A F F E C T E D E N V I R O N M E N T
CHAPTER 3

Chapter 3 describes the present condition of the environment of the Clark Canyon area that could be affected by the No Action and Preferred Alternatives. Effects of the alternatives are discussed in the next chapter.

Water Supply

The Beaverhead River joins the Big Hole and Ruby rivers near Twin Bridges to form the Jefferson River. Major tributaries of the Beaverhead include Grasshopper Creek, Blacktail Deer Creek, and Rattlesnake Creek. In all, the Beaverhead drains 3,619 square miles and had a 1935-2004 average flow at the mouth of 293,600 AF. Average annual flow for 1935-1963, before Clark Canyon Dam, was 281,600 AF. Average annual flow for 1964-2003 was 302,100 AF.

Clark Canyon Reservoir is the major reservoir on the Beaverhead River. It serves as the headwaters source of the Beaverhead, receiving inflows from the Red Rock River and Horse Prairie Creek. Storage allocations are listed in Table 3.1.

Table 3.1: Clark Canyon Storage Allocations

Allocation Pool	Top of Pool Elevation (feet msl)	Capacity (AF)
Dead Pool	5455	4
Inactive Pool	5470.6	1,057
Active Conservation	5535.7	123,099
Joint Use	5546.1	50,207
Replacement	5556.5	56,455[1]
Exclusive Flood Control	5560.4	79,075

[1] Replacement storage is a part of the Exclusive Flood Pool

Lima Reservoir, a state-owned structure on Red Rock River near Lima, is a major storage facility that influences inflow to Clark Canyon Reservoir. It was originally constructed in 1890 and most recently rehabilitated in 1992. Its primary purpose is to supply irrigation water to the Red Rock Water Users Association. The reservoir has a storage capacity of 75,180 AF at elevation 6581.3 feet msl.

Water Quality

Water quality in the Beaverhead River and Jefferson River basins is affected by many factors, including development of Clark Canyon Reservoir which altered the natural flows of the river. Other factors include:

- Mining
- Agriculture
- Silviculture

- Highway, road and bridge construction and maintenance
- Domestic wastewater lagoons
- Unpaved road runoff
- Land development and urbanization

The Beaverhead River flows from the reservoir to its confluence with the Big Hole River, forming the Jefferson River, approximately 71 miles downstream. The watershed is principally agricultural with livestock and forage production being the dominant land uses. Since water quality in the Beaverhead varies, the river has been divided into the following three reaches for this EA, as well as the Jefferson River:

Clark Canyon Reservoir and Tributaries

Clark Canyon Reservoir is at the confluence of Horse Prairie Creek with the Red Rock River (Location Map). Water from the reservoir is released into the Beaverhead River. The total drainage area of the reservoir is 2,260 square miles, with the two principal inflows being the Red Rock River and Horse Prairie Creek. The Red Rock River drains 1,580 square miles from primarily igneous and sedimentary mountains, while Horse Prairie drains 680 square miles. Principal land use in the drainages is agriculture, and there are many irrigation diversions.

Reclamation sampled water quality in 2001-2003 at five sites in the reservoir—including both sources of inflows and the tailrace (U.S. Bureau of Reclamation, 2003a). The sites are listed in Figure 3.1. Physical limnology, plankton analysis, nutrients, metals, organics, and hydro-acoustic fisheries data were collected. Water column profiles recorded from surface to bottom for temperature, dissolved oxygen, specific conductance, and pH. Zero to five meter (m) samples was collected for chlorophyll analysis. Integrated samples of phytoplankton (0-5 m) and zooplankton (0-15m) were collected at each reservoir site to identify species and density. Nutrient grab samples were collected from the top and bottom of the lake and analyzed for ortho-phosphate, nitrate, ammonia, and nitrogen.

Quality is affected by several factors, including tributary input, reservoir water levels, and contributing factors from land uses surrounding the lake. Most inflow to the reservoir is from Red Rock River and the water chemistry of the reservoir reflects this fact. Inflow from Horse Prairie Creek was often immeasurable due to upstream agricultural diversions.

Tributary Total Maximum Daily Load Status

The Red Rock River from Lima Dam to Clark Canyon reservoir is on Montana's 303(d) list (Montana Department of Environmental Quality (MDEQ), 2004) of impaired water bodies. Bank erosion, dewatering, fish habitat degradation, flow alteration, lead, zinc, metals, habitat alterations, and siltation are probable causes for concern about this reach's ability to support aquatic life and cold water fisheries, and to supply drinking water. Probable sources are agriculture, crop-related, grazing related, resource extraction, abandoned mining, habitat modification, and removal of riparian vegetation.

Figure 3.1: Map showing inflow, tailrace, and reservoir sampling locations (CC1-5).

Horse Prairie Creek from the headwaters to the reservoir is also listed as not supporting aquatic life and cold water fishery, and a drinking water supply. Probable causes are dewatering, flow alteration, and metals. Probable sources are crop-related and abandoned mining.

Beaverhead River (Clark Canyon to Barretts Diversion)

The first comprehensive water quality study of the basin was done to study effects of the reservoir on the Beaverhead (Smith, 1973). This study compared flows in the Beaverhead pre- and post-impoundment. Downstream of the reservoir, the river has higher flows in May-August compared to pre-impoundment conditions. This fact is also borne out when comparing reservoir inflows and discharges. Later summer months tend to have higher discharge than inflow due to irrigation demands, whereas during spring runoff and early summer, inflows generally exceed discharge. Similarly reservoir operations have had the effect of limiting daily temperature fluctuations for several miles downstream of the reservoir.

Data collected in 2001-2003 compared to that collected in 1973 indicated the overall reservoir conditions have changed little over the 30-year period. Data from the tailrace closely reflected the deep water pool in the reservoir, with the exception of dissolved oxygen. Dissolved oxygen levels in the tailrace were at higher levels than indicated by reservoir sampling due to substantial mixing in the outflow zone bringing dissolved oxygen levels to near saturation and within accepted levels.

According to Montana's 303(d) list (MDEQ, 2004), the Beaverhead River between Clark Canyon Dam and Grasshopper Creek is listed as not supporting aquatic life and cold water fishery, and a drinking water supply. Probable causes are bank erosion, dewatering, flow alteration, lead, metals, and habitat alterations. Probable sources are agriculture and abandoned mining.

Beaverhead River (Barretts Diversion to Confluence)

Barretts Diversion dam diverts water into the EBID canal, while the CCWSC has many diversion points directly from the Beaverhead River. A system of drains and wasteways conveys excess water from irrigated lands back to the Beaverhead River.

Reclamation sampled water quality within EBID (Figure 3.2) and the Beaverhead River in 2002-2003 (U.S. Bureau of Reclamation, 2003b). Six sites were sampled, three on the river affected by EBID (Barretts Diversion, Anderson Lane Bridge, and Geim Bridge) and three on return flow areas within the EBID (Stone Creek, Spring Creek, and the wasteway at the end of the East Bench Canal). These parameters were sampled (data are shown in Methods of Analysis):

- discharge,
- temperature,
- pH,
- conductivity,
- dissolved oxygen,
- total Kjehdahl nitrogen,
- total organic carbon,
- nitrate-nitrogen,
- ammonia-nitrogen,
- total phosphorous,
- ortho-phosphorous,
- major anions and cations,
- a quantitative ICP scan for trace metals, and
- herbicides, pesticides, and semi-volatiles.

