

# **SITE MANAGEMENT PLAN FOR SOMBRERO MARSH CITY OF BOULDER OPEN SPACE AND MOUNTAIN PARKS DEPARTMENT**

12/5/01

## **1. A COMMON VISION FOR SOMBRERO MARSH**

## **2. CONTEXT FOR SITE MANAGEMENT**

- a. Ecological Context for Site Management
- b. Land Use Context for Management
- c. Project Goals and Background
- d. Marsh Restoration Process
- e. Sombrero Marsh Educational Program

## **3. SITE IMPROVEMENTS AND FACILITIES**

- a. Sombrero Marsh Environmental Education Center
- b. Trails
- c. Boardwalk and Teaching / Activity Areas
- d. Viewing Blind
- e. Viewing Platform on the North Side of the Marsh
- f. Interpretive Facilities
- g. Site Access, Parking, Fencing and Gates
- h. Site Security
- i. Landscaping
- j. Habitat Improvements
- k. Natural Area Management and Facility Maintenance Responsibilities

## **4. PARAMETERS FOR EDUCATIONAL AND PUBLIC USES OF SOMBRERO MARSH**

- a. Allowed Recreational and Educational Uses for Different Use Areas
- b. Seasonality of Use
- c. Parameters for Daily Use of the Marsh Area
- d. Public Access to the Sombrero Marsh Education Center
- e. Neighborhood Use and Connections
- f. Monitoring Program

## **5. ISSUES AND CHALLENGES FOR THE FUTURE**

- a. Difficulty of Assessing Visitor Use Impacts and Educational Quality
- b. Seasonal Drying Out of the Marsh and Associated Odors
- c. Subdivision Surface Drainage into the Marsh
- d. Need to Eliminate the Escape and Spread of Non-Native Invasive Ornamental Plants from the Surrounding Neighborhood
- e. Opportunities for Partnering with Boulder County
- f. Possibility of Undergrounding the Xcel Power Line
- g. Proposed Development at 63<sup>rd</sup> and Arapahoe and Associated Marsh Preservation Opportunities

# Sombrero Marsh Site Management Plan

City of Boulder Open Space and Mountain Parks



- City Open Space Boundary
- Boardwalk
- Trail
- Ditch / Lateral



Environmental Preservation Area



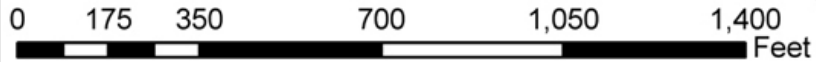
Boulder County Open Space



Marsh Restoration Area



Public Parking





# SITE MANAGEMENT PLAN FOR SOMBRERO MARSH

## CITY OF BOULDER OPEN SPACE AND MOUNTAIN PARKS DEPARTMENT

12/5/01

### 1. A COMMON VISION FOR SOMBRERO MARSH

**Sombrero Marsh Restoration and Education Goals.** The Sombrero Marsh partnership includes the City of Boulder Open Space and Mountain Parks Department (OSMP), the Boulder Valley School District (BVSD), and Thorne Ecological Institute. This partnership is first and foremost aimed at restoring and sustaining the Marsh's ecological health and functioning, which provides an educationally-rich outdoor setting for teaching children and adults about wetland ecology, environmental restoration, and the necessity for land stewardship.

**Role of the Sombrero Marsh Environmental Education Center.** The primary role of the Sombrero Marsh Environmental Education Center is to promote ecological literacy among BVSD students and to provide high-quality teaching that supports the BVSD science curriculum and other standards.

**Resource Protection at the Marsh.** The outdoor education program for Sombrero Marsh, provided by Thorne Ecological Institute on behalf of the School District, and provided by OSMP for the general public, will be designed so as to be compatible with the long-term protection of Sombrero Marsh's natural resources.

### 2. CONTEXT FOR SITE MANAGEMENT

#### a. Ecological Context for Management

Sombrero Marsh is an exceptional ecological resource in the Boulder Valley. Sombrero Marsh is the only naturally occurring perennial open water body of its size in the Boulder Valley, totaling over 20 acres (the majority of wetlands in the Boulder Valley are less than 10 acres). Sombrero Marsh formed in a closed depression approximately 0.5 mi. east of South Boulder Creek in Boulder County, Colorado. The Marsh probably originated as a "blow out" where wind erosion locally lowered the topography of the site below the adjacent stream terrace of South Boulder Creek to the west.

This naturally functioning wetland contains soils, hydrology and vegetation that combine to create important habitat for many birds, mammals, amphibians, and invertebrates. The Marsh's brackish waters and seasonal salt flats support wetland plant communities that are uncommon. Sombrero Marsh's physical environment and wildlife habitat are highly unique because its waters and soils are highly alkaline, which provide a highly specialized niche for plants and animals, and the Marsh provides a locally rare combination of open water and emergent vegetation. Besides important wildlife habitat, Sombrero Marsh also provides important wetland functions of: flood storage, nutrient retention and removal, food chain support, and passive recreation / heritage value.

Sombrero Marsh is not always wet and changes with the seasons and weather conditions. This fluctuation of water occurs in most natural wetland ecosystems, and plants and animals that live here must adapt to these changing conditions. As a shallow closed-basin wetland (i.e., it has no inlet or

drainage outfall), Sombrero Marsh can be dry for up to eight months of the year, while in wetter years, the Marsh may never dry out completely. The water level in the Marsh is governed by rainfall, runoff from its tributary basin and by fluctuation of the groundwater table (which is interconnected with South Boulder Creek). The elevation of the water is also influenced by seepage from the East Boulder Ditch and the Enterprise Ditch. The City of Boulder owns 0.1751 shares in the East Boulder ditch and in cooperation with the School District has dedicated this water to Sombrero Marsh since 1989. Since this dedication, water levels in the Marsh have been higher and more stable than in the past. Shorebirds and ducks find food plentiful in the muddy shallows of the Marsh. Cattails and bulrushes provide ideal nesting habitat for blackbirds, yellow warblers, and rails. Abundant insect life nourishes many types of swallows, bats, and amphibians while red-tailed hawks and northern harriers hunt the alkaline flats bordering Sombrero Marsh. The Marsh also provides habitat for small mammals such as muskrats, raccoons, skunks, rabbits, voles and ground squirrels. Sombrero Marsh is included in the Boulder County Comprehensive Plan as critical wildlife habitat for Wilson's phalarope and various species of raptors.

