

CHAPTER 1 - LAND-USE PLAN

Introduction

The U.S. Bureau of Reclamation (Reclamation) has developed the *Draft Box Butte Reservoir Resource Management Plan* (DRMP) to guide land use and resource management decisions. The RMP will help ensure that public resources are used wisely, while considering the needs and desires of the public. Box Butte Reservoir water level management is outside the scope of this RMP and therefore will not be addressed. Reclamation and the Mirage Flats Irrigation District entered into a repayment contract January 1, 1951. The available water supply to the District is the natural flows of the Niobrara River and the storage waters available for release above the established reservoir shutoff elevation. Reclamation is required by the Reclamation Act of 1956 to provide irrigation districts holding long-term water service contracts the first right to a stated share of the available water supply. See Chapter 5 for additional information.



Purpose and Scope

The purpose of the RMP is to establish a 10-year plan for the conservation, protection, enhancement, development, and use of resources at Box Butte Reservoir. The RMP reflects current physical, biological, and social conditions at the reservoir. Reclamation intends for the land and water resources to be used according to current standards, therefore, this plan should be updated and amended as necessary to meet current needs.

To meet requirements of the National Environmental Policy Act, a Categorical Exclusion Checklist was prepared to address the implementation of this RMP. (See Appendix C1)

The area considered in this RMP is comprised of 2,260 acres acquired for Box Butte Dam and Reservoir, surrounding lands, and associated facilities. Land use, recreation, fish and wildlife management and administration, agency responsibilities, and reservoir operations are discussed in the RMP. The specific land uses for Box Butte Reservoir are recreation, wildlife, and reservoir operations.

Authority

This project was authorized for construction on April 26, 1940, under the Water Conservation and Utilization Program (53 Stat. 685).

Title 28 of Public Law 102-575, Section 2805 (106 Stat. 4690, Reclamation Recreation Management Act of October 30, 1992), provides Reclamation with the authority to prepare this RMP.

Agency Coordination

Preparation of the Box Butte Reservoir RMP is a cooperative effort between Reclamation and the Nebraska Game and Parks Commission (Commission). According to Lease Agreement #14-06-700-3816-A (included in Appendix A1), the Commission is the administering agency for recreational facilities and activities of Box Butte State Recreation Area and for wildlife management activities of the Box Butte Wildlife Area. The Commission's fishery division is responsible for the Box Butte fishery. This agreement, effective March 1, 1995, is in effect for a term of 25 years. Both agencies will work together to ensure the RMP remains current, as resource standards may change over the remaining term of this lease.

The Commission has developed the Box Butte Wildlife Management Area management plan (See Appendix A2). The Commission does not plan on developing a management plan for the State Recreation Area. A current Lake Management Plan is in place and serves as the fishery management plan (See Appendix A3). These plans contain management objectives and strategies for

Public Involvement

Based on the limited facilities and visitor use at Box Butte, it was decided a user survey was not necessary. Initial scoping letters were sent to appropriate local, state, and Federal agencies, Native American tribes, organizations and other interested groups soliciting comments and concerns about the management of Box Butte Reservoir and surrounding lands. A public notice was published in local newspapers, and also posted on Reclamation's website seeking public comments for development of the "Draft Box Butte Reservoir RMP" (DRMP).

Copies of the DRMP along with land and water use maps were mailed to all the target publics. In addition, copies of the DRMP were made available for review at the Fort Robinson State Park, Commission District Office in Alliance, NE, Nebraska-Kansas Area Office (NKAO), McCook Field Office, and the Alliance, Chadron, and Hemingford public libraries. The public was invited to send any written comments, suggestions, and/or changes to the NKAO. A public notice was published in local newspapers and posted on Reclamation's website. The Draft RMP was also posted on Reclamation's website.

Maintaining effective public relations is a high priority of both Reclamation and the Commission. The Commission uses a wide variety of methods to promote the area to the public and provide information and education. Weekly news releases, monthly magazines, video and digital photography, regulations and informative brochures, special publications, special events, and media liaison functions are conducted on a statewide basis. In addition; newsletters, new releases, public surveys, weekly hunting and fishing reports on the Commission website, and one on one communication with the area users are also valuable public relation tools. As demand and variety of recreational opportunities increases, information and education efforts will also increase.

