

# APPENDIX A: NATURAL RESOURCE INVENTORY

## CONTENTS

Introduction.....	1
Study Area and Location .....	1
Methods.....	2
Soils .....	2
Colby Series.....	2
Longmont Series.....	3
Nunn Series.....	3
Renohill Series.....	4
Hydrology .....	5
Surface Water .....	5
Ground Hydrogeology .....	5
Wetlands .....	5
Vegetation.....	6
General Vegetation Description.....	6
Rare Plants and Plant Communities.....	7
State Noxious Weeds .....	7
Wildlife .....	8
Threatened and Endangered Species, including Candidate Species.....	9
Management Recommendations.....	11
Weed Control.....	11
Wildlife.....	13
References.....	16

## APPENDICES

Appendix A: Plant Species

Appendix B: Wildlife Species with Potential to Occur in the Study Area

# MCINTOSH LAKE NATURAL RESOURCE INVENTORY

## **Introduction**

Shapins Associates, Inc. retained ERO Resources Corporation to complete a natural resource inventory for the McIntosh Lake Study Area (“study area”), a 265-acre parcel northwest of Longmont in Boulder County, Colorado. On February 10, 2003, ERO’s Andy Cole, a natural resource planner, and Steve Butler, a biologist, visited the study area to review natural resources. Activities included a review of potential wetlands, identification of potential threatened and endangered species habitat, and identification of other natural resources that might affect proposed recreational use of the study area. Jurisdictional wetland delineations were not conducted during the review. This report summarizes the basic physical and ecological conditions of the study area and provides initial management recommendations.

## **Study Area and Location**

The study area is centered around the 265-acre McIntosh Lake, currently leased by the City of Longmont and proposed for recreational use. Possible projects could include extension of the existing trail to surround the entire lake, and creation of recreational facilities such as a swimming beach, fishing piers, and boat docks and ramps. The study area is located in Boulder County in a portion of Sections 29 and 30, Township 3 North, Range 69 West. The UTM coordinates are Zone 13: 4449000mN, 487250mE. The study area consists of McIntosh Lake and wetlands and uplands surrounding the lake. Oligarchy Ditch is located north of the study area, which includes a short (approximately 1,000 feet) length of the ditch. The elevation of the study area ranges from 5,100 to 5,060 feet above sea level.

The study area is located in an area of rolling plains in northeastern Boulder County. Until recently, much of the acreage in the area has been irrigated cropland. The principal crops grown in the area are corn, sugar beets, alfalfa, and small grains. In recent years

much of the area surrounding the study area has been used for residential development. McIntosh Lake, an irrigation reservoir, dominates the study area.

## **Methods**

This natural resource inventory included analysis of topographical maps and aerial photography of the study area and a review of existing information available from the Colorado Division of Wildlife (CDOW), the Natural Diversity Information System (NDIS), the Colorado Natural Heritage Program (CNHP), and the U.S. Fish and Wildlife Service (FWS). The inventory also included a site reconnaissance to identify and address any potential wildlife issues associated with the potential uses of the study area.

## **Soils**

Geologic mapping by Tweto (1979) indicates that the surface bedrock underlying the site is likely the Upper Shale Member of the Pierre Shale. The Natural Resources Conservation Service (NRCS, formerly Soil Conservation Service) has mapped eight soil types in the study area (SCS 1975). Each mapping unit for the study area is described below; Table 1 rates the soils in the study area according to limitations that affect their suitability for anticipated recreational uses. All soil information was gathered from the NRCS soil survey. The study area is considered by Boulder County to have agricultural lands of statewide and national importance (BOCO 2003).

## **COLBY SERIES**

Located on the west side of the study area, the Colby series is made up of deep, well-drained soils. These soils formed on upland slopes in loamy, uniform wind-deposited material. The native vegetation community is mainly short grass prairie. For agricultural purposes, these soils are used for irrigated cropland, dry cropland, and pasture. Colby soils have moderate permeability.

***Mapping Unit CoC. Colby silty clay loam, 3 to 5 percent slopes.*** Runoff is medium on this soil and the erosion hazard is moderate to high. Almost all of the acreage for this soil is used for irrigated or dry cropland.

**Mapping Unit CoD. Colby silty clay loam, 5 to 9 percent slopes.** Runoff is rapid on this soil and the erosion hazard is high. About two-thirds of the acreage for this soil is used for irrigated or dry cropland; the remaining third for pasture.

### LONGMONT SERIES

Longmont soils on the north side of McIntosh Lake are made up of deep, poorly drained, salty and alkaline soils. These soils formed on terraces and upland swales in clayey alluvium derived from shale. Native vegetation on these soils includes alkali sacaton and inland saltgrass.

**Mapping Unit LoB. Longmont clay, 0 to 3 percent slopes.** In most places on this soil, runoff is slow and some concave areas are ponded. The erosion hazard is slight. Drainage and removal of salt and alkali are difficult because of this soil's slow permeability. In agricultural production, this soil is best suited to pasture. Pasture areas that are in excellent condition will include switchgrass, alkali sacaton, and western wheatgrass. Grazing on these soils should be limited when they are extremely wet to avoid trampling and compaction. Reseeding these soils is difficult because they are seldom dry.

### NUNN SERIES

Nunn soils on the south side of McIntosh Lake and in the northwest portion of the study area are deep, well-drained soils. These soils formed on terraces and valley side slopes in loamy alluvium. The native vegetation community is mainly short and midgrass prairie. The acreage of these soils is used mainly for irrigated crops, dryland crops, and pasture. Nunn soils have slow and moderately slow permeability.

**Mapping Unit NnB. Nunn sandy clay loam, 1 to 3 percent slopes.** Runoff is medium on this soil and permeability moderately slow. The erosion hazard is moderate. Almost all of the acreage of this soil is used for irrigated crops.

**Mapping Unit NuA. Nunn clay loam, 0 to 1 percent slopes.** Runoff is slow on this soil. Permeability is slow and the erosion hazard is slight. Almost all of the acreage of this soil is used for irrigated crops, but a few small areas are used for irrigated pasture.

**Mapping Unit NuB. Nunn clay loam, 1 to 3 percent slopes.** Runoff is medium on this soil. Permeability is slow and the erosion hazard is moderate. Most of the acreage of this soil is used for irrigated crops and pasture, and the rest is used for dryland crops. A very few small areas are used for range.

## RENOHILL SERIES

The Renohill soils on the west and northeast sides of McIntosh Lake are made up of moderately deep, well-drained soils. These soils formed on upland hills and ridges in loamy parent material weathered from shale and sandstone. Short and midgrass prairie, including blue grama and the needlegrasses, represent the native vegetation communities on these soils. Renohill soils have slow permeability.

**Mapping Unit RnB. Renohill silty clay loam, 1 to 3 percent slopes.** Runoff is medium on this soil and the erosion hazard is moderate. Almost all of the acreage of this of this soil is cultivated and is used for irrigated crops and pasture. Smaller areas are used for dryland crops and pasture.

**Mapping Unit RnD. Renohill silty clay loam, 3 to 9 percent slopes.** In a few places this soil has scattered gravel and cobbles on the surface. Runoff on this soil and the erosion hazard are high. All of the acreage of this soil is used for irrigated crops, dryland crops, and pasture.

**Table 1. Limitations<sup>†</sup> of soils for anticipated recreational uses.**

Symbol	Soil	Picnic Areas	Trails
CoC	Colby silty clay loam, 3 to 5 percent slopes	Moderate due to silty clay loam surface layer	Moderate due to silty clay loam surface layer
CoD	Colby silty clay loam, 5 to 9 percent slopes	Moderate due to silty clay loam surface layer	Moderate due to silty clay loam surface layer
LoB	Longmont clay, 0 to 3 percent slopes	Severe due to clay surface layer layer	Severe due to clay surface layer layer
NnB	Nunn sandy clay loam, 1 to 3 percent slopes	Moderate due to sandy clay loam surface layer	Moderate due to sandy clay loam surface layer
NuA	Nunn clay loam, 0 to 1 percent slopes	Moderate due to clay loam surface layer	Moderate due to clay loam surface layer
NuB	Nunn clay loam, 1 to 3 percent slopes	Moderate due to clay loam surface layer	Moderate due to clay loam surface layer
RnB	Renhill silty clay loam, 1 to 3 percent slopes	Moderate due to silty clay loam surface layer	Moderate due to silty clay loam surface layer
RnD	Renhill silty clay loam, 3 to 9 percent slopes	Moderate due to silty clay loam surface layer	Moderate due to silty clay loam surface layer

<sup>†</sup>Soils rated as having a slight, moderate, or severe limitation. A *slight* limitation is so minor and can easily be overcome. A *moderate* limitation can be overcome by planning, design, or special maintenance. A *severe* limitation may require costly soil reclamation, special design, or intense maintenance.

