres of riparian area from overgrazing by restricting and planning livestock access to the stream (see Objective III for needed measures and estimated costs).

The irrigation diversion used by the Lower Chalk Creek Irrigation Company and the Robinson Ditch has prevented fish passage for upstream spawning for years. A series of rock drop structures could be constructed in a step pool fashion to allow upstream migration of fish. Another alternative is to use a fish ladder over the wall. The drop system would be more costly; however, it is more natural and would work more effectively.

Best Management Practices: 395-Fish Stream Improvement; 410-Grade Stabilization Structure; 580-Streambank Protection; 584-Stream Channel Stabilization; 322-Channel Vegetation; 342-Critical Area Planting; 587-Structure for Water Control; 595-Pest Management; 449-Irrigation Water Management; 393-Filter Strip; 382-Fencing; 472-Livestock Exclusion; 352-Deferred Grazing; 512-Pasture and Hayland Planting; 510-Pasture and Hayland Management; 528-Proper Use Grazing; 530-Proper Woodland Grazing; 556-Planned Grazing System; 516, 574, 614, 642-Livestock Water Development (off stream water source).

Benefits: An improved fishery would provide a recreational asset for the local community and out-of-town fishers.

Estimated cost: Rock drops - $20,000, or fish ladder $4,000-$5,000.

Objective VIII: Facilitate the development of an acceptable plan with landowners and the Division of Wildlife Resources (DWR) which will protect natural resources and balance the harvest of wild game animals with economic returns throughout the watershed.

Action Item 1: A conflict exists between landowners in the upper watershed and landowners in the lower watershed over wildlife. Large numbers of deer and elk winter on the lands of the lower watershed which causes depredation losses to alfalfa hay fields. These animals summer on the high mountain ranges and are hunted by members of private hunting clubs.

The lower landowners (whose resources are significantly impacted from winter and spring use by deer and elk) do not receive equal or adequate compensation for the depredation. The landowners in the upper watershed sell hunting rights to exclusive hunting clubs which hunt these same herds.

Recommendation: Develop a watershed hunting unit that distributes proceeds from the sale of hunting rights on an equitable basis to all landowners.

Best Management Practices: 645-Wildlife Upland Habitat Management.

Benefits: Implementation of this action item will facilitate better management of wildlife and forage resources in the watershed. Relations among the landowners and between the DWR and the landowners will improve. Landowners will be more willing to manage land for winter and spring wildlife habitat.

Estimated cost: Costs associated with this action item generally consist of time at meetings necessary to bring agencies and landowners to a successful agreement.

Action Item 2: Beaver have become a problem on Chalk Creek and the lower reaches of its tributaries.

Beaver keep stripping the stream flood plain of woody plants like willows, cottonwoods and aspen. Already in short supply, these deep rooted plants are necessary to help stabilize streams, stop bank deterioration and allow flood plain development. Beaver activity is inhibiting the reestablishment of this resource in the watershed.

The swift water, frequent flooding and high levels of debris carried by Chalk Creek and its tributaries make it impossible for beaver to dam this stream. Thus they build lodges by burrowing into the banks. Each burrow loosens the bank at that point. During major flood events these burrows collapse and serious bank erosion begins. Because damming the creek is impossible, beaver are attempting to dam irrigation systems, outlets, culverts, ditches and turnouts.

The Division of Wildlife Resources will clear the way to issue nuisance beaver trapping permits throughout the chalk Creek drainage. The Government Trapping Service can be used to manage beaver activity during the establishment years of willow and other plantings. Following establishment, landowners will be issued permits to trap or to allow others to trap those areas where beaver are still causing problems.

Best Management Practices: UN-Beaver Trapping

Benefits: These practices will facilitate the accomplishment of Objectives II and III which establish bank protection and improve the filtering function of the riparian zone flood plain. Also irrigation system maintenance will be reduced.

Estimated cost: $50,000

Information and Education Program

The Chalk Creek Watershed is ranked third on Utah's high priority list of nonpoint pollution water quality problems. An information and education program is necessary to inform and educate the general public, landowners, students and public officials about the problems associated with Chalk Creek and what methods are being used to solve pollution problems. This goal will be achieved through the implementation of the four specific objectives listed below:

1. Sixty percent of the landowners along Chalk Creek will be educated about Best Management Practices.

2. One thousand students in the three school districts in Summit County will be educated on water quality concepts.

3. Eighty percent of the residents in Summit County will be informed of the Chalk Creek Water Quality project and its goals through the use of news articles, pamphlets, videos, public meetings and tours.

4. A cooperative educational and informational program will be developed with the participating government agencies and personnel.

In order to accomplish these specific objectives the following activities have been proposed:

1. **Video -** Interview of landowners along Chalk Creek discussing the problems and solutions associated with the stream; in addition, show the successes implemented thus far on the stream and what can be done by landowners.

2. **Printed Material -** Produce several pamphlets/brochures/news articles showing what the objectives and accomplishments are in the project. This material would be used for general distribution in schools, public meetings, mailings, etc.