#### **b. Land Use Context for Management**

Sombrero Marsh property ownership is currently held by the City of Boulder, Boulder County, one major private landowner, and five smaller rural lot owners who own land right up to the west side of the Marsh. (See the Sombrero Marsh Site Management Plan Map.) To the south, west and southeast of Sombrero Marsh are low-density residential areas. Generally, the homes are located on lots of an acre or more and many have small livestock sheds and paddocks for horses. Other developments in the area are composed of more modern and larger homes on smaller lots, such as "The Reserve at Cherryvale" located on the southern margin of Sombrero Marsh. Two subdivision outlots of The Reserve, owned by Boulder County, include some shoreline of the Marsh and adjacent upland. Boulder County currently has a trailhead on the east side of the Swallow Lane cul de sac that provides access for neighborhood residents to the County's open space outlot between the East Boulder Ditch and the Enterprise Ditch.

Commercial and industrial uses occur north of Sombrero Marsh. A mobile home park, storage units, and a lumberyard are located to the north of the Marsh. The administration building and the Vocational/Technical School of the Boulder Valley School District are located near the eastern edge of the Marsh. The School District's service access road runs along the northern boundary of the Marsh. Use of this road is restricted to school district vehicles.

Two agricultural ditches flow (east) near Sombrero Marsh. The East Boulder Ditch is located 0.1 mile southeast of the Marsh. The Enterprise Ditch parallels the East Boulder Ditch several hundred yards to the east in the vicinity of Sombrero Marsh.

#### **c. Project Goals and Background**

The two most important project goals for Sombrero Marsh are:

- Restoring and sustaining the ecological health of Sombrero Marsh, which involves protecting and restoring natural water cycles, wetland functions, and plant and animal species.
- Using the educationally-rich outdoor setting for teaching children and adults about wetland ecology, environmental restoration, and land stewardship.

Sombrero Marsh is surrounded by urban development, accentuating the uniqueness of this wetland. The Marsh is an urban natural area that retains many important ecological functions. However, over the past several decades, impacts from encroaching development, dumping and filling activities and alteration of the hydrologic regime have degraded the wetland's ecological functions. The Sombrero Marsh project has come together, as a partnership among the City of Boulder Open Space and Mountain Parks Department, the Boulder Valley School District, Thorne Ecological Institute, and others, to protect and restore the Marsh. This partnership provides the opportunity to effectively save this natural treasure and also innovate an ecological restoration process that we can learn from and apply to other degraded natural areas.

Sombrero Marsh also offers a unique educational opportunity. The BVSD has built an environmental educational center near the Marsh, which will provide environmental education classes to students in the District (1<sup>st</sup>, 4<sup>th</sup>, and 7<sup>th</sup> grades). The center will take advantage of the unique outdoor education laboratory of both the wetland and upland grasslands, which will be nurtured back to ecological health. Thorne, BVSD, and OSMP have collaborated in developing a curriculum for the educational program, which offers both indoor and outdoor hands-on learning activities. The Sombrero Marsh curriculum is designed to meet BVSD science, math, and language arts curriculum standards in an integrated way. Thorne Ecological Institute will be responsible for providing the education program to BVSD students, and OSMP will offer educational programs to the public at large.

#### **d. Marsh Restoration Process**

Two environmental assessments were completed for Sombrero Marsh to evaluate hazardous waste issues on the site. Both assessments failed to detect hazardous materials in the soil or groundwater at concentrations that pose a threat to public health or require special disposal. In addition, data collected from soil test pits and 13 ground water monitoring wells in the restoration area indicated suitable hydrologic and soil conditions for marsh reestablishment.

Restoring the ecological health of Sombrero Marsh will continue to require commitment of significant financial resources and efforts on the part of staff, volunteers, and the public. It should be recognized that it will take several years to achieve a fully functioning marsh ecosystem, which depends on marsh physical improvements, multi-year plant community development, fine-tuning of the hydrologic features and regimes, and response of wildlife to changing habitat conditions. One of the biggest challenges will be the on-going control of non-native species. Steps in the physical process of restoration include:

- Excavating and properly disposing of old landfill materials, exposing of relict wetland soils and seeds, and creating a re-contoured drainage basin (completed in Spring 2001)
- Planting of native wetland plants (Summer and Fall 2001 and then continuing)
- Control of invasive, noxious weeds (Spring 2001 and continuing)
- Planting of native upland grasses, shrubs, and flowering plants (Spring, Summer, Fall 2001 and continuing)
- Enhancement of wildlife habitat quality (installation of raptor perches, planting of native trees and shrubs, improvement of water quality—Fall 2001 and continuing)
- Monitoring of the progress of restoration activities and adjustment of land management practices as needed (2001 and continuing)

The Sombrero Marsh restoration site actually has three ecosystems that are to be restored and managed: a lowland saltmarsh wetland ecosystem, a drier upland shortgrass prairie ecosystem, and a wetter tallgrass meadow ecosystem tied to irrigation from the East Boulder Ditch. (See the Sombrero Marsh Site Management Plan Map.) The three of these ecosystems will need different kinds of restoration materials and processes. All three offer unique experiences for involving children and adults in the restoration process. Pathways on the site will demonstrate the natural distribution of wetland and upland ecosystem zones: there will be a continuum from wetter, saltier soils to drier less salty soils as one moves from the wetland to the upland grassland, and this continuum will be reflected in distinct plant communities in these zones. Measurement of the different characteristics of these zones is an opportunity for hands-on participant involvement and interpretation.

The restored area of the Marsh, which was previously filled in, is the focal point for the collaboration between OSMP, BVSD, and Thorne. See the restoration area shown on the Sombrero Marsh Site Management Plan Map. Environmental education activities will be limited to this restored area, thereby protecting the existing marsh from visitor impacts. This approach to environmental education will share the benefits of environmental restoration with students and citizens, ensure appropriate use of the Marsh, and direct visitors to the restored wetland and away from sensitive areas that are currently subjected to unmanaged use. Environmental preservation will be at the forefront of land management at the Marsh, guiding the number of visitors to the Marsh, the times of day and seasons that visitation is appropriate, and the types of visitor activities that will be permitted.

#### **e. Sombrero Marsh Educational Program**

The Marsh educational program is described in depth in the Sombrero Marsh Annual Plan and the Sombrero Marsh Curriculum Plan produced by Thorne Ecological Institute. The curriculum is targeted at 1<sup>st</sup>, 4<sup>th</sup>, and 7<sup>th</sup> grades, and the intent is to get as many classes in these grades as possible to take advantage of the wetland study that Sombrero Marsh offers. The Sombrero Marsh curriculum is an integrated curriculum designed to science, math, and language arts standards of the District. The curriculum involves pre-visit and post-visit materials and activities, which teachers will be required to use with their classes. Thorne Ecological Institute will provide training to BVSD teachers that will foster teachers' understanding of the possibilities for indoor and outdoor learning, the expectations for low-impact outdoor education activities, and the layout of the education center and the marsh site. The students' educational experience at the Marsh will focus on gaining an understanding of ecological concepts, restoration processes, and land stewardship.