## Hydrology

### SURFACE WATER

According to topographic information from the USGS 7.5 minute quadrangle maps, surface water on and in the vicinity of the study area generally flows to the southeast (USGS 1968, photorevised 1979). St. Vrain Creek, the most significant surface drainage in northeastern Boulder County, is about 1 mile south of the study area.

### GROUND HYDROGEOLOGY

Based on a review of the USGS Hygiene quadrangles, shallow ground water would flow in a southeasterly direction within the St. Vrain Creek drainage basin.

## Wetlands

Wetland descriptions are based on the site visit from February 10, 2003 and do not represent a jurisdictional determination. Wetlands in the study area consist of those

generally associated with the open water and littoral zone of McIntosh Lake. The alkali flats on the north side of McIntosh Lake are part of a larger wetland complex that includes the lake itself. This wetland may be the result of natural drainage and a perched water table from the clay soils. The cattail marsh below the dam is probably the result of seepage from McIntosh Lake.

Waters of the U.S., such as stock ponds and other open waters, are jurisdictional when they are located within natural drainages. Stock ponds and other open waters are non-jurisdictional when they are constructed in upland areas into which no natural drainage flows. The U.S. Army Corps of Engineers considers alkali flat areas as special aquatic sites that fall under its jurisdiction. A formal survey would need to be conducted to determine the full extent of jurisdictional wetlands in the study area.

## Vegetation

### GENERAL VEGETATION DESCRIPTION

At the time of the site visit, the lake level was low due to the recent drought, exposing mud flats around the perimeter of the lake. Dense stands of cattails (*Typha latifolia* and *T. angustifolia*) occur on the eastern and northeastern banks of the lake. In general, the vegetation along the edges of the lake is dominated by saltgrass (*Distichlis spicata*), with three-square bulrush (*Scirpus americanus*), soft stem bulrush (*Scirpus lacustris*), and sandbar willow (*Salix exigua*) occurring in scattered areas around the lake margin. Plains cottonwood (*Populus deltoides*) and tamarisk (*Tamarix ramosissima*) seedlings are present in the mudflats bordering the lake. Drier upland areas are dominated by saltgrass, kochia (*Kochia scoparia*), and intermediate wheatgrass (*Agropyron intermedium*). A park with mowed, irrigated lawns and picnic tables is located on the southern bank of the lake.

Oligarchy Ditch is bordered by a narrow band of riparian vegetation, including plains cottonwood, Emory's sedge (*Carex emoryi*), showy milkweed (*Asclepias speciosa*), crack willow (*Salix fragilis*), and Russian olive (*Elaeagnus angustifolia*). A few stands of

sandbar willow also occur along the ditch. A list of plant species identified during the field visit appears in Appendix A.

**Wetlands.** Wetland communities dominated by broad-leaved cattail and narrow leaf cattail occur on the east side of McIntosh Lake and below the dam. Smooth brome, intermediate wheatgrass, and Canada thistle dominate the margins of these wetland communities.

**Cropland.** The croplands south of the dam are dominated by smooth brome (*Bromus inermis*). Also present in these croplands are orchardgrass (*Dactylis glomerata*), Canada thistle (*Cirsium arvense*), and field bindweed (*Convolvulus arvense*).

**Alkali Flats.** The alkali flats occur on the north side of McIntosh Lake. Soils in the community are poorly drained and alkaline. Native vegetation including alkali sacaton (*Sporobolus airoides*) and inland saltgrass (*Distichlis spicata*) occurs within the community. Other species include prickly lettuce (*Lactuca serriola*), netseed lambsquarters (*Chenopodium berlandieri*), Canada thistle, curly dock, intermediate wheatgrass, and crested wheatgrass. The community has been disturbed due to its location within an agricultural field. Ground water is likely shallow and near the surface for a portion of the growing season as evidenced by evaporates on the soil surface. Drier areas clearly had alkali on the surface indicating a shallow water table when evapotranspiration rates are high. Animal prints also suggest that the soil is saturated at times. The alkali flats likely provide sediment and nutrient retention, recharges ground water and provides habitat for insects and small mammals.

## RARE PLANTS AND PLANT COMMUNITIES

No rare plants or plant communities have been identified by CNHP in the study area (NDIS 2003a).

## STATE NOXIOUS WEEDS

The authority and responsibility to formulate and implement a Noxious Weed Management Plan comes from Colorado Revised Statutes 35-5.5-101 et seq., and the



Colorado Weed Management Act (Act). The Act identifies both statewide and countywide noxious weeds and obligates all Colorado counties to use Integrated Weed Management (IWM) techniques to control them. Based on the site visit, nine noxious weed listed by the State occur in the study area:

- Tamarisk (*Tamarix ramosissima*) seedlings are present in the mudflats bordering the lake.
- Canada thistle (*Cirsium arvense*) occurs scattered within the alkaline flats and is abundant below the dam and along the margins of the wetland in the east side of the study area.
- Russian olive (*Elaeagnus angustifolia*) individual trees are scattered along the Oligarchy Ditch.
- Downy brome (*Bromus tectorum*) is scattered along roads and near buildings in the study area.
- Field bindweed (*Convolvulus arvense*) is scattered throughout the study area.
- Musk thistle (*Carduus nutans*) is scattered along the dam.
- Cutleaf teasel (*Dipsacus laciniatus*) is scattered along the dam.
- Kochia (*Kochia scoparia*) is found throughout the study area.

## **Wildlife**

The wetland habitat, irrigation ditches, shoreline of McIntosh Lake, and uplands in the study area contain potential habitat for a variety of wildlife species. Large cottonwoods along the Oligarchy Ditch provide nesting sites for raptors, as well denning sites for mid-sized mammals such as raccoon. Migratory shorebirds may be found along McIntosh Lake's edge in search of crayfish and other invertebrates. Common species seen near the lake may include American avocet, common snipe, willets, Wilson's phalaropes, various sandpipers, semipalmated plovers, and long-billed dowitchers.

Small rodents that probably occur in wetland habitat or along the irrigation ditch in the study area deer mouse, prairie vole, meadow vole, house mouse, and western harvest mouse. Other mammals that occur or are likely to occur in the study area include coyote, red fox, striped skunk, and raccoon. All of these species probably frequent the wetland habitat or habitat along the irrigation ditch, although coyote may be more common in more open areas.

Bird species observed during the site visit include Canada goose and bald eagle. Additional surveys during migration or the breeding season would increase the number of observed species. A list of potential wildlife species that may occur in the study area was compiled from the Colorado Natural Diversity Information Source (NDIS 2003b). The compilation is an edited list of Boulder County Species Level Occurrence and Abundance data available through the Colorado Division of Wildlife. The list is provided in Appendix B and includes species that may use both McIntosh Lake and its shoreline.

### **Threatened and Endangered Species, including Candidate Species**

Passed in 1973 and reauthorized in 1988, the Endangered Species Act (ESA) regulates a wide range of activities affecting plants and animals designated as endangered or threatened. By definition, *endangered species* is any animal or plant listed by regulation as being in danger of extinction. A *threatened species* is any animal or plant that is likely to become endangered within the foreseeable future. A *candidate species* is any animal or plant for which reliable information is available that a listing under the ESA may be warranted. There are no mandatory Federal protections required under the ESA for a candidate species; however, it is advisable to voluntarily protect these species. The Act prohibits a number of activities involving endangered species.

According to the NDIS database for the area, there are no threatened and endangered species in the study area. The bald eagle (*Haliaeetus leucocephalus*), a threatened species, was observed during the site visit, and an additional threatened species that has the potential to occur in wetland habitats in the study area is the Ute ladies'-tresses orchid (*Spiranthes diluvialis*). The black-tailed prairie dog (*Cynomys ludovicianus*), a candidate species for listing as threatened under the Endangered Species Act, is present in the northeast corner of the study area.

**Bald Eagle.** The bald eagle is a large North American bird with a historical distribution throughout most of the U.S. The bald eagle was listed as an endangered species in 1978. Population declines are attributed to habitat loss, the use of organochlorine pesticides, and mortality from shooting. Since listing, the population trend for the bald eagle has been increasing. The bald eagle was downlisted from endangered to threatened in 1995 and the FWS is proposing to delist the bald eagle due to

population recovery. If the bald eagle is removed from the list of threatened and endangered species, it will continue to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Bald eagles are primarily winter residents in Colorado, although nesting along the Colorado Front Range has increased in recent years (CDOW 2003). Most nesting in Colorado occurs near lakes or reservoirs or along rivers. Typical bald eagle nesting habitat consists of forests or wooded areas that contain many tall, aged, dying and dead trees (Martell 1992). Several large cottonwoods that could provide perching or roosting sites occur along Oligarchy Ditch. Two bald eagles, an adult and an immature, were observed during the site visit in flight and on the ice of the frozen lake.

