2. EXISTING CONDITIONS

FINAL BIDWELL PARK MASTER MANAGEMENT PLAN UPDATE

EDAW

2 EXISTING CONDITIONS

2.1 PARK ZONES

For the purpose of this Master Management Plan Update, Bidwell Park has been divided into three primary use zones referred to as Lower Park, Middle Park, and Upper Park (Exhibit 1.1.1-2). This section describes the three main park planning zones as well as specific planning areas that are addressed as part of this planning effort.

2.1.1 LOWER PARK

Lower Park, located between the historic Bidwell Mansion in downtown Chico and Manzanita Avenue in downtown Chico, can be characterized as a narrow, predominantly oak/sycamore dominated riparian corridor along Big Chico Creek. Lower Park's valley oak population is one of the largest in the state, representing a habitat type that was once prevalent in the Sacramento and San Joaquin valleys before the arrival of modern agriculture. Lower Park's flat terrain and thick canopy of trees provide ample shade for visitors. Facilities in Lower Park are shown in Exhibit 2.1.1.1. Lower Park has easy vehicular, bicycle and pedestrian access to numerous park facilities including playgrounds, a swimming pool, and a visitor center. Several streets pass through the park. Lower Park's woodlands, alluvial meadows, multiple-use trails, and turf areas constitute a 400 acre "back yard" for the community, subject to high intensity recreational use. One-Mile Recreation Area, a few blocks from downtown, is a park activity hub that accommodates special events, playing fields, a playground, parking, and restrooms. Of special interest at One-Mile is Sycamore Pool, a concrete pool that was constructed within Big Chico Creek in 1923–24. Caper Acres at One-Mile is a fantasy play area specifically designed for pre-elementary and elementary school aged children under 12 years of age. The Chico Creek Nature Center, operated by an independent non-profit organization, operates as the interpretive center for Bidwell Park and offers a variety of programs for students and families, as well as University internships and a volunteer program.

2.1.1.1 CEDAR GROVE

Within Lower Park, Cedar Grove is an important location for community events including the Annual Endangered Species Faire, the Shakespeare in the Park event and open air concerts. This Master Management Plan Update explores future uses of the Cedar Grove picnic area and seeks to accommodate multiple uses in a manner that is compatible with the site's location in native riparian woodland. Appendix G includes the Cedar Grove Area Concept Plan and a verbal description of potential futures design, layout, and uses of the area.

2.1.1.2 ONE-MILE RECREATION AREA

The One-Mile Recreation Area within Lower Park contains several of Lower Park's prime attractions, including Caper Acres Playground, Sycamore Field and Sycamore Pool. Also present within the One-Mile Recreation Area are horseshoe pits, two group picnic areas, and several areas designated for oak regeneration. Parking, bike racks and drinking fountains are available at several locations within the One-Mile Recreation Area and restrooms are available at both Caper Acres and Sycamore Pool.

2.1.1.3 LOST PARK

The westernmost segment of Bidwell Park, between Camellia Way and the downtown area, is referred to as Lost Park. Lost Park encompasses a narrow corridor on the north and south banks of Big Chico Creek. Several businesses and residences back up against Lost Park.

2.1.1.4 ANNIE'S GLEN/CAMELLIA WAY

Annie's Glen/Camellia Way is located towards the western boundary of the Park, between Lost Park (the westernmost portion of Bidwell Park) and the One-Mile Recreation Area. The north side of Big Chico Creek is referred to as Camellia Way and includes a creekside picnic area. The south side is referred to as Annie's Glen and contains paved and unpaved multi purpose trails traversing the riparian woodland along the creek.

2.1.2 MIDDLE PARK

The area east of Manzanita Avenue to the Chico municipal golf course, the gate on the road near Parking Area E, and the ridge just east of the Horseshoe Lake area is referred to as Middle Park (Exhibit 1.1.1-2). Middle Park is accessible by two paved roads, Wildwood Avenue and Upper Park Road, on the north side of Big Chico Creek and by one paved road, Centennial Avenue, on the south side of Big Chico Creek. Several developed facilities are present among the dramatic natural resources and give Middle Park a transitional character between the higher density use patterns of Lower Park and the low density use patterns of Upper Park. Facilities in Middle Park are shown in Exhibit 2.1.2.1. Several leases to both private groups and the Chico Area Recreation District (CARD) exist here including the Chico Municipal golf course, the Chico Equestrian Center, the Kiwanis Community Observatory, the Chico Rod and Gun Club facility and the Hooker Oak Recreation Area. Five-Mile Recreation Area is a popular destination for large group gatherings and provides picnic tables, barbecues and plenty of open space. Hooker Oak Recreation Area offers playing fields and a site for summer day camp programs as well as a children's playground and picnic area. Middle Park serves as the most common starting point for Upper Park trail use, especially when the unpaved portions of Upper Park Road are closed to vehicular traffic.

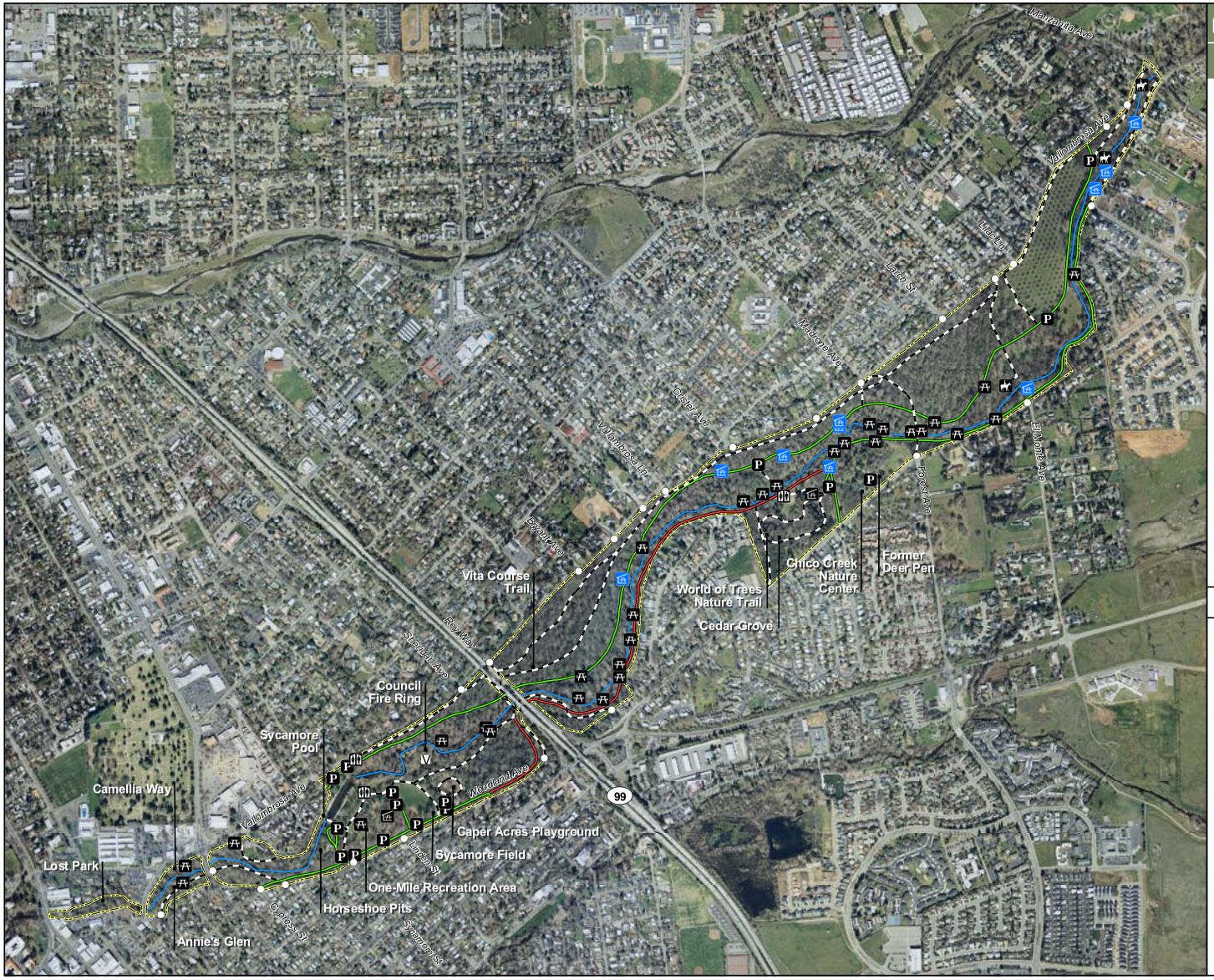
In Middle Park the qualities of Lower Park and Upper Park blend together. Middle Park elevation, soil type and vegetation conditions differ from both Lower and Upper Park.

2.1.2.1 HORSESHOE LAKE

The area around Horseshoe Lake is an important hub for hikers and bikers exploring the varied terrain of Upper Park. The lake is a popular family resource that provides fishing and bird watching opportunities. During the spring and early summer the area receives heavy use by visitors enjoying the spectacular display of wildflowers in Middle Park's grasslands, vernal pools, and oak woodlands. Horseshoe Lake was constructed around 1930 to store water from Big Chico Creek for the purpose of irrigating the municipal golf course. Abandoned after a few years, Horseshoe Lake has remained a shallow, turbid pond, fed by winter and spring runoff, gradually losing water between wet seasons, but never completely drying up. Well water is used to keep a minimum pool within the lake during the late summer and early fall. A project to remove polynuclear aromatic hydrocarbons (PAHs) from the lake from a prior rifle range on-site and place lead contaminated soil in a containment cell under Parking Area E was completed in November 2005. The Horseshoe Lake area is another focus for site-specific planning as part of this Master Management Plan Update. Issues addressed include restroom facilities, trails, and pathways around the lake, picnic facilities, native vegetation plantings, and parking. Appendix F includes Horseshoe Lake Area Concept Plan and a description of potential futures design, layout, and uses.

2.1.3 UPPER PARK

The dominant feature of Upper Park is a natural steep-walled, rocky canyon with an elevation change of up to 1,000 feet from the creek bed to the canyon rim. This change in topography provides for dramatic views across the ravines and foothills. Access within the canyon is limited due to steep slopes and lack of developed pathways and roads. Access to Upper Park is provided by Upper Park Road and various trails. The south side of Upper Park can also be accessed from SR 32. Upper Park includes various swimming holes (Alligator Hole, Bear Hole,



Bidwell Park Master Management Plan

LOWER PARK FACILITIES

LEGEND

- Park Access Point
- Group Picnic Area
- Equestrian Water Crossing
- Parking
- Restroom
- Picnic Area
- Picnic Area, Handicap Accessible
- Paved Roadway No Vehicles Permitted
- Paved Roadway Vehicles Permitted
- Multi-Use Trails
- Big Chico Creek
- Lower Park Boundary

Sources: Kent Lundberg 1998, City of Chico 2005

N

1 Inch = 1,200 Feet

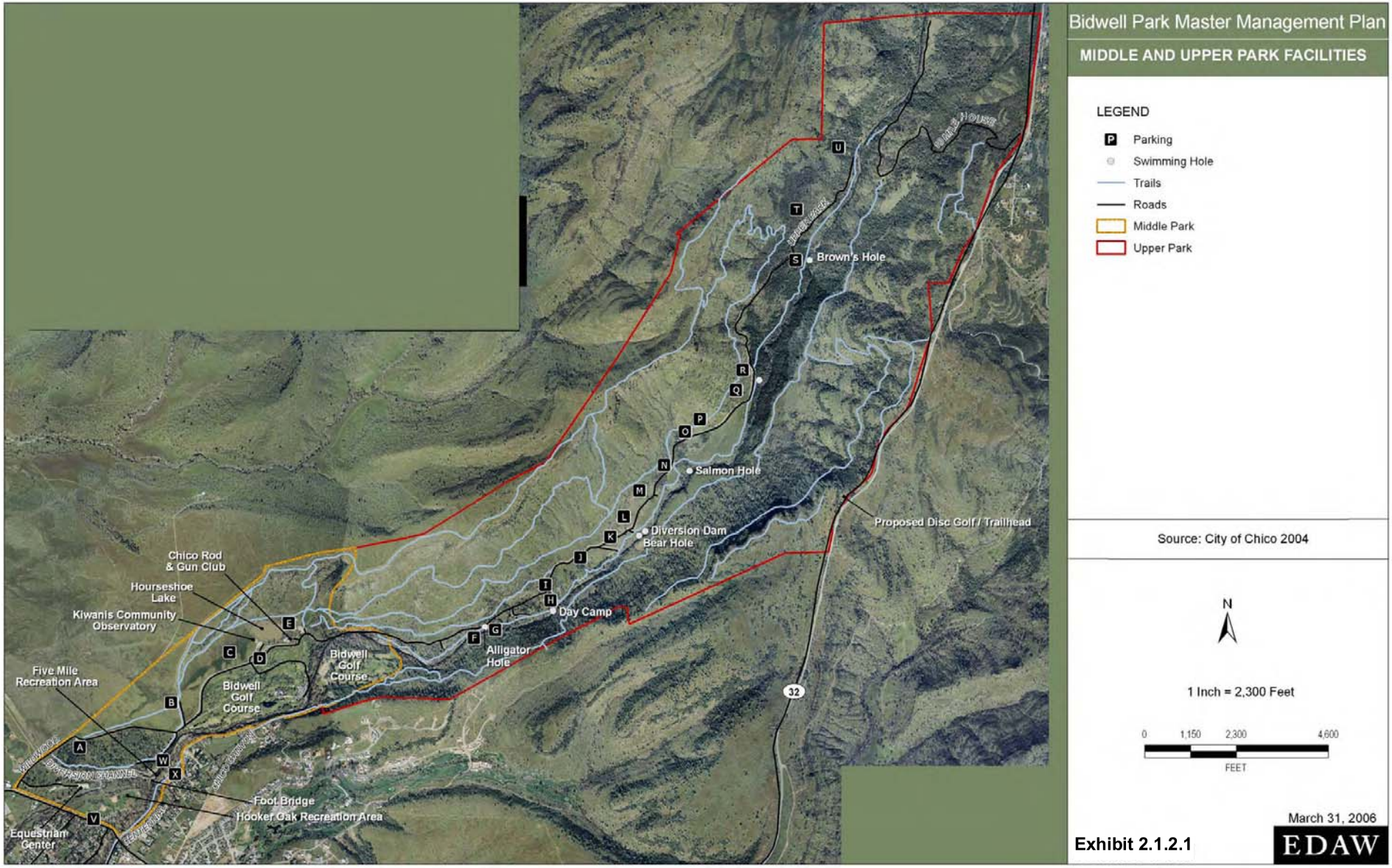
0 600 1,200 2,400

FEET

May 22, 2008

Exhibit 2.1.1.1

EDAW


Bidwell Park Master Management Plan
MIDDLE AND UPPER PARK FACILITIES
LEGEND
Parking
Swimming Hole
Trails
Roads
Middle Park
Upper Park
Brown's Hole
Salmon Hole
Diversion Dam
Bear Hole
Day Camp
Alligator Hole
Proposed Disc Golf / Trailhead
Chico Rod & Gun Club
Hourseshoe Lake
Kiwanis Community Observatory
Five Mile Recreation Area
Bidwell Golf Course
Bidwell Golf Course
Foot Bridge
Hooker Oak Recreation Area
Equestrian Center
32
Source: City of Chico 2004
N
1 Inch = 2,300 Feet
0
1,150
2,300
4,600
FEET
March 31, 2006
Exhibit 2.1.2.1
EDAW

Salmon Hole, and Brown's Hole) as well as many of the Park's popular multiuse trails and the Yahi trail which is only open to hikers. The south side of Upper Park also includes the SR 32 Site, currently used as an unofficial disc golf facility. Facilities in Upper Park are limited and are shown in Exhibit 2.1.2.1.