A key component of the Sombrero Marsh project is involvement of BVSD students in the long-term restoration and monitoring activities at the Marsh. This involvement will take different forms depending on the age group involved. However, for all age levels, an attempt will be made to facilitate this kind of hands-on involvement.

OSMP (and Thorne) will also be offering public education programs at the Marsh. These programs will often be at different times than the school programs. School programs will generally occur during weekdays of the school year. Public educational programs will generally be offered on the weekends and evenings. There will also be occasional special events at the Marsh, which may be scheduled by OSMP, BVSD, or Thorne. It is important to not simultaneously schedule too many educational

participants at the Marsh at any one time. Coordination in the scheduling of programs is critical to protection of the Marsh. Thorne Ecological Institute will take the responsibility for implementing coordinated scheduling of all programs and activities at the Marsh.

A web site for Sombrero Marsh will be developed and maintained by both BVSD and OSMP staff. The web site will offer much useful and interesting information for teachers planning trips, potential visitors, and others. It may also be a tool for teachers to schedule their visits with Thorne. The web site will offer student exploration and teacher materials on wetland ecology, plant community development, restoration methods, and more.

### **3. SITE IMPROVEMENTS AND FACILITIES**

Site improvements and facilities on the Sombrero Marsh site are geared to support both the restoration and educational programs at the Marsh. These improvements and facilities are designed to maximize the protection of the Marsh's natural resources, while at the same time meet the needs of the intended audiences—both children and adults. They will be accessible to people with disabilities. The overall philosophy in making site improvements and constructing facilities at Sombrero Marsh is to promote natural resource conservation that minimizes possible negative impacts of development on the Marsh and ensures that visitor use does not undermine the essential qualities and functions of the marsh ecosystem. There are three reasons for this conservation approach: 1) Sombrero Marsh is such a unique and valuable natural area and educational opportunity; 2) A large investment of resources has been committed to the restoration and educational programs for the Marsh; and 3) The urban setting of the Marsh makes it especially vulnerable to many kinds of adverse environmental impacts. The principal site improvements and facilities are described below.

The wetland public use area of the Sombrero Marsh is limited to the newly excavated and restored eastern portion of the Marsh (about five acres). This limitation serves to prevent new disturbance of the pre-existing marsh and conserve its wetland values and habitat quality. Opening up the restored portion of the marsh to public use (with a new boardwalk and trail system that guides users to the intended use areas) provides a new valuable environmental education opportunity, while still allowing viewing of the pre-existing marsh from afar.

#### **a. Sombrero Marsh Environmental Education Center**

OSMP owns most of the land in and around Sombrero Marsh (about 45 acres). Boulder County Parks and Open Space owns approximately nine acres. Private landowners also own approximately nine acres. BVSD owns a one-acre site where the Sombrero Marsh Environmental Education Center is situated close to the Marsh. BVSD owns the building but leases it out to Thorne Ecological Institute. The educational program at the center will have an indoor component and an outdoor component on wetland and grassland ecosystem areas in proximity to the center. The center building, about 4,800 square feet, houses space for educational activities and also offices for Thorne Ecological Institute. Educational facilities at the center include: a large classroom / activity center, a laboratory / library, educational and interpretive displays, a wetlands exhibit with animal mounts (relocated from the OSMP Flagstaff Summit Nature Center), an outdoor patio for staging field visits, and one office space shared by OSMP and BVSD for staging educational programs and ongoing monitoring activities. As part of the monitoring of the progress of marsh restoration and impacts from educational use, there is a

desire to install remote instrumentation for monitoring activities. The building is wired to allow this instrumentation to be hooked up to it.

## **b. Trails**

Two trails serve the educational and wildlife viewing needs at Sombrero Marsh, both of which start at the Sombrero Marsh Environmental Education Center. The trails have good ADA-compatible tread surfaces and interpretive signs, and they lead to good vantage points to view the Marsh. The goal is to keep users on these developed trails and prevent user-created social trails. The Boardwalk Trail, as the name implies, starts in upland grass and follows down to the marsh boardwalk. The Boardwalk Trail then circles back to the education center but steers the path next to the restored native tallgrass area. The Viewing Blind Trail, as the name implies, starts at the education center and winds down to a viewing blind. All visitor use at Sombrero Marsh will be encouraged to stay on trail. No shortcutting between these two trails will be permitted. Both trails will be surfaced with crusher fine gravel. The width of the trails and the boardwalk will be six feet.

BVSD will construct a connecting trail on the west side of the Education Center property, which connects the Viewing Blind trail and the Boardwalk trail.

## **c. Boardwalk and Teaching / Activity Areas**

The ADA-accessible boardwalk is designed to get educational participants down to the eastern, restored portion of the Marsh. It offers two teaching / activity areas and several places for interpretive signs. Each of the two teaching / activity areas, on extended platforms where participants may gather, is located where there are potholes or depressions in the Marsh mudflats. At certain times of the year, these potholes will be able to provide educational participants access to small areas of standing water and wetland soils, where in-field observations and measurements can add to the learning opportunities.

Because of the conservation-oriented approach to placement of the boardwalk and the teaching / activity areas, the Boardwalk Trail is located at the eastern perimeter of the Marsh. The intent is to reduce possible direct and indirect disturbance from educational and public use on the wildlife that will be attracted to the newly restored eastern area of the Marsh. The southern teaching / activity area involves a boardwalk trail spur that extends to a pothole. The northern teaching / activity area also extends to a pothole and is located right alongside the boardwalk.

Given the current location of the boardwalk (where it is anticipated that marsh plants will fill in all around it) and the current location of the teaching / activity areas (near potholes that will be wet only part of the year), it will be necessary to take a wait and see attitude as to how well this boardwalk alignment works. Effectiveness of the boardwalk in meeting educational program needs will be formally assessed after the first year of operation and then periodically evaluated thereafter. Thorne, OSMP, and BVSD staff will monitor how well this alignment works in minimizing disturbance to wildlife and in serving the educational program needs. If ongoing monitoring and annual assessment show there is a need to modify the boardwalk system, OSMP will consider possible modifications such as extending a new boardwalk trail spur to a pothole closer to the original marsh boundary or deepening the potholes used by the current teaching / activity areas.



The length of the boardwalk is approximately 300 linear feet, including the trail spur to the southern pothole. The teaching / activity areas will be enlarged platforms for educational participants to gather. At the potholes there will be step-down structures to provide direct access to the water (when present) and wetland soils. The boardwalk will be a “floating design”, whereby it will be able to maintain its structural integrity and usability even with shifting and settling of soils.