***Ute Ladies'-tresses Orchid.*** The following types of habitat are considered to potentially support populations of the orchid:

- Areas determined to be jurisdictional wetlands;
- Seasonally moist areas near springs, lakes, irrigation ditches, or perennial streams and their associated flood plains;
- Old stream channels and alluvial terraces;
- Sub-irrigated meadows; and
- Areas supporting vegetation indicative of seasonally wet areas or areas dominated by vegetation considered to be facultative wet.

Based on these criteria, certain vegetation communities in the study area may potentially support the orchid.

***Preble's Meadow Jumping Mouse.*** On behalf of the City of Longmont, ERO Resources conducted a habitat assessment in the study area for the Preble's meadow jumping mouse (ERO 2003). The FWS concurred with the findings of this report that a population of Preble's is not likely to be present within the study area.

***Black-tailed Prairie Dog.*** The black-tailed prairie dog, a candidate species for listing as threatened under the Endangered Species Act, is present in the northeastern portion of the study area. Species such as burrowing owl (*Athene cunicularia*), prairie rattlesnake (*Crotalus viridis*), and mountain plover (*Charadrius montanus*) are closely linked to prairie dog burrow systems for food and/or cover. Prairie dogs provide an important prey

resource for numerous predators including badger, coyote, fox, golden eagle, ferruginous hawk and other raptors. The study area provides adequate habitat for each of these species for which prairie dogs may serve as a prey base.

***Mountain Plover.*** The mountain plover is a federal candidate species that inhabits dry tablelands and the Colorado Plateau. The plover is expected to be listed as threatened in the near future. This species nests primarily in shortgrass prairie sites used historically by prairie dogs, bison, and pronghorn. This species breeds from northern Montana, Wyoming, and Colorado to central New Mexico. The mountain plover's habitat requirements generally consist of open, flat tablelands and short, intensively grazed grasslands. Typically plovers nest in areas with at least 30 percent bare ground and are often found in disturbed habitats, burned prairie, fallow agricultural fields, and prairie dog colonies (Knopf 1996). This species avoids hillsides and vegetation over 6 inches tall. Although no mountain plovers have been observed in the study area, there is sufficient habitat and conditions to warrant further study.

## **Management Recommendations**

This section builds on information for the study area and presents initial management recommendations for McIntosh Lake. These initial management recommendations are based on a one-time site visit and designed to provide a starting point for overall master plan implementation and management for the study area.

## **WEED CONTROL**

Immediate vegetation management (e.g., enhancement) activities should concentrate on noxious weed control targeted primarily at tamarisk and Canada thistle in the study area.

***Tamarisk.*** Tamarisk is an aggressive, woody invasive plant species that is establishing along the lake margin in the study area. Tamarisk is a relatively long-lived plant that can tolerate a wide range of environmental conditions once established. It produces massive quantities of small seeds and can propagate from buried or submerged stems. It can replace or displace native woody species, such as cottonwood and willow,

which occupy similar habitats. Stands of tamarisk generally have lower wildlife values compared to stands of native vegetation. Tamarisk is a facultative phreatophyte, meaning that it can draw water from underground sources but once established it can survive without access to ground water. It consumes large quantities of water, possibly more than woody native plant species that occupy similar habitats. Tamarisk is tolerant of highly saline habitats, and it concentrates salts in its leaves. Over time, as leaf litter accumulates under tamarisk plants, the surface soil can become highly saline, thus impeding future colonization by many native plant species or potential enhancement efforts along the lake shore.

Tamarisk can be controlled by five principal methods: 1) applying herbicide to foliage of intact plants; 2) removing aboveground stems by burning or mechanical means followed by foliar application of herbicide; 3) cutting stems close to the ground followed by application of herbicide to the cut stems; 4) spraying basal bark with herbicide; and 5) digging or pulling plants.

***Canada Thistle.*** Canada thistle is abundant throughout the study area and occurs in nearly every wetland area observed. Canada thistle typically infests areas intermediate in moisture and can often be found dominating the transition zone between wetland and upland.

Some infestations may be completely controlled by one technique, while others will only be partially controlled because two or more ecotypes are present within the population. Additionally, Canada thistle responds differently to management under different weather conditions. Therefore it is often necessary to implement several control techniques, and to continuously monitor their impacts. Mowing and herbicides are examples of effective control measures, although Canada thistle tends to grow near water, restricting the use of certain herbicides.

Where possible it is best to kill all Canada thistle plants within a site. Where resources are limited, two strategies are recommended:

1. Target Canada thistle clones based on location within the study area, controlling plants in high quality areas first, then in low quality areas. Treat entire clones to prevent resprouting from undamaged roots; and

2. Target female clones to reduce seed production and additional spread of Canada thistle.

***Russian Olive.*** Effective control includes cutting the plant off at the main stem and paint the herbicide on the stump. Glyphosate is an effective and commonly used herbicide.

***Downy Brome (Cheatgrass).*** Cheatgrass is so widespread and resistant to control methods that the most effective control may be to establish and maintain healthy stands of perennial plants that can compete with this weed.

***Field Bindweed.*** Field bindweed is difficult to control and is unaffected by pulling, mowing, or burning. Repeated applications of herbicides may be the only way to control it. Field bindweed is shade intolerant, so maintaining a healthy cover of perennial plants can help prevent establishment.

***Musk Thistle.*** Biological controls have been introduced for this species, and this may account for its low abundance for a noxious weed.

***Cutleaf Teasel.*** Cutting seed stalks after flowering is the recommended control method.

***Kochia.*** The seedlings of this annual can be treated with herbicide. Small infestations can be pulled by hand.

## WILDLIFE

General management recommendations are provided for grassland songbirds, migratory shorebirds, black-tailed prairie dog, burrowing owl, mountain plover, and human-tolerant species.

***Grassland Songbirds.*** Grassland songbirds prefer habitats with healthy grass and thick litter cover. They can be found in shortgrass and mixed grass prairies, croplands, montane grasslands, desert shrublands, sagebrush, and cottonwood groves interspersed with grasslands (Kingery 1998). There are two critical elements in determining appropriate nesting habitat: open views and a variety of vegetation heights. Western

meadowlarks (*Sturnella neglecta*) and lark sparrows (*Chondestes grammacus*) are examples of grassland songbirds in the study area. Although they are still relatively common throughout North America, they are being threatened by habitat loss and encroachment. One of the simplest and most effective strategies for maintaining populations of grassland songbirds is to conserve native prairie and the plant and animal species found there. A number of studies have documented the effects of recreation on songbird habitat and abundance. Studies on western meadowlark, lark sparrow, and vesper sparrow are drawn on here as examples to consider for future management activities within the study area.

In a study examining the influence of recreational trails on the density of songbirds, western meadowlarks were significantly more abundant along control transects than along recreational trails (Miller et al. 1998). Abundance increased with increasing distance from trails. Meadowlarks are very sensitive to any human presence in their nesting territories and will desert a nest if disturbed during incubation (Kingery 1998). Keys to management include providing a variety of grassland types and heights, sparse woody cover, and high forb and grass cover.

Lark sparrows in Colorado preferred shortgrass and mixed-grass uplands over tallgrass remnants or hayfields (Bock et al. 1995). Keys to management include providing suitable habitat (open grasslands with sparse to moderate herbaceous and litter cover, and a shrub component) and allowing moderate grazing or occasional burning.

It is important to note that each grassland species has specific habitat needs whether it is short vegetation for nesting sites or areas of tall, dense vegetation, which provides habitat for small insect prey. One of the first steps in managing for grassland bird species is to determine which species are present or could be present if the appropriate habitat conditions were available. In some cases, management recommendations for one species may contradict the recommendations for another species. In general, management activities such as fire, mowing, and intensive grazing should be scheduled in the spring before the nesting season or mid to late summer (at least mid-July), fall, or winter. These activities during the nesting season can disrupt breeding activities, destroy nests, or expose nests and birds to predators. Prescribed burning and mowing should be conducted

in such a manner as to leave some areas uncut and unburned each year, to make a variety of habitats available to birds at all times.