Upper Park's size, relatively undisturbed condition and proximity to other undeveloped open space allows the presence of large fauna and other unique animals that require greater range of undisturbed conditions, such as black bear, mountain lion, and peregrine falcon. This section of the park is also home to rare plant life, including Butte County checkerbloom, a plant that grows only in Butte County.

2.1.3.1 PROPOSED DISC GOLF FACILITY/TRAILHEAD AT THE SR 32 SITE

This Master Management Plan Update also includes a concept plan for a proposed Disc Golf Facility/Trailhead at the SR 32 Site. Three conceptual alternatives for the site were developed (Appendix H). These alternatives aim to accommodate disc golf as an acceptable recreational use within Upper Park while minimizing potential adverse effects on the site's sensitive biological, soils, cultural and aesthetic resources and accommodating other uses of the site such as scenic viewing, mountain biking, picnicking, and hiking.

2.1.4 TRAILS PLAN

As part of this Management Plan update, the planning team assessed the existing network of official and unofficial trails in the Park, conducted workshops with park users, and reviewed and revised an existing trails plan to create a new and comprehensive Trails Plan for Bidwell Park (Appendix E).

2.2 LAND USES

Bidwell Park is located within the planning area of the City of Chico's General Plan (City of Chico 1999b). The broad purpose of the General Plan is to express the policies that will guide the City's decisions on future growth, development, and resource protection. Specific plans, area plans, zonings, subdivisions, local agency projects, and other local land use decisions must be consistent with the Chico General Plan.

2.2.1 CITY OF CHICO GENERAL PLAN & ZONING

Bidwell Park is designated *Parks* in the Land Use element of the General Plan. In addition, nearly the entire park is identified as a Resource Conservation Area (RCA). RCAs are designated to recognize the presence of sensitive and valuable habitat requiring protection and conservation in perpetuity, including seasonal and permanent wetlands, riparian woodlands, valley oak woodlands, riverine habitats, areas known to support special status species, and areas known to serve as important wildlife movement corridors. Application of the RCA designation varies considerably within Bidwell Park as it covers the more intensively developed locations near downtown as well as the more remote reaches of Upper Park. The General Plan requires the preparation of a long-term comprehensive planning program for RCAs to ensure the long-term viability of these areas. The BPMMP and its associated Environmental Impact Report implement this General Plan requirement for Bidwell Park by inventorying sensitive resources and establishing comprehensive resource management policies and programs for all areas of the Park. Consistent with the General Plan, these resource management policies and programs are balanced with policies pertaining to providing various recreational opportunities throughout the Park.

The General Plan elements most relevant to the BPMMP Update include the Community Design, Land Use, Parks, Public Facilities, and Services, Open Space and Environmental Conservation, and the Safety and Safety Services elements. The Community Design element addresses the importance of the creek corridors to the identity of the City and establishes policies that protect the creeks as natural resources while providing enhanced opportunities for views and access. The Land Use element establishes land use designations within the City, which detail the types and intensities of permissible uses and special classifications.

The Parks, Public Facilities, and Services element specifically addresses current and future needs of Bidwell Park, establishing City policy to provide recreation opportunities at a variety of scales for all residents and to protect views, open space, and sensitive resources while expanding Upper Bidwell Park. The Open Space and Environmental Conservation element expresses the policies that comprise the City's approach to managing and conserving various natural resources including air quality, biological resources, cultural resources, water resources, open space, soils, and geology. In the Safety and Safety Services element, policies are expressed that address wild land fires, fire safety and law enforcement. The Chico General Plan and Municipal Code include many policies that apply to Bidwell Park. Due to the large number of policies and codes, they are included as Appendix J of this document.

Bidwell Park is zoned *OS-1* (*primary open space*), which is consistent with the *Parks* General Plan land use designation. While the *OS-1* zoning classification identifies the types of land uses generally considered appropriate for parks and open space areas on a city-wide basis, the BPMMP shall be recognized as the detailed planning document for Bidwell Park, specifying allowable uses by area and establishing a set of management practices to follow.

Aside from the General Plan, two other plans have guided the provision of park and recreation facilities in the City of Chico: the 1988 Park and Recreation Plan, a CARD document, and the 1990 Bidwell Park Master Management Plan (BPMMP), adopted by the City Council and the Bidwell Park and Playground Commission (BPPC).

2.2.1.1 PARK AND RECREATION PLAN, CARD (1988)

The Chico Area Recreation District (CARD) was formed in 1948 as a recreation district that is primarily funded by a special property tax assessment district. It serves an area of about 225 square miles, extending from the Tehama County line through the Chico urban area, including the Park. CARD is responsible for the acquisition, development, and operation of community parks, as well as recreation programs, indoor recreation areas, and management of various facilities in the Chico area. CARD has been involved in the purchase of portions of parklands.

CARD owns or leases many facilities throughout the City, including the 20th Street Community Park, Oak Way Park, Pleasant Valley Community Center and Pool, Rotary Park, Hooker Oak Recreation Area, and DeGarmo Park (under construction). The CARD master plan proposes park locations and describes improvements for existing facilities. While parts of the master plan were incorporated and implemented through the City's General Plan, the implementation of the master plan has been slow, primarily because of lack of funding. (City of Chico 1999b).

2.2.1.2 BIDWELL PARK MASTER MANAGEMENT PLAN (1990)

The Master Management Plan adopted in 1990 includes park-wide goals, objectives, and design standards, as well as recommendations for each of 32 management zones. This document comprises a comprehensive update of the 1990 Bidwell Park Master Management Plan. Goals, objectives, design standards, and management recommendations were updated to reflect current conditions. Management zones were combined to make the document more user friendly and easier to understand. Furthermore, this BPMMP Update includes a variety of technical Appendices including Annie Bidwell's Deed (Appendix A), a Visitor and Community Survey Summary (Appendix B), a Natural Resources Management Plan (NRMP) (Appendix C) and an annotated outline for a Cultural Resources Management Plan (Appendix D). Also included are a trails plan (Appendix E), and site specific concept plans for the Horseshoe Lake and Cedar Grove areas, and the proposed disc golf facility/trailhead at the SR 32 site(Appendices F, G, and H). Information on the overall regulatory context pertaining to BPMMP implementation and relevant City of Chico Policies are included in Appendices I and J, respectively. Appendix K (confidential) includes a cultural resources inventory, Appendix L contains completely updated design standards,

and Appendix M includes the City of Chico Bench Policy. Appendix N has been established as a depository of future written guidance from the BPPC on interpretation of the BPMMP).

2.2.2 SURROUNDING LAND USES

The City of Chico and Butte County General Plan land use elements govern land uses in and around the Park. Lower Park is adjacent to urban, residential, and commercial land found within the City of Chico, as well as the California State University at Chico (CSUC). Middle Park is surrounded by undeveloped ranch land to the north and residential zoning to the south. Upper Park is surrounded by various properties including the Brown Ranch to the north, the State-owned Big Chico Creek Ecological Reserve to the east and several private parcels including the Canyon Oaks residential development and SR 32 to the south.

2.2.2.1 BUTTE COUNTY GENERAL PLAN

Butte County has land use planning authority over private and local government-owned property surrounding Upper Bidwell Park and outside the City of Chico boundaries. The Butte County General Plan assigns parcels to one of its many land use designations, each with prescribed land uses and development densities. Most of these areas have been designated by Butte County General Plan as Grazing and Open Land (Butte County 2000).

Large portions of the area located south and east of Bidwell Park are designated Agriculture Residential, which allows for a very low residential density (minimum parcel size of one residential unit to 40 acres) to maintain rural character, although recent development in Butte County has been exceeding these suggested rates. The primary allowable uses are agricultural uses and single-family dwellings; secondary uses are animal husbandry, forestry, intense animal uses, home occupations, mining, outdoor recreation facilities, environmental preservation activities, airports, utilities, public and quasi-public uses, group quarters, care homes, and transient lodging (Butte County 2000).

The existing uses surrounding the park are low-intensity uses and are considered to be compatible with the Park. The Butte County General Plan land use designations for these areas require that these areas remain as low-intensity land uses.

2.2.3 PARK-WIDE LAND USE

Bidwell Park is zoned *OS-1* (*primary open space*) in the Chico Municipal Code. This zoning district usually applies to publicly-owned areas appropriate for permanent open space. The *OS-1* zone is consistent with the *Parks* General Plan land use classification.

The General Plan sets the policy direction for land use in Bidwell Park and also acknowledges the BPMMP as the more refined guidance document. Whereas the *OS-1* zoning designated in the Municipal Code identifies the types of land uses generally considered appropriate, the BPMMP is the more detailed planning document, specifying uses by area and recommending a set of management practices to follow.

The General Plan, Municipal Code and BPMMP provide increasing levels of detail and complementary guidance to the BPPC when considering land use questions for Bidwell Park. As a charter commission, BPPC has authority to utilize all of the City's planning documents in concert to make discretionary land use decisions for Bidwell Park, subject to City Council concurrence and an appropriate level of environmental review under CEQA.

The primary land uses in Bidwell Park are open space and recreation. Both intensive and non-intensive recreation occurs within the Park, with more intensive recreation occurring in Lower Park, where there are more amenities and access points. The area along Big Chico Creek, Middle Park, and Upper Park are oriented more towards non-intensive recreation and open space preservation, consistent with RCA status.

2.2.4 REGIONAL CONTEXT

The 3,670-acre Bidwell Park is one of the largest municipal parks in the United States and is an important resource to the City of Chico and its residents. In the Chico metropolitan area, the variety of parks and open space areas is growing. The primary local agencies that develop and operate parks within the City are the City of Chico Park Division and the CARD. Other entities in charge of community and open spaces in the region include school districts, California State Parks, California Department of Fish and Game, U.S. Fish and Wildlife Service, CSUC, and others.

The number of parks within the City has been growing. The change between 1989 and 2003 is shown in Table 2.2.3-1.

Table 2.2.3-1
City of Chico Park Acreage, 1989–2003

Year	1989	1991	1997	2003
Park Acreage	2,292	2,294	3,689	3,909
Source: City of Chico Park Department 2004				

The BPPC is responsible for oversight review and direction of Bidwell Park operation and maintenance. The BPPC also has oversight responsibilities for the maintenance of City parks, street trees, and landscaping within public rights-of-way. A list of parks under the responsibility of the city of Chico's Park Division is provided in Table 2.2.3-2 below.

Although the City owns the Park's municipal golf course, the current golf course was developed and is operated by a private enterprise. While schools are not recreation providers, school playground facilities are available for public use. As some schools are switching to a year–round schedule, the availability of school playgrounds for recreation purposes may become more limited. Current City and CARD policies promote development of new park facilities in conjunction with Chico Unified School District (City of Chico 1999b).

The Chico General Plan classifies all parks into five categories: Mini Park/Tot Lots, Neighborhood Parks, School Parks, Community Parks, and Regional Parks. Bidwell Park is a designated a Regional Park. The Regional Park classification denotes parks that are usually at least 50 acres in size and serve the entire City or region. While regional parks can provide for varying intensities of recreation activity, a portion of a regional park is generally maintained in a rustic setting for non-intensive recreation use. For Bidwell Park and other Regional Parks, the Chico General Plan established the following standards (City of Chico 1999b):

- Distribution: 29.5 acres/1,000 residents
- Park Size: 50+ acres
- Service Area: Entire City

Based on these standards, the size of Bidwell Park required at buildout of the city and projected population would be 1,572 acres. Due to the relative inaccessibility of Upper Bidwell Park to urban residents, the General Plan calls for the addition of at least one large "city park" in close proximity to urban uses that would, over time, acquire a character similar to that of Lower Bidwell Park (City of Chico 1999b).

A variety of recreational uses occur in different parts of the Park, with developed recreational uses being limited to the facilities created for those purposes and non-intensive uses occurring throughout. Use levels vary with locations as well, with the highest use levels typically occurring in Lower Park which is located within a denser population and where there are more amenities and access points.

Table 2.2.3-2 Responsibilities of the City of Chico Park Division	
Park	**Acreage**
Bidwell Park (including Lost Park, Annie's Glen/ Camellia Way	3,670
Creekside Greenways and Open Space	
East 20th Street at Notre Dame Open Space	
First and Verbena Open Space	
Little Chico Creek Creekside Greenway	
Mud Creek Creekside Greenway	
Sycamore Creek Creekside Greenway	
Comanche Creek Linear Park	
Sandy Gulch (Lindo Channel)	
Developed Parks	
Bidwell Bowl Amphitheatre	
Children's Playground	
Depot Park	
Humboldt Park	
Plaza Park	
Ringel Park	
Skateboard Park	
Wildwood Park	
Undeveloped Neighborhood Parks	
Baroni Park	
Ceres Park	
Henshaw Park	
Maintenance of 30,000 street trees	
Management of more than 130 maintenance Districts	
Source: presentation provided by Susan Mason	

2.2.5 PARK ORIENTATION

The Park starts at Bidwell Mansion in the downtown area of Chico and continues in a northeasterly direction for about ten miles. The Park is bisected by Big Chico Creek, which offers few opportunities for vehicle crossings. Roadways cross the creek at The Esplanade, Camellia Way Bridge, at the intersection of Mangrove Avenue and Vallombrosa Avenue, Highway 99 and Manzanita. The major roadways within the Park and general patterns of circulation are described in the circulation element below.

2.3 PARK RESOURCES

2.3.1 PHYSICAL RESOURCES

2.3.1.1 TOPOGRAPHY

Big Chico Creek, the central hydrologic feature of Bidwell Park, enters Bidwell Park in the foothills of the Sierra Nevada/Cascade Range. This part of Bidwell Park is dominated by rolling hills. The incision made by Big Chico Creek as it flows towards the valley floor creates dramatic topographic relief characterized in places by a steep canyon flanked with rocky outcrops and cliffs. As the creek winds through the Park towards the Sacramento Valley floor, the terrain features flat terrain or gently sloping alluvial fans with elevations ranging between 60 and 200 feet.

2.3.1.2 GEOLOGY/SOILS

A geologic province is an area of the earth surface characterized by a common history of geologic processes. Bidwell Park is located at the interface of three geologic provinces: the Sierra Nevada to the south, the Cascades to the north, and the Sacramento River Valley floor to the west.