By design, the Sombrero Marsh project provides multiple places where outdoor activities can be held simultaneously. These places include the patio at the education center, the viewing blind, the two wetland teaching / activity platforms, and other activity areas to be established in upland grassland areas. These multiple places and the curvilinear alignment of the boardwalk itself lend interest and diversity to the educational experience and also serve to disperse small groups and thereby reduce concentrated impacts on marsh plants and animals.

#### **d. Viewing Blind**

The viewing blind is intended to provide bird and mammal watching opportunities that minimize the disturbance and flushing of the wildlife. It will be a low profile, three-sided wood structure with a roof and entrance screen to control glare and shadows. It will be camouflaged with neutral colors, partial berming, and landscaping. A drainage system will be installed in it. The trail leading to it will provide vegetative cover, berming, or other screening techniques to minimize the view by wildlife of people approaching the blind. Inside the blind, there will be multiple viewing holes with different levels for kids and adults. It will be ADA accessible.

#### **e. Viewing Platform on the North Side of the Marsh**

A simple wooden viewing platform is provided on the north side of Sombrero Marsh south of the BVSD access road just east of 63<sup>rd</sup> Street (on OSMP property). This viewing platform is on a bluff above the Marsh and is fenced off from the Marsh. The viewing platform may be used by birders and others when the marsh itself is closed to public access (given seasonal closure and dusk to dawn use restriction). Monitoring of bird populations at Sombrero Marsh will occur at several sites, with this viewing platform being one. One enhancement that could be considered in the future is converting this viewing platform into a screened viewing blind, which would create less disturbance to wildlife and may enhance viewing opportunities.

#### **f. Interpretive Facilities**

There will be a number of interpretive facilities to enhance the quality of visitor experience, promote good user ethics, and ensure safe operation of the Sombrero Marsh site. These interpretive facilities, to the extent possible, will be planned and implemented using the input and creativity of BVSD students, including both their ideas and artwork. Trailhead boards will be located at the beginning of the Viewing Blind Trail and the Boardwalk Trail. These boards will contain a number of informational, educational, and safety messages.

A number of interpretive signs will eventually be constructed along various points of the trail and boardwalk system. These will highlight various aspects of the wetland and grassland ecosystems, the restoration process, and other topics. A natural place for interpretive signs is at the locations of the wetland teaching / activity areas.

#### **g. Site Access, Parking, Fencing and Gates**

As envisioned in the intergovernmental agreement between OSMP and BVSD, the public access point to Sombrero Marsh will be from 63<sup>rd</sup> Street and the access road on the north side of the Marsh. Except when ADA accessibility is required, vehicle access will stop short of the Sombrero Marsh Environmental Education Center at the eastern public parking area (west side of the east gate). Public vehicle access to the eastern designated parking area will be allowed only during week-day working hours when the BVSD gates are open (generally 6 a.m. to 6 p.m. Monday to Friday). Only pedestrian access is allowed beyond this point. It is very important that the BVSD property be secure from unauthorized access, as there are numerous areas where public safety is a concern (bus fueling stations and storage areas, maintenance yards with various kinds of machinery, etc.). Fences, gates, and the location of trails will channel visitors to areas designed for public use. All improvements will be ADA accessible. Because of site security concerns, the public parking is located some distance from the main trailhead to the Marsh. Bus access to the Education Center will allow drop off of students near the building on the north side of the East Boulder Ditch. The following information describes the details of site access, parking, fencing, and gates, based on the agreements reached by OSMP and BVSD and the original concepts reflected in the access agreement granted by BVSD to OSMP and the GOCO grant application.

##### Access

Educational and public visitors access Sombrero Marsh at the trailhead located next to the Sombrero Marsh Environmental Education Center. It is highly beneficial to have one main access point for the general public, which funnels school and public use initially to the main trailhead. One main access makes it possible to monitor and control access effectively. One main access allows all visitors to be exposed to trailhead information that informs about the special quality and vulnerabilities of the Marsh and guides user ethics appropriately.

##### Parking

- On-site parking is provided at the Environmental Education Center for Thorne, BVSD, and OSMP staff. This parking lot includes 5 regular parking spaces and one parking space for the disabled. This accessible parking space may be used by public users displaying approved ADA accessibility stickers.
- Public use parking is located at two places: 1) three spaces located on the south side of the BVSD access road west of the east gate—a crusher-fine pedestrian trail leads from there to the main trailhead and the Education Center; 2) five to six spaces at the junction of 63<sup>rd</sup> Street and the BVSD access road; a crusher-fine trail on the south side of the access road leads from there to the other trail segment then on to the main trailhead and the Education Center. OSMP will make the improvements for the public parking spaces and the crusher fine trails. In either location, public parking is allowed here dawn to dusk only.

## Fencing and Gates

- Replace the existing west gate and relocate it to the east of the current viewing platform on the south side of the access road, but install a separate pedestrian opening to provide pedestrian access when vehicle access and parking are prohibited. BVSD will make this gate improvement.
- Retrofit the existing east gate and construct new parallel fencing along a 90-100-foot section of the existing BVSD cyclone fencing, in order to accommodate a new trail to be constructed from the east gate to the main trailhead and Education Center. The east gate is in two sections; the southerly section will remain closed and locked except for emergency access. The new crusher fine trail is south of the existing BVSD cyclone fence (which is on the south side of the access road) and follows close to the fence and parallel to the East Boulder Ditch. BVSD will make the fence and gate improvements. OSMP will install needed directional and parking signs.
- Both the west and east gates provide openings for BVSD buses to travel one-way west on the access road to 63<sup>rd</sup> and Arapahoe, but this vehicle access will be closed after hours.
- In order to control access to the Viewing Blind trail and the Boardwalk trail (during times of the year when wildlife closures are in effect), OSMP will install gates that which can be locked in the fence openings leading from the Education Center to the Marsh. OSMP will also install a gate for emergency / maintenance access at the vehicle entrance in the fence on the west side of the Education Center.
- To promote safety, fences along the East Boulder Ditch will be installed. OSMP will install a fence along the north side of the ditch from the east gate to the culvert crossing to the Education Center; this gate will then cross the culvert and wrap around to the BVSD west property line fence. OSMP will also install fencing along the south side of the ditch north of the Education Center, which then ties back to the culvert crossing.

Note: The access easement attached to the sale of the BVSD marsh property to OSMP commits OSMP to pay \$5,000 to BVSD toward the cost of necessary fence and gate improvements.

### **h. Site Security**

As indicated above, fences and gates will be used to control access points to the education center and maintain adequate security. However, there are a number of other ways that security will be enhanced. First, Thorne Ecological Institute will have a daily presence at the education center; Thorne will be leading many school programs at various times of the year. Thorne staff will be the most consistent eyes and ears that lead to site security. BVSD also has year-round 24-hour on-site security services at the adjacent BVSD administration complex. In addition, OSMP will schedule occasional patrols by rangers during off-hours at the Marsh site. In the case of BVSD security guards and OSMP rangers, they will add incrementally to on-site security. During emergencies, OSMP rangers, City police, County sheriff, and a number of emergency medical providers will be asked to respond.