Figure 3.2: Map showing sampling locations (in tan) for EBID.

In general, the study showed dissolved oxygen (milligrams/liter – mg/L), total dissolved solids (mg/L), temperature (degrees centigrade – ^oC), and conductivity (micromho/centimeter – μmhos) increase moving from Barretts Diversion Dam down the Beaverhead River. Most samples for ions and trace metals were below limits of detection. Nitrogen samples in return flows (sampled at Spring and Stone Creeks) were relatively high. Nitrogen levels in Spring and Stone Creeks were higher than expected and contribute to an increase in nitrogen in the Beaverhead River as water moves through the system (Table 3.2) Data results from the study (U.S. Bureau of Reclamation, 2003b) are included in Methods of Analysis.

According to Montana's 303(d) list (MDEQ, 2004), the 63-mile stretch of the Beaverhead from Grasshopper Creek to the mouth is listed as not supporting the beneficial uses of aquatic life, cold water fishery, and primary contact. Probable causes are bank erosion, dewatering, fish habitat degradation, flow alteration, mercury, metals, habitat alterations, and siltation. Probable sources are crop-related, grazing-related, land development, habitat modification, removal of riparian vegetation, and abandoned mines.

Table 3.2: Nitrogen Levels in the Beaverhead River

	Minimum	Maximum	Average	Notes
Barretts Diversion	0.00	0.00	0.00	Uppermost Beaverhead site. All samples below detection.
Anderson Lane	0.14	0.72	0.39	Middle Beaverhead Site. 6 samples above detection.
Stone Creek	2.68	7.27	4.78	Drains EBID lands. 8 samples above detection.
Spring Creek	0.50	2.91	1.41	Drains EBID lands. 8 sites above detection.
Giem Bridge	0.12	0.67	0.40	Lower Beaverhead Site. 8 samples above detection.
Terminal Wasteway	0.00	0.00	0.00	Returns unused water to river. All samples below detection.

Jefferson River (headwaters to mouth)

The Jefferson River is formed near Twin Bridges by the convergence of the Beaverhead and Big Hole Rivers. According to Montana's 303(d) list (MDEQ, 2004), the 83.6 miles stretch of river is listed as not supporting the beneficial uses of aquatic life support, cold water fishery, and drinking water supply and only partially supporting primary contact and industrial uses. Probable causes are dewatering, fish habitat degredation, flow alteration, lead, metals, other habitat alterations, siltation, suspended solids, and thermal modifications. Probable sources are agriculture, crop-related sources, resource extraction, abandoned mining, hydromodification, dam construction, flow regulation/modification, habitat modification, removal of riparian vegetation, and bank/shoreline modification/destabilization.

Ongoing Water Quality Studies and Other Considerations

Reclamation entered into a cooperative agreement with Montana State University beginning in 2004 to initiate a study of water distribution among the various entities withdrawing water from the Beaverhead River. In order to address the issues of water allocation, MSU identified major diversions from the river, identified major tributaries, and return flows. Data loggers were then installed to quantify the volume of water associated with each diversion, tributary, and area of return flow to establish a water budget for the basin. Additional data were gathered in 2005 and will be gathered in 2006, with a final report being issued at that time.

Reclamation entered into a cooperative agreement with Montana Tech in 2006 to assist with the finalization of an ongoing groundwater study which began in 2003. This study provides an opportunity to evaluate the groundwater system contributing to the Beaverhead River, inflowing tributaries, underlying aquifers, and area wetlands with little influence of surface water flowing in the East Bench Canal. This will allow evaluation of the nature and extent of recent supplemental well irrigation in the area, evaluation of the effects of pumping on the surface water, and will provide a numerical modeling tool for the evaluation of additional development which will provide opportunities to make the best management decisions.

MDEQ is in the process of completing the Total Maximum Daily Load for the Beaverhead River watershed. The earliest the MDEQ plans to complete the total maximum daily load (TMDL) is 2008. Reclamation will provide all available data from the above studies to MDEQ for inclusion into the TMDL planning and implementation phases.

Fisheries

Clark Canyon Reservoir, the Beaverhead River, and the Jefferson River provide fishery habitat for the native and introduced fish listed in Table 3.3. Fisheries in the reservoir and rivers are managed by MDFWP. Other creeks, streams, and rivers near the area—Red Rock River, Horse Prairie Creek, Grasshopper Creek, and Blacktail Deer Creek—would not be affected by the alternatives.

Clark Canyon Reservoir

The reservoir provides a diversity of habitat, with the lake environment and the two streams flowing into it. Heavy fishing pressure occurs on the reservoir, likely due to trout populations, unique species composition, easy accessibility by vehicle, and boat launch facilities.

The reservoir provides fisheries for introduced rainbow and brown trout, as well as native burbot, and mountain whitefish (Table 3.3). Westslope cutthroat trout and brook trout have also been found in the reservoir. Non-game species include white sucker, longnose sucker, common carp, and redside shiner. Hatchery rainbow trout are added annually, while the other species are wild and self-sustaining.

Rainbow stocking is generally done in early June to take advantage of a favorable thermal regime and the growth phase of the cladoceran zooplankton community. In the past, young-of-year fish were stocked, but management has shifted in recent years to stocking over-wintered yearling fish because they have a distinct survival advantage during stressful low water conditions (Oswald, 2004).

Fish populations and conditions in general depend on storage and surface area of the reservoir. Trout depend on adequate production of aquatic organisms to survive and grow. Oswald (1993) linked poor (declining) rainbow trout stocking survival and poor (declining) rainbow and brown trout condition factors to low reservoir surface acreage. Fisheries typically remain healthy in years where storage has remained over 60,000 AF at the end of the irrigation season, with optimum fishery conditions existing with pools over 100,000 AF. The threshold of 60,000 AF results in about 3,000 surface acres of lake available for primary production and is the suggested minimum pool for healthy fisheries by Oswald (1993) and Oswald (2005). Surface acreage drops as lake content decreases below 60,000 AF. Survival and growth of stocked and wild fish typically decline in years where storage drops below this level.

The reservoir Eagle Lake rainbow trout population became an effective wild brood source of fertilized eggs for rearing as over-wintered yearlings in 1995. Adult fish make spawning runs up Red Rock River and have been monitored by electro-fishing since 1986 (Oswald, 2004). Eggs are collected during monitoring, taken to a hatchery, reared, and planted in the reservoir and other locations. Since the program began, Clark Canyon has provided from 300,000-500,000 fertilized eggs annually (Oswald, 2002).