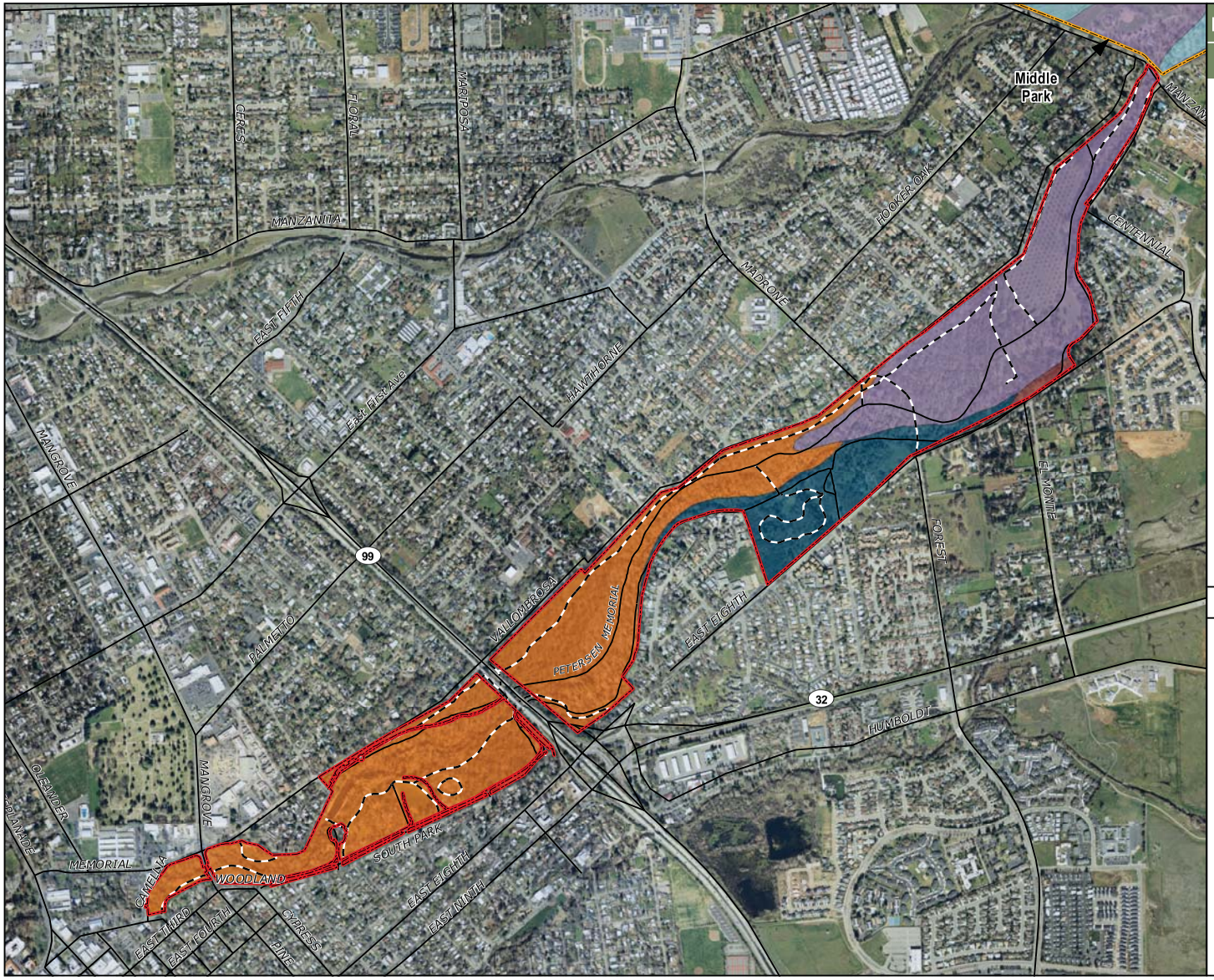
As Big Chico Creek flows from the mountains to the valley, its gradient changes many times depending on the varying underlying geology. The hard rock sections of the metavolcanics and the Lovejoy Basalt in Upper Park result in much more varied, steeper sections with harsher drops and deeper pools being formed. The approximately 20 million year old Lovejoy Basalt first surfaces upstream of the east edge of Upper Bidwell Park and is visible in the canyon. The Lovejoy formation in the cliffs is fractured and breaks apart easily. Over time, pieces of the basalt, ranging from small cobbles to boulders, have fallen off cliff faces and covered the gentler slopes below.

The 4 million-year-old Tuscan Formation consisting of volcanic mud flows and sandstone and conglomerate forms the foothills along the westward extent of the volcanic Cascades, adjacent to the valley floor. This is the most dominant geologic formation in the Big Chico Creek watershed.

While the extreme upper portion of the Park consists of materials of the Chico Formation (sandstone, conglomerate, and siltstone; marine deposits), coarse red gravel, sand and silt of the Red Bluff Formation and alluvium of the Modesto Formation are located along Big Chico Creek within the remainder of Upper Park and extend downslope to Lower Park (Saucedo and Wagner 1992).

The preparation of an up-to-date soil survey for Butte County is currently in progress. Soils in the project vicinity, however, were first mapped in 1925 by the U.S. Department of Chemistry and Soils. The soils descriptions provided below are based on soil units mapped by the Natural Resource Conservation Service (NRCS) in 1925. Soil descriptions are preliminary until the Soil Survey for Butte County is completed. Soil mapping units identified in the Park site are shown in Exhibits 2.3.1-1 and 2.3.1-2.

There are thirty preliminary soil mapping units that have been described for Bidwell Park. These include the deep, nearly level, very fertile valley basin and alluvial soils of the Sacramento Valley and associated alluvial fans, which support intensive agriculture, and the shallow, gentle to steep sloping, less fertile residual soils of the foothill areas.



Bidwell Park Master Management Plan

SOILS LOWER PARK

LEGEND

- Lower Park
- Middle Park
- Redsluff Gravelly Loam
- Redtough-Redswale Complex
- Almendra Loam, Slope 8-15%
- Vina Fine Sand Loam, Slope 0-1%
- Charger Fine Sandy Loam
- Xerofluvents, Frequently Flooded

Source: City of Chico 2004, NRCS 2008

N

1 Inch = 1,200 Feet

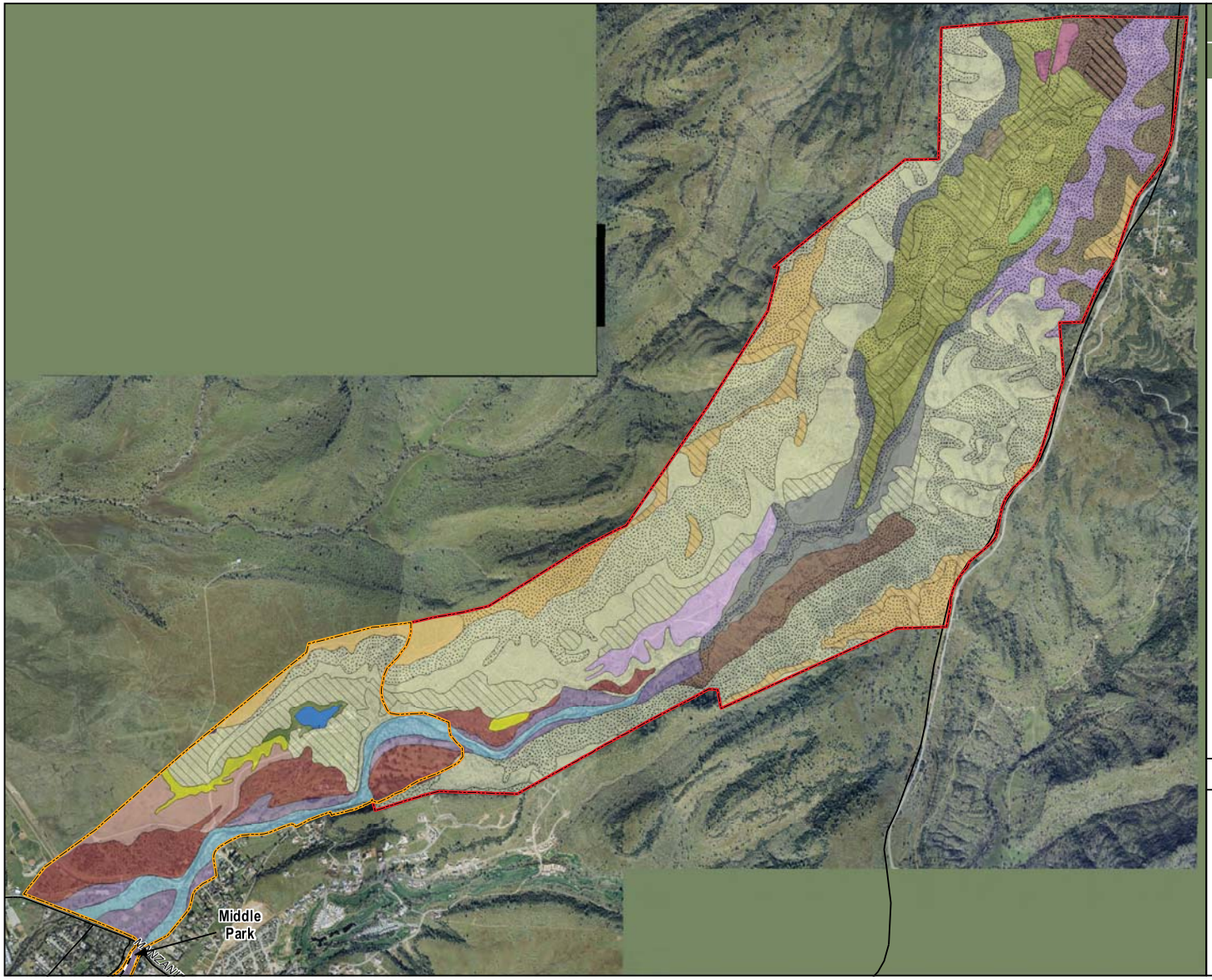
0 600 1,200 2,400

FEET

May 27, 2008

Exhibit 2.3.1-1

EDAW



Bidwell Park Master Management Plan

SOILS MIDDLE/UPPER PARK

LEGEND

- Upper Park
- Lower and Upper Park
- Anita-Galt Complex
- Redsluff Gravelly Loam
- Redtough-Redswale Complex
- Cherokee Spring Gravelly Silt Loam
- Charger Fine Sandy Loam
- Doemill-Jokerst Complex
- Jokerst-Doemill-Typic Haploxeralfs Complex, Slope 15-30%
- Doemill-Jokerst-Ultic Haploxeralfs, Thermal Complex, Slope 3-8%
- Doemill-Jokerst-Ultic Haploxeralfs, Thermal Complex, Slope 8-15%
- Xerorthents-Typic Haploxeralfs-Cliffs Complex, Slope 15-30%
- Xerorthents-Typic Haploxeralfs-Cliffs Complex, Slope 30-50%
- Xerothents-Typic Haploxeralfs Complex
- Ultic Haploxeralfs, Mesic-Rockstripe Complex, Slope 2-15%
- Ultic Haploxeralfs, Mesic-Rockstripe Complex, Slope 15-30%
- Ultic Haploxeralfs, Sandstone
- Slideland Gravelly Loam
- Chinacamp Gravelly Loam, Slope 3-15%
- Chinacamp Gravelly Loam, Slope 15-30%
- Chinacamp Gravelly Loam, Slope 30-50%
- Coalcanyon Taxadjunct, Slope 3-15%
- Coalcanyon Taxadjunct, Slope 15-30%
- Coalcanyon Taxadjunct, Slope 30-50%
- Coalcanyon Taxadjunct, Slope 50-70%
- Rock outcrop, Basalt-Campbellhills-Thermalrocks
- Rock Outcrop-Coalcanyon Taxadjunct
- Carhart-Anita Taxadjunct Complex
- Tuscan-Fallager-Anita, Gravelly Duripan, Complex
- Mesic Tuscan Backslopes
- Xerofluvents, Frequently Flooded
- Water

Source: City of Chico 2004, NRCS 2008

N

1 Inch = 2300 Feet

0 1,150 2,300 4,600

FEET

May 27, 2008

Exhibit 2.3.1-2

EDAW

2.3.1.3 HYDROLOGY/WATER QUALITY

Hydrology of the Park

Big Chico Creek has a 72-square mile watershed and flows a distance of 45 miles from its origin, crossing portions of Butte and Tehama counties, to its confluence with the Sacramento River, west of the City of Chico. The creek is perennial, and is mainly a low elevation rain-fed stream with summer flows sustained largely by accretions from the volcanic geology in the watershed. As is true with most California streams, its flow is highly erratic, running high in the winter and spring and low in the late summer and fall. The watershed also encompasses three smaller drainages flowing from the north: Sycamore, Mud, and Rock Creeks. All of these tributaries flow into Big Chico Creek between the City of Chico and the confluence of the Sacramento River.

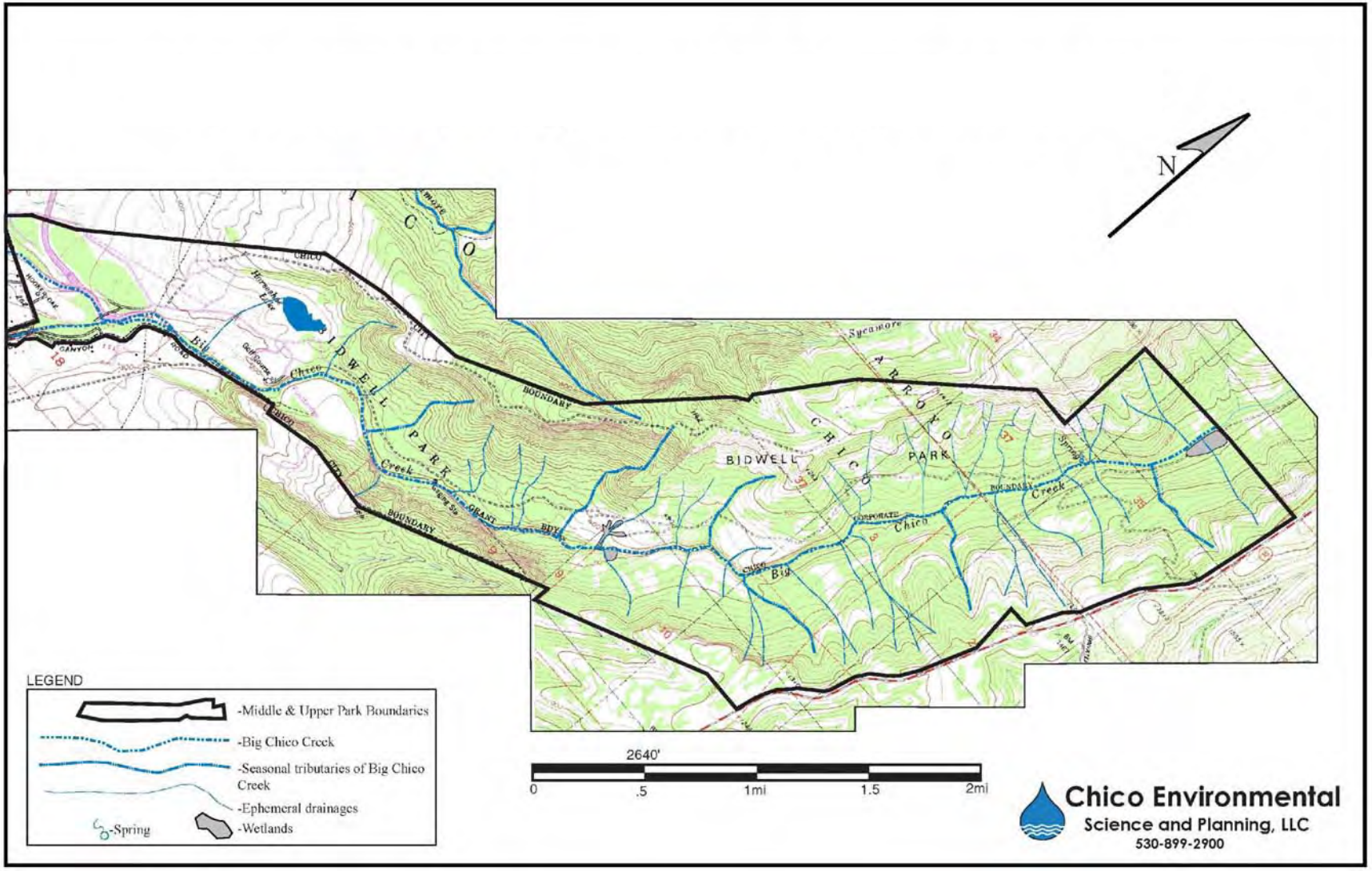
The creek stems from a series of springs at an elevation of about 5,400 feet, northeast of the City of Chico on the southwest flanks of Colby Mountain, that come together to form a main channel at Chico Meadows. After leaving Chico Meadows the creek turns and flows in a westerly direction for a short stretch before its confluence with Cascade Creek, the first main tributary, at Soda Springs Campground (above Upper Park). From here the creek turns to the southwest and begins to follow the valley to the north of SR 32. Downstream of the Cascade Creek confluence to Upper Bidwell Park, Big Chico Creek has six primary tributaries: Little Smokey Creek, Nine-mile Creek, Big Bear Creek, Little Bear Creek, Campbell Creek, and Web Hollow.