***Migratory Shorebirds.*** During migration, shorebirds are associated primarily with shallowly flooded coastal or freshwater wetlands or intertidal mudflats (Helmert 1992). In the study area, they may exploit the lakeshore and adjacent grassland areas. Migratory shorebirds show differences in foraging habitat use between species in relation to water depth and vegetation structure and distribution. Habitat conditions ranging from sparsely vegetated mudflats to moderately vegetated open shallows provide shorebirds with required habitats throughout their annual cycle. Upland habitats associated with wetlands are also exploited by shorebirds.

The peak migration periods for shorebirds generally occur from March through May (spring) and July through September (summer/fall). During spring and summer/fall, large numbers of shorebirds may concentrate at coastal and inland staging areas. Migratory shorebirds need staging areas to refuel and continue migrating. Disturbance to shorebirds at feeding, roosting and nesting sites can also have potentially serious effects on populations. In general, management for shorebirds should focus on: 1) protection of natural habitats used by breeding, migrating, and wintering shorebirds; 2) reduction of disturbance; and 3) increasing the accessibility of appropriate habitats in managed wetlands (Helmert 1992). Management actions at McIntosh Lake should consider the temporal and spatial availability of habitats for the foraging and roosting needs of shorebirds. In addition, these needs should be considered in relation to human recreational activities adjacent to the lake.

***Black-tailed Prairie Dog.*** The prairie dog colony should remain separate and buffered from recreational trails proposed within the study area. Various methods, such as visual barriers that use Griffolyn®, exist to control prairie dog populations and create buffers between them and recreational visitors. Any prairie dog management in the study area should also be considered within the context of nesting and foraging raptors. With this in mind, large cottonwood trees along the Oligarchy Ditch should be surveyed for raptor nests if possible. Depending on survey results, management should focus on protecting nest sites while defining important foraging areas that support the pair's



nesting effort. The Colorado Division of Wildlife has outlined recommended buffer zones and seasonal restrictions for Colorado raptors that provide additional guidance for land managers (Craig 2002).

***Burrowing Owl.*** The burrowing owl is a small migratory owl that occupies prairie dog towns in Colorado during the summer breeding season. The owl is active during the day and uses abandoned prairie dog burrows for nesting and roosting. Although not a threatened or endangered species, federal and state laws, including the Migratory Bird Treaty Act, prohibit the killing of burrowing owls. Burrowing owls are present in Colorado between March 1 and October 31. Future development activities (e.g., trail construction) could potentially affect the burrowing owl if the species is discovered in the study area.

***Mountain Plover.*** Future development activities (e.g., trail construction) could potentially affect the mountain plover if the species is discovered in the study area. Active mountain plover nests should be buffered to ¼-mile. During the nesting period, plovers are sensitive to pedestrian traffic and continual equipment operations (FWS 2002).

***Human-tolerant Species.*** The future residential development surrounding the study area will encourage the proliferation of human tolerant species such as striped skunk, raccoon, coyote, and red fox. These species adapt well to urbanized environments and often survive by consuming domestic garbage. As these species grow in number, populations of less human tolerant species may potentially decline. Management actions should focus on outreach efforts in existing and new subdivisions to curtail activities that attract these species.

## References

- BOCO (Boulder County). 2003. Significant Agricultural Lands. <<http://www.co.boulder.co.us/lu/bccp/bccpmap/agland.pdf>>. March 28.
- Bock, C.E., J.H. Bock, and B.C. Bennett. 1995. The avifauna of remnant tallgrass prairie near Boulder, Colorado. *Prairie Naturalist*.
- CDOW (Colorado Division of Wildlife). 2003. Colorado listing of endangered, threatened and wildlife species of special concern. <<http://www.wildlife.state.co.us/t&e/list.asp>>. March 28.

- Craig, Gerald R. 2002. Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors. Denver, CO
- ERO Resources Corporation (ERO). 2003. Preble's meadow jumping mouse habitat assessment for McIntosh Lake. Denver, Colorado.
- Helmets, D.L. 1992. Shorebird management manual. Western Hemisphere Shorebird Reserve Network, Manomet, MA.
- Kingery, Hugh E. 1998. Colorado Breeding Bird Atlas. Colorado Bird Atlas Partnership and the Colorado Division of Wildlife. Colorado Springs, Colorado.
- Knopf, F.L. 1996. Mountain plover (*Charadrius montanus*). In The Birds of North America, No. 211 (A. Poole and F. Gill, Eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.
- Martell, M. 1992. Bald eagle winter management guidelines. FWS, Reg. 3, Minneapolis, MN. 14pp.
- Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications.
- NDIS (Colorado Natural Diversity Information Source). 2003a. <<http://ndis.nrel.colostate.edu>>. March 28.
- NDIS (Colorado Natural Diversity Information Source). 2003b . Boulder County Species Level Occurrence and Abundance. <[http://ndis.nrel.colostate.edu/ndis/countyab/species/sname/bo\\_oc\\_ab.html](http://ndis.nrel.colostate.edu/ndis/countyab/species/sname/bo_oc_ab.html)>. March 28.
- Soil Conservation Service. 1975. Soil Survey of Boulder County Area, Colorado. Denver, Colorado
- Tweto, Odgen. 1979. Geologic Map of Colorado. U.S. Geological Survey. Denver, Colorado.
- U.S. Fish and Wildlife Service (FWS). 2002. Mountain Plover Survey Guidelines.
- U.S. Geological Survey. 1968, photorevised 1979. Hygiene Quadrangle Longmont Quadrangle. Denver, Colorado.

## APPENDIX A: PLANT SPECIES

Based on February 10, 2002 Site Visit

Common Name	Scientific Name
<b>GRAMINOIDS</b>	
crested wheatgrass	<i>Agropyron cristatum</i>
intermediate wheatgrass	<i>Agropyron intermedium</i>
smooth brome	<i>Bromus inermis</i>
downy brome	<i>Bromus tectorum</i>
Emory's sedge	<i>Carex emoryi</i>
orchardgrass	<i>Dactylis glomerata</i>
inland saltgrass	<i>Distichlis spicata</i>
three-square bulrush	<i>Scirpus americanus</i>
soft stem bulrush	<i>Scirpus lacustris</i>
alkali sacaton	<i>Sporobolus airoides</i>
narrow-leaf cattail	<i>Typha angustifolia</i>
broad-leaved cattail	<i>Typha latifolia</i>
<b>FORBS</b>	
western ragweed	<i>Ambrosia psilostachya</i>
showy milkweed	<i>Asclepias speciosa</i>
netseed lambsquarters	<i>Chenopodium berlandieri</i>
Canada thistle	<i>Cirsium arvense</i>
bindweed	<i>Convolvulus arvense</i>
common sunflower	<i>Helianthus annuus</i>
kochia	<i>Kochia scoparia</i>
prickly lettuce	<i>Lactuca serriola</i>
alfalfa	<i>Medicago sativa</i>
curly dock	<i>Rumex crispus</i>
<b>TREES</b>	
Russian olive	<i>Elaeagnus angustifolia</i>
plains cottonwood	<i>Populus deltoides</i>
sandbar willow	<i>Salix exigua</i>
crack willow	<i>Salix fragilis</i>
tamarisk	<i>Tamarix ramosissima</i>

**APPENDIX B: WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE  
STUDY AREA**

Common Name	Scientific Name
<b>AMPHIBIANS</b>	
Tiger salamander	<i>Ambystoma tigrinum</i>
Western chorus frog	<i>Pseudacris triseriata</i>
Bullfrog	<i>Rana catesbeiana</i>
<b>REPTILES</b>	
Fence lizard	<i>Sceloporus undulatus</i>
Plains garter snake	<i>Thamnophis radix</i>
<b>MAMMALS</b>	
Coyote	<i>Canis latrans</i>
Hispid pocket mouse	<i>Chaetodipus hispidus</i>
Least shrew	<i>Cryptotis parva</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>
Ord's kangaroo rat	<i>Dipodomys ordii</i>
Plains pocket gopher	<i>Geomys bursarius</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Black-tailed jackrabbit	<i>Lepus californicus</i>
White-tailed jackrabbit	<i>Lepus townsendii</i>
Striped skunk	<i>Mephitis mephitis</i>
Prairie vole	<i>Microtus ochrogaster</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
House mouse	<i>Mus musculus</i>
Bushy-tailed woodrat	<i>Neotoma cinerea</i>
Mule deer	<i>Odocoileus hemionus</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Common muskrat	<i>Ondatra zibethicus</i>
Plains pocket mouse	<i>Perognathus flavescens</i>
Silky pocket mouse	<i>Perognathus flavus</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Raccoon	<i>Procyon lotor</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>
Plains harvest mouse	<i>Reithrodontomys montanus</i>
Fox squirrel	<i>Sciurus niger</i>
Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Red fox	<i>Vulpes vulpes</i>