Table 3.3: Fish Species in the Reservoir and Rivers

Common Name	Scientific Name	Native or Introduced	Reservoir	Beaver-head	Jeffer-son
Rainbow trout	*Oncorhynchus mykiss*	I	X	X	X
Brown trout	*Salmo trutta*	I	X	X	X
Burbot	*Lota lota*	N	X	X	X
Mountain whitefish	*Prosopium williamsoni*	N	X	X	X
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*	N	X		
Brook trout	*Salvelinus fontinalis*	I	X		
White sucker	*Catostomus commersoni*	N	X	X	X
Longnose sucker	*Catostomus catostomus*	N	X	X	X
Common carp	*Cyprinus carpio*	I	X	X	X
Redside shiner	*Richardsonius balteatus*	I	X		X
Longnose dace	*Rhynichthys cataractai*	N		X	X
Mottled sculpin	*Cottus bairdi*	N		X	X
Mountain sucker	*Catostomus platyrhynchus*	N		X	X
Fluvial arctic grayling	*Thymallus arcticus montanus*	N		X	X
Flathead chub	*Platygobio gracilis*	N			X

Observations of Red Rock River during low-water in 2002-2004 found stream conditions too low to even sustain a spawning migration, so fish generally attempted to spawn in the very limited fluvial reach near the confluence with the reservoir. Without spawning conditions in Red Rock River, egg collection could not have taken place. Monitoring and egg collection will resume when drought conditions improve.

Like the rainbows, the wild and self-sustaining brown trout population is high during times of ample water in Red Rock River and the reservoir. Populations are lower and conditions are declining during drought years.

Native burbot reside in the lake, but very little is known about their life history requirements or population trends. They appear occasionally during creel surveys and are targeted by some anglers.

Beaverhead River

Before completion of Clark Canyon Dam in 1964, the confluence of Red Rock River and Horse Prairie Creek constituted the beginning of the Beaverhead River. Now, the river begins at the Clark Canyon Dam outlet works. For fishery evaluation purposes, the river in the affected area can be roughly divided into two sections based on flow regime. The upper reach includes from the outlet works downstream to Dillon. The lower reach is from Dillon downstream to the confluence of the Big Hole River.

Main game fish in the Beaverhead are brown trout, mountain whitefish, and rainbow trout (Table 3.3). Other river species are burbot, common carp, longnose dace, longnose sucker, mottled sculpin, mountain sucker, and white sucker. Fluvial Arctic grayling have been stocked unsuccessfully in the river. Stocking success has declined primarily due to drought conditions and low flows. As mentioned earlier, drought conditions have even halted trout egg collection in the Red Rock River.

Upper Beaverhead

The river between Clark Canyon Dam and Barretts Diversion Dam is generally a productive tailwater fishery dependent on reservoir releases. The river between Barretts Diversion Dam and Dillon is not as productive as the tailwater fishery. Summer flows are typically ample for fishery habitat, but winter flows can often be critically low. Habitat is characterized by a tight channel meandering through densely covered willow banks. Fish cover mainly consists of submerged and overhanging bank vegetation, undercuts, and long, deep pools (Montana Department of Fish, Wildlife, and Parks, 2005). This area, a Blue Ribbon Trout Stream, receives heavy use between May-November. Some years the fishing season is shortened because of low water levels in the river. Angler use has been concentrated in this reach of the river, with many anglers being out-of-region or out-of-state.

The Upper Beaverhead supports populations of brown and rainbow trout, with brown trout being the dominant species. Limited rainbow populations are supported, and trout populations are wild and self-sustaining. Brown trout spawn in the fall and the eggs incubate throughout the winter. They depend on ample, stable winter flows in the river for successful reproduction as well as overwinter survival of adults. According to Oswald (2003), fish sampling of the Hildreth section of the Beaverhead in 2002 indicated populations ranging from 399 18-inch or larger brown trout per mile in lower winter flow regimes (mean flow of ~50 cfs or less) compared to 832 18-inch or larger brown trout per mile following ample winter flow regimes (mean flow of ~350 cfs or more) in 1999 sampling. The same reach also supports populations of rainbow trout ranging from 150 to about 350 18-inch or larger fish per mile annually (Oswald, 2003).

Fish health and populations have been affected in the past by outbreaks of bacterial furunculosis and gas bubble disease during times of stress. More recently, fish health may be affected by the recent arrival of the exotic nuisance New Zealand mud snail, as well as whirling disease.

Lower Beaverhead

The Beaverhead below Dillon is downstream of diversions which divert the majority of storage water released from Clark Canyon Dam. This section typically has an altered hydrograph from natural conditions, with low spring/summer flows (decreased from upstream diversions) and then a rising hydrograph in the fall and winter months. Accordingly, fisheries in this reach tend to experience difficulties in summer months due to warm water temperatures caused by low flows coupled with warm ambient air temperatures.

According to MDFWP, brown trout and mountain whitefish populations in the lower river typically vary from 200-400 fish per mile, which are the lowest populations of the Red Rock, Beaverhead, Ruby, and Bighole study sections. (See MDFWP's comment in the Comments/Responses section of this report)

The upper Missouri River drainage is historical habitat for fluvial Arctic grayling, and they have been stocked in this reach of the Beaverhead several times. Although sampling crews have collected a few wild individuals over the past two decades, a population has not been successfully established. (MDFWP's comment in the Comments/Responses section).

Jefferson River

The Jefferson River is formed at the confluence of the Beaverhead and the Big Hole rivers near Twin Bridges. The Ruby River also contributes to Jefferson flows, entering the Beaverhead just south of where the Jefferson is formed. From Twin Bridges to Whitehall, the Jefferson River meanders widely through a grassy valley between the Continental Divide and the Tobacco Root Mountains.

The main game fish in the Jefferson are brown trout, mountain whitefish, and rainbow trout. Other fish species that occur in the river include burbot, common carp, flathead chub, longnose dace, longnose sucker, mottled sculpin, mountain sucker, redside shiner, and white sucker (Table 3.3). Fluvial Arctic grayling have been stocked in the Jefferson River twice, once in 2002 and once in 2003 (Montana Department of Fish, Wildlife and Parks, 2005). Prior to stocking, a few native fluvial arctic grayling have been observed in the Jefferson (MDFWP comment in the Comments/Responses).

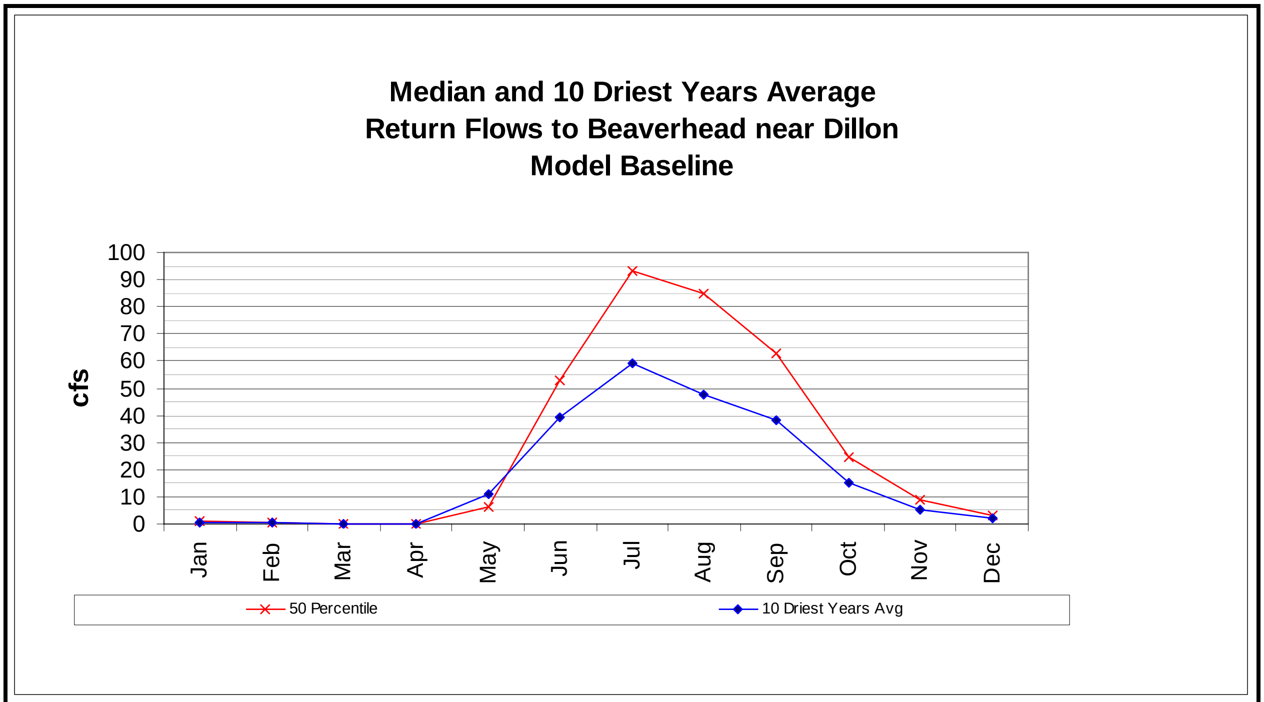
The Jefferson is extensively used for irrigation and is subject to dewatering in low-water years (Montana Department of Fish, Wildlife, and Parks, 2005). Fisheries in the Jefferson River typically experience the same issues with low summer flows and high temperatures as the lower Beaverhead.