Downstream of Web Hollow the creek flows freely for 3–4 miles before reaching Bear Lake, a large plunge pool formed by a waterfall. About 1/3 of a mile above the Ponderosa Way bridge the creek has another significant waterfall which forms Higgins Hole, the generally agreed upon uppermost barrier to anadromous fish migration. The creek continues toward the valley passing just north of Forest Ranch in a deep, wide topped canyon before reaching Upper Bidwell Park. As Big Chico Creek enters Upper Bidwell Park, it assumes a pool and drop morphology, due to a steeper gradient. This area, referred to as Iron Canyon, is characterized by classic wildland swimming holes, such as Browns Hole, Salmon Hole, Bear Hole, and other unnamed holes. These holes are believed to serve as over-summering grounds for adult spring-run Chinook salmon, especially during drought years. A fish ladder was installed in the 1950's, to aid in fish passage between Browns Hole and Salmon Hole, but due to rock slides and spring flooding activities, the fish ladder has fallen into disrepair. Surface Hydrology of Upper and Middle Bidwell Park is depicted in Exhibit 2.3.1-2.

Big Chico Creek is a free flowing stream down to Five-Mile dam in Bidwell Park. At Five-Mile dam, Big Chico Creek's flow is partially diverted into Lindo Channel (historically known as Sandy Gulch). Lindo Channel is an ephemeral stream that formed as a natural channel on the Chico alluvial fan, but was historically modified for flood control purposes in the early 1960's. Lindo Channel runs parallel to Big Chico Creek for almost eight miles before rejoining the creek about 2 1/2 miles from Big Chico Creek's confluence with the Sacramento River, Lindo Channel is still used today as a diversion channel to relieve flood flows in Big Chico Creek. In addition to flood control, Lindo Channel is important for groundwater recharge as well as aquatic and riparian habitat.

Another flood control channel, the Sycamore Diversion, was constructed off of Lindo Channel. It can be seen running to the northwest at the entrance to Upper Bidwell Park, diverting flood flows from Lindo Channel to Sycamore Creek, which drains into Mud Creek. These channels divert potentially damaging flood flows around the City of Chico.

Big Chico Creek enters the City of Chico flowing through Lower Bidwell Park and reaching One-Mile dam just east of the Vallombrosa and Mangrove/Pine intersection. One-Mile dam creates the Sycamore Swimming Pool, also known as One-Mile Pool, a concrete pool constructed directly in the channel of the creek. A fish ladder is present next to the dam. Between Camellia Way and Main Street, the Big Chico Creek flows through an area known as Lost Park. The creek then flows through the California State University, Chico campus, providing a living laboratory for research at the University.



Source: Chico Environmental 2005

Surface Hydrology of Upper and Middle Bidwell Park **Exhibit 2.3.1-2**

Two stream-flow gauging stations are located on Big Chico Creek: one at the Bidwell Golf Course and the other at the Rose Avenue Bridge (outside of Bidwell Park). The golf course station was a U.S. Geological Survey (USGS) station from 1931 to 1986, when it was abandoned. It was not in use again until 1997 when it was moved downstream about 3/4 of a mile and the Department of Water Resources (DWR) took over monitoring.

The channel of Big Chico Creek carries water during the rainy season and is important for groundwater recharge as well as aquatic and riparian habitat. The presence of porous geologic formations in the lower reach of Big Chico Creek provides opportunities for groundwater recharge. The stretch of creek between Five-Mile to the mouth of the creek is considered a losing stream (losing surface water and providing groundwater recharge) and the stretch from Five-Mile to above the Golf Course is considered to be either a losing or a gaining stream, depending upon the water table in any given year. The geology associated with Big Chico Creek and aquifer recharge contributes to much of the recharge and transmission of groundwater from surface water via fault and joints in the Tuscan formation.

Surface Water Conditions

In May 1974, CH2M Hill prepared a Reconnaissance Water Supply Study for the City of Chico (CH2MHill 1974). At that time, it was found that the quality and quantity of surface and ground water were generally excellent for swimming, irrigation, and domestic uses. However, the report warned that Big Chico Creek in Bidwell Park faced a serious water quantity and water quality problem in the future, and recommended augmentation of streamflow with groundwater, to enhance and preserve the present and future uses of the park. It also noted that the use of Big Chico Creek as a storm drain interceptor for roadway runoff during low flow periods could create the potential for water quality problems in the future.

According to the Master Environmental Assessment (City of Chico 1999c), water quality in Big Chico Creek has been degraded by heavy metals from drainage through mining areas in the upstream watersheds and from urban runoff. A system of storm sewers directs urban runoff from the City into the creek, and contributes pesticides, petroleum compounds, solids, and other urban waste and contaminant products.

Water Quality

All storm drainage in the City of Chico Planning Area is diverted into its five major creeks, of which Big Chico is one (the others are Mud Creek, Lindo Channel, Little Chico Creek, and Comanche Creek, also known as Edgar Slough). Studies of urban runoff contamination have shown different pollution generation rates for residential, commercial and highway areas and generally indicate an increase in mass loading of contaminants as one flows downstream. The concept of heavy “first flush” contamination, where runoff concentrations are highest within the first 1/2 inch of rain, stems from the fact that pollutants tend to accumulate during the dry season, and often enter the channel during the first rainfall runoff, or during a low stream flow, with little dilution. Typical urban runoff contaminants are contained in runoff reaching Big Chico Creek. These include the following:

- Suspended sediment resulting from erosion, (primarily in Upper Park);
- oil, grease, and heavy metals from roadways;
- surfactants (soluble chemical compounds that reduce the surface tension between two liquids; surfactants are used in many detergents and soapy cleaning compounds);
- solvents, pesticides (particularly from golf course maintenance operations);
- urban lawn maintenance products (herbicides, fertilizers, etc.)

- nutrients – field and laboratory alkalinity, turbidity, specific conductance, nitrite, nitrate, ammonia, organic nitrogen, Kjeldahl nitrogen (ammonia and organic nitrogen), dissolved orthophosphate, dissolved acid hydrolyzable phosphate, and total phosphorus;
- fecal coliform bacteria from wildlife, livestock, and pets; and
- septic tanks and sewage from broken lines in an aged City sewer system.

Various agencies and entities have conducted water quality monitoring on Big Chico Creek since approximately 1959. USGS, DWR, California Department of Fish and Game (DFG), Central Valley Regional Water Quality Control Board (RWQCB), Streaminders, the California State University, Chico Environmental Laboratory and Geosciences Department have all contributed to the available water quality data. The data identifies several areas of concern for the water quality of Big Chico Creek, including the weekly cleaning in summer of One-Mile Pool, fecal coliform bacteria, urban stormwater runoff, and groundwater nitrate contamination (see below). These primary water quality concerns are addressed in more detail below. The Big Chico Creek Watershed Alliance is currently actively training volunteers to implement a water quality monitoring program.

One-Mile Pool

Because the dam that creates One-Mile Pool is not completely removed each winter, large accumulations of gravel, sand, and silt build up behind it. Each May, in preparation for the summer swimming season, the creek water is diverted under the swimming area by means of a large pipe, and tons of gravel are removed from behind the dam and dumped behind the Horseshoe Pit area. Every Thursday thereafter between Memorial Day and Labor Day the pool is drained and cleaned. City workers must be careful not to allow silt deposited on the bottom of the pool to enter the water downstream, negatively affecting aquatic organisms and habitat.

Prior to 1997, the pool was drained by simply removing the dam's flashboards. The problem was that the draining of the pool and subsequent work elevated turbidity levels and increased sedimentation downstream. This was due to increased water velocities entraining sediment when the flashboards were removed, and when the creek continued to flow through the muddy work area after the pool was drained. Due, in part, to this impairment of water quality, the Central Valley RWQCB issued Waste Discharge Requirements and a Monitoring and Reporting Program under Order 94-140 (CVRWQCB 1994). The installation of the pipe beneath the pool has reduced increased turbidity from pool cleaning activities.

Fecal Coliform Bacteria

The Central Valley RWQCB Order 94-140 also included conditions regarding elevated levels of fecal coliform bacteria and required the City to begin monitoring One-Mile Pool "… for fecal coliform immediately upstream and immediately downstream of the pool." The pool is sampled weekly except between Memorial Day and Labor Day (swimming season) when it is monitored daily and results are analyzed within 24 hours. Various entities have conducted sampling activities over the past few years.

If fecal coliform counts reach 200 colonies/100 milliliters (ml) (most probable number [MPN] method) at Sycamore Pool during the swimming season, the City is on "alert," but does not necessarily take action. At 500 colonies/100 ml MPN, the City still takes no action, but is on alert, and checking how that day's reading relates to those in previous days. If counts reached or exceeded 5,000 colonies/100 ml MPN, the pool would be closed immediately with no question. This threshold coincides with the Butte County "Recreational and Swimming Area Monitoring/Closure Policy" (Beardsley, pers. comm. 2005). To date the pool has not been closed due to fecal coliform contamination.

Urban Stormwater Runoff

A limited study prepared by Dr. Stewart Oakley and others entitled "Water Quality Management Plan, Big Chico Creek, Butte County, CA: A Preliminary Assessment for Urban Stormwater Runoff and Fecal Coliform Contamination" (Oakley et al. 1997) suggests that stormwater run-off from the storm events sampled does not have a significant water quality effect on Big Chico Creek from Five-Mile Recreation Area to Bidwell Avenue.

Golf Course Maintenance

Regular maintenance of Bidwell Golf Course includes the application of herbicides, fungicides, algaecide, and fertilizers. These chemicals have the potential to negatively impact water quality downstream of the golf course. Based on information submitted by the Golf Course to the Butte County Agricultural Commission, Friends of Bidwell Park (FOBP) has compiled a list of chemical compounds applied at the golf course over the last three years. The golf course conducts quarterly sampling using standard protocols and submits the results to the City. To date, all results have been categorized as non-detectable.

Erosion

Erosion presents another threat to water quality in Big Chico Creek. The degree of erosion that can occur in any given area is based on the soil type present, the slope, the degree of human disturbance and the timing of disturbance (i.e., during wet vs. dry conditions). Level, well-drained soils, and permeable, stone-free soils are more stable. Wet, steep, excessively dry, thin, and sandy soils are less resistant to damage. Erosion is commonly associated with trails in Upper Park that are located on slopes with thin soils forming over volcanic mudflow formations. The shallow soil becomes saturated during the rainy season, and ruts caused by bicycle, horse, or foot traffic channel the water flow which leads to increased erosion. In addition, dry, thin soil along trails can be easily washed away, causing erosion gullies to form, especially along steep trail segments. Once erosion has occurred, the rocky and rutted trail conditions cause trail users to seek smoother, less eroded routes, leading to widened or "unofficial" trails.

Due to the particular soil conditions in Upper Park described above, erosion is quite common, particularly in areas of heavy or repeated use. The presence of red, unvegetated soils indicate that the thin topsoil has been eroded, exposing compacted subsoils. Problems associated with eroded soils include the following:

- reduced infiltration, because topsoil and its associated root-mass from grasses and forbs are necessary to allow infiltration of precipitation;
- compounded erosion, in which exposed subsoils are compacted, further limiting infiltration, accelerating erosion during storm events; and
- habitat deterioration, because the ability of the soils to absorb water and provide sustenance for trees, shrubs and other vegetation is dramatically reduced.

A report entitled A Resource Inventory of Upper Bidwell Park Expansion (CSURF 2000) identified the following areas as "Erosion Hot Spots" deserving further study and preventative measures:

- Pine Trail (Pine Tree Trail) (erosion is particularly visible in the meadow where Pine Tree Trail connects to Guardian Trail);
- Segment Connecting Upper Trail to Lower Trail on the Bloody Pin Trail.

Other trails in Upper Park suffering from varying degrees of erosion include the following trails on the north side of Big Chico Creek:

- Monkey Face: multiple unofficial trails create an unsightly appearance and cause erosion.
- B Trail. Steep grade and switchbacks are eroding.
- Upper Trail. Where this trail crosses areas of thin, shallow soils, several sections of the trail are showing signs of erosion. Signs of degradation and erosion are evident in the sections with steep slopes and thin soils. Erosion is particularly evident in the meadow where Upper Trail joins Lower Trail.

Additional eroding trails on the south side of Big Chico Creek include:

- Annie Bidwell Trail: this trail is highly eroded, steep, and rocky. Erosion is visible near the area of Bear Hole and Devils Kitchen.
- Jeep Trail (segment of the Annie Bidwell Trail): steep grade of trail alignment down the fall line is creating substantial erosion.
- Bloody Pin Trail. Steep grade and switchbacks are eroding.

Furthermore, erosion and trail degradation are occurring on segments of the South Rim Trail west of the BLM property due to poor trail maintenance practice and years of heavy use by the hiking and mountain biking communities. Ten Mile House Road, which provides vehicular access to Upper Park, is a rutted, unimproved road in poor condition. It experiences high levels of erosion and poor drainage and is considered to be improperly angled.

A further activity of concern for erosion is disc golf in Upper Park. The disc golf course is situated in an area where thin soils on volcanic mudflow formations are subject to erosion. The nature of the game, where thrown discs may travel in various directions and past the sides of the intended target has the potential to result in trampling and wear of off trail areas of the course and may cause erosion if not properly designed and managed (see section 3.2.3, “Upper Park” for additional information).

Floodplain

The construction of the Lindo Channel and Sycamore Creek Diversions, and their utilization as flood control facilities, has removed any threat of serious flooding from Big Chico Creek to the City of Chico.

Ground Water Bearing Zones

The general groundwater geology of the Chico area is comprised of the primary water-bearing Tuscan Formation of the Plio-Pleistocene Age. Beneath the Sacramento Valley floor, it is in part underlain by marine tertiary formations and the Miocene basalt overlying the Cretaceous and crystalline basement rock. The Tuscan Formation is overlain westerly by the Older Alluvium, which dips gently westward. Recent alluvium also occurs along Big Chico Creek as channel fill and recent terraces.

Three water bearing zones occur beneath the Chico area: shallow, intermediate, and deep. The shallow zone occurs between sea level and approximately 150 feet above sea level. This zone consists of recent alluvial material deposited by Big Chico and Little Chico Creeks. Most of the material is coarse sand and gravel. The shallow zone is 30 feet thick and consists of silt from 0 to 22 feet and coarse sand and gravel to 30 feet. Groundwater in this zone is unconfined. Very little groundwater is pumped from this zone in the eastern portion of Chico due to its limited storage capabilities. This zone receives its recharge directly from infiltration of precipitation, stream flow, domestic waste water from leach fields, and urban runoff from drainage wells.