Common Name	Scientific Name
<b>BIRDS</b>	
Spotted sandpiper	<i>Actitis macularia</i>
Clark's grebe	<i>Aechmophorus clarkii</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Cassin's sparrow	<i>Aimophila cassinii</i>
Wood duck	<i>Aix sponsa</i>
Northern pintail	<i>Anas acuta</i>
Cinnamon teal	<i>Anas cyanoptera</i>
Blue-winged teal	<i>Anas discors</i>
Mallard	<i>Anas platyrhynchos</i>
Great blue heron	<i>Ardea herodias</i>
Burrowing owl	<i>Athene cunicularia</i>
Canada goose	<i>Branta canadensis</i>
Great horned owl	<i>Bubo virginianus</i>
Bufflehead	<i>Bucephala albeola</i>
Barrow's goldeneye	<i>Bucephala islandica</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Ferruginous hawk	<i>Buteo regalis</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Lark bunting	<i>Calamospiza melanocorys</i>
McCown's longspur	<i>Calcarius mccownii</i>
Chestnut-collared longspur	<i>Calcarius ornatus</i>
House finch	<i>Carpodacus mexicanus</i>
Veery	<i>Catharus fuscescens</i>
Hermit thrush	<i>Catharus guttatus</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Chimney swift	<i>Chaetura pelagica</i>
Killdeer	<i>Charadrius vociferus</i>
Lark sparrow	<i>Chondestes grammacus</i>
Common nighthawk	<i>Chordeiles minor</i>
Northern harrier	<i>Circus cyaneus</i>
Marsh wren	<i>Cistothorus palustris</i>
Rock dove	<i>Columba livia</i>
American crow	<i>Corvus brachyrhynchos</i>
Blue jay	<i>Cyanocitta cristata</i>
Horned lark	<i>Eremophila alpestris</i>
American kestrel	<i>Falco sparverius</i>
American coot	<i>Fulica americana</i>

<b>Common Name</b>	<b>Scientific Name</b>
Common yellowthroat	<i>Geothlypis trichas</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Barn swallow	<i>Hirundo rustica</i>
Bullock's oriole	<i>Icterus bullockii</i>
California gull	<i>Larus californicus</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Black-crowned night-heron	<i>Nycticorax nycticorax</i>
House sparrow	<i>Passer domesticus</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Black-billed magpie	<i>Pica pica</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Black-capped chickadee	<i>Poecile atricapillus</i>
Common grackle	<i>Quiscalus quiscula</i>
American avocet	<i>Recurvirostra americana</i>
Bank swallow	<i>Riparia riparia</i>
Brewer's sparrow	<i>Spizella breweri</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Western meadowlark	<i>Sturnella neglecta</i>
European starling	<i>Sturnus vulgaris</i>
Brown thrasher	<i>Toxostoma rufum</i>
House wren	<i>Troglodytes aedon</i>
American robin	<i>Turdus migratorius</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Western kingbird	<i>Tyrannus verticalis</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Mourning dove	<i>Zenaida macroura</i>

Source: NDIS 2003b.

## Appendix B: Restoration Plant Recommendations

Below is a list of recommendations for revegetation and enhancement McIntosh Lake. Please refer to Figure 1 for area locations. “Height” for trees and shrubs refers to expected height at maturity.

### AREA 1 — ALKALINE FLATS

- Remove noxious weeds, such as tamarisk, Canada thistle, and kochia
- Reseed disturbed areas (including areas where noxious weeds were removed) with the alkali seed mix from Table 6 below.
- Plant alkali/salt-tolerant shrubs and trees:

**Table 2. Shrubs and Trees for Area 1.**

Common Name	Scientific Name	Height (ft)	Planting Location
Fourwing saltbush	<i>Atriplex canescens</i>	2-4	Very alkaline areas.
Broom snakeweed	<i>Gutierrezia sarothrae</i>	1-2	Very alkaline areas.
Rubber rabbitbrush	<i>Chrysothamnus nauseosus</i>	2-4	Less alkaline, drier areas.
Sandbar willow	<i>Salix exigua</i>	5-15	Shoreline, less alkaline areas. Can be planted as cuttings or in one-gallon containers.
Peachleaf willow	<i>Salix amygdaloides</i>	20-40	Shoreline, less alkaline areas.

### AREA 2 — UPLAND GRASSLAND AND LAKE SHORE

Reseed disturbed areas with the short to mid-grass prairie seed mix (Table 7).

Control noxious weeds

Plant the following shrubs and trees where appropriate:

**Table 3. Shrubs and Trees for Area 2 or 3.**

Common Name	Scientific Name	Height (ft)	Planting Location
Rubber rabbitbrush	<i>Chrysothamnus nauseosus</i>	2-4	Upland grasslands.
Yucca	<i>Yucca glauca</i>	1	Upland grasslands, especially in area where a barrier is desired.
Chokecherry	<i>Padus virginiana</i>	10-20	Moist areas near shoreline.
Wood's rose	<i>Rosa woodsii</i>	2-4	Moist areas near shoreline.
Sandbar willow	<i>Salix exigua</i>	5-15	Wet areas along shoreline. Can be planted as cuttings or in one-gallon containers.
Peachleaf willow	<i>Salix amygdaloides</i>	20-40	Wet to moist areas along shoreline.
Plains cottonwood, native	<i>Populus deltoides</i>	20-60	Wet to moist areas along shoreline.

**Area 3 — Former Recreation Area (Cockleburr Club)**

Revegetate this degraded area as follows:

- Test the existing soil.
- Based on the tests, contaminated soils and some of the sand areas may need to be removed.
- Thoroughly rip the existing areas.
- Depending on the soil tests, either place a minimum of 6 inches of topsoil on top of the ripped soils or add organic soil amendments.
- Reseed with the short to mid-grass prairie mix in Table 7.
- Plant the shrubs/trees listed in Table 3 as appropriate.



## AREA 4 — CATTAIL MARSH/UPLANDS

- Remove noxious weeds, such as Canada thistle.
- Reseed disturbed areas (including areas where noxious weeds were removed) as follows:
  - Wetland areas – reseed with the alkali seed mix Table 6.
  - Upland areas – reseed with short to mid grass prairie mix in Table 7.
- Plant herbaceous species, shrubs and trees in the appropriate areas. The herbaceous species should not be used to replace undisturbed cattail marsh because of the low chance of success.

**Table 4. Shrubs and Trees for Area 4.**

Common Name	Scientific Name	Height (ft)	Planting Location
Three-square bulrush	<i>Scirpus pungens</i>	1-3	Plant this herbaceous species in disturbed areas within wetlands.
Softstem bulrush	<i>Scirpus validus</i>	1-4	Plant this herbaceous species in disturbed areas within wetlands.
Alkali bulrush	<i>Scirpus maritimus</i>	1-4	Plant this herbaceous species in disturbed areas within wetlands.
Rubber rabbitbrush	<i>Chrysothamnus nauseosus</i>	2-4	Upland areas.
Sandbar willow	<i>Salix exigua</i>	5-15	Shoreline and wetlands. Can be planted as cuttings or in one-gallon containers.
Peachleaf willow	<i>Salix amygdaloides</i>	20-40	Shoreline and edge of wetlands.
Plains cottonwood, native	<i>Populus deltoides</i>	20-60	Wet to moist areas along shoreline.

## AREA 5 — WETLANDS ALONG SHORELINE

- Remove noxious weeds, such as tamarisk, Canada thistle, and kochia
- Reseed disturbed areas (including areas where noxious weeds were removed) with the alkali seed mix from Table 6 below.
- Plant the appropriate herbaceous species, shrubs and trees:

**Table 5. Shrubs and Trees for Area 5.**

Common Name	Scientific Name	Height (ft)	Planting Location
Three-square bulrush	<i>Scirpus pungens</i>	1-3	Plant this herbaceous species in disturbed areas within wetlands.
Softstem bulrush	<i>Scirpus validus</i>	1-4	Plant this herbaceous species in disturbed areas within wetlands.
Alkali bulrush	<i>Scirpus maritimus</i>	1-4	Plant this herbaceous species in disturbed areas within wetlands.
Sandbar willow	<i>Salix exigua</i>	5-15	Shoreline and wetlands. Can be planted as cuttings or in one-gallon containers.
Peachleaf willow	<i>Salix amygdaloides</i>	20-40	Shoreline and edge of wetlands.