Wetlands

Combination of shallow water, high nutrient levels, and primary productivity in wetlands is ideal for development of organisms forming the base of the food web. Wetlands attract an immense variety of insects, amphibians, reptiles, birds, fish, and mammals. More than a third of Threatened and Endangered Species, for instance, live only in wetlands, with nearly half using wetlands at some point in their lives. Wetlands improve water quality, offer flood protection, and control erosion. They are also important for hunting, bird watching, and photographing wildlife.

Wetlands associated with canals, laterals, and drains can be found throughout CCWSC and EBID. Most are palustrine, frequently referred to as marshes, swamps, bogs, or prairie potholes. They can also include ponds, lake shores, and areas surrounding streams or conduits. Water seeping from the canal prism flows underground to provide a supply during and after the irrigation season. Palustrine wetlands are the most common in the Clark Canyon Reservoir area, including areas with unconsolidated or aquatic bed bottoms, scrub/shrub-dominated wetlands, and forested wetlands like the riparian galleries found along the Beaverhead River.

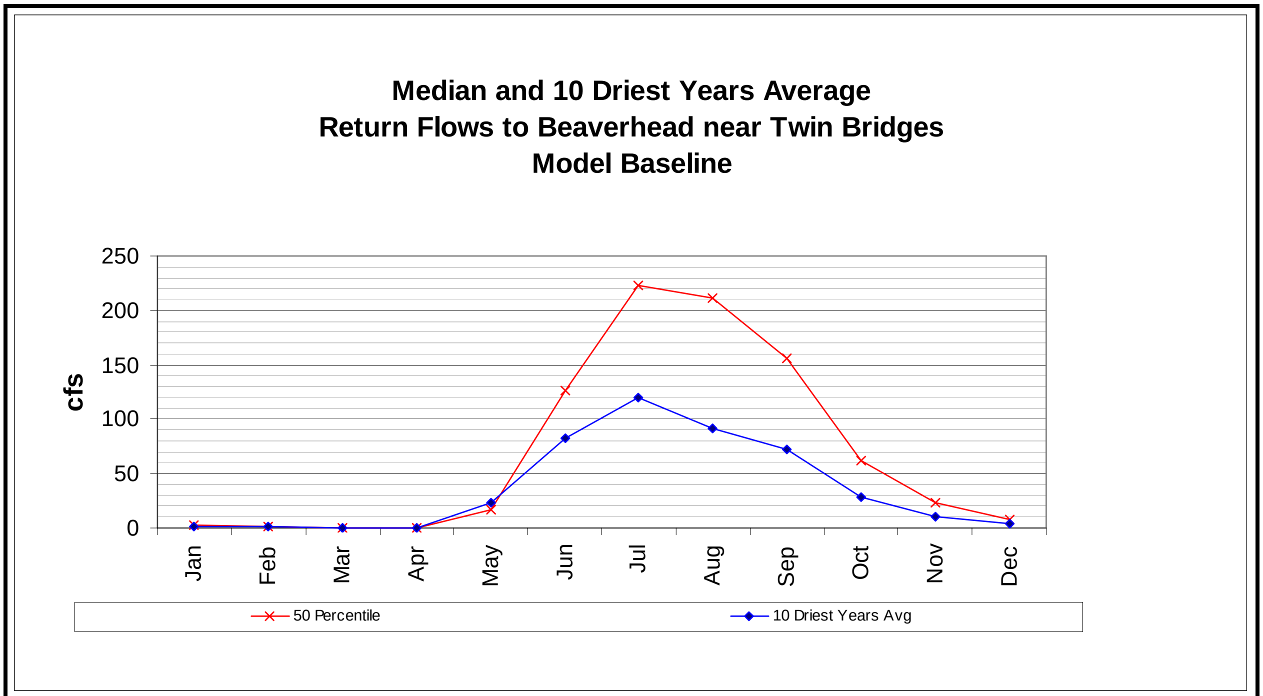
Return flows provide water to wetlands in the Beaverhead valley along the periphery of drains and in wetland areas located down slope of irrigation facilities. Figure 3.3 shows the median (mid-point) and the 10 driest years for return flows to the Beaverhead River near Dillon.



[1] **This graph represents return flows to the model "node" entering the river and does not represent the total discharge of the river at this station.**

Figure 3.3[1]: Return Flows to the Beaverhead near Dillion

Figure 3.4 shows median and the driest return flow years expected at Twin Bridges, Montana. As in the previous figure, return flows typically increase with the irrigation season, peak in July, and slowly decline.



[1] **This graph represents return flows to the model "node" entering the river and does not represent the total discharge of the river at this station.**

Figure 3.4[1]: Return Flows to the Beaverhead near Twin Bridges

Wetlands beyond those associated with irrigation facilities also occur in the region. Riverine wetlands are those associated with streams or conduits that convey running water exclusive of surrounding areas dominated by trees, shrubs, persistent emergents, or mosses. These wetlands can be found along all stream and river drainages in CCWSC and EBID. Lacustrine wetlands are deepwater habitats and shorelines associated with a topographic depression or dammed river channel. Clark Canyon Reservoir supports lacustrine, limnetic wetlands in generally deep water with an unconsolidated bottom. Lacustrine, littoral wetlands occur in water shallower than 1 meter (3 feet). These wetlands are found around the periphery of the reservoir and include deepwater habitat in CCWSC and EBID like natural wetlands and canals. They rely on high reservoir water levels to provide a period of inundation. Table 3.4 lists EOM (end-of month) return flows for median and the 10 driest years.

National Wetlands Inventory (NWI) mapping has not been completed for the Clark Canyon Reservoir area.