### **i. Landscaping**

Consistent with the overall restoration goals, revegetation on the Marsh site will involve only plants native to the inland saltmarsh ecosystem, the shortgrass prairie ecosystem, and the xeric tallgrass ecosystem. The goal is to restore those plant communities that would have been present before Euro-American settlement. On the BVSD Sombrero Marsh Environmental Education Center site, some of the initially planted trees, shrubs, and grasses are not native to Colorado. It is hoped that some of these

will be replaced over time with native plant materials. However, on the one-acre BVSD site, there are large areas still needing landscaping. Demonstration xeriscape gardens with native plants will be established. These types of gardens are perfect for involvement of different BVSD classes to participate directly in establishing different types of native xeriscape plots. OSMP is committed to work with BVSD and Thorne to make this happen.

**j. Habitat Improvements**

Control of noxious weeds on the OSMP site and the BVSD site will need to be coordinated. Aggressive efforts to replace non-native plants with natives will be ongoing. OSMP plans to replace non-native Russian olives and Chinese elms with native trees like cottonwoods or native fruit trees like wild plums. In order to protect the Marsh's water quality and habitat values, coordination has already taken place with the installation of berms on the BVSD site to channel drainage away from the Marsh. Other water quality improvements that prevent direct runoff of pollution and excessive nutrients into the Marsh from surrounding development will be needed. (OSMP staff has begun working with Boulder County and surrounding landowners to accomplish these improvements.)

Other habitat improvements like bird perching poles and nest boxes may be considered in the future. Consultation with groups like Boulder County Nature Association and the Boulder Audubon Society would occur prior to these kinds of improvements.

**k. Natural Area Management and Facility Maintenance Responsibilities**

The delineation of maintenance responsibilities between OSMP and BVSD are clear. OSMP has assumed the responsibility for ongoing restoration and "natural area" management of the Marsh and for maintenance of all site improvements and facilities on its property. OSMP will: 1) continue the ongoing restoration of Sombrero Marsh's ecological values and functions; 2) control non-native species; 3) improve and maintain the quality of the habitat; 4) monitor the results of the marsh restoration and use impacts; and 5) maintain the trails, boardwalk, and viewing blind. BVSD will maintain Sombrero Marsh Education Center building and site improvements on its property, including the Sombrero Marsh Education Center and associated parking and landscaping. However, there may be specific facilities that will require joint contributions from OSMP and BVSD for maintenance of such items as fencing or the access road. These joint areas of responsibility and funding contributions still need to be decided.

OSMP assumes its Sombrero Marsh maintenance responsibilities under its operating budget. The cost estimate for maintaining the Education Center is about \$4,000 per year. BVSD assumes this financial responsibility for maintaining the Education Center. Proceeds from any endowment funds that Thorne Ecological Institute and BVSD are successful in fundraising will be added to the BVSD's funding for this purpose.

#### 4. PARAMETERS FOR EDUCATIONAL AND PUBLIC USES OF SOMBRERO MARSH

##### a. Allowed Recreational And Educational Uses For Different Use Areas

The overall logic behind the proposed set of use parameters is that the more sensitive parts of the Sombrero Marsh site should get higher levels of protection than less sensitive areas. In other words, the more sensitive areas are managed with a higher level of restriction of uses. See the Sombrero Marsh Site Management Plan Map for the delineation of different management areas. The proposed scheme for allowed uses in different management areas is as follows:

###### Allowed Uses within the Environmental Preservation Area (west of East Boulder Ditch):

- Hiking, wildlife viewing, and non-invasive, non-destructive nature study
- Users are **required** to stay on trail
- No dogs, bikes, or horses
- Public use of the marsh area during day-light hours only
- No parking dusk to dawn in the designated Sombrero Marsh parking area(s) or on the access road
- University, high school, or other student research projects that require off-trail access or collection of plants or animals are subject to approval through the OSMP research permit process.

###### Allowed Uses outside the Environmental Preservation Area (east of East Boulder Ditch):

- Hiking, wildlife viewing, and non-invasive, non-destructive nature study
- Users are requested to stay on trail
- Dog walking with dogs permitted on-leash **only**
- Biking and horseback riding on designated trails **only**
- No parking dusk to dawn in the designated Sombrero Marsh parking area(s) or on the access road

###### Permitted Hours of Use for the Environmental Education Center

After-dark use is permissible for the education center but not the marsh area itself. On a case-by-case basis, exceptions for sanctioned nighttime BVSD educational programs in the marsh area may be approved by OSMP upon request.

##### b. Seasonality of Use

- To protect nesting birds and other wildlife, the boardwalk trail will be closed April 15-August 31.
- The viewing blind trail will be open year-round.

##### c. Parameters for Daily Use of the Marsh Area

###### Common Assumptions for Defining Acceptable Daily Use Limits for Sombrero Marsh

1. **Educational Audiences.** The target audience for BVSD student outdoor education at the Marsh initially will be 1<sup>st</sup> grade, 4<sup>th</sup> grade, and middle-school grade levels. For many of the 1<sup>st</sup> grade classes, the educational program will be in-classroom at their home school location, although some classes may visit the Marsh. For the other grades, it is expected that the educational program will include field trips to Sombrero Marsh, with both on-site in-classroom and outdoor components.



Other student educational experiences centered on Sombrero Marsh will be student involvement in the on-going process of restoration and on-going ecological monitoring activities.