The intermediate zone occurs from sea level to approximately 300 to 400 feet below sea level and lies above the top of the Tuscan Formation. It ranges in depth from 0 to 450 feet. This zone is equivalent to the older alluvium, and is composed of mainly thick, clayey layers and cemented sand and gravel. Groundwater occurs mainly in thin uncemented sand and gravel aquifers under semi-confined conditions. This zone receives recharge from faults and streams incised in the older alluvium through vertical leakage from the overlying saturated alluvium, and possibly subsurface inflow from the Tuscan formation. The older alluvium appears to have limited vertical permeability due to cementation of the rock matrix.

The deep zone occurs below the Tuscan Formation. The deep zone aquifers are thick beds of black sand and/or coarse grained gravel of the Tuscan Formation confined by less permeable clay, tuff, and mudflow layers. The highly permeable volcanic sediments yield large amounts of water to deep irrigation and municipal wells. This zone is recharged mainly by faults and streams that drain the foothill area east of Chico, including Big Chico Creek.

Ground Water Conditions

Groundwater is available in the Chico area from three water bearing zones (Dames and Moore 1996):

- Recent Alluvium – a shallow water-bearing zone with extremely variable permeability, generally producing 100 or less gallons per minute per well. This zone ranges in thickness from 0 to about 50 feet.

- Older Alluvium – an intermediate water-bearing zone, generally producing 100 to 1,000 gallons per minute per well. This aquifer is the source for most of the individual wells in the Chico area. This zone ranges from 150 thick in the foothills east of Chico to over 600 feet thick west of Chico.

- Tuscan Formation – a deep water-bearing zone, generally producing from 1,500 to 2,000 gallons per minute per well. This is the source for the California Water Service Company wells, which serve incorporated areas within the City of Chico. This zone lies approximately 300 feet below ground surface east of Chico and gradually deepens to about 600 feet below ground surface west of Chico.

In 2001, available water supplies during normal and drought years were estimated, and regional impacts on groundwater were estimated by comparing groundwater extraction estimates with groundwater hydrology data (Camp, Dresser & McKee 2001). For purposes of this analysis, the Report divided the County into water inventory units and sub-units; Big Chico Creek flows through the Foothill and West Butte Inventory Units. The findings of this report as they relate to ground water conditions and supply are summarized below:

- The portion of the Sacramento Valley aquifer system under Butte County has recovered from the 1988–1994 drought. Long-term trends in groundwater storage indicate the basin groundwater aquifer is not in a state of decline. During normal to wet years, the aquifer system recharges to its maximum storage capacity by the following spring.

- Within the Foothill Inventory Units and Mountain Inventory Unit, overall groundwater supply is limited because the groundwater occurs primarily in fractures and joints of volcanic bedrock. Shallow, domestic wells could be susceptible to dewatering during periods of drought.

- Under the normal hydrologic scenario, Butte County has an adequate surface water and groundwater supply to meet current demands.

- Under the drought scenario evaluated, current demand can generally be met through increased groundwater extraction provided groundwater extractions are increased to offset reduced surface supplies.

- Under the drought scenario evaluated, additional groundwater wells and conveyance and distribution systems may be required to fully utilize the groundwater resource.
- Under the drought scenario evaluated, the Foothill Inventory Unit experiences water shortages.
- Future increases in demand will be associated with population growth and environmental regulatory requirements, both within and outside the county.
- A significant amount of water supplied to meet demand remains available for use through deep percolation to groundwater and outflow to other areas.
- Environmental water use constitutes a substantial amount of water demand in the county, extending water demand past the typical irrigation season. The trend in environmental water has increased in the recent past due to regulatory requirements.
- Water quality is generally adequate to meet current demands; however groundwater nitrate contamination could threaten supply in areas with a high density of septic systems. Regulation of non-point source agricultural return water may become an issue in the near future.

Groundwater Contamination

Groundwater contamination by nitrates has been a matter of concern in the Chico area for many years. In 1979 the California Department of Water Resources (DWR) found elevated nitrate levels in 21 of the 69 private wells it tested in the Chico area and attributed the problem to failing septic systems. Additional studies in 1983 identified four nitrate plumes, with concentrations over 60 mg/L (DWR 1984). The Federal Environmental Protection Agency and the World Health Organization have set the nitrate regulatory level for groundwater contamination at 45 mg/L for Nitrate, and 10 mg/L for Nitrite. The State of California has adopted identical standards.

In response to the nitrate plumes, the Central Valley RWQCB issued Prohibition Order No. 90-126 on April 27, 1990. This order affects approximately 30,000 residents on 9,800 parcels, and represents nearly 12,000 dwelling units, all utilizing on-site septic systems. Of these 12,000 dwelling units, Order 90-126 identified approximately 7,300 dwelling units in areas of relatively high density that it recommends be added to the City of Chico's sewer system.

The bulk of these on-site septic systems fall into three areas: neighborhoods in north Chico (the Lassen Avenue corridor) central Chico (the Avenues), and south Chico (Chapman-Mulberry area). These three zones represent areas with large amounts of unincorporated parcels within the City, resulting in numerous single-family dwellings, apartment complexes, and mobile home parks relying on on-site septic rather than the City sewer system. The City has been moving towards annexing these areas into the City limits and providing City sewer service to them.

Another problem is the contamination of the local groundwater in certain areas of Chico from perchloroethylene (PCE) and trichloroethylene (TCE), by-products from chemical dry-cleaning operations. Dry-cleaning operations often disposed of PCE by pouring it down the drain. Being highly soluble and heavier than water, leaky sewer pipes allowed the substance to contaminate the shallow, unconfined groundwater aquifer. This has created a 1.5-mile long plume stretching from approximately the corner of Mangrove Avenue and Big Chico Creek down to the railroad tracks near Nord Avenue. Two older wells, located on the Chico Junior and Senior High School campuses, allowed the contaminants to travel to the middle and deep aquifers. These wells have since been closed and cleanup and monitoring efforts are ongoing.

2.3.1.4 AIR QUALITY

The Park is located in the Northern Sacramento Valley Air Basin. Air quality in the Park is regulated by several jurisdictions including the U.S. Environmental Protection Agency (U.S. EPA), California Air Resources Board (ARB), and the Butte County Air Quality Management District (BCAQMD).

The BCAQMD is the agency primarily responsible for assuring that national and state ambient air quality standards are not exceeded and that air quality conditions are maintained in Butte County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. Butte County is classified non-attainment for the state 1-hour ozone and respirable particulate matter (PM10). The County recently attained the federal 1-hour ozone standard and, as a result, is currently designated "transitional nonattainment" for the federal 1-hour ozone standard. The County is in attainment or designated unclassified for all remaining Californian Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS). Attainment status designations for the recently adopted federal 8-hour ozone and PM2.5 standards have not yet been assigned (BCAQMD website).

2.3.2 BIOLOGICAL RESOURCES

The biological resources section includes an overview of applicable laws and regulations, botanical resources, terrestrial wildlife and aquatic resources.

Information on biological resources in the BPMMP study area was compiled through a review of existing documentation, reconnaissance level field surveys, and consultation with biologists familiar with the local biological resources. Sources of information also included the California Department of Fish and Game's (DFG's) Natural Diversity Database (CNDDB) (CNDDB 2005), California Native Plant Society's (CNPS's) Electronic Inventory of Rare and Endangered Plants of California (CNPS 2005) and a number of existing environmental documents, as listed in the Chapter 6, References.

2.3.2.1 REGULATORY BACKGROUND

Many biological resources in California are protected and/or regulated by specific laws, regulations, and policies. Key regulatory compliance issues that may need to be addressed prior to implementation of the BPMMP are listed below. A brief description of each of these laws and regulations is provided in Appendix I (Regulatory Framework):

- Federal Endangered Species Act
- Migratory Bird Treaty Act
- Section 404 of the Clean Water Act
- Magnuson-Stevens Fishery Conservation and Management Act
- California Endangered Species Act
- Section 401 of the Clean Water Act
- Porter Cologne Act
- Section 1602 of the California Fish and Game Code
- Section 3503.5 of the California Fish and Game Code

2.3.2.2 BOTANICAL RESOURCES

Plant Communities

Bidwell Park supports a wide variety of native plant communities due its diversity in terrain and elevation. For the purpose of this BPMMP plant community names and descriptions are based primarily on the *Preliminary*

Descriptions of the Terrestrial Natural Communities of California (Holland 1986). Additional plant community information was obtained from *A Manual of California Vegetation* (Sawyer and Keeler-Wolfe 1995). Information on species composition within each community was also obtained from previously prepared biological resource documents including *A Resource Inventory of Upper Bidwell Park Expansion Area* (CSUC 2000), *Survey for Special-status Botanical Species for the City of Chico's Bidwell Park Trails Project* (Stuart 2002), *Survey for Special-status Botanical Species for Selected Areas of Annie Bidwell and Yahi Trails of the City of Chico's Upper Bidwell Park* (Stuart 2003), as well as reconnaissance-level surveys of the park conducted by EDAW botanists in the spring 2005 and special-status plant surveys conducted at the disc golf course area by EDAW in spring and summer 2005. The following plant communities (listed in alphabetical order) are present in the Master Management Plan study area:

- Annual grassland
- Blue oak savanna
- Blue oak woodland
- Buckbrush chaparral
- Canyon live oak forest
- Freshwater seep/wet meadow
- Foothill pine-chaparral woodland
- Foothill pine-oak woodland
- Great Valley mixed riparian forest
- Great Valley valley oak riparian forest
- Interior live oak chaparral
- Interior live oak woodland
- Mixed oak woodland
- North slope foothill woodland
- Northern volcanic mudflow vernal pool
- White alder riparian forest
- Wildflower field

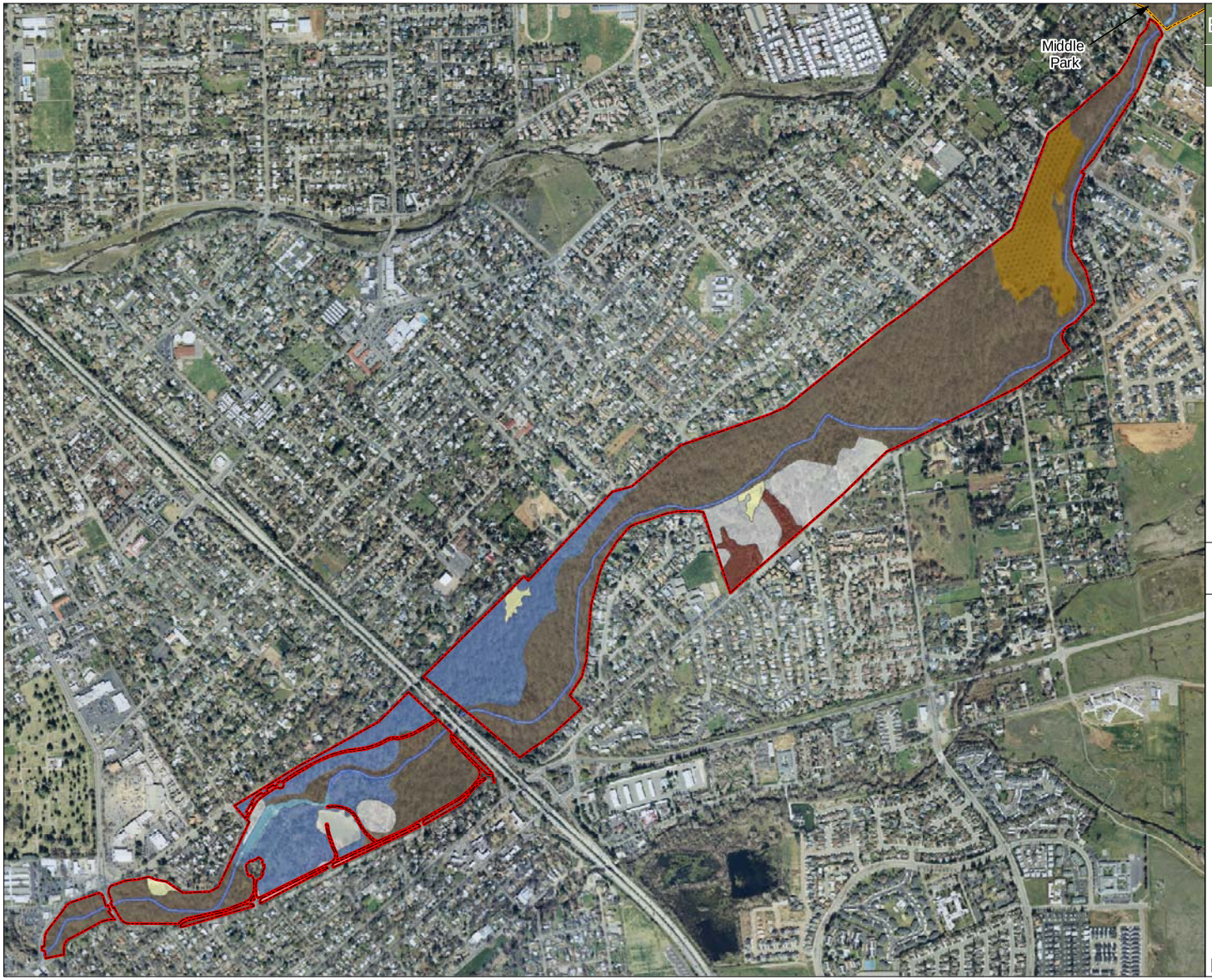
Each of these plant communities is briefly described below. A map of existing plant communities in the Park was produced from reconnaissance-level field surveys, aerial photograph interpretation, and existing biological resource documents (Exhibits 2.3.2-1a and 2.3.2-1b).

Table 2.3.2-1 below provides an overview of the acreage occupied by each plant community.

Annual Grassland

Annual grassland is an herbaceous plant community characterized by a dense cover of nonnative annual grasses with numerous species of nonnative annual forbs, as well as native wildflowers. Typical grass species include bromes (*Bromus diandrus*, *B. hordeaceus*, and *B. madritensis* ssp. *rubens*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), medusahead (*Taeniatherum caput-medusae*), and Italian ryegrass (*Lolium multiflorum*). Common nonnative forbs include vetches (*Vicia* spp.), filarees (*Erodium* spp.), and clovers (*Trifolium* spp.). Native wildflowers such as California poppy (*Eschschozia californica*), frying pans (*Eschscholzia lobbii*), California goldfields (*Lasthenia califonica*), Fremont's tidy-tips (*Layia fremontii*), rusty popcorn flower (*Plagiobothrys nothofulvus*), and Fitch's tarweed (*Hemizonia fitchii*) are also a common component of the annual grassland community. This plant community occurs in openings and disturbed areas throughout the Park and characterizes the understory of the woodland plant communities.

Annual grassland communities frequently develop in areas that have been disturbed in the past and often include a number of invasive plant species such as ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), medusahead, black mustard (*Brassica nigra*), and yellow starthistle (*Centaurea solstitialis*).