Table 3.4: Return Flows for the Beaverhead Stations

	Beaverhead near Dillon (cfs)	Beaverhead at Twin Bridges (cfs)
January	1.1	2.9
February	0.5	1.4
March	0.2	0.5
April	0.1	0.2
May	6.3	16.3
June	52.7	126.8
July	93.4	223.0
August	84.9	211.5
September	62.6	156.1
October	24.6	61.6
November	9.0	22.6
December	3.1	7.8

Wildlife

The intermontane valley of the Clark Canyon Reservoir area ranges from about two miles wide at the reservoir to less than a half-mile wide from the from the reservoir to Barretts Diversion Dam, at which point it widens to an average of 12 miles.

Lands surrounding Clark Canyon Reservoir are primarily short grass prairie with intermittent sagebrush habitat. Three riparian areas can be found around the reservoir, with willow and cottonwood habitat, cattail marshes, wet and semi-wet meadows, and exposed mud flats during drawdown. These habitats support a diverse variety of bird and animal species such as golden eagle, ferruginous hawk, chestnut-collared longspur, pygmy rabbit, red fox, antelope, and white-tailed deer. The wet and semi-wet cattail and willow dominated areas near reservoir inflows provide forage and nesting habitat for a myriad of wildlife species, including migratory birds.

Clark Canyon Reservoir is in the Beaverhead/Red Rock flyway for migratory birds. Exposed mudflats and shallow water provide a wealth of macro-invertebrates, a food source for migrating shorebirds. Shorebird and water bird species found during spring and fall migrations include the killdeer, spotted sandpiper, long-billed curlew, and common loon.

The Beaverhead River immediately below the dam is a “Montana Wildlife Viewing Area” in the Montana Watchable Wildlife Program.


Sandhill cranes in the Beaverhead Valley (Steve Cottom photo).

The river valley surrounding CCWSC and EBID are primarily used for agriculture, including irrigated pasture, crops, and fallow. Streams, reservoirs and wetlands are abundant throughout the valley, supporting a deciduous riparian forest primarily of willow species. Native and tame grasslands are found throughout the valley, also. This diversity of habitats supports both game and non-game species: white-tailed and mule deer are common. Predators include red fox, coyote, and cougar. Smaller mammals — beaver, muskrat, cottontail rabbit, jackrabbit, badger, mink, weasel, raccoon, porcupine, striped skunk, and several bat species—are also abundant.

Reptiles in the Clark Canyon Reservoir area include the short-horned lizard, painted turtle, racer snake, gopher snake, western rattlesnake, common garter snake, and western terrestrial garter snake. Amphibians in the abundant wetlands and riparian areas include western toad, northern leopard frog, and spotted frog.

The Beaverhead River valley is on the westernmost boundary of the central flyway and the easternmost boundary of the Pacific flyway. Over 150 species of migratory birds can be seen in the area over the course of the year. Common upland species include the long-billed curlew, horned lark, western meadowlark, cedar waxwing, gray catbird, mountain bluebird, and house wren. Waterfowl in the area include Canada goose, snow goose, mallard duck, pintail, American widgeon, green-winged teal, common merganser, and barrows goldeneye. Birds of prey include the bald eagle, golden eagle, northern harrier, sharp-shinned hawk, osprey, red-tailed hawk, and American kestrel.

Threatened and Endangered Species

The Endangered Species Act seeks to recover and conserve listed species and the ecosystems on which they depend. Section 7 (a)(2) of the act requires Federal agencies to consult with the U.S. Fish and Wildlife Service (Service) to ensure that Federal actions do not jeopardize listed species. The species described below include those provided by the Service that may be found in the action area. The action area defined for the threatened and endangered species section of this Federal action is defined as the Beaverhead Valley corridor, including portions of Red Rock River and Horse Prairie Creek, Clark Canyon Reservoir, the Beaverhead River, Beaverhead River Valley, and portions of the Jefferson River.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a threatened species. In Montana, it primarily inhabits forested areas along rivers and lakes, especially during the breeding season. Important year-round habitat includes wetlands, major water bodies, spring spawning streams, ungulate winter ranges, and open water areas. Wintering habitat may include upland sites. Nesting sites are generally within larger forested areas near large lakes and rivers where nests are usually built in the tallest, oldest, large diameter trees. Nest selection depends on maximum local food availability and minimum disturbance from human activity (Montana Bald Eagle Working Group, 1994).

Most nesting bald eagles nesting are found in the western third of Montana, although breeding pairs also may be found along many of the major rivers and lakes in the central part of the state and along the Yellowstone and Missouri Rivers in the east. They may be somewhat more seasonally dependent east of the Continental Divide than in the western part of Montana, for migrants from the north travel through Montana to reach their wintering grounds further south.

On May 24, 2005, (updated February 8, 2006), the Montana Natural Heritage Program provided Reclamation with a list of all known bald eagle nests in the vicinity (Table 3.5).

There are no known bald eagle nests at Clark Canyon Reservoir or the rock outcrops at Barrets Diversion Dam. Cottonwood forests along the periphery of the Beaverhead provide suitable nest sites. The rivers and reservoir provide foraging habitat. Clark Canyon Reservoir even provides winter foraging habitat during mild winters. The Beaverhead River provides additional forage species (fish and waterfowl) and may result in reduced prey abundance during extreme drought periods when winter releases from the reservoir are reduced.

Table 3.5: Eagle Nests

Territory Number	Nest Number	Township	Range	Section
038009	1	5S	7W	31
038025	1	8S	9W	9
038029	2	6S	8W	33
038009	3	5S	7W	20
038033	1	1S	5W	15
038005	1	9S	10W	21
038005	2	9S	10W	21
038005	3	9S	10W	21
038003	1	4S	7W	15
038022	1	3S	6W	22
038026	1	4S	7W	28
038026	2	4S	7W	29

Ute Ladies' Tresses

The Ute ladies' tresses (*Spiranthes divuvialis*) is a threatened species. This plant is a perennial orchid that arises from tuberous roots and flowers in August-September. It is known to grow in wetlands and swales in broad valleys, and at habitat margins with calcerous carbonate accumulation.

On February 8, 2006, the Montana Natural Heritage Program provided Reclamation with a list of all known Ute Ladies' Tresses in the vicinity (Table 3.6).

Table 3.6: Ute Ladies' Tresses

Survey Site	Number of plants counted	Last observation	Latitude	Longitude
Beaverhead River	1	Aug 1996	452414N	1122530W
Beaverhead River Valley	55	Aug 1997	452919N	1122219W
Albers Slough	277	Aug 1997	451823N	1123510W

These three sites are either located on private land or state trust land. According to the site description from the Montana Natural Heritage Program, these sites are not adjacent to the Beaverhead River or within the boundaries of Albers Slough; these survey site names are used as the closest identifying feature. Other potential habitat can be found throughout the Beaverhead Valley.

Canada Lynx

The Canada lynx (*Felis lynx*) is a threatened species found in the mountains of western Montana. Home range sizes vary between 10-243 square acres. Lynx are non-migratory, but movements of 90-125 miles have been recorded in Montana. Canada lynx east of the Continental Divide generally occur in subalpine forests between elevations 5,413-7,874 feet. Throughout their range, shrub-steppe habitats may provide important linkage habitat between the primary habitat types. Within these habitat types, disturbances that create early successional stages—fire, insect infestations, or timber harvest--provide foraging habitat (Montana Natural Heritage Program, 2005).