2. **Compatibility of Educational Use with Resource Protection.** It is assumed that there is a limit on the amount of educational use that would be compatible with sustaining Sombrero Marsh's natural values and functions. Use beyond this level would cause adverse impacts that diminish the Marsh and would therefore be unacceptable. However, it is difficult to determine the amount of compatible educational use in the absence of experience with actual students and visitors and efforts to mitigate use impacts. Management of the educational program will intentionally limit the amount of use in order to protect the natural values and functions of the Marsh, especially while it is recovering from previous human disturbance. Setting the appropriate amount of use will depend on assessment of whether or not use impacts will be acceptable.
3. **Initial Educational Program.** During the initial phase of implementing the educational program, it is anticipated that no more than two BVSD classes a day will use the Marsh. This level of educational programming is about 60-70 participants per day. Initially, this level of programming is not likely to be exceeded because: a) many of the 1<sup>st</sup> grade activities will be located within home school classrooms; b) not all targeted grade level teachers will choose to take advantage of the Sombrero Marsh field trip option; and c) a normal start-up developmental phase is expected for Sombrero Marsh educational programs. This level of educational programming will be formally evaluated after 1-2 years so it can be modified if needed. Periodic evaluation of the appropriate level of educational programming will occur on an ongoing basis after that.
4. **Management of Daily or Weekly Use.** Scheduling of Thorne BVSD programs and OSMP public programs will be designed to both maximize the quality of educational programs offered and minimize the impacts of use. The actual numbers of participants and timing of arrival and departure will be set to make transitions between groups manageable. Scheduling of programs will be flexible in providing "resting periods" for the Marsh, when use has been heavy or concentrated for short periods of time.
5. **Use Levels and Monitoring.** A visitor use impact-monitoring program, designed to provide early detection of any potentially significant negative impacts on the Marsh, will be implemented. OSMP, BVSD, and Thorne agree that levels of use will not be allowed to exceed levels that cause unacceptable negative impacts on the Marsh. Development of the wetland and grassland plant communities and restoration of other natural values and functions of Sombrero Marsh in the new public use area will occur over several years. During this period, the Marsh will be extra vulnerable to use impacts. The restoration process is experimental in nature and requires patience and persistence for success; consequently, monitoring of the progress of the Marsh's restoration is critical and will allow management actions to be adjusted as needed. The educational program will be considered a pilot project that will be monitored and adapted, as needs dictate.

#### Approach for Managing Daily Use at Sombrero Marsh

1. **Trial Period for Daily Use.** As formalized in the first two annual operating plans for Sombrero Marsh (covering years of operation between 2001 and the 2004), the BVSD educational program offered by Thorne Ecological Institute will be planned to accommodate no more than two classes or 70 participants per day.
2. **Limited Departure from Daily Use Parameters.** As an experiment, BVSD may schedule a limited number of multiple-use days where there would be two student use groups of 70 participants, one in the morning and one in the afternoon. These multiple-use days will be

scheduled with the consent of OSMP, and careful monitoring of the differential impact of these higher use days will be conducted.

3. **Record-Keeping of Use.** Good records of actual use will be maintained by Thorne for BVSD programs and OSMP for public programs. These visitation numbers will be used for purposes of adjusting the operation of the educational program at Sombrero Marsh.
4. **Monitoring Program.** A visitor use impact-monitoring program will be implemented to monitor the impacts of daily and cumulative use on Sombrero Marsh. This visitor use impact monitoring will be one part of the overall monitoring program supported by all three partners. OSMP will be responsible for designing and implementing the visitor use impact-monitoring program, in coordination with the other project partners.
5. **Decisions on Modification of the Level of Educational Programming.** In the annual operating plans for 2002 and 2003, a determination will be made on whether or not significant negative impacts have occurred from the use of the Marsh. If warranted, adjustments will be made to minimize and mitigate these impacts. If the assessment shows minimal impacts from on-going educational use of the Marsh, and it indicates the potential for increased use without unacceptable impacts, then the programmed number of participants may be revised upward subject to on-going monitoring and adjustment as needed. Conversely, if the assessment shows an unacceptable level of impacts from educational use, then the number or program participants will be reduced.
6. **Supportive Management Practices.** In order to minimize possible negative impacts from educational and public use, the partners agree to the following:
  - a) Thorne instructors, OSMP instructors, and BVSD teachers will teach environmental stewardship as a key part of the curriculum, which teaches individual and collective responsibilities to provide respect and care for natural ecosystems and teaches specific ways that negative impacts of nature study and recreational use can be minimized or avoided. A stewardship contract is under development, which would commit students, teachers, and public program leaders to use specific ways of minimizing negative impacts on wildlife or other natural resources of the marsh.
  - b) Outdoor education activities will be managed to minimize impacts from participants by minimizing off-trail use, noise or other disturbances, and damage to habitat. Participants shall be required to remain on designated trails. Group activity areas will be provided in both wetland and upland areas.
  - c) The outdoor portion of classes may need to be rescheduled if trails become excessively wet or muddy. Severe wet conditions can result in excessive damage to plants and result in severe soil erosion.
  - d) No double booking of school and public groups will occur so as to exceed reasonable levels of use.
  - e) Management of larger educational or public groups will require splitting them up so that no more than 35 participants will be brought into the marsh site at any one time for outdoor activities. (Practically speaking then, "larger groups" could be as few as 36 participants.) In addition, for school-age participants, the adults-to-children ratio shall be at least 1 adult per 15 children.
  - f) In order to avoid concentrated use and associated impacts, outdoor education activities will be managed to disperse the participants over the Sombrero Marsh use areas at any one time. These use areas include places inside and outside the education center, the Viewing Blind Trail and Boardwalk Trail, and marsh and upland shortgrass restoration areas.
  - g) Research permits will be required for either BVSD or public research projects. These permits may be obtained through approval by OSMP staff after submittal of required information. However, OSMP reserves the right to deny research permits if it determines that negative impacts of the project are unacceptable.

- h) Any collection of water samples, flora, or fauna will only occur within defined acceptable parameters, which will be jointly agreed to by OSMP and Thorne Ecological Institute.
- i) Public educational programs at Sombrero Marsh that exceed 50 participants will require approval of OSMP group use permits.

**d. Public Access to the Sombrero Marsh Education Center**

1. **Trailhead Access.** The main trailhead will be located near the Education Center. The trailhead is the gateway to the viewing blind trail and the boardwalk trail. The location of the main public access trail will funnel people to the trailhead but not to the Education Center per se. The main trailhead is the focal point for the educational and public use of the Marsh. The trailhead board will have educational / interpretive information, use regulations, stewardship information, and a possible user sign-in.
2. **Public Access to the Sombrero Marsh Education Center.** The Education Center will serve as the main platform for the School District's education program at the Marsh. The Education Center will play a more limited role in providing outreach and education services to the public. The Center will be open to the public during a limited number of hours by reservation only.
3. **Officially-Sponsored Agency or Public Group Events.** Each of the partners may sponsor agency or public group events at the Education Center. These events will be limited to the public access portions of the building. These events will be coordinated through Thorne or BVSD in their facility scheduling capacities. These events will require official partner sponsorship and on-site supervision and responsibility for proper use and operation of the building.

**e. Neighborhood Use and Connections**

Currently, the Sombrero Marsh site experiences a moderate amount of use from people and dogs from the neighborhood. There are no formal access points from the neighborhood into the Sombrero Marsh site. There is an informal trailhead for the Boulder County subdivision outlot southeast of the Marsh (off of Swallow Lane), which leads to several social trails that can be used to access the marsh area. There is a definite need to work with neighborhood residents to decide on formal trail connections from the neighborhood to the Marsh. Neighborhood use and connections will be addressed jointly with residents at a later time. OSMP will work with Boulder County Parks and Open Space staff and neighbors to determine necessary public access and trails located outside the Environmental Preservation Area and connections to trails in the Environmental Preservation Area. Fencing and signs to facilitate and guide public access will be determined and erected along the southern and eastern boundaries of the property.