Environmental Setting

Location and General Description

Box Butte Dam and Reservoir is part of the Mirage Flats Project. The Dam and Reservoir are located on the Niobrara River approximately 23 miles southwest of Chadron, Nebraska, and 28 miles northwest of Alliance, Nebraska. The Niobrara River originates in Wyoming and flows in an easterly direction to Box Butte Reservoir about 135 miles downstream from its origin.

Box Butte Dam was completed by Reclamation in April, 1946. The Mirage Flats Unit consists of the Box Butte Reservoir with 29,161 acre-feet (AF) storage capacity, the Dunlap Diversion Dam, and associated canal and laterals to irrigate 11,662 acres. Reclamation has transferred the operation and maintenance responsibility of the Mirage Flats Project to the Mirage Flats Irrigation District. The project was designed for irrigation with secondary benefits for recreation, fish and wildlife. See Table 1 for additional Reservoir Statistics.

Vater Surface at 1.O.C. (acres)	2,260
	1600
Total Land (acres)	660
Operations (acres)	47
Wildlife (acres)	433
Recreation (acres)	180
Conservation pool (acre-feet)	27,769
Shoreline length at T.O.C. (miles)	14

Table 1- Reservoir Statistics

The top of the active conservation storage at elevation 4007.0 ft. corresponds to the crest of the uncontrolled service spillway. The surcharge capacity is above the crest of the uncontrolled service spillway. There is also an uncontrolled auxiliary (emergency) spillway above elevation 4009.0 ft. after the fuse plug washes away. (see Figure 1)

When the reservoir is at the top of conservation pool (elevation 4007.0), water backs upstream approximately 4 miles from the dam. The reservoir has a shoreline length of approximately 14 miles with a water surface area of 1,600 acres. The total storage of Box Butte Reservoir is 45,901 AF. The reservoir capacity includes 188 AF of dead storage, 2,204 AF of inactive storage, 27,769 AF for irrigation. There is no flood control pool at Box Butte Reservoir.

Box Butte Dam is an earth and gravel embankment with a controlled irrigation outlet works and two uncontrolled spillways. The dam's crest length is 5,508 feet with a structural height of 87 feet above the original river bed. The top of the irrigation pool is 4,007 feet above mean sea level. Figure 1 depicts the Box Butte Reservoir allocations.



Figure 1 – Box Butte Reservoir Allocations

Environmental Characteristics

Physiography and Geology

The Mirage Flats Project lies within the Niobrara River Basin in northwestern Nebraska. Geographically this portion of the basin is characterized by flat tablelands of the High Plains Section of the Great Plains Physiographic Province. The tableland topography has been greatly modified at many points by erosional forces of the Niobrara River and its tributaries making the terrain rolling to rough. The Niobrara valley becomes entrenched and varies from one-fourth to one-half mile in width. In this area, the northern boundary of the basin is coincident with the Pine Ridge Escarpment which forms the border between the High Plains and the un-glaciated Missouri Plateau. Land surfaces slope generally southeastward from the escarpment.

Over its west-to-east meandering course of some 450 miles, the Niobrara River drops from an elevation of 5,200 feet to 1,200 feet above mean sea level. River elevations in the project area vary from approximately 3,970 feet msl at Box Butte Dam to 3,640 feet near the eastern edge of the unit.

Climate

The climate of the Box Butte Reservoir area is characterized by frequent changes of weather. Annual precipitation averages 18.2 inches, 80 percent of which occurs during the growing season of April through September. Precipitation is generally light in the winter and commonly falls as light snow. Occasionally there is heavy snow and persistently cold weather. Moisture entering Nebraska from the south is often shunted to the east before reaching the Panhandle; therefore, the area receives less rainfall when compared to the rest of the state. (See figure 2)

The prevailing winds are from the south and southeast during the spring and summer months, and from the north and northwest during the remainder of the year. The average wind velocity in the area is about 12 miles per hour. Winds of fairly high velocity lasting from three to five days are common. Tornadoes have occurred in the general vicinity, but are generally rare.