The lynx is not known to inhabit the area of potential effect but has been documented in Beaverhead County. The montane habitat in the mountains surrounding Clark Canyon Reservoir provides suitable habitat and forage.

Grizzly Bear

The grizzly bear (*Ursus arctos horribilis*) is a threatened species found in the mountainous regions of western Montana. Grizzlies in Montana primarily use meadows, riparian areas, mixed shrub fields, timbered areas, sidehill parks, and alpine slabrock habitats. Although no true migration occurs, grizzlies often exhibit discrete elevational movements from spring-fall following food availability (Montana Natural Heritage Program, 2005). Grizzlies are generally found at lower elevations in spring and higher elevations during mid-summer and winter. The grizzly was primarily a plains species in the past occurring throughout most of eastern Montana.

The grizzly is not known to inhabit the action area but has been documented in Beaverhead County. The montane habitat in the mountains surrounding Clark Canyon Reservoir provides suitable habitat and forage.

Gray Wolf

The gray wolf (*Canis lupus*) is a threatened species found in experimental populations in western Montana. It exhibits no particular habitat preference but typically establishes territories where prey is abundant (Montana Natural Heritage Program, 2005). Wolves are opportunistic carnivores that predominantly prey on large ungulates including mule deer, elk, and moose. This species is not migratory but may move seasonally within their territory and disperse widely. Male wolves in northwestern Montana can move an average of 70 miles from their natal territory and females 48 miles before establishing a new territory or joining an existing pack (Montana Natural Heritage Program, 2005).

The gray wolf is not known to inhabit the action area but has been documented in Beaverhead County. A forage base for the wolves exists in the area around Clark Canyon Reservoir and much of Beaverhead County.

Social and Economic Conditions

Social and economic conditions studied in this EA include population, income, employment, recreation, and agriculture in Beaverhead and Madison counties, the two counties that constitute the region that could be affected by the alternatives.

Overall population has steadily grown in the region, except for the decrease Madison County experienced from 1950-1970 (U.S. Bureau of Census, 1995). From 1970-2000, however, both counties grew consistently: Beaverhead County's population increased 37.94% and Madison County's increased 14.22% On average, Beaverhead County increased .76% annually, while Madison County increased .28% annually (U.S. Bureau of Census, 2000). Compared to the State of Montana the counties have grown slower than the State average. The State of Montana's population increased 1.05% annually. The following table (Table 3.7) shows the population of the counties and the state from 1950-2000.

Table 3.7 Population

	1950	1960	1970	1980	1990	2000
Beaverhead	6,671	7,194	8,187	8,186	8,424	9,202
Madison	5,998	5,211	5,014	5,448	5,989	6,851
Montana	**591,024**	**674,767**	**694,409**	**786,690**	**799,065**	**902,195**

Source: U.S. Bureau of Census, 1995 and 2000.

Income

The 1998 total combined personal income of $299,836,000 in the two counties increased to $368,192,000 in 2002 (Table 3.8). The total average combined personal income for 1998-2002 was $333,670,000 (U.S. Bureau of Economic Analysis, 2005). Average total personal income for the state of Montana for the years 1998-2002 was $20,665,370,000 (U.S. Bureau of Economic Analysis, 2005). Madison and Beaverhead counties accounted for 1.615% of the total income for the state.

Table 3.8 Personal Income ($1,000's)

	1998	1999	2000	2001	2002	Average
Beaverhead	$180,867	$185,184	$197,005	$204,348	$211,342	$195,749
Madison	$118,969	$126,409	$135,390	$151,988	$156,850	$137,921
Total	**$299,836**	**$311,593**	**$332,395**	**$356,336**	**$368,192**	**$333,670**

Table 3.9 shows total personal income and income per person (per capita income) for 1998-2002. Average per capita income for the two counties for the period was $20,778. The Montana average per capita income was $23,077 which is more than the per capita income for the two counties.

Table 3.9: Per Capita Income

	1998	1999	2000	2001	2002	Average
Beaverhead	$19,804	$20,164	$21,416	$22,500	$23,524	$21,482
Madison	$17,602	$18,587	$19,707	$22,040	$22,533	$20,094
Average	**$18,703**	**$19,376**	**$20,562**	**$22,270**	**$23,029**	**$20,778**

Employment

The civilian labor force is considered to be people 16 years of age or older either employed or actively seeking employment, excluding those not seeking employment or those in the armed forces. Beaverhead County had 7,338 people in the civilian labor force in 2000, while Madison County had 5,516 (U.S. Bureau of Census, 2005). Table 3.10 from the U.S. Census Bureau shows a breakdown of area employment by industry. Agriculture, forestry, fishing, hunting, and mining accounted for 19.3% of the earnings in Beaverhead County and 20.7% of the earnings in Madison County. Beaverhead County had an unemployment rate of 3.8%, while Madison County's unemployment rate was 5.2 %.

Table 3.10: Major Industries by % of Total Earnings

	Beaverhead	Madison	Average
Agriculture, forestry, fishing and hunting, and mining	19.34%	20.67%	20.01%
Construction	7.03%	13.16%	10.10%
Manufacturing	4.49%	5.21%	4.85%
Wholesale trade	2.14%	0.92%	1.53%
Retail trade	9.22%	10.22%	9.72%
Transportation and warehousing, and utilities	4.47%	4.29%	4.38%
Information	1.94%	1.39%	1.67%
Finance, insurance, real estate, and rental and leasing	3.86%	4.00%	3.93%
Professional, scientific, management, administrative, and waste management services	3.60%	4.29%	3.95%
Education, health and social services	25.99%	16.25%	21.12%
Art, entertainment, recreation, accommodation, and food services	10.25%	10.30%	10.28%
Other services (except public administration)	2.52%	4.30%	3.41%
Public administration	5.15%	5.00%	5.08%
	100.00%	100.00%	100.00%

Source: U.S Bureau of Census, 2005

Recreation

Recreational Activities

Recreation activities in the area (Clark Canyon Reservoir and Beaverhead River) consists of land and water-based activities that take place primarily from May 1-Labor Day weekend in early September (see the "Recreation Section" following). In winter, there is also ice fishing when conditions are appropriate.

Clark Canyon Reservoir and Barretts Diversion Dam provide regional camping and water based recreation opportunities for the communities surrounding the dam and reservoir, as well as for other Montanans or out-of staters. According to the Institute for Tourism and Recreation Research (2004), about 50% of the visitors were Montana residents, followed by Idaho (9%), Utah (8%), and California (5%).

The Benefits Transfer approach was used to determine recreation values for specific recreational activities. This methodology for calculating recreation benefit values is based on using values from previous economic research which have similar types of recreation and locations. The values were based on publications by the Institute for Tourism and Recreation Research (2005); U.S. Forest Service; and J.C. Bergstrom and Ken Cordell. The recreation values were indexed to 2005 using the Consumer Price Index to adjust for inflation.

Recreation activities participation percentages were based on Institute for Tourism and Recreation Research (2004). The top five recreational activities were fishing, scenic viewing, camping, power boating, and walking/hiking. Hunting is also an important recreational activity for the area, but was not listed in Table 3.11 because it typically falls outside of the peak recreation season of May1 to Labor Day. Table 3.11 lists the percentages for these activities. They were used to allocate the total recreation visitation to activities which have an established recreation benefit value. For those activities without a specific benefit value or classified as "other activities," a general recreation benefit value was assigned.