**f. Monitoring Program**

General Monitoring Framework

A Sombrero Marsh monitoring program will be implemented jointly with the involvement of all three partners. The goals of the monitoring program are to: 1) monitor the progress of restoration activities (with respect to restoring high-quality habitat, native species, and natural processes supporting them); 2) monitor levels and characteristics of visitor use and the unintended impacts of daily and cumulative use on Sombrero Marsh (allowing visitor use management to adjust if needed); and 3) monitor the impact of the educational program on participants (allowing the program to be improved over time).

To assess the progress of restoration activities, several physical and biological parameters will be monitored. Some of these parameters include the hydrological cycles, growth and development of vegetation communities, changes in water and soil chemistry, changes in species mix (including native vs. non-native), and changes in habitat structure and other characteristics. A baseline measurement of these parameters is being completed.

As part of the monitoring program, Thorne and OSMP will coordinate ongoing documentation of the levels and characteristics of visitor use. It will be difficult to separate the impacts of use from all the other factors influencing general improvement of environmental conditions as well as external factors that may negatively influence conditions at the Marsh. However, simple things like the amount of off-trail use (and associated vegetation trampling) and the flushing of birds (moving away from people) will be observed in a systematic way.

Impacts will be assessed on the Marsh overall and on the concentrated use activity areas. Impacts of levels of use on the quality of the educational experience will also be assessed. OSMP will take the lead on environmental impact assessment, and Thorne Ecological Institute will take the lead on educational quality assessment. Quarterly consultation will occur among all three partners regarding the implementation of the monitoring program. At an annual meeting among the Sombrero Marsh partners, the results of the monitoring program will be evaluated and then incorporated into the annual operating plan. Monitoring activities have been initiated starting in October 2001.

With regard to implementing the trail, vegetation, and wildlife monitoring described below, a combination of staff, volunteers and students will be involved. Since involvement in restoration and monitoring activities builds ownership in the marsh, OSMP will design and implement monitoring methods that volunteers and students can also participate in. Further discussions on implementing the involvement of students in monitoring activities as part of the Sombrero Marsh curriculum or as separate stewardship projects will be undertaken.

#### Details on Trail Monitoring

The focus of trail monitoring is to determine whether visitors are staying on the trails, going off trail, or widening trails. Users who go off trail or create wider trails can affect soil and vegetation in undesirable ways. Six trail transects will be installed on the wildlife blind trail and the “upland prairie trail” to evaluate changes in trail width. Creation of undesignated or braided trails or trail widening, and impacts such as soil erosion and compaction, loss of vegetation, and presence of weeds will also be monitored with additional sample plots. Staff and volunteers will initially be involved in this monitoring.

#### Details on Vegetation Monitoring

The growth and development of plant communities will be monitored throughout the marsh restoration area. Sampling areas and control areas will be established. In these transect areas, changes in vegetational composition, structure, and succession will be monitored. The establishment of native vs. weedy plant communities will be a key factor monitored. A key monitoring question will be: are we finding the expected distribution of plant communities that are adapted to the different environmental

gradients—the continuum from wetter, saltier soils to drier less salty soils as one moves from the wetland to the upland. Measurement of the different characteristics of these zones is an opportunity for hands-on participant involvement and interpretation. Staff and volunteers will initially be involved in this monitoring.

### Details on Wildlife Monitoring

A wildlife monitoring program at Sombrero Marsh will contribute to general monitoring of the progress of restoration and the assessment of the impacts of visitor use of the marsh. Wildlife monitoring at the marsh will focus on use by birds and in the future may be expanded to include other taxa such as insects, mammals, and amphibians. A species list for birds exists for the site but is not comprehensive. Preliminary baseline data for insects, mammals, and amphibians is limited. Changes to these communities may be difficult to assess, confounding the difficulties in assessing visitor impacts. We will continue to learn more about the marsh as the restoration progresses and will base future monitoring and management recommendations on all available valid data sources.

Trained and experienced volunteers will conduct the majority of avian monitoring at Sombrero Marsh. Visits to the marsh will occur weekly for a minimum of 12 months beginning in October of 2001. The program will be assessed and any necessary changes will be made in 2002.

Volunteers will visit the marsh and observe any birds using the area from 3 different observation areas. The first area is the viewing platform near the west gate (see the Sombrero Marsh Site Management Plan Map). The second is the viewing blind, and the third is the boardwalk trail. Time will be spent at each location so that all birds using the marsh can be identified and counted. Although viewing will occur from three points, efforts will be made to avoid double counting birds. The three observation areas will allow better viewing of all birds and an improved opportunity for identifying and observing birds that may be cryptic, camouflaged by vegetation, or otherwise unidentifiable. Duration of each observation will be based on the amount of bird activity at the time. Volunteers will be encouraged to stay for a minimum of 30 minutes.

Volunteers will visit the Sombrero Marsh during two sampling periods: one during the school week when education programs are likely to occur; and one during the weekend when there will likely be less visitor use. These two sampling periods should reflect different visitation use patterns. Variations in time of day may also provide insight into avian use patterns and potential human impacts. In addition to species and number of birds observed, volunteers will record the following information: behavior of birds and their responses to human presence (if any); human activity present at the marsh during the observation; location of human and avian activity within the marsh; weather, date, time of day; and any other wildlife they observe and can accurately identify. Species assemblage and relative abundance will be tracked over time to reflect the progress of the Marsh's recovery.

### Visitor Use Monitoring

Thorne and OSMP will keep data that tracks the number of visitors and any other pertinent characteristics of visitor use. OSMP and Thorne will pool their information on use and share that with BVSD. In order to facilitate collecting as complete information as possible, a trailhead sign-in station is being considered, especially to estimate the use by unsupervised public users.



## Monitoring Program Summary

Physical and biological changes occurring at the Marsh over time and also the amount and characteristics of visitor use will be monitored by staff, volunteers, and students. Monitoring change and levels of visitor use are important to document the success of the ongoing marsh restoration efforts and the shared marsh stewardship activities. Monitoring methods can identify resource conditions or wildlife population trends that are positive, but also those that may be “redflags”. If any redflags are identified, more detailed investigation of possible problems and development of appropriate recommendations will occur. The results of the monitoring program will be discussed by OSMP, BVSD, and Thorne quarterly as part of the ongoing coordination efforts. If the impacts of visitor use suggest a need to revise the education program, that issue would be discussed by all three partners and decided in advance of adopting the next Sombrero Marsh annual operating plan.