BOX BUTTE RESERVOIR

Figure 2 – Box Butte Reservoir Precipitation/Inflow

The frost-free period is an average of about 142 days. During the summer months, daytime temperatures frequently exceed 90° F. Summer nights are generally cool to warm and are conducive to plant growth. Winter months are characterized by persistent cold and winds. Temperature extremes on record are

37°F and 100°F. Additional climatic and inflow data for the last 10 years can be seen in Table 2.

Year	Total Precipitation (inches)	Total Evaporation (acre-feet)	Inflow (acre-feet)
1998	18.10	3,530	17,119
1999	18.98	4,113	16,574
2000	19.67	4,321	18,078
2001	18.53	3,611	16,668
2002	9.71	3,450	15,715
2003	16.99	2,778	12,456
2004	16.15	2,465	12,527
2005	17.78	3,060	16,464
2006	14.77	2,892	10,391
2007	13.06	2,374	11,674

Table 2 – Climatic Conditions

Vegetation

The following is excerpted from the Nebraska Game and Parks Commission's Nebraska's Natural Legacy Project. This narrative provides an overview of the plant diversity found in the Box Butte Reservoir region. The Natural Legacy Project is a blueprint for conserving wildlife and their habitats.

"Two distinct prairie types occur in the ecoregion: shortgrass and mixed grass. Shortgrass prairie communities are dominated by short statured grasses such as buffalograss, blue grama, side-oats grama, and purple threeawn. More than 100 species of forbs including milkvetches, scarlet guara, cutleaf ironplant, spine-fruit prickly pear, purple locoweed, slender-flower scurfpea, prairie coneflower, and scarlet globe mallow can be found interspersed with grasses. The low precipitation in the shortgrass prairie ecoregion, in conjunction with grazing, causes most shortgrass vegetation to rarely exceed 10 inches in height.

Mixed-grass prairie in the ecoregion is typically dominated by blue grama, prairie sandreed, threadleaf sedge, needle-and-thread grass, little bluestem, and western wheatgrass. Grass height can reach 18-24 inches in height but is often shorter in this ecoregion due to local management and precipitation. Shrubs found in mixedgrass prairies include skunkbush sumac, winterfat, fringed sage, snowberry, yucca, and broom snakeweed. More than 100 species of forbs can be found including scarlet guara, dotted gayfeather, skeletonplant, cutleaf ironplant, lemon scurfpea, and scarlet globe mallow.

Within the mixedgrass prairie type there are two unique communities. The northwestern mixedgrass prairie tends to be dominated by western wheatgrass and blue grama, and may include big sagebrush, silver sagebrush, rubber rabbitbrush,

greasewood, and yucca. The (western) loess mixedgrass prairie is dominated by typical shortgrass prairie species if grazed intensely, but on slopes or lightly grazed areas taller grasses like little and big bluestem, switchgrass, and sideoats grama become more common. Leadplant and sandsage are the most common shrubs, where eastern red cedar has not invaded. Common forbs include western ragweed, fringed sage, prairie coneflower, scarlet globe mallow, scarlet guara, broom snakeweed, and others.

The sandhills dune prairie and sandsage prairie (Sandhills borders prairie) is recognized mainly by the high proportion of sandsage but also includes sand bluestem, blue grama, prairie sandreed, needle-and-thread, and yucca. Forbs in this community include sand-lily, desert goosefoot, plains sunflower, bush morning-glory, and showy ipomopsis. Sandhills prairie is dominated by prairie sandreed, hairy grama, and sunsedge, and shrubs include leadplant, dwarf prairie rose, western poison ivy, and yucca. Forbs include stiff sunflower, bush morning glory, plains gayfeather, brittle prickly pear, hairy puccoon, desert goosefoot, winged pigweed, field snake cotton, etc.

Sandage prairie in the southern part of the ecoregion is dominated by prairie sandreed and needle-and-thread, shrubs such as sandsage and yucca, and forbs that are similar to those found in the sandhills community. Western alkaline meadows along the North Platte are characterized by inland saltgrass, alkali sacaton, clustered field sedge, foxtail barley, and meadow bluegrass. Forbs include spearscale, alkali aster, viscid camphor-daisy, and thelypody. Ponderosa pine woodlands are dominated by ponderosa pine, but may have inclusions of quaking aspen and a green ash subcanopy. Saskatoon serviceberry, chokecherry, dwarf juniper, fragrant sumac, mountain mahogany, and wolfberry are common shrubs. Kentucky bluegrass and littleseed ricegrass may be found in the sparse herbaceous layer.