Table 3.11: Recreation Activity Percentages

Recreation Activities	Percentage of Total Recreation
Fishing	19.41%
Camping	10.47%
Power boating	7.37%
Picnicking	4.71%
Swimming	2.57%
Sunbathing	2.15%
Scenic viewing	18.19%
Walking/hiking	9.47%
Visit historic sites	6.90%
Photography	5.61%
Other activities	13.15%
Total	**100.00%**

Recreation visitor days were obtained from Recreation Specialists at the recreation site. Total average recreation visitor days for Clark Canyon Reservoir (including the river access directly below the dam) based on a five-year average are 59,112 annual visits.

Recreational Benefits Results

Recreation benefits were determined by taking the annual total visitation estimates per recreation use and multiplying this number by the benefits received each day from each recreation use. Table 3.12 shows the results. It should be noted that values in the EA were for reservoir based recreation only and used net economic measures for the daily values and they only relate to the historical operation of the reservoir. Tail-water fishery values were not included. Reclamation recognizes that flows below the dam in the river and the associated fishery have economic value above and beyond that in the reservoir.

There are a number of economic net value estimates for Montana for trout fishing. A survey of those estimates can be found in the "Economic Valuation Studies of Fish and Wildlife Resources in Montana by John Duffield, University of Montana, 2003. While not specific to the Beaverhead, they can be expected to be good approximations of the values to be found in western Montana trout waters. In 2005 dollars these would range from $34 per day for resident and $203 for nonresident (USFWS -Net Economic Values for Wildlife-Related Recreation in 2001) to $82 per day for resident and $303 nonresident (Upper Missouri River 1997 values). Using these values and the 1989 to 2003 average of usage statistics from the Beaverhead and Big Hole River Recreation Rules EA (Sperry, 2005), the river usage has a value between $3.3 million and $5.2 million annually.

Table 3.12: Recreation Benefits

Recreation Activities	Annual Recreation Visits	2005 Values	Total Benefit Value ($)
Reservoir Fishing	11,474	$52.66	$604,221
Camping	6,189	$47.26	$292,492
Power boating (includes waterskiing and jet skiing)	4,357	$35.53	$154,804
Picnicking	2,784	$31.61	$88,002
Swimming	1,519	$39.55	$60,076
Sunbathing	1,271	$35.88	$45,603
Scenic viewing	10,752	$23.73	$255,145
Walking/hiking	5,598	$49.84	$279,004
Photography	3,316	$76.26	$252,878
Visit historic sites	4,079	$72.89	$297,318
Other activities	7,773	$35.88	$278,895
Total	**59,112**		$2,608,440

Agricultural Economy

Agriculture is extremely important to the economy in both Beaverhead and Madison counties. Cattle were first raised commercially in 1857 in the Beaverhead Valley, and agricultural settlement began as early as 1862. Primary crops grown in the region include alfalfa and small grains (wheat, barley, and oats) to feed livestock. Livestock cattle ranching is the predominant agricultural operation in both counties.

In order to accurately display the benefit that irrigated agriculture brings to the Beaverhead Valley, a farm budget method of analysis was used for estimating irrigation benefits for CCWSC and EBID. The two contract water users operate very similarly and thus it was determined that one set of budgets and results would be done for both of them.

With this method of analysis, two budgets are completed: one with irrigation as it currently exists and one with irrigation removed. The method depicts two representative farms, one that reflects the typical full time irrigated farm in the area, one that reflects the typical full time dryland farm. The irrigated farm should be large enough to fully employ the farmer. The dryland farm is the same size farm with cropping patterns changed to dryland patterns. In the dryland budget, it was assumed the land investment would stay the same but that most irrigation-related equipment was sold and the land returned to dryland farming. The difference between these two budgets was the benefit (or lack of benefit) that existed because of irrigation.

Budget returns of the farm “with irrigation” were estimated at $120.67/acre. Budget returns of the farm “without irrigation” were $75.29/acre, a difference of $45.38. That was the annual per- acre irrigation benefit. The total irrigated agricultural annual benefit for CCWSC and EBID would be $2,802,714 [(28,055 + 33,706) X $45.38].

Recreation

Recreation opportunities in southwestern Montana and the Beaverhead Valley are abundant. Local and area residents are provided several types of recreation opportunities, including (but not limited to) fishing (flat water and stream), camping, power boating, picnicking, swimming, hiking, and wildlife viewing. Out-of-area visitors may visit southwestern Montana as they pass through the area. They may also intentionally come to the Dillon area to recreate or fish the upper Beaverhead River, a tailwater fishery created by Clark Canyon Dam that has been classified as a blue ribbon trout stream. Fishing in this stretch of the Beaverhead River gets heavy use, due to easy access, as well as good fishing that can be experienced.

Clark Canyon Reservoir and Barretts Diversion Dam are part of the East Bench Unit and provide recreational opportunities with campgrounds and recreation sites maintained and operated by Reclamation. Other Federal recreation sites and private campgrounds are also located nearby. The Bureau of Land Management manages land near Clark Canyon Reservoir and the Beaverhead River.

Commercial opportunities also exist in the project area with outfitters and guides taking clients on fishing outings on Clark Canyon Reservoir and fishing float trips down the upper Beaverhead River. Many of these outfitters use Reclamation lands and facilities to access the water and launch watercraft. All commercial activities on Federal lands need to be permitted in order for the Federal government to receive fair market value for the use of these Federal lands and facilities.

Clark Canyon Reservoir

Clark Canyon Reservoir provides recreational opportunities for a wide region. The area also attracts people from out-of-state to fish or who are just passing through.

Recreation facilities surrounding the reservoir include a total of eight developed and primitive campgrounds, a marina (currently closed), two day-use areas, three fishing access sites, an interpretive site, seven boat ramps (one low-water, two normal, three small craft, and one currently unusable), and a wildlife trail. The campgrounds range from well defined campsites with camping pads, parking spurs, campfire rings, and wind breaks, to primitive camping sites with few facilities and few or no defined parking spaces.

Barretts Diversion Dam

Barretts Diversion Dam includes 38 acres primarily used for recreation. The site is suitable for day use and camping with recreational vehicles or tents. There are about 22 undefined campsites, a group shelter, a boat ramp, and 4 toilets. The day use area is very popular with Dillon residents who often come in groups by reserving the shelter or pavilion. The area is also very popular with fishermen. The boat ramp serves as the last take out facility for anglers drifting the Beaverhead River before reaching the diversion dam.

Other Resources Potentially Affected

Water conservation, cultural resources, noxious weeds, and prime and unique farmlands were also studied for possible effects from the alternatives.

Water Losses/Conservation

The water use efficiency of the East Bench Unit can be broken into two components: the water conveyance or delivery efficiency and on-farm efficiency components.

The water conveyance system of CCWSC consists of earthen ditches that convey water from the Beaverhead River to the irrigated croplands of its shareholders. The majority of the conveyance facilities were constructed in the mid to late-1800s. The conveyance ditches are of earthen construction that traverse the lighter soils (loam, silt loam, fine sandy loam) of the Beaverhead Valley. Ditch losses, estimated to be approximately 45% of the water diverted, are typical of earth constructed water conveyance ditches.