3. **Educational Meetings -** Meet with the general public, public officials, and students to inform them of the Chalk Creek project and other water quality concerns.

4. **Workshops -** Workshops involving landowners and students teaching them what they can do to improve the condition along Chalk Creek.

5. **Tours -** County and statewide tours involving landowners, public officials and agency personnel viewing successful water quality projects which can be implemented on the Chalk Creek Watershed.

6. **One-on-One Visits -** Personal visits made to landowners teaching and encouraging them to use BMPs, showing them the benefits of using such practices.

7. **Inschool Programs -** Go into the three school districts in Summit County to teach students water quality principles and to inform them about the Chalk Creek Project.

8. **Demonstration Sites -** Select three sites along the stream to show correct riparian management concepts and streambank stabilization items for landowners and public to view. Signs will be posted at the site showing what is being accomplished.

9. **Adopt-a-Stream Program -** Encourage youth and public service organizations to participate in Utah Adopt-A-Stream Program for important segments of Chalk Creek and its tributaries.

The table below shows estimated costs, responsible party and date completed as related to the proposed activities:

Output/Element	No. to be Completed	Responsible Party	Completion Date	Cost
Chalk Creek Water Quality Video	1	USU Ext,SCS,UDA	6/30/94	$4,000
News Articles	6	USU Ext.	Monthly Apr-Sept	N/C
Pamphlets/Brochures	2	USU Ext,SCS,UDA	4/30/94	$2,000
Educational Meetings	2	"	1st 5/30/94 2nd 11/30/94	$ 300
Workshop	1	"	7/31/94	$ 400
Tours	2	"	9/30/94	$4,000
Demonstration Sites	2	"	11/30/94	$3,500
Inschool Programs	15	USU Ext.	9/30/94	$ 500
One-on-One Visits	*	USU Ext, SCS	Monthly	**
Adopt-a-Stream	6	USU Ext./UDA/DEQ	Ongoing	3,000
Soil Testing	40	USU Ext.	Monthly	$ 500
Additional cost to carry out the proposed program		USU Ext.		$9,500
Total cost				$27,700

Monitoring and Evaluation

Monitoring and evaluation will be used to document progress towards achieving improved water quality conditions as nonpoint source control programs are implemented. The effectiveness of BMPs and whether the objectives of the Chalk Creek Coordinated Resource Management Plan are being met will also be documented.

All data collection and water quality sampling will be conducted by the Department of Environmental Quality. Monitoring of riparian vegetation, stream geomorphology and fishery population/productivity and photo points will be collected by the NPS Interagency Monitoring Work Group.

Land use and BMP implementation tracking will be conducted by the Soil Conservation Service and Summit Soil Conservation District.

The Utah Division of Wildlife Resources is monitoring the fishery at selected sites. They are conducting shocking studies to determine species numbers and production (in pounds) of each species.

Monitoring sites are located at critical points along the course of Chalk Creek. Information obtained will help determine the trend of water quality at that site, and if the BMP's applied are effective.

Water quality parameters that are being monitored in Chalk Creek drainage include TSS, total phosphorous, total coliform, fecal coliform, total dissolved phosphorous, TKN, NO_2, NO_3, NH_3, oil and grease, water flows, fish habitat, geomorphic and vegetation.

The eight official monitoring sites established by the Utah Department of Environmental Quality (DEQ) are at the following locations:

- -Chalk Creek at US-189 crossing
- -Chalk Creek above confluence with South Fork
- -So. Fork Chalk Creek above confluence with Chalk Creek
- -Chalk Creek 4 miles east of Upton
- -Chalk Creek above confluence with East Fork
- -East Fork above confluence with Chalk Creek
- -Chalk Creek at the Utah/Wyoming state line
- -Huff Creek above confluence with Chalk Creek

Specific monitoring procedures outlined by DEQ are found in the monitoring plan for the Chalk Creek Watershed.

Compliance with NEPA and Other Regulations

Action items proposed in this plan are covered in the Soil conservation Service National Program for Soil and Water Conservation, 1982 Final Program Report and Environmental Impact Statement. Specific actions will be implemented through individual or group conservation plans. In compliance with NEPA and SCS policy, SCS will prepare site-specific environmental evaluations (EE) before actions proposed in this plan are implemented. The EE will identify practicable activities needed to reduce or eliminate adverse impacts, or the need for an Environmental Assessment (EA) or Environmental Impact Statement (EIS) to assess the impacts of implementing a proposed action. As appropriate, these EE's will be documented in landowner/operator or group conservation plans.

The control of airborne dust and pollution are addressed in the Utah Air Conservation Regulations R446-1. SCS will address these requirements by designing projects to comply with R446-1.

Utah SCS has an established policy for compliance with the National Historic preservation Act (NHPA) of **1966** as amended, the Archaeological Resource Protection Act (ARPA) of **1979,** and the American Indian Religious Freedom Act (AIRFA) of **1978.** This policy will be adhered to when implementing any proposed action.

Changes in irrigation diversion points and stream alteration work will need to be permitted through the Utah Division of Water Rights.