Bidwell Park Master Management Plan

Plant Communities - Lower Park

LEGEND

- Annual Grassland
- Creek
- Landscaped
- Great Valley Mixed Riparian Forest
- Great Valley Valley Oak Riparian Forest
- Orchard
- World of Trees
- Lower Park
- Middle Park

Source: City of Chico 2004, EDAW 2005, Stuart 2002, City of Chico 2000

N

1 Inch = 1100 Feet

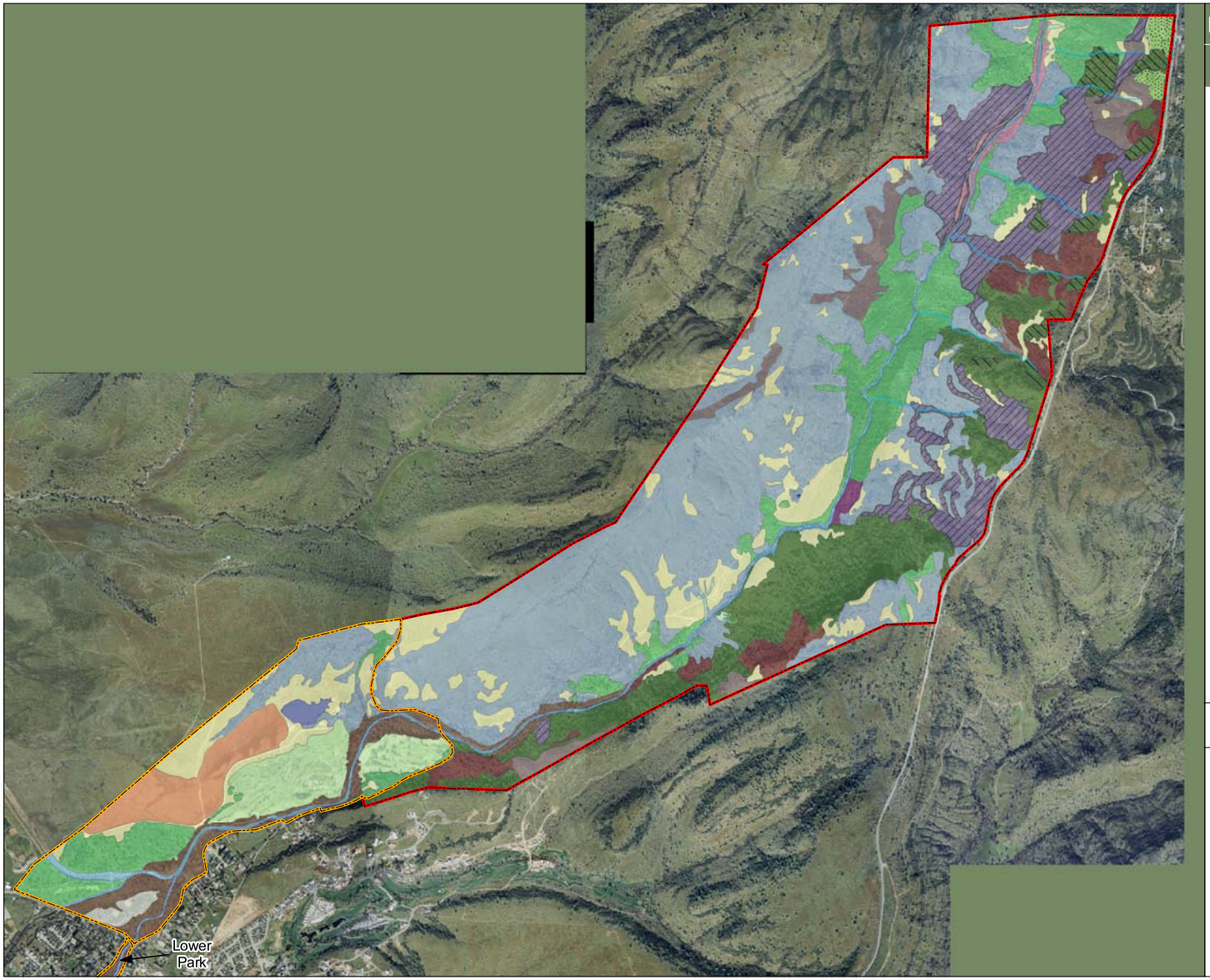
0 550 1,100 2,200

FEET

March 2 , 200

Exhibit 2.3.2-1a

EDAW



Bidwell Park Master Management Plan

Plant Communities - Middle and Upper Park

LEGEND

- Annual Grassland
- Buckbush Chaparral
- Blue Oak Woodland/Savanna
- Canyon Live Oak Forest
- Creek
- Foothill Pine-Chaparral Woodland
- Foothill Pine-Oak Woodland
- Golf Course
- Horseshoe Lake
- Interior Live Oak Chaparral
- Interior Live Oak Woodland
- Landscaped
- Mixed Oak Woodland
- Great Valley Mixed Riparian Forest
- North Slope Foothill Woodland
- Northern Volcanic Mudflow Vernal Pool
- Freshwater Seep
- Seasonal Wetland
- White Alder Riparian Forest
- Upper Park
- Lower and Middle Parks
- Ephemeral Drainage

Source: City of Chico 2004, EDAW 2005, Stuart 2002, City of Chico 2000

1 Inch = 2,300 Feet

0 1,150 2,300 4,600

FEET

March 30, 2006

Exhibit 2.3.2-1b

EDAW

Table 2.3.2-1 Overview of the Acreage Occupied by Each Plant Community	
Plant Community Type	**Appropriate Acreage**
Annual Grassland	332.31
Buckbrush Chaparral	17.63
Blue Oak Woodland/Savanna	1,170.74
Canyon Live Oak Forest	6.87
Big Chico Creek	54.96
Foothill Pine-Chaparral Woodland	129.84
Foothill Pine-Oak Woodland	367.65
Golf Course	111.82
Horseshoe Lake	9.05
Interior Live Oak Chaparral	109.12
Interior Live Oak Woodland	301.42
Landscaped	41.67
Mixed Oak Woodland	402.90
Great Valley Mixed Riparian Forest	295.86
North Slope Foothill Woodland	53.36
Northern Volcanic Mudflow Vernal Pool	95.24
Orchard	21.07
Freshwater Seep/wet meadow	3.70
Seasonal Wetland	0.11
Great Valley Valley Oak Riparian Forest	56.09
White Alder Riparian Forest	21.15
World of Trees	5.61
Other	3,670
Total:	**3,608.14**

Annual grassland communities on well-developed soils in the park often support a number of native perennials including blue dicks (*Dichelostemma capitatum*), Ithuriel's spear (*Triteleia laxa*), harvest brodiaea (*Brodiaea elegans*), and larkspur (*Delphinium* spp.). Remnant patches of purple needlegrass (*Nassella pulchra*), a native perennial grass species, are occasionally encountered within the annual grassland community.

Blue Oak Savanna

Blue oak savanna is a broadleaved deciduous plant community characterized by an open tree canopy and an understory of nonnative annual grasses and forbs interspersed with native wildflowers. The tree canopy is dominated by blue oak. Individual foothill pine trees occur occasionally in this community and patches of shrubs such as buckbrush, common manzanita, or toyon may also be present. Blue oak savanna occurs on south-facing slopes with thinner soils and is the dominant plant community on the northwest side of Chico Creek in Upper Park.

Blue Oak Woodland

Blue oak woodland is a broadleaved deciduous woodland plant community. Blue oak woodland within the park varies from open savannah with a grassy understory to relatively dense woodland with a shrubby understory. This plant community is dominated by blue oak (*Quercus douglasii*) but other oaks, including canyon live oak (*Quercus chrysolepis*), interior live oak (*Quercus wislizenii*), and foothill pine (*Pinus sabiniana*) are also typically present. Common understory shrubs include common manzanita (*Arctostaphylos manzanita* ssp. *manzanita*), buckbrush (*Ceanothus cuneatus*), toyon (*Heteromeles arbutifolia*), redberry buckthorn (*Rhamnus crocea*), and poison oak (*Toxicodendron diversilobum*). Blue oak woodland is very common in the park, particularly in Upper Park where it is the dominant plant community. It occurs in valley uplands and on gentle to steep slopes with shallow, rocky, infertile soils that are moderately to excessively drained.

Buckbrush Chaparral

Buckbrush chaparral is a broadleaved shrub community characterized by dense cover of buckbrush, which may be either the sole constituent in the community or the dominant species. Other shrubs including yerba santa (*Eriodictyon californicum*), toyon, and common manzanita are sometimes present in buckbrush chaparral communities within the park. Shrub cover is generally too dense to allow development of an herbaceous layer but widely scattered foothill pine trees are often present. Buckbrush chaparral occurs on ridge tops and upper slopes in the northern part of Upper Park.

Canyon Live Oak Forest

Canyon live oak forest is a broadleaved evergreen forest community dominated by canyon live oak. Other tree species present include black oak (*Quercus kelloggii*) and California bay (*Umbellularia californica*). This is a dense forest community with little understory development due to the closed tree canopy. Canyon live oak forest is present on the upper banks of Big Chico Creek northeast of Salmon Hole.

Freshwater Seep/Wet Meadow

Freshwater seep/wet meadow is a wetland plant community characterized by dense cover of perennial herb species usually dominated by rushes, sedges, and grasses. Freshwater seep/wet meadow communities occur on sites with permanently moist or wet soils resulting from daylighting groundwater. Freshwater seep/wet meadow habitat in Bidwell Park is dominated by southwestern bushy bluestem (*Andropogon glomeratus* var. *scabriglumis*) and rushes (*Juncus* spp.). Other species observed in the freshwater seep/wet meadow habitat include deergrass (*Muhlenbergia rigens*), cattail (*Typha* sp.), bull thistle (*Cirsium vulgare*), curly dock (*Rumex crispus*), blue-eyed grass (*Sisyrinchium bellum*), and willow (*Salix* sp.). Freshwater seeps/wet meadows are present at several locations in Upper Park including the Bear Hole area. As with all wetlands, freshwater seeps/wet meadows help maintain water quality by intercepting and retaining runoff and sediment from surrounding areas. However, they are prone to compaction and degradation from roads, vehicles, excessive foot traffic, and other uses. Freshwater seep/wet meadow is considered a sensitive natural community by DFG and is tracked in the CNDDB.

Foothill Pine-Chaparral Woodland

Foothill Pine-Chaparral Woodland is an evergreen plant community characterized by an open tree canopy composed of widely scattered foothill pine trees and a dense to open evergreen shrub layer that includes such species as buckbrush, toyon, redberry buckthorn, chaparral honeysuckle (*Lonicera interrupta*), and common manzanita. Openings in the shrub layer support annual grassland. Small patches of foothill pine-chaparral are present in shallow soils of ridgelines and other exposed areas throughout Upper Park.

Foothill Pine-Oak Woodland

Foothill Pine-Oak Woodland is an evergreen plant community characterized by foothill pine-dominated tree canopy with oaks including blue oak and interior live oak as subdominants. This is a moderately open woodland community with an annual grassland understory. Shrub species including toyon, buckbrush, mountain mahogany (*Cercocarpus betuloides*), and common manzanita are often present. Foothill pine-oak woodland is widespread on east and northeast aspects in Upper Park.

Great Valley Mixed Riparian Forest

Great Valley Mixed Riparian Forest is a deciduous broadleaved forest community with a moderately dense to dense tree canopy that typically includes several species as codominates. Shrubs and lianas are also typically present. Mixed riparian forest within Bidwell Park is typically dominated by sycamore (*Platanus racemosa*) and valley oak (*Quercus lobata*), with Fremont cottonwood (*Populus fremontii*), white alder (*Alnus rhombifolia*), willow (*Salix* spp.), catalpa (*Catalpa bignonioides*), and Oregon ash (*Fraxinus latifolia*) also occurring frequently. Common shrub species in this community type include blue elderberry (*Sambucus mexicana*), California buttonbush (*Cephalanthus occidentalis* var. *californicus*), spicebush (*Calycanthus occidentalis*), and Himalayan blackberry (*Rubus discolor*). The herbaceous understory consists primarily of annual grasses and forbs similar to those found in the annual grassland communities but with a higher proportion of shade-tolerant species such as miner's lettuce (*Claytonia parviflora*), common bedstraw (*Galium aparine*), bur-chervil (*Anthriscus caucalis*), and meadow nemophila (*Nemophila pedunculata*). At stream edges, the herbaceous understory of this community is characterized by hydrophytic species such as tall flatsedge (*Cyperus eragrostis*), common tule (*Scirpus acutus*), cattail, sedges (*Carex* spp.), deergrass, and common monkeyflower (*Mimulus guttatus*). Great Valley mixed riparian forest is the predominant community type on the banks of Big Chico Creek throughout Lower and Middle Park. Great Valley mixed riparian forest is considered a sensitive natural community by DFG and is tracked in the CNDDB.

Great Valley Valley Oak Riparian Forest

Great Valley Valley Oak Riparian Forest is a deciduous broadleaved forest community with a closed canopy. This community type is similar to the Great Valley mixed riparian forest community described above but is clearly dominated by valley oak. Characteristic species include many of the same associates found in the Great Valley mixed riparian forest community type but tree and shrub associates are more widely scattered. This community occupies the highest portions of the floodplain terrace of Big Chico Creek throughout Lower and Middle Park. Great Valley valley oak riparian forest is considered a sensitive natural community by DFG and is tracked in the CNDDB.

Interior Live Oak Chaparral

Interior live oak chaparral is a broadleaved sclerophyll community dominated by interior live oak shrubs and trees up to 20 feet tall. Several other sclerophyllous species are typically present including canyon live oak, blue oak, toyon, buckbrush, and holly-leaf redberry (*Rhamnus ilicifolia*). This is a dense chaparral community with sparse understory development due to deep shade and persistent leaf litter. Interior live oak chaparral is present in Upper Park primarily on south-facing slopes with shallow soils, often intergrading with oak woodland communities.

Interior Live Oak Woodland

Interior live oak woodland is a broadleaved evergreen woodland community dominated by interior live oak trees up to 50 feet tall. This is a dense woodland community with persistent leaf litter, like the live oak chaparral community described above, and thus, has a poorly developed understory. California bay is a common associate in this community type and scattered buckeye (*Aesculus californica*), canyon live oak, blue oak, black oak, and foothill pine are often present. Poison oak, chaparral honeysuckle, western redbud (*Cercis occidentalis*), mountain

mahogany, and common snowberry (*Symphoricarpos albus* var. *laevigatus*) may also be present. Interior live oak woodland is present primarily on north-facing slopes throughout Upper Park.

Mixed Oak Woodland

Mixed oak woodland is an ecotone community that intergrades with blue oak woodland, interior live oak woodland, and north slope foothill woodland. This community type is not included in the Holland (1986) classification system as it is a transitional community. The tree canopy is relatively dense and includes both blue oak and interior live oak as well as scattered gray pine, California bay, and California buckeye. The shrub and herb layers include species similar to those found in the previously described oak woodland community types. Mixed oak woodland is scattered throughout portions of Upper Park primarily along the banks of Big Chico Creek.

Northern Volcanic Mudflow Vernal Pool

Northern volcanic mudflow vernal pool is an herbaceous plant community characterized by a mixture of low growing annual grasses and forbs adapted to live both on land and in water. Vernal pools are seasonal pools that typically occur within a grassland and form where winter rainfall perches on soils with a restrictive hardpan layer. In this case, the restrictive layer is composed of volcanic mudflow material of the Tuscan Formation. Typical plant species encountered in vernal pools in Bidwell Park include white-tipped clover (*Trifolium variegatum*), Fremont's goldfields (*Lasthenia fremonitii*) ornate downingia (*downingia ornatissima*) and Sacramento Valley Pogogyne (*Pogogyne zizyphoroides*), stalked popcornflower (*Plagiobothrys stipitatus*), purslane speedwell (*Veronica peregrina* ssp. *xalapensis*), pigmy-weed (*Crassula aquatica*), and water starwort (*Callitriche marginata*). Northern volcanic mudflow vernal pools are primarily concentrated on the north side of Upper Park Road beginning at the entrance to Middle Park and extending east to Horseshoe Lake. Additional scattered pools are located at the proposed disc golf course study site.