## AREA 6 — SHORELINE

- Control noxious weeds.
- Reseed disturbed areas with either the alkali seed mix (Table 6) if wetlands disturbed or with the short to mid grass seed mix (Table 7) if uplands are disturbed.
- Plant sandbar willows in dense patches along the shoreline adjacent to Dawson Park to create a visual barrier in order to discourage geese from moving into the park area. Do not plant willows in areas that are to be designated for shoreline fishing.

**Table 6. Alkali Seed Mix.**

Common Name and Variety	Scientific Name	% PLS/Ac.	PLS/ Lb Acre *
Western wheatgrass, Arriba	<i>Pascopyrum smithii</i>	55	6
Saltgrass, inland	<i>Distichlis spicata (stricta)</i>	3	0.35

Slender wheatgrass	<i>Elytrigia trachycaulus</i>	18	2.0
Alkali sacaton	<i>Sporobolus airoides</i>	3	0.3
Prairie cordgrass	<i>Spartina pectinata</i>	18	2.0
Nuttal's alkali grass	<i>Puccinellia nuttalliana (airoides)</i>	3	0.3
<b>Total</b>		<b>100</b>	<b>10.95</b>

\*Rate for drill seeding, double if broadcast seeding

**Table 7. Short to Mid-grass Prairie Seed Mix (Clay Loam Soils).**

<b>Common Name and Variety</b>	<b>Scientific Name</b>	<b>% PLS/Ac.</b>	<b>PLS/ Lb Acre *</b>
Western wheatgrass, Arriba	<i>Pascopyrum smithii</i>	35	7
Blue grama, Pastura	<i>Bouteloua gracilis</i>	5	1
Sideoats grama, Vaughn	<i>Bouteloua curtipendula</i>	10	2
Green needlegrass, Lodorm	<i>Stipa viridula</i>	10	2
Little bluestem	<i>Schizachyrium scoparium</i>	10	2
Buffalograss	<i>Buchloe dactyloides</i>	30	6
Fringed sage	<i>Artemisia frigida</i>	<1	0.05
<b>Total</b>		<b>100</b>	<b>20.05</b>

\*Rate for drill seeding, double if broadcast seeding

## Appendix C: Alternatives Carrying Capacity Analysis

---

### *National Red Cross Boating Standards*

#### Space Requirements

Sailboats	5 acres per boat
Sailboards	3 acres per boat
Fishing Boats	5 acres per boat
Hand Propelled Rec. Boats	3 acres per boat
Motorboats/water skiing	10 acres per boat
Beach	300 sq. ft. per person
	500 sq. ft. water per swimmer

---

### *McIntosh Maximum Capacity at Low Water*

*Alternative A* – No Boating

*Alternative B (at Low Water)*

#### Adjusted Navigable Boating Area

McIntosh Lake Surface Area at Low Water	190 acres
Wildlife Protection Zone	<u>35 acres</u>
<b>Total Navigable Surface Area</b>	<b>155 acres</b>

<u>Activity (at low water)</u>	<u>Space Req.</u>	<u>Use Dist.</u>	<u>Space Req.</u>	<u>Cap.</u>
Hand Propelled Fishing Boats	5 acres per vessel	35%	54 acres	10
Canoes, kayaks	3 acres per vessel	35%	54 acres	18
Sailboards	3 acres per vessel	30%	47 acres	15
<b>TOTAL VESSELS</b>				<b>43</b>

*Alternative C (at Low Water)*

#### *Non-Motorized Days*

#### Adjusted Navigable Boating Area

McIntosh Lake Surface Area at Low Water	190 acres
Swim Beach Zone	<u>3 acres</u>
<b>Total Navigable Surface Area</b>	<b>187 acres</b>

<b>Activity (at low water)</b>	<b>Space Req.</b>	<b>Use Dist.*</b>	<b>Space Req.</b>	<b>Cap.</b>
Canoes, kayaks	3 acres per vessel	35%	65 acres	21
Sailboards	3 acres per vessel	30%	56 acres	18
Sailboats	5 acres per vessel	25%	47 acres	9
Hand Propelled Fishing Boats	5 acres per vessel	10%	19 acres	3
<b>TOTAL VESSELS</b>				<b>51</b>

***Motorboat Days***

**Adjusted Navigable Boating Area**

McIntosh Lake Surface Area at Low Water 190 acres

Swim Beach Zone 3 acres

Unsafe Boating Zone (3 feet or less) 110 acres

**Total Navigable Surface Area 77 acres**

<b>Activity (at low water)</b>	<b>Space Req.</b>	<b>Use Dist.*</b>	<b>Space Req.</b>	<b>Cap.</b>
Motorboat	10 acres per vessel	100%	77 acres	7
<b>TOTAL VESSELS</b>				<b>7</b>

***Comparison of Regional Reservoir Facilities***

***Wakeless or Non-Motorized Facilities***

<b>Comparable Facilities*</b>	<b>Boats per Year</b>	<b>Percentage by Use**</b>
Union Reservoir (735 ac.)	2,300	60% Fishing, 30% Sailing, 10% Rec.
Pella Crossing (80 ac.)	8,148	100% Non-Motorized Fishing
Lagerman Res. (116 ac.)	3,016	60% Fishing, 30% Rec., 10% Sailing
Fairgrounds Lake (21 ac.)	716	100% Bellyboats
Barr Lake (900 ac.)	3,000	55% Fishing, 35% Rec., 10% Sailing
Barbour Ponds (80 ac.)	90-120	80% Fishing, 10% Rec., 10% Sailing

\* All of these reservoirs are open to non-motorized or wakeless (<10 hp) boating.

\*\* *Fishing* boats include bellyboats and all other fishing vessels, *Sailing* includes sailboats and windsurfers, *Recreation* boats includes canoes, kayaks and all other non fishing and sailing vessels.

### ***Motorized Facilities***

<b>Comparable Facilities</b>	<b>CC*</b>	<b>Percentage by Use*</b>
Boulder Reservoir (500 ac.)	130	60% Motor, 30% Sailing, 20% Rec., 10% Fishing
Carter Reservoir (1,100 ac.)	250	30% Sailing, 30% Motor, 25% Fishing, 15% Rec.
Boyd Lake (718 ac.)	153	75% Motor, 12% Sailing, Rec. 8%, 5% Fishing
Cherry Creek (880 ac.)	177	60% Motor, 15% Sailing, 15% Fishing, 10% Rec.

CC – Carrying Capacity

Motor – Includes motorboats and personal water craft (jet skis)

Sail – Includes sailboats and windsurfers

---

### ***Optimum McIntosh Lake Boating Capacities***

McIntosh Lake has a unique carrying capacity due to limitations that include shallow water, limited parking, close proximity to residential development and special wildlife needs. The optimum carrying capacity for the lake must take into consideration the *social, resource and management* capacities as they relate specifically to McIntosh Lake.

#### ***Social Capacity***

- User Experience
- Sensitivity to Neighbors
- Land Use
- Safety

#### ***Resource Capacity***

- Protection of Habitat
- Resource Preservation

#### ***Management Capacity***

- Administrative Ease
- Feasibility of Exercising Control
- Cost-Effectiveness

### ***Alternative A – No Boating***

### ***Alternative B***

In Alternative B, recreation is balanced with resource preservation. Here the resource itself functions as a primary component of the visitor experience. Therefore sensitivity to the environment dictates that use numbers remain low in order to experience and view wildlife in an uncrowded and natural state. In addition, the close proximity to residential neighborhoods necessitates added sensitivity to resource protection. Overuse in this scenario would negate the benefits of costly habitat enhancement.

Based on site observations, recommendations from specialists and discussions with managers of comparable wildlife viewing areas, a 70% increase in the space requirement per vessel was determined to provide a better visitor experience.

<b>Activity (at low water)</b>	<b>Space Req.</b>	<b>Use Dist.</b>	<b>Space Req.</b>	<b>Cap.</b>
Hand Propelled Fishing Boats	8 acres per vessel	35%	54 acres	6
Canoes, kayaks	5 acres per vessel	35%	54 acres	10
Sailboards	5 acres per vessel	30%	47 acres	9
<b>TOTAL VESSELS</b>				<b>25</b>

### ***Alternative C***

The emphasis in Alternative C is on recreation with limited resource preservation and habitat enhancement. Without some reduction in boating numbers, wildlife viewing opportunities and habitat enhancement would be negated. Therefore some decrease in boating activity is necessary.

Based on site observations, recommendations from specialists and discussions with managers of comparable reservoir facilities, a 30% increase in the space requirement per vessel was determined to provide some increase in wildlife viewing opportunities with limited resource protection.