### **5. ISSUES AND CHALLENGES FOR THE FUTURE**

OSMP, BVSD, and Thorne are committed to the success of the partnership to restore Sombrero Marsh and provide high quality environmental education there. However, a number of site management issues will be a challenge to this success. Some of these issues are discussed briefly below.

#### **a. Difficulty of Assessing Visitor Use Impacts and Educational Quality**

The goal of monitoring and assessing visitor use impacts is to ensure that impacts fall within a range of acceptability, given that any human presence and use of the Marsh will cause some unwanted impacts. There are several difficulties surrounding this goal and related assessment activities. First, the Marsh is not located in a pristine area--any human impacts on plants and wildlife are the result of the cumulative effects of surrounding land uses, urban environmental factors, as well as planned visitor use. These different sources of impacts will be hard to distinguish. Second, the extremely degraded condition of the eastern portion of the Marsh, before it was excavated and rehabilitation efforts were initiated, will of course show improvement in habitat quality from what previously existed. The incremental effects of new visitor use on this part of the Marsh may be very difficult to separately measure from the general trends in habitat improvement. Third, while many of the types of wildlife that will be commonly seen on the marsh site will likely have the ability to adapt to human presence over time, other species that will not be seen because they cannot adapt to human presence, and they will not be picked up in the monitoring. Finally, it may take some work for OSMP, BVSD, and Thorne to agree on how to strike an acceptable balance between competing goals of preservation vs. use—the same challenge that natural area managers in many public land programs face.

#### **b. Seasonal Drying Out of the Marsh and Associated Odors from Decaying Vegetation**

Given its topography and natural hydrologic regime, Sombrero Marsh in most years will dry out significantly or completely. When this drying out occurs, emergent vegetation dies and rots, which creates hydrogen sulfide gas—as is common in most marshes. Previous studies by the Boulder County Health Department have determined that people who live by the Marsh are not exposed to any added health risks from the H<sub>2</sub>S gas. But this gas is a nuisance. OSMP, BVSD, and the County Health Department have begun and will continue discussions on appropriate agency responses to extreme occurrences of this gas. If possible to achieve, OSMP will try to prevent the gas smell from getting worse than in the past.

**c. Subdivision Surface Drainage into the Marsh**

The Reserve at Cherryvale subdivision channels all of its stormwater drainage to the Marsh through a system of rural-type swales alongside the residential streets. The original subdivision plan proposed two stormwater drainage detention ponds that would intercept the stormwater from the swale system and filter out most of the harmful pollutants or excess nutrients from the runoff. However, these detention ponds were never built, so fertilizers, pesticides, herbicides, grass clippings, vehicle oil spills, and other pollutants have a way of directly flowing into the Marsh. Wetlands, by their nature, have the inherent ability to absorb and detoxify some of these pollutants. But the irony is that the excess nutrients in fertilizers that can flow from residential yards into the Marsh probably exacerbate the algal blooms and rotting of this vegetation, which causes odors that may be unpleasant to nearby residents. OSMP and the County Health Department have started a process of educating the Reserve at Cherryvale residents on ways that they can reduce the pollutant inputs from their properties and streets into the Marsh. For example, residents could minimize the use of lawn fertilizers and pesticides. In addition to continuing these efforts, there is a need to physically reduce the direct inputs of stormwater and pollutants into the Marsh. OSMP has initiated discussions with the County (and residents should be brought into them) to explore possibilities for constructing needed detention ponds or other kinds of pollutant or excess-nutrient traps.

**d. Need to Eliminate the Escape and Spread of Non-Native Invasive Ornamental Plants and Grasses from the Surrounding Neighborhood**

One of the most intractable problems facing natural area managers virtually everywhere is the intense competition that native plants face from non-native ornamental plants. There are many examples of these invasive plants displacing natives on Open Space and Mountain Parks lands, with invaders like yellow toadflax, sweet pea, purple loosestrife, myrtle spurge, bouncingbet, and others. When native plants are eliminated or displaced, there is often a cascading effect on the wildlife that depends on them. Preventing the invasion of non-native plants into the marsh site will depend, in large part, on the cooperation of neighborhood residents and other surrounding property owners (including BVSD). Some discussions have already begun between OSMP staff and residents on the need to use alternative landscaping materials.

**e. Opportunities for Partnering with Boulder County**

Boulder County owns and manages two open space outlots on the south side of Sombrero Marsh adjacent to the Reserve subdivision, which include part of the wetland as well as wet and dry grassy upland areas. Cooperation with Boulder County is essential for current and future management of Sombrero Marsh. OSMP has previously collaborated with the County in outreach activities with homeowners who live in the Reserve at Cherryvale, in order to educate residents about the need to minimize pollutants that can run off to the Marsh. OSMP will pursue additional discussions with Boulder County to ensure that land management around Sombrero Marsh is coordinated and mutually supportive. Such coordination is important on such issues as trail development and management of social trails, dog and bike management, horse management, integrated weed management, and implementation of best management practices for wetland and water quality management. OSMP will

work with Boulder County on implementing an agreement for the day-to-day management of its two outlots, in order to ensure cost-effective, integrated land management.

**f. Possibility of Undergrounding the Xcel Power Line**

The power line that runs north-south through Sombrero Marsh bisects the marsh habitat. Many people feel that it is an ugly eyesore and detracts from the quality of visitor experience to Sombrero Marsh as a natural area. The effects of the power line on wildlife are unknown. OSMP, BVSD, and Thorne have all had discussions with Xcel on the possibility of installing this power line underground. Residents of the adjacent Columbine mobile home park also have had conversations with Xcel representatives and the County Health Department about the adverse health risks associated with the electromagnetic radiation from the power line. Xcel has estimated that the cost of the undergrounding to be \$250,000. Because of this high cost, this issue may be a difficult one to resolve. OSMP does not have adequate funding, by itself, to absorb this cost. Continued discussion and cooperation between the partners, the affected residents, the County, and Xcel should be initiated to further explore possibilities for undergrounding. There may be substantial cost savings, if the power line undergrounding adjacent to the mobile home park and through or around the marsh is done at the same time.

**g. Proposed Development at 63<sup>rd</sup> and Arapahoe and Associated Marsh Preservation Opportunities**

A significant portion of the Marsh is still in private ownership on the northwest corner of the Marsh (which extends all the way to the corner of Cherryvale and Arapahoe). Currently there is a development proposal for this vacant property. This proposal would involve the building of several Jewish synagogues and some housing. This development could occur only if the property were annexed to the City of Boulder. Even if this development proposal is not approved, there is still a high likelihood that this property will be developed in the future. So there may be opportunities for working with the landowner to preserve the remaining non-public land around the Marsh through some combination of development exaction and purchase by Open Space and Mountain Parks.