North Slope Foothill Woodland

North slope foothill woodland is a broadleaved woodland community characterized by a dense canopy of black oak and California bay with scattered big leaf maple (*Acer macrophyllum*), interior live oak, and occasional foothill pine trees (CSUC 2000). This community type is not included in the Holland (1986) classification system but corresponds loosely to an intermediate community between black oak woodland and mixed north slope cismontane woodland (CSUC 2000). This community type has a poorly developed understory due to the dense tree canopy. This community type occurs on shady north-facing slopes in the uppermost reaches of Upper Park.

White Alder Riparian Forest

White alder riparian forest is a broadleaved deciduous streamside forest dominated by white alder. The understory is composed primarily of deciduous shrubs including willow, mulefat (*Baccharis salicifolia*), brown dogwood (*Cornus glabrata*), and California rose (*Rosa californica*). Big leaf maple and Oregon ash are also common associates. White alder riparian forest occurs as narrow corridors along the steep sided, bedrock constrained upper reaches of Big Chico Creek where stream velocity is highest.

Wildflower Field

Wildflower field is an herbaceous plant community characterized by native annual wildflowers including California sandwort (*Minuartia californica*), divaricate navarretia (*Navarretia divaricata* ssp. *vividior*), Fremont goldfields (*Lasthenia fremontii*), Muhlenberg's centaury (*Centaurium muhlenbergia*), Sierra stonecrop (*Parvisedum pumilum*), and Bidwell's knotweed (*Polygonum bidwelliae*). The wildflower field community type occurs on thin rocky soils where overall vegetative cover tends to be low with many areas of exposed rock and bare soil. This community type appears very unique from the surrounding annual grassland community and

includes only occasional annual grasses and weedy forbs that characterize adjacent annual grassland communities. Wildflower fields occur in soils of the Tuscan formation and other thin volcanic soils throughout Middle and Upper Parks, particularly around Horseshoe Lake and along the southern ridge top. Wildflower fields are considered sensitive natural communities by DFG and are tracked in the CNDDB.

Special-status Plant Species

Special-status plant species are defined as species that are legally protected or that are otherwise considered sensitive by federal, state, or local resource agencies. Special-status species are species, subspecies, or varieties that fall into one or more of the following categories, regardless of their legal or protection status:

- Officially listed by California or the federal government as endangered, threatened, or rare;
- A candidate for state or federal listing as endangered, threatened, or rare;
- Taxa (i.e., taxonomic category or group) that meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act (CEQA) Guidelines;
- species identified by the California Department of Fish and Game (DFG) as Species of Special Concern;
- species afforded protection under local planning documents; and
- Taxa considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California." The CNPS Inventory includes five lists for categorizing plant species of concern, which are summarized as follows:
    - List 1A - Plants presumed to be extinct in California;
    - List 1B - Plants that are rare, threatened, or endangered in California and elsewhere;
    - List 2 - Plants that are rare, threatened, or endangered in California but more common elsewhere;
    - List 3 - Plants about which more information is needed (a review list); and
    - List 4 - Plants of limited distribution (a watch list).

A list of special-status plant species with potential to occur at Bidwell Park was compiled by performing database searches of the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2005) and California Department of Fish and Game's (CDFG) California Natural Diversity Database (CNDDB 2005) and through a review of previously prepared biological resource reports including *A Resource Inventory of Upper Bidwell Park Expansion Area* (CSUC 2000), *Survey for Special-status Botanical Species for the City of Chico's Bidwell Park Trails Project* (Stuart 2002), and *Survey for Threatened and Endangered Botanical Species for Selected Areas of Annie Bidwell and Yahi Trails of the City of Chico's Upper Bidwell Park* (Stuart 2003). Known occurrences of special-status species are shown in Exhibits 2.3.2-2a and 2.3.2-2b.

Thirty-nine special-status plant species have potential to occur in Bidwell Park. Table 2.3.2-2 lists these species and provides information on their listing status, habitat, distribution, flowering period and potential for occurrence. Descriptions of special-status plants that are federally or state listed as endangered or threatened or are known to occur at Bidwell Park are provided below. Additional species that have high potential to occur in the Park because ample habitat is present and known occurrences exist in the immediate vicinity of the Park are also described below.

A total of 11 special-status plant species are reported to occur within the Park, including depauperate milkvetch (*Astragalus pauperculus*), Butte County calycadenia (*Calycadenia oppositifolia*), small spikerush (*Eleocharis parvula*), rose-mallow (*Hibiscus lasiocarpus*), Humboldt lily (*Lilium humboldtii* ssp. *humboldtii*), woolly

meadowfoam (*Limnanthes floccosa* ssp. *floccosa*), shield-bracted monkeyflower (*Mimulus glaucescens*), Tehama navarretia (*Navarretia heterandra*), Bidwell's knotweed (*Polygonum bidwelliae*), California beaked-rush (*Rhynchospora californica*), and Butte County checkerbloom (*Sidalcea robusta*).

In 2006, a new CNPS Threat Code extension was added following the CNPS List number (e.g. 1B.1, 2.2 etc.). This extension replaces the E (Endangerment) value from the R-E-D Code that was formerly used. The main difference is that the number coding is now reversed to reduce confusion and represent this information in parallel with the threat rankings that the California Natural Diversity Database (CNDDB) uses. Therefore the logic is reversed so that the lower the number, the higher the corresponding threat level.

New Threat Code extensions and their meanings:

1 - Seriously endangered in California
2 – Fairly endangered in California
3 – Not very endangered in California

CNPS List 1A species are presumed extinct because they have not been seen or collected in the wild in California for many years. Although most of them are restricted to California, a few are found in other states as well. In many cases, repeated attempts have been made to rediscover these plants by visiting known historical locations. All of the plants constituting List 1A meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, it is mandatory that they be fully considered during preparation of environmental documents relating to the California Environmental Quality Act (CEQA).

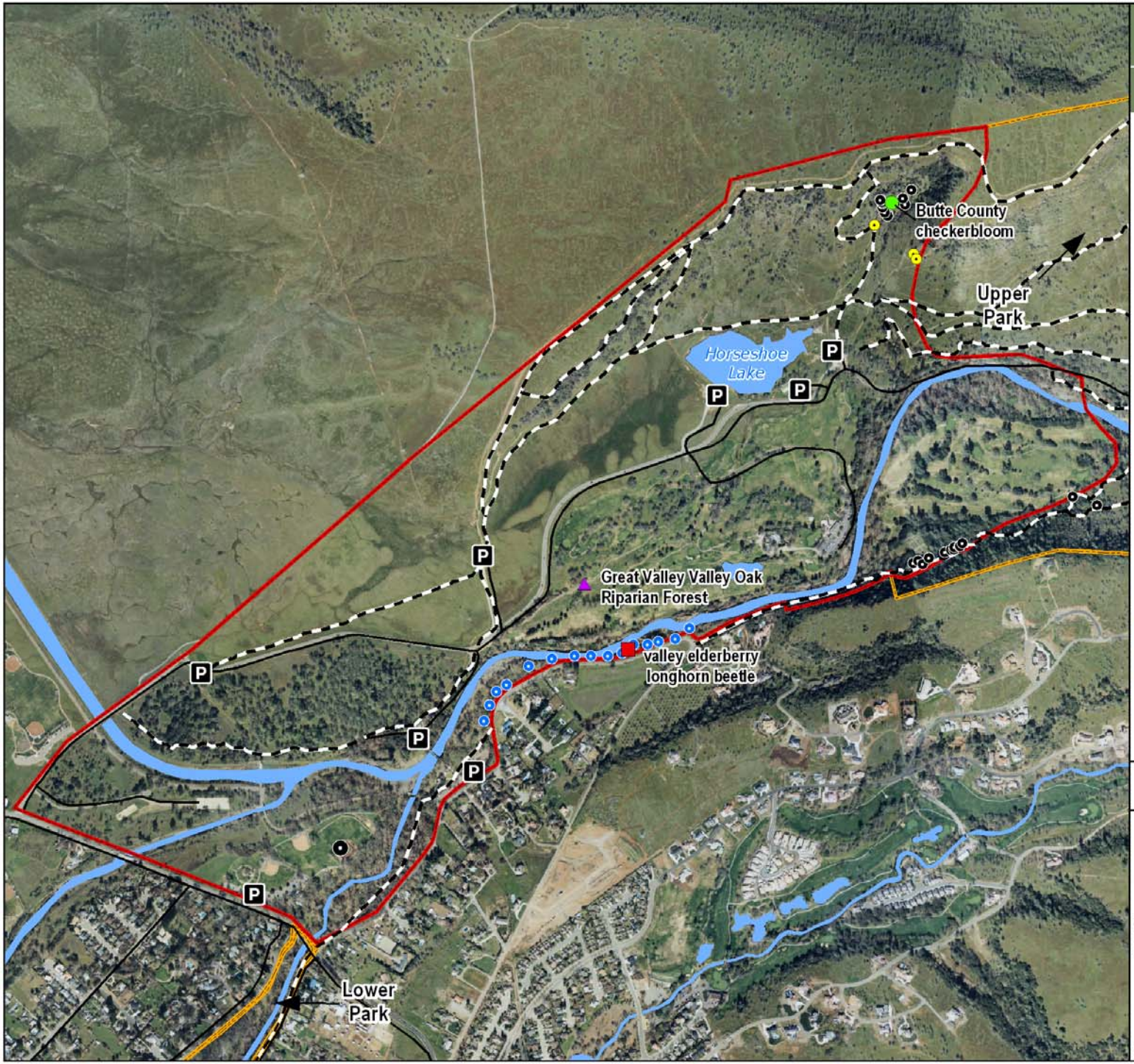
CNPS List 1B species are plants that are rare, threatened, or endangered throughout their range and are considered vulnerable to threats under present circumstances because of their limited or vulnerable habitat, low numbers of individuals per population, or limited number of populations. Most CNPS List 1B species are endemic to California. All species on List 1B meet the definitions of Section 1901, Chapter 10 of the Native Plant Protection Act or Sections 2062 and 2067 of CESA and are eligible for state listing. It is mandatory that CNPS List 1B species be fully considered during the CEQA process.

CNPS List 2 species are plants that are rare, threatened, or endangered in California but are more common elsewhere. The only thing that separates these species from those on List 1B is that they are common somewhere outside of California. The Native Plant Protection Act provides consideration for the protection of species that are rare in California regardless of their distribution outside the state. It is mandatory that CNPS List 2 species be considered during the CEQA process.

CNPS List 3 is a review list for plants that require more information in order to assign them to one of the other lists or reject them from listing. Plants on this list are nearly all taxonomically challenging. Some of the plants on

List 3 do meet the definitions of Section 1901, Chapter 10 of the Native Plant Protection Act or Sections 2062 and 2067 of CESA and are eligible for state listing. It is strongly recommended that List 3 plants be considered during the CEQA process.

CNPS List 4 is a watch list for plant species that are of limited distribution or are infrequent throughout a broader area in California but appear to have relatively low vulnerability at this time. Plants on List 4 generally do not meet the definitions of Section 1901, Chapter 10 of the Native Plant Protection Act or Sections 2062 and 2067 of CESA and are not currently eligible for state listing. However, these species are generally of local concern and the CNPS strongly recommends consideration of List 4 species during the CEQA process particularly in areas where the species is especially uncommon or has sustained a significant decline.



Bidwell Park Master Management Plan

Known Special-Status Species Occurences Middle Park

LEGEND

Recreational Resources

- P Parking Lot
- Main Trails
- Roads

Biological Resources

CNDDB Occurrences

- Plant
- Animal
- Terrestrial Community

Stuart Data

- Blue elderberry
- Butte County Checkerbloom
- Shield-bracted monkeyflower

EDAW 2005 Data

- Streams and Lakes
- Middle Park
- Upper and Lower Parks

Sources: City of Chico 2004, Stuart 2002, CNDDB 2005

N

1 Inch = 1,250 Feet

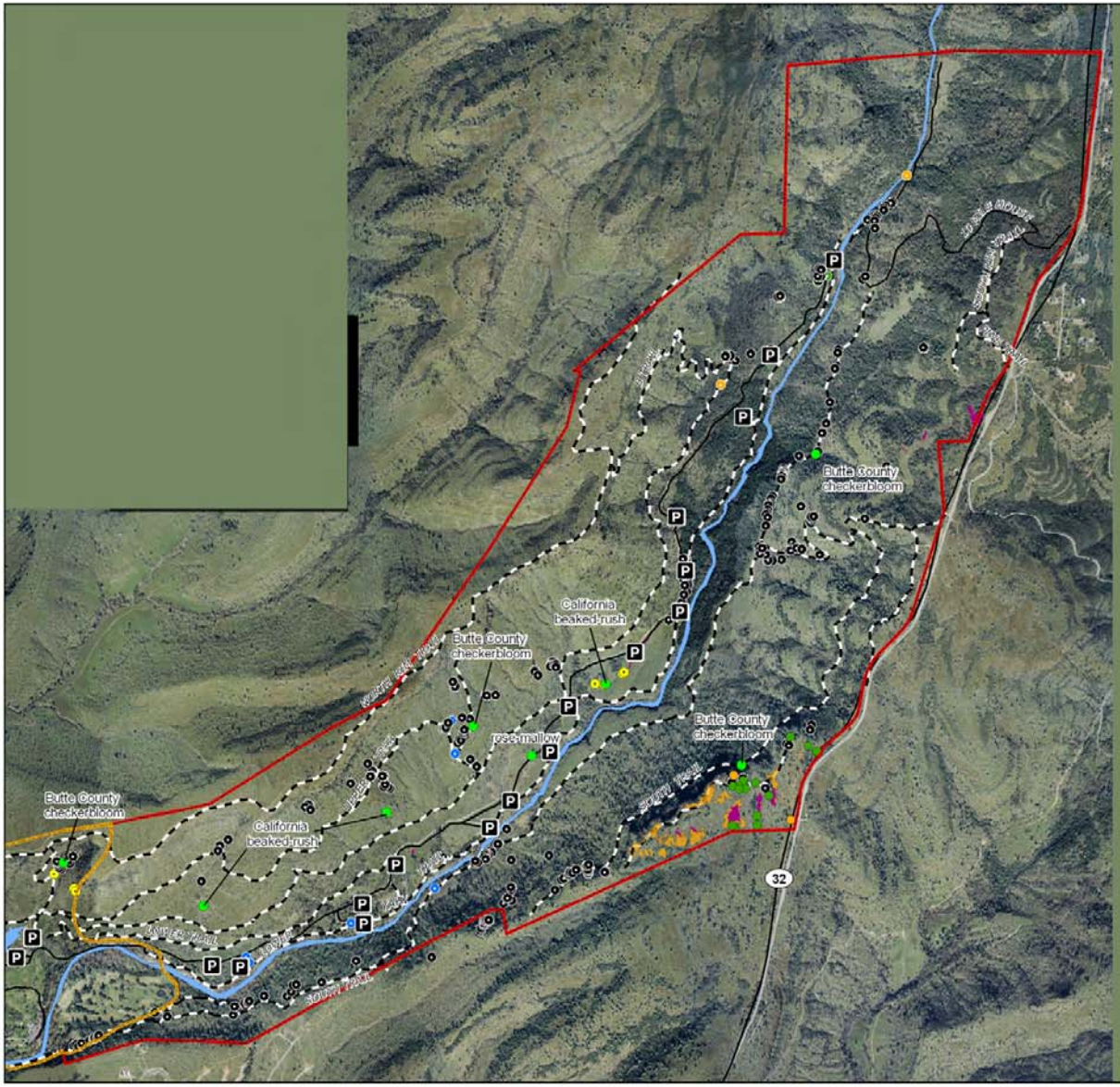
0 625 1,250 2,500

FEET

March 29, 2006

Exhibit 2.3.2-2a

EDAW



Bidwell Park Master Management Plan

Known Special-Status Species Occurences Upper Park

LEGEND

Recreational Resources
- Parking Lot
- Main Trails
- Roads

Biological Resources
- CNDDB Occurrences

Stuart Data
- Butte County Checkerbloom
- Blue elderberry
- Fritallaria sp.
- Humboldt Lily
- Shield-bracted monkeyflower
- Bidwell's knotweed

EDAW Data
- Bidwell's Knotweed
- Butte County Checkerbloom
- Bidwell's knotweed

- Streams and Lakes
- Upper Park
- Middle Park

Sources: City of Chico 2004, Stuart 2002, CNDDB 2005, EDAW 2005

N

1 Inch = 2,000 Feet

0 1,000 2,000 4,000

FEET

March 29, 2006

Exhibit 2.3.2-2b

EDAW

Table 2.3.2-2
Special-Status Plant Species Known to Occur or with Potential to Occur in Bidwell Park

Species	Listing Status			Habitat	Distribution in California	Flowering Period	Potential for Occurrence
	Fed.	State	CNPS				
Jepson's onion *Allium jepsonii*	--	--	1B	Volcanic or serpentinite soils in chaparral, cismontane woodland, and lower montane coniferous forest; 980–3,800 feet elevation.	Butte and Tuolumne Counties	May–August	Low; suitable habitat is present in the higher elevations but there are only two know occurrences of this species.
Sanborn's onion *Allium sanbornii* var. *sanbornii*	--	--	4	Chaparral, cismontane woodland, and lower montane coniferous forest usually on gravelly, granitic, volcanic, and serpentinite substrates; 850–4,600 feet elevation feet.	Butte, Calaveras, El Dorado, Nevada, Placer, Shasta, Tehama, and Yuba Counties	May–September	High; suitable habitat is present.
Henderson's bent grass *Agrostis hendersonii*	--	--	3	Mesic sites in valley and foothill grassland, vernal pools; 230–1,000 feet elevation.	Butte (?), Calaveras, Merced, Shasta, and Tehama Counties	April–May	Low; suitable habitat is present but identity of Butte County plants is questionable. Species not documented within the quads surrounding the park.
Depauperate milk-vetch *Astragalus pauperculus*	--	--	4	Vernally mesic sites and volcanic soils in chaparral, cismontane woodland, valley and foothill grassland; 195–2,800 feet elevation.	Butte, Placer, Shasta, Tehama, and Yuba Counties	March–June	High; known occurrences have been documented within the park.
Ferris's milk-vetch *Astragalus tener* var. *ferrisiae*	--	--	1B	Vernally mesic meadows and seeps, subalkaline flats in valley and foothill grassland; 15–250 feet elevation.	Butte, Colusa, Glenn, Solano, Sutter, and Yolk Counties (believed extirpated from all but Butte and Glenn Counties)	April–May	Low; suitable habitat is present in lower elevation seeps, but the only known occurrences in Butte County are in the Butte Sink Wildlife Management Area.
Thread-leaved beakseed *Bulbostylis capillaris*	--	--	4	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest; 1,295–6,800 feet elevation.	Butte, Fresno, Mariposa, Nevada, Plumas, Sierra, Tehama, and Tuolumne Counties	June–August	Moderate; suitable habitat is present, there are known occurrences in the park vicinity.

Table 2.3.2-2
Special-Status Plant Species Known to Occur or with Potential to Occur in Bidwell Park

Species	Listing Status			Habitat	Distribution in California	Flowering Period	Potential for Occurrence
	Fed.	State	CNPS				
Butte County calycadenia *Calycadenia oppositifolia*	--	--	1B	Volcanic or serpentinite soils in chaparral, cismontane woodland, lower montane coniferous forest, meadows, and valley and foothill grassland; 700–2,800 feet elevation	Butte County	Late April–July	High; known occurrences in Upper Park.
Butte County morning glory *Calystegia atriplicifolia* ssp. *buttensis*	--	--	1B	Rocky soils in chaparral and lower montane coniferous forest; 1,950–5,000 feet elevation.	Butte, Shasta, and Tehama Counties	May–July	Moderate; there is a known occurrence very close to Upper Park but the known elevation range of this species is slightly higher than the park elevation.
Dissected-leaved toothwort *Cardamine pachystigma* var. *dissectifolia*	--	--	3	Chaparral, lower montane coniferous forest; usually in serpentinite, rocky soils; 800–7,000 feet elevation.	Butte, Glenn, Mendocino, Placer, Sonoma, and Tehama Counties	February–May	Moderate; suitable habitat is present and species is known from surrounding quads.
Fox sedge *Carex vulpinoidea*	--	--	2	Freshwater marshes and swamps, riparian woodland; 10–4,000 feet elevation.	Butte, Shasta, Siskiyou, Tehama, and Trinity Counties	May–June	Moderate; suitable habitat is present and species is known from surrounding quads.
Pink creamsacs *Castilleja rubicundula* ssp. *rubicundula*	--	--	1B	Openings in chaparral, cismontane woodland, meadows, and seeps, and valley and foothill grassland in serpentinite soils; 65–3,000 feet elevation.	Butte, Colusa, Lake, and Napa Counties	April–June	Moderate; suitable habitat is present and species is known from surrounding quads.
Hoover's spurge *Chamaesyce hooveri*	FT	--	1B	Vernal pools; 80–820 feet elevation.	Butte, Glenn, Merced, Stanislaus, Tehama, and Tulare Counties	July–August	Moderate; suitable habitat is present and species is known from surrounding quads.
White–stemmed clarkia *Clarkia gracilis* ssp. *albicaulis*	--	--	1B	Chaparral and cismontane woodland; sometimes on serpentinite soils; 800–3,500 feet elevation.	Butte and Tehama Counties	May–July	High; suitable habitat is present and there are known occurrences in the park vicinity.

Table 2.3.2-2
Special-Status Plant Species Known to Occur or with Potential to Occur in Bidwell Park

Species	Listing Status			Habitat	Distribution in California	Flowering Period	Potential for Occurrence
	Fed.	State	CNPS				
Mildred's clarkia *Clarkia mildredia* ssp. *mildrediae*	--	--	1B	Sandy, usually granitic soil in cismontane woodland and lower montane coniferous forest; 800–5,600 feet elevation.	Butte and Plumas Counties	May–August	Moderate; suitable habitat is present and species is known from surrounding quads.
Mosquin's clarkia *Clarkia mosquinii*	--	--	1B	Rocky roadsides in cismontane woodland and lower montane coniferous forest; 600–4,000 feet elevation.	Butte County	May–July	Moderate; suitable habitat is present and species is known from surrounding quads.
Small spikerush *Eleocharis parvula*	--	--	4	Mudflats in marshes and swamps; 3–8,300 feet elevation.	Butte, Contra Costa, Glenn, Humboldt, Napa, Orange, San Luis Obispo, Siskiyou, Sonoma, and Ventura Counties	June–September	High; known to occur on mudflats at Horseshoe Lake.
Four-angled spikerush *Eleocharis quadrangulata*	--	--	2	Freshwater marshes and swamps; 100–1,600 feet elevation.	Butte, Merced, Shasta, and Tehama Counties	May–September	Low; suitable freshwater marsh habitat may be lacking.
Round-leaved filaree *Erodium macrophyllum*	--	--	2	Clay soils in cismontane woodland and valley and foothill grassland; 50–4,000 feet elevation.	Distributed in 25 counties in California from Humboldt to San Diego County	March–May	Moderate; suitable habitat is present and species is known from surrounding quads.
Butte County fritillary *Fritillaria eastwoodiae*	--	--	3	Chaparral, cismontane woodland, lower montane coniferous forest; sometimes in serpentinite soils; 160–4,900 feet elevation.	Butte, Nevada, Placer, Shasta, Tehama, and Yuba Counties	March–May	Moderate; suitable habitat is present and species is known from park vicinity.
Adobe-lily *Fritillaria pluriflora*	--	--	1B	Chaparral, cismontane woodland, valley and foothill grassland; often in adobe soils; 200–2,300 feet elevation.	Butte, Colusa, Glenn, Lake, Napa, Solano, Tehama, and Yolo Counties	February–April	Moderate; suitable habitat is present on alluvial fans with adobe deposits.

Table 2.3.2-2
Special-Status Plant Species Known to Occur or with Potential to Occur in Bidwell Park

Species	Listing Status			Habitat	Distribution in California	Flowering Period	Potential for Occurrence
	Fed.	State	CNPS				
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	--	CE	1B	Lake margin marshes and swamps and vernal pools in clay soils; 30–7,800 feet elevation.	Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Shasta, Siskyou, San Joaquin, Solano, and Tehama Counties	April–August	Low; reported in a surrounding quad but not previously known from Butte County.
Rose-mallow *Hibiscus lasiocarpus*	--	--	2	Freshwater marshes and swamps; 0–400 feet elevation.	Butte, Contra Costa, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolk Counties	June–September	High; known to occur in seep habitats in Upper Park.
Red Bluff dwarf rush *Juncus leiospermus* var. *leiospermus*	--	--	1B	Vernally mesic sites in chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools; 100–3,350 feet elevation.	Butte, Shasta, and Tehama Counties	March–May	Moderate; suitable habitat is present, known occurrences are in the park vicinity.
Humboldt Lily *Lilium humboldtii* ssp. *humboldtii*	--	--	4	Openings in chaparral, cismontane woodland, and lower montane coniferous forest; 300–3,600 feet elevation.	Amador, Butte, Calaveras, El Dorado, Fresno, Madera, Mariposa, Nevada, Placer, Tehama, Tuolumne, and Yuba Counties	May–July	High; known occurrences have been documented within the park.
Butte County meadowfoam *Limnanthes floccosa* ssp. *californica*	FE	CE	1B	Mesic sites in valley and foothill grassland, vernal pools, ephemeral drainages; 160–3,050 feet elevation.	Butte County	March–May	Moderate; suitable habitat is present, known occurrences are in the park vicinity.
Woolly meadowfoam *Limnanthes floccosa* ssp. *floccose*	--	--	4	Vernally mesic sites in chaparral, cismontane woodland, valley and foothill grassland, and vernal pools; 195–3,600 feet elevation.	Butte, Lake, Napa, Shasta, Siskiyou, Tehama, and Trinity Counties	March–June	High; known occurrences have been documented within the park.
Shield-bracted monkeyflower *Mimulus glaucescens*	--	--	4	Serpentinite seeps in chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland; 200–4,000 feet elevation.	Butte, Colusa, Lake, Nevada, Shasta, and Tehama Counties	February–August	High; known to occur in seeps and ephemeral drainages throughout Upper Park.

Table 2.3.2-2
Special-Status Plant Species Known to Occur or with Potential to Occur in Bidwell Park

Species	Listing Status			Habitat	Distribution in California	Flowering Period	Potential for Occurrence
	Fed.	State	CNPS				
Veiny mondardella *Monardella douglasii* ssp. *venosa*	--	--	1B	Cismontane woodland and valley and foothill grassland in heavy clay soils; 200–1,350 feet elevation.	Extant in Butte and Tuolumne Counties; extirpated in Sutter County	May–July	Moderate; suitable habitat is present and species is known from surrounding quads.
Tehama navarretia *Navarretia heterandra*	--	--	4	Mesic sites in valley and foothill grassland, vernal pools; 100–3,100 feet elevation.	Butte, Colusa, Lake, Shasta, Tehama, Trinity, and Yuba Counties	April–June	High; known occurrences have been documented within the park.
Awl-leaved navarretia *Navarretia subuligera*	--	--	4	Rocky mesic sites in chaparral, cismontane woodland, and lower montane coniferous forest; 490–3,600 feet elevation.	Amador, Butte, Del Norte, Lake, Mendocino, Modoc, Napa, Shasta, and Tehama Counties	April–August	Moderate; suitable habitat is present, there are known occurrences in the park vicinity.
Hairy orcutt grass *Orcuttia pilosa*	FE	CE	1B	Vernal pools; 175–650 feet elevation.	Butte, Glenn, Madera, Merced, Stanislaus, and Tehama Counties	May–September	Moderate; suitable habitat is present and species is known from surrounding quads.
Slender orcutt grass *Orcuttia tenuis*	FE	CE	1B	Vernal pools; 100–6,000 feet elevation.	Lake, Lassen, Plumas, Sacramento, Shasta, Siskiyou, and Tehama Counties	May–October	Low; reported in a neighboring quad but not previously known from Butte County.
Ahart's paronychia *Paronychia ahartii*	--	--	1B	Cismontane woodland, valley, and foothill grassland, vernal pools; 100–1,700 feet elevation.	Butte, Shasta, and Tehama Counties	March–June	Moderate; suitable habitat is present, known occurrences are in the park vicinity.
Bidwell's knotweed *Polygonum bidwelliae*	--	--	4	Chaparral, cismontane woodland, valley and foothill grassland / volcanic soils; 195–4,000 feet elevation.	Butte, Shasta, and Tehama Counties	April–July	High; known to occur at several locations within the park.
California beaked-rush *Rhynchospora californica*	--	--	1B	Bogs and fens, lower montane coniferous forest, meadows and seeps, freshwater marshes and swamps; 150–3,300 feet elevation	Butte, Mariposa, Marin, and Sonoma Counties	May–July	High; known from three locations in Upper Park.

Table 2.3.2-2
Special-Status Plant Species Known to Occur or with Potential to Occur in Bidwell Park

Species	Listing Status			Habitat	Distribution in California	Flowering Period	Potential for Occurrence
	Fed.	State	CNPS				
Brownish beaked-rush *Rhynchospora capitellata*	--	--	2	Lower montane coniferous forest, meadows and seeps, marshes and swamps, upper montane coniferous forest / mesic sites; 1,500–6,600 feet elevation.	Butte, Mariposa, Nevada, Plumas, Shasta, Sonoma, Tehama, and Trinity Counties	July–August	Moderate; suitable habitat is present in the upper elevations of the park, known occurrences are nearby.
Sanford's arrowhead *Sagittaria sanfordii*	--	--	1B	Assorted shallow freshwater marshes and swamps; 0–2,000 feet elevation.	Butte, Del Norte, Fresno, Kern, Merced, Orange, Sacramento, Shasta, San Joaquin, Tehama, and Ventura Counties	May–October	Low; suitable freshwater marsh habitat may be lacking.
Butte County checkerbloom *Sidalcea robusta*	--	--	1B	Chaparral, cismontane woodland; 300–5,300 feet elevation.	Butte County	April–June	High; known from numerous occurrences throughout the park.
Butte County golden clover *Trifolium jokerstii*	--	--	1B	Mesic sites in valley and foothill grassland, vernal pools; 160–1,300 feet elevation.	Butte County	April–May	Low; suitable habitat is present but there are only seven known occurrences of this species.
Greene's tuctoria *Tuctoria greenei*	FE	CR	1B	Vernal pools; 100–3,500 feet elevation.	Butte, Fresno, Glenn, Madera, Merced, Shasta, San Joaquin, Stanislaus, Tehama, and Tulare Counties	May–September	Moderate; suitable habitat is present and species is known from surrounding quads.
Columbian watermeal *Wolffia brasilienensis*	--	--	2	Assorted shallow freshwater marshes and swamps; 100–325 feet elevation.	Butte County and elsewhere	