<b>Activity (at low water)</b>	<b>Space Req.</b>	<b>Use Dist.</b>	<b>Space Req.</b>	<b>Cap.</b>
Canoes, kayaks	4 acres per vessel	35%	65 acres	16
Sailboards	4 acres per vessel	30%	56 acres	14
Sailboats	6 acres per vessel	25%	47 acres	7
Hand Propelled Fishing Boats	6 acres per vessel	10%	19 acres	3
<b>TOTAL VESSELS</b>				<b>40</b>

<b>Activity (at low water)</b>	<b>Space Req.</b>	<b>Use Dist.</b>	<b>Space Req.</b>	<b>Cap.</b>
Motorboat	13 acres per vessel	100%	77 acres	5
<b>TOTAL VESSELS</b>				<b>5*(3)</b>

\* In order to ensure safe motorized boating particularly when water skiers are present, McIntosh Lake would adopt the same motorboat carrying capacity as the Cockleburrr Club. Given the size and configuration of navigable surface area, use of more than 3 motorboats at a time has been deemed unsafe.

## Appendix D: Alternatives Cost Estimate

	Alternative A <i>Wildlife Refuge</i>		Alternative B <i>Low Impact Recreation</i>		Alternative C <i>Maximum Recreation</i>		
	Unit Cost	Qty.	Cost	Qty.	Cost	Qty.	Cost
<b>Habitat Improvement</b>							
Fish Structures	\$100.00 ea.	14	\$ 1,400.00	8	\$ 800.00	3	\$ 300.00
Fish Stocking (no charge if public)							
Wetland Enhancements	\$13,200 ac.	11	\$ 145,000.00	6	\$ 79,000.00	3	\$ 39,600.00
Upland Enhancements	\$1,000.00 ac	18	\$ 18,000.00	12	\$ 12,000.00	8	\$ 8,000.00
Trees (Cottonwood)	\$115.00 ea.	200	\$ 23,000.00	150	\$ 17,250.00	80	\$ 9,200.00
Restoration of Cockleburr Club	\$17,000.00 lump	1	\$ 17,000.00	1	\$ 17,000.00	1	\$ 17,000.00
Invasive Plant Mitigation	\$95.00 ac.	50	\$ 4,750.00	30	\$ 2,850.00	10	\$ 950.00
<b>Recreation Improvements</b>							
Observation Decks/Docks	\$30,000 ea.	3	\$ 90,000.00	2	\$ 60,000.00	3	\$ 90,000.00
Boat Ramp gravel	\$1000 ea.			3	\$ 3,000.00		
Boat Ramps concrete	\$6000.00 ea.					1	\$ 6,000.00
Boat Slip Dock	\$11,000 ea.					1	\$ 11,000.00
Soft Surface Trails (6' wide)	\$ 2.75 ft.	7,750	\$ 21,312.50	14,750	\$ 40,562.50	4,250	\$ 11,687.50
Hardsurface Trails (8' wide)	\$22.00 lf	4,500	\$ 99,000.00	5500	\$ 121,000.00	13,750	\$ 302,500.00
Boardwalks (6' wide)	\$65.00 lf			1350	\$ 87,000.00		
Interpretive Signage	\$400.00 ea.	7	\$ 2,800.00	4	\$ 1,600.00	2	\$ 800.00
Restroom Facility	\$85,000 ea.					1	\$ 85,000.00
Picnic Shelter	\$26,000 ea.					2	\$ 52,000.00
Beach	\$ 1.40 sq. ft.					15,000	\$ 21,000.00
Beach Safety Equipment	\$3,000.00 lump					1	\$ 3,000.00
<b>Infrastructure</b>							
Asphalt Parking (curb & gutter)	\$825.00 per sp.	30	\$ 24,750.00	60	\$ 49,500.00	100	\$ 82,500.00
Asphalt Boat/Trailer Parking	\$900.00 per sp.					10	\$ 9,000.00
Asphalt Access Road	28' wide \$75.00 ft.					3,484	\$ 261,360.00
Auto Bridge	\$60,000.00 ea.					1	\$ 60,000.00
Accel and Decel Lanes ?							
Signage (regulatory, directional)	\$250.00 ea.	5	\$ 1,250.00	8	\$ 10,000.00	12	\$ 3,000.00



At Grade Crossing 17th Ave.	\$7,000.00 lump	1	\$ 7,000.00	1	\$ 7,000.00	1	\$ 7,000.00
<b>Maintenance and Staffing</b>							
Life Guards	\$30,000.00 season						\$ 30,000.00
Lake Patrol & boat	\$65,000.00 1st yr.						\$ 65,000.00
Annual Maintenance Labor	\$17 hr./ \$136 day	20	\$ 2,720.00	60	\$ 8,160.00	250	\$ 34,000.00
Annual Maintenance Materials			\$ 2,000.00		\$ 7,000.00		\$ 16,000.00
<b>TOTAL COST</b>			<b>\$ 459,982.50</b>		<b>\$ 523,722.50</b>		<b>\$ 1,225,897.50</b>



## **PUBLIC MEETING #1**

On February 20th, the first of five scheduled public meetings was held at the City of Longmont Public Works Department. Approximately 175 area residents participated in the meeting. The purpose of the meeting was to provide the public with the opportunity to express their concerns and desires related to the McIntosh Lake Master Plan. After a brief presentation explaining the project process, schedule and existing site conditions meeting participants were separated into four groups. Over the course of the next hour and a half each of the four groups were asked to brainstorm the existing qualities of the site, issues or concerns they had regarding existing or future activities, and ideas or dreams they had for McIntosh Lake.

In addition to the meeting, the City received feedback from the public through other sources. These included questionnaires that were made available at the meeting and on the City's website as well as numerous e-mail letters sent to City staff. The public's input from the meetings, questionnaires, and letters will help guide the development of the master plan.

The following summary provides a description of what the Project Team heard during the public scoping process. This summary highlights the responses heard most often. Since it was impractical to mention every comment, less frequently mentioned issues and ideas were recorded and will be considered in the development of the master plan.

## **WHAT WE HEARD FROM YOU**

***The public was first asked to identify the qualities that are most important and that should be preserved at McIntosh Lake.***

Wildlife was the quality that most respondents felt was important to the site. The public described a wide array of wildlife that could be seen at the site and special qualities of the natural environment. Open space, views and peace and quiet were also consistently mentioned. Sunsets, wetlands and the unique aspect of the water body itself also were also deemed significant.



Others felt the passive recreation opportunities of the site were the most important quality. Activities mentioned most included walking, jogging, fishing and recreation within the adjacent parks. The proximity to schools, regional trails and the Boulder County Agricultural Heritage Center were also important qualities.

The overall quality of life in nearby neighborhoods was also mentioned repeatedly. People referred to the lack of traffic, people and the relative safety of the neighborhoods as important attributes.

***Secondly, the public was asked to identify issues or problems to be addressed during the planning effort.***

Of utmost concern to the public (near the lake) was access through neighborhoods and the lack of parking around McIntosh Lake. Others expressed concern over increased traffic, speeding and the loss of privacy in adjacent neighborhoods. For many, safety and neighborhood security was a major concern. Several people cited the lack of law enforcement and multiple jurisdictions within the project area as a primary concern.

Others conveyed problems associated with previous activities at the lake including: noise, wildlife disturbance from people and boats, hunting near residential areas, alcohol and drug consumption, unleashed dogs, loitering, littering, fires and vandalism.

Many people expressed concern over the protection and preservation of site resources including open space, wetlands, wildlife and views. The public also raised concerns regarding air, water and light pollution if recreation development occurred.

Several people suggested that water depths in the lake and the low refilling priority posed significant limitations to water-based recreation. Many people felt there was a need to develop lake carrying capacity limits, control access points and limit the types and hours of usage. Other issues to be addressed included liability, staffing, fees and permits.

***Lastly, the public was asked to generate ideas or dreams they had for what McIntosh Lake should be in the future.***

The vast majority of meeting and questionnaire participants expressed a desire to see wildlife preserved and protected at the site. Wildlife viewing was stated as the most desired use at the lake. Many suggested that all or portions of the site be established as a wildlife refuge. Numerous people wanted the site preserved in its natural state, while others wanted habitat improvements to the



resource including trees and expanded wetlands. Many respondents wanted the site to remain as peaceful and quiet as possible.

Trails were the recreation amenity requested most often. However, there were varying opinions about whether or not the trail(s) should be multi-use, encircle the reservoir, or be paved, unpaved or a combination of both.