The EBID's conveyance system consists of a main canal and a series of laterals to provide irrigation water to serviceable lands. The canal, constructed in the 1960s, is primarily of earth construction. Between the 1996-2005 irrigation seasons, it was estimated that EBID delivered an average of 53% of all water diverted from the Beaverhead to the lands of its members. Table 3.13 displays the volume of water diverted from the Beaverhead River, the volume delivered to the farm turnouts of the EBID conveyance system, and the delivery efficiency.

Table 3.13: Water Diverted from the Beaverhead River

Year	Diverted (AF)	Delivered (AF)	Delivery Efficiency (%)
1996	90,617	50,606	56%
1997	78,476	41,312	53%
1998	79,668	43,304	54%
1999	89,151	48,571	54%
2000	90,944	49,675	55%
2001	65,204	35,452	54%
2002	49,742	25,993	52%
2003	26,858	14,739	55%
2004	0	0	
2005	34,688	12,994	37%

The inefficiency of EBID conveyance system consists of two major components, operational spills and seepage losses. Operation spills occur for two primary reasons: the first is that sufficient water surface level is required in the canal system to make farm deliveries, with excess water returned to the river. The second is that length of the canal requires some excess water to be in the system to meet the demands of the irrigators. EBID attempts to coordinate between irrigators who want to stop irrigating and those who want to start irrigating. At times, this leads to some excess water in the conveyance system that is spilled into the system's wasteways.

The second major component, seepage loss, occurs because the canal is of earthen construction. Water seeps from the canal into the ground and raises the groundwater table in the vicinity of the conveyance system. Typically the conveyance system is less efficient at the beginning of the irrigation season, improving as the irrigation season progresses and as the local groundwater table rises to intercept the canal and laterals.

The on-farm efficiency of CCWSC shareholders is estimated to vary from 40% efficient for flood irrigation applications to 75% efficient for sprinkler irrigation applications. At present, approximately 22% of CCWSC's shareholders lands are irrigated with flood irrigation, 78% irrigated with sprinkler irrigation.

The on-farm efficiency of EBID members is estimated to vary from 40% efficient for flood irrigation to 75% efficient for sprinkler irrigation. At the time of this report, approximately 1% of EBID member's lands are irrigated with flood irrigation and 99% with sprinkler irrigation.

Both the CCWSC and EBID have conducted water conservation measures on their delivery systems in the past. This includes such things as canal lining and piping laterals. These water conservation measures will continue and will be outlined in water conservation plans. In accordance with Section 210 of the Reclamation Reform Act of 1982 (P.L. 97-293), both CCWSC and EBID are legally required to draft water conservation plans. Section 210 states that "each district that has entered into a repayment contract or water service contract pursuant to Federal reclamation law or the Water Supply Act of 1958, as amended (43 U.S.C. 390b), shall develop a water conservation plan which shall contain definite goals, appropriate water conservation measures, and a time schedule for meeting their water conservation objectives." The negotiated contracts with both entities will contain an article that requires them to be in compliance with Section 210(b) of the Reclamation Reform Act of 1982.

The EBID submitted an updated water conservation plan for review and comment on May 3, 2001, in accordance with the Reclamation Reform Act of 1982 and Reclamation policy. Their water conservation plan contained definite goals, appropriate water conservation measures, and a time schedule for meeting their water conservation measures. EBID will be required to update and submit their water conservation plan to Reclamation in 2006 with updated water conservation goals and a schedule.

The CCWSC submitted an updated water conservation plan in 2004 in accordance with the Reclamation Reform Act of 1982 and Reclamation policy. Their water conservation plan contained definite goals, appropriate water conservation measures, and a time schedule for meeting their water conservation measures. CCWSC will be required to update and submit their water conservation plan to Reclamation in 2009 with updated water conservation goals and a schedule.

Federal assistance is available although limited, to help implement water conservation plans. Entities required to develop water conservation plans are encouraged to seek funding from other sources as well, such as state grants, to supplement their own funds to implement the specific measures identified in their plans.

Both CCWSC and the EBID will be contractually required to establish reserve funds and annually contribute to them until a negotiated ceiling is achieved throughout the term of their contracts. The reserve funds are intended to provide the entities with a source of funding to cover emergency situations and to provide a source of funds to modernize and improve the efficiencies of their systems. Once sufficient balances are achieved, CCWSC and the EBID's reserve funds could be used to help implement their water conservation plans or make other improvements. Reclamation's permission is required before the reserved funds may be tapped to help fund system improvements.

Cultural Resources

Cultural resource describes both archaeological sites and the “built environment” such as dams, roadways, and buildings. The National Historic Preservation Act (NHPA) and other Federal laws and regulations protect and promote scientific study of cultural resources, specifically historic properties. Historic properties are any prehistoric or historic district, site, building, structure, or object which meet certain criteria outlined in the NHPA. Examples are archaeological sites such as tipi-rings, bison kills, or camp sites, and historic sites such as homesteads, irrigation canals and structures, and bridges.

Section 106 of the NHPA requires Federal agencies to: 1) consider the affects of an undertaking (for example, issuing water service contracts) on historic properties, and 2) consult with the State Historic Preservation Office, tribes, interested parties, and the public regarding these affects. Before conducting Section 106, the Area of Potential Effect (APE) must first be identified. Reclamation has determined the APE includes lands irrigated by CCWSC and EBID.

Noxious Weeds

The Soil and Moisture Conservation Act and the Federal Noxious Weed Act require Federal agencies develop a program to control undesirable plants on lands under its jurisdiction. Noxious weeds can be a serious environmental problem to natural resources and are capable of rapid spread and can potentially render lands unfit for beneficial uses.

Noxious weeds targeted for containment and suppression around Clark Canyon Reservoir are: whitetop (*Cardaria draba*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), and spotted knapweed (*Centaurea maculosa*). All are defined by Montana’s State Noxious Weed List as “currently established and generally widespread in many counties of the State.”

Reclamation has a cooperative agreement with Beaverhead County to control noxious weeds on its lands and occasionally hires a private herbicide applicator for particularly troublesome areas. In CCWSC, individual ditch riders control noxious weeds on the delivery system, or CCWSC hires weed management from a private herbicide applicator. EBID uses their staff to control noxious weeds on the irrigation delivery system. Routine O&M activities also reduce noxious weed infestations in CCWSC and EBID.

Prime and Unique Farmlands

“Prime farmland” has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other crops with minimum need for fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion as determined by the U.S. Secretary of Agriculture. Prime farmland also has an adequate and dependable water supply from precipitation or irrigation.

“Unique farmland” is land other than prime farmland that is used for production of specific high-value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables (Natural Resources Conservation Service, 2002). Generally, additional farmland of statewide importance includes soils that are nearly prime, producing high yields of crops when treated and managed according to acceptable farming practices.

Population growth, demographic changes, preferences for larger lots, expansion of transportation systems, and economic prosperity have contributed to increases in agricultural land being converted to non-agricultural use (Natural Resources Conservation Service, 2002). The Farmland Protection Program has made it possible for the Federal government to purchase conservation easements of prime, unique, or other productive soil farmlands from willing land owners.

Many irrigated lands in the Beaverhead River valley or on the East Bench—including lands served by CCWSC and EBID—are categorized as prime farmlands or locally important farmlands (Kris Berg, Personal Communication, 2005). In many instances, these lands would not meet the criteria if they were not irrigated.