Riparian woodlands are dominated by an open canopy of tall cottonwoods and shorter peachleaf willows. The subcanopy may include green ash, box-elder, Russian olive, and junipers. Sandbar willow is a common shrub, but wild plum, chokecherry and buffaloberry are also present on higher terraces and banks. The herbaceous layer is sparse and may include field horsetail, Emory's sedge, woolly sedge, marsh muhly, and prairie cordgrass. Badlands are mainly unvegetated eroded areas sparsely covered by low shrubs such as saltbush and rubber rabbitbrush and a scant cover of forbs such as silver orache, poverty weed, and Russian thistle. Occasionally mixedgrass prairie grasses may also be found.

Similar to badlands are the interspersed rock outcrops across the rugged terrain of the panhandle. Here the dominant shrub is typically skunkbush sumac, with herbaceous vegetation made up of blue grama and thickspike wheatgrass or few-flower buckwheat and Hood's phlox".

The map on page 8a shows the different land cover areas at Box Butte Reservoir.





Miles

0

LAND COVER

Dry Cropland Non-irrigated farmland in Dawes County is either dry cropland or tame pasture. Crops include wheat, corm, sugar beets, alfalfa, oats, and grain sorghum.

Irrigated Cropland The major irrigated crops in the area are corn, alfalfa, and sugar beets.

Woodland and Riparian Communities Woodland vegetation in the area occurs along the reaches of the Niobrara River and the reservoir shoreline. Trees common to the flood plain include ash, box elder, cottonwood, hackberry, and willow.

Eastern red cedar and ponderosa pine are found on the hilly areas and wooded draws. Prairie woodland thickets are composed of plum, skunkbrush, snowberry, and sumac. Cottonwood, green ash, and willows became established around the edge of the reservoir as it filled. As water recedes annually, new tree growth expands. When water levels are near conservation pool, some of these trees die offering excellent fish habitat when inundated. However, when reservoir levels recede this standing and fallen timber and stumps interfere with management and control of noxious weeds, and become a safety hazard to boaters.

Timber management is becoming a high priority for the Commission. Efforts will concentrate on removal of dead and standing timber and stumps to improve wildlife habitat, improve public safety, and allow for effective noxious weed control.

Terrestrial Ecosystem

The diverse habitats in the vicinity of Box Butte Reservoir support a variety of wildlife species. Big game species in the area include white-tailed deer, mule deer, antelope, and wild turkey. Common small game species include mourning dove, sharp-tail grouse, prairie chicken, ring-necked pheasant, cottontail rabbits and fox squirrels. Game bird species include mourning dove, sharp-tail grouse, prairie chicken, wild turkey and migratory waterfowl.

A number of furbearer species common to the area include the black-tailed jackrabbit, black-tailed prairie dog, coyote, badger, skunks, opossum, antelope, opossum, mink, and raccoon. Beaver and muskrats occur in the perennial streams, reservoir areas, and willow covered overflow areas.

The Nebraska Ornithologists Official List of Birds in Nebraska lists 434 bird species occurring in Nebraska (Nebraska Ornithologists Union, 1998). The Box Butte Reservoir is located within the central flyway for waterfowl and shorebirds. The area is inhabited by migrants, winter visitors, summer residents and permanent resident species of birds.

Aquatic Ecosystem

The aquatic ecosystem in Box Butte Reservoir is typical of a northern prairie system. Sport fish populations are based on water level stability, with management activities based accordingly. The reservoir contains populations of northern pike, bluegill, walleye, yellow perch, largemouth bass, smallmouth bass, rock bass, channel catfish, black crappie, and gizzard shad, which is also the main forage in the reservoir. Chapter 2 contains a detailed discussion of the fishery resource.

Threatened and Endangered Species This topic is discussed in detail in Chapter 2. There are three Federal species listed as threatened or endangered, four State listed T & E species and 16 state listed at-risk species documented within the vicinity of Box Butte Reservoir. The list includes mammals and birds. No critical habitat has been proposed or listed within the project area.

Lands

Soils Box Butte Dam is located in a High Plains Section of the Great Plains where the mean annual precipitation is little above the minimum required for profitable dry land farming. Soil moisture is the limiting factor in determining the productivity and the use capability of the land for crops.

Soils in the Box Butte Reservoir area range from deep silt loams in the areas along the north side of the reservoir to fine sands along the south side with gravelly sandy loams below the dam. They are characteristically light brown in color and are quite friable. Top soils contain only small amounts of organic matter and are shallow in numerous areas and completely removed by erosion or excavation in other areas. (Soil Survey of Dawes County, 1977)

Table 5 - Box Butte Reservoir Son Descriptions			
Alliance loam	Deep, well-drained upland soil formed in material		
	weathered from sandstone. Suited to dryland and		
	irrigated crops and tree and shrubs for wildlife habitat.		
Busher loam	Deep, well-drained to excessively drained soil formed		
	in material weathered from sandstone. Mainly found in		
	native grass rangelands. Suited for irrigated cropland		
	and tree and shrubs for wildlife habitat.		
Las Animas soils	Deep, moderately wet bottomland soils with a coarse		
	textured surface and subsoils developed in recent		
	stream deposited material.		
Schamber soils	Shallow, excessively drained soils that occupy		
	escarpments of stream terraces along the Niobrara		
	River. Not suited to cultivated crops, better suited to		
	rangelands.		
Valent and Dwyer loam	Deep, excessively-drained upland soil formed in wind		
	deposited sands. Valent soils mainly on uplands and		
	along major drainage-ways.		

Table 3 - Box Butte Reservoir Soil Descriptions



Duroc loam

Tassel loamy very fine sand

Page 10a

Vetal and Bayard soils	Deep, well-drained soil formed in sandy alluviam on
	slight slopes and stream terraces. Suited to both
	dryland and irrigated crops. Also suited to grass, trees,
	and shrubs for wildlife habitat and recreation.

A soil association map shown on page 10a provides more information.

Flood Pool Management To comply with Section 7 of the Flood Control Act of December 22, 1944, the Corps of Engineers conducted studies to determine if there was a need for flood storage space in Box Butte Reservoir. The Corps concluded "... that flood control storage benefits would be negligible and that provision of firm flood control storage benefits would not be economically justified. Accordingly, the provision of firm flood control storage in Box Butte Reservoir is not recommended."

Adjacent Land Use Most lands surrounding Box Butte Reservoir are privately owned rangelands.

Water Resources

Ground The geologic material under the Box Butte Reservoir area consists of several hundred feet of sandstone. Ground water in the reservoir area is quite variable and usually not predictable. In the river valley, wells have been developed and may yield more than 1,000 gallons per minute.

Surface Surface flow in the Niobrara River is declining (see Figure 2). The river drains the flat tablelands, which extend into Dawes, Sioux, and Box Butte Counties from the west.

Social and Economic

Population In 2006 Dawes County had a population of 8,466 people. Chadron and Alliance are the nearest trade centers. In 2006 they had a population of 5,320 and 8,331 respectively. The majority of Box Butte Reservoir visitors come from a 100-mile travel radius. Like most rural areas in the United States, this area experienced a rapid decline in population between 1950 and 1970. The Dawes County population has decreased by nearly 6% between the years 1990 – 2006. A decline in the rural farm population is the principle factor for fewer residents.

Access Commercial airstrips are located in Alliance and Chadron, Nebraska. Automobile access from Alliance and Chardon is via US Highway 385. Alliance is 28 miles southeast and Chadron is 23 miles to the northeast of the Box Butte Reservoir area.

Cultural Resources

Prior to the 1940s, no professional archeological or paleontological work was conducted in the Box Butte Dam and Reservoir area. In August 1946, after the construction of the dam had been completed, the Smithsonian Institution's

Missouri River Basin Surveys (RBS) conducted archeological and paleontological surveys of the Box Butte Reservoir area. The archeological survey resulted in the discovery of one archeological site and no paleontological sites.

The archeological site recorded is of prehistoric origin with an unknown cultural affiliation containing a scatter of lithic and faunal remains. At that time, no historic sites were recorded. There were no historic properties within the Box Butte Reservoir area listed on the National Register of Historic Places.

Under current legislation (16 U.S.C. 470f), any Federal undertaking requires some form of cultural resource activity. This includes all major maintenance, and development at the reservoir. As a result of this, several small scale survey projects have been conducted in association with construction projects. These small surveys have led to the discovery of one additional site containing a prehistoric component.

As currently planned, in compliance with Executive Order No. 11593 and 16 U.S.C. 470h-2 (section 110), Reclamation will enter into a cooperative agreement to complete an extensive archeological survey of all Federal lands to identify and evaluate all cultural resources at Box Butte Reservoir. Presently, there are no sites on or nominated to the National Register of Historic Places. However, the two previously identified archeological sites and possibly one or more newly discovered sites may require additional National Register eligibility testing. If any of the sites are determined to be eligible for the National Register, they will be nominated.

While this project may be a year or more away from completion, there are several other reservoir projects in the general area that have been completed or are nearing completion which may shed light on the prehistoric occupation of this portion of Nebraska. The lack of many prehistoric sites may be a reflection of the sparse settlement of the region throughout the late Pleistocene and Holocene. While no direct evidence has been found in the project area for Paleoindian occupation, it has been suggested based on the proximity to other nearby known sites. With this evidence, it is also suggested that prehistoric man inhabited the area sporadically through historic times. Possible evidence of occupation during the Archaic Period (ca. 7000-500 B.C.) has been found nearby. Evidence for Plains Woodland Period (ca. 500 B.C.–A.D. 1000) and the Plains Village Period (A.D. 900–1500) have been identified. In addition, several other prehistoric, protohistoric and historic sites have been identified in the general area near Box Butte Reservoir.

Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in assets held in trust by the United States for Indian tribes, nations, or individuals. Assets can be considered as anything that has monetary value and can include real property, physical assets, or

intangible property rights. Examples of resources that could be an ITA include lands, minerals, hunting and fishing rights, water rights, and instream flows.

The United States has a trust responsibility to protect and maintain rights reserved by or granted to Indian tribes or individual Indians by treaties, statutes, and executive orders. All Department of the Interior agencies, including Reclamation, share the Secretary of the Interior's duty to act responsibly to protect ITAs.

Reclamation established policy concerning the protection of ITAs in 1993. This policy states Reclamation will carry out activities in a manner which protects ITAs and avoids adverse impacts where possible. When adverse impacts cannot be avoided, Reclamation will provide appropriate mitigation or compensation.

Extensive research by Reclamation in 2004 identified that no ITAs are located in the project area.

Land-Use Rights

Prior Rights and Reservations

All reservoir lands were acquired by Reclamation subject to any oil, gas, or mineral rights reserved to or outstanding in third parties and subject to any existing rights-of-way in favor of third parties for roads, railroads, telephone lines, transmission lines, ditches, conduits, or pipelines on, over, or across these lands, including all rights-of-way heretofore granted the United States. There are no prior rights reserved on Federal lands at Box Butte Reservoir.

Government-acquired Access Rights-Of-Way

In April, 2006 Reclamation was granted a perpetual Easement from Carl E. Wilkins and Iris L. Wilkins for public access to the Box Butte Wildlife Management Area. This easement tract is the East 50 feet of the North 978 feet of the NE1/4NW1/4 of Section 25, T.29N., R.50W. of the 6th P.M., containing 1.48 acres, more or less.

Environmental Compliance

The National Environmental Policy Act of 1969 (NEPA) and the implementing regulations of the Council of Environmental Quality (CEQ) require an analysis of environmental impacts for Federal actions proposed in the Box Butte Reservoir RMP which may have a significant impact on the human environment and/or are controversial.

There are three processes which can be used to analyze environmental impacts. In order of complexity and importance are: categorical exclusion checklists (CEC), environmental assessments (EA) tied to Findings of No Significant Impact, and environmental impact statements (EIS). A description of these processes is included in the Reclamation's draft NEPA Handbook. Development of the RMP utilizes a decision making process integrated with the NEPA process. It is used to ensure protection of resources and determine the best use of those resources by evaluating impacts of a full range of alternatives. A CEC was considered to be the appropriate NEPA compliance document for the development of this RMP. The CEC can be found in Appendix C1.

A listing of other environmental statutes is included in Appendix B1.