There were numerous proposals for how boating might work on the reservoir. Many people liked the idea of permitting non-motorized boating from designated launch sites. A few people suggested motorboats and jet skis be permitted during restricted hours. Several suggested motorboating would work better at Union Reservoir. Still others wanted no boating what so ever.

Many respondents expressed the desire to permit fishing at the reservoir, including improved habitat and fishing piers. Others wanted fishing permitted at designated locations only, while some wanted no fishing at all.

Several members of the public felt it was important that the site remain day-use only. The public mentioned that fees and permits might need to be established and that careful management of any in-water uses from swimming to boating would need to be carefully considered.

There were several respondents that did not want McIntosh Lake to change at all. Some suggested that no recreation improvements or activities should be accommodated at the site. Others wanted no public access at all.

There were several other uses and activities mentioned less frequently including ice-skating, a dog park, interpretive stations and wildlife viewing blinds. All of these suggestions will be considered in the planning effort.

## **NEXT STEPS**

All of the issues and ideas gathered from the public meeting, questionnaires and letters will be utilized in the development of Master Plan Alternatives. A range of alternatives will be presented at the next public meeting.

The next public meeting is scheduled for Tuesday, **April 15, 2003** at the Senior Center, 910 Longs Peak Ave. From **6:00 pm** to **6:30 pm** an open house will take place followed by a meeting from **6:30 pm** to **8:30 pm**. At his meeting several alternative plans will be presented and feedback will be gathered on which plan or combination of plans is preferable.

*Thank you for participating in the process*



**PUBLIC MEETING #2 SUMMARY**

**May 14, 2003**

On April 15th, the second of five public meetings was held at the City of Longmont Senior Center. As with the first meeting, there was an exceptional turnout with over 125 participants. The purpose of the meeting was to provide the public with an opportunity to express their ideas and concerns about a series of alternative master plan concepts for McIntosh Lake. After a brief summary of the alternatives, participants were divided into four discussion groups. Each of the groups was asked to describe which elements, from any of the plans, that they liked best, what elements they were opposed to and which alternative they preferred. At the end of the meeting all participants were asked to come back together and hear the comments recorded in each group.

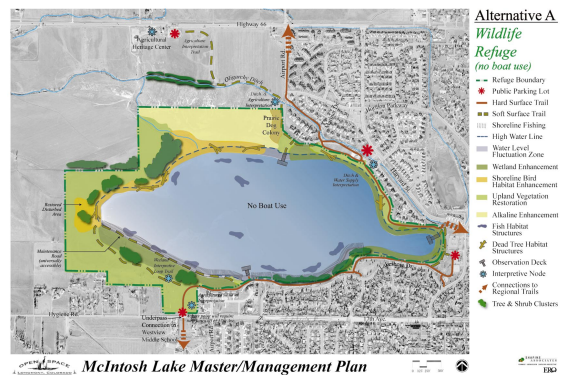


In addition to the meeting, the City received over 150 written comments in the form of questionnaire responses and email messages. The public's input from the meeting and all written responses will be used to help generate the draft McIntosh Lake Master Plan.

**ALTERNATIVE CONCEPTS DISCUSSED**

Three alternative concepts were discussed at the meeting. These concepts were developed utilizing input from the last public meeting. Each alternative has a different emphasis in relation to resource preservation and recreation.

**In Alternative A:** Wildlife Refuge, the vast majority of the site would be conserved as a wildlife area. Wildlife and fish habitat preservation and enhancement would be emphasized. No boating would be permitted on the lake and, although the existing trail system would be expanded, it would not circumvent the lake. The entire north and west sides of the park would be designated as a "wildlife refuge" where habitat would be protected and restored and public access



prohibited. Fishing would be allowed only along the south shore. Education and interpretation would be emphasized with exhibits provided at key natural and cultural resource areas. To enhance educational opportunities and provide safe access to the park, an underpass would be constructed at 17th Street with a link to Westview Middle School. Several dispersed parking lots would be provided near different parts of the lake.

**Alternative B:** Restoration and Recreation would preserve and enhance prime wildlife areas while allowing more recreational uses than shown in Alternative A. A trail would be developed around the entire lake. The sections of the trail near residential developments would be paved with unpaved trails provided along the outer edges of the park. On the north side, three unpaved trail options would be considered. Either one or all three of these trails could be built, depending upon agreements decided between the City and several adjacent landowners. Non-motorized carry-in boating would be allowed and gravel boat ramps would be provided. Fishing would be permitted along much of the shoreline and within the water. A northern section of the lake and shore would be designated a "lake protection zone" and would be off limits to visitors in order to protect wildlife and their habitat. As in Alternative A, several small-scale dispersed parking lots would be provided along with a pedestrian underpass at 17th Street.



**Alternative C:** Recreation Emphasis would provide for the greatest diversity of recreational uses and limited wildlife preservation and enhancement. Both motorized and non-motorized boating would be allowed on the lake. However, due to the small scale of the waterbody, motorized and non-motorized uses would occur on different days of the week. In addition, two sandy swim beaches, a designated windsurf area, a dog water park, a water ski route and a paved trail around the entire lake would be provided. Fishing would be allowed from several places along the shore and within the water. Additional access and road improvements on the west side of the lake would be provided either off of Highway 66 or 17th Street. The west side would be developed with a large parking lot, a multi-use building, a boat launch ramp, a fishing pier, a canoe rental, storage facility and a sandy swim beach.



## WHAT WE HEARD FROM YOU

The following information summarizes what the Project Team heard at the second public meeting and learned from reading the residents' written comments.

***The public was first asked what elements from any of the plans that they liked best.***

The vast majority of respondents listed wildlife habitat preservation, restoration and enhancement as the most important characteristics to include in the plan. Much of the public obviously cares deeply about the wildlife in this area and wants to ensure that recreational uses minimize interference with wildlife.



Respondents also frequently mentioned the need for an expanded trail system. Most residents wanted a trail around the lake that would provide access for a diversity of trail users while minimizing disturbance to important wildlife habitats. In some cases, residents were opposed to a trail around the lake and wanted a system that provided access only to the portions of the lake that were away from prime wildlife areas. Some people specifically stated that they wanted all new trails to be soft surface while others wanted as much paved trail as possible. Some respondents mentioned that they wanted bike trails while others spoke of having hiking, jogging and interpretive trails. A few of the public specifically stated that they wanted the trail to link to the Boulder County Heritage Center and to other trail systems in the area.

Most respondents wanted non-motorized, carry-in boating. Many people specifically mentioned that they wanted canoeing and kayaking while some mentioned that they wanted windsurfing in a designated area that was clean and free of glass. Several residents mentioned that they were in favor of non-motorized boating as long as certain areas of the shoreline and the water remained off limits to ensure wildlife were preserved. Only a few residents wanted motor boating or wakeless boating and very few mentioned that they desired water skiing. A swimming area with a beach was also considered a desirable amenity by many residents.



Other uses and facilities listed less frequently by residents included the desire to have fishing, fish habitat improvements, a dog beach with a dog swim area, an underpass at 17th Street that linked to Westview Middle School and parking off of 17th Street on the west side of the lake, away from residences. Other ideas mentioned by a few people include the provision of an observation viewing area, gravel boat launch ramps, canoe rental, boat storage and interpretive areas.

***Secondly, the public was asked to identify elements from the alternative plans that they would definitely NOT want to see happen.***

Motor boating was listed as the use least desired on McIntosh Lake by many of the respondents. Other uses and facilities mentioned frequently as undesirable include a swim area and beach, non-motorized boating, a dog beach/park and traffic. New parking facilities in existing neighborhoods, big parking lots and too much parking were also listed as negative uses. Mentioned less frequently as undesirable uses were water skiing, prairie dogs, trails traversing wildlife areas or passing too near the lake, new roads on the west side of the lake and fishing near homes.



***Lastly, the public was asked which alternative they preferred, A, B or C.***

The majority of respondents felt Alternative B, the Restoration and Recreation concept was the most preferable. The second most desired concept was Alternative A which focused on creating a Wildlife Refuge. By far the fewest people desired Alternative C, which was the Recreation Emphasis concept and focused on providing diverse recreation opportunities with few wildlife habitat preservation and enhancement areas.

## **NEXT STEPS**

All the comments gathered from the two public meetings inform the development of the draft McIntosh Lake Master Plan. It is likely, that the draft plan will include elements from several of the alternative concepts. The next public meeting will provide an opportunity for the public to comment on the draft plan. The meeting will be **June 4**, at the Senior Center, 910 Longs Peak Avenue. There will be an open house from **6:00 PM to 6:30 PM** followed by a meeting from **6:30 PM to 8:30 PM**.

*Thank you for participating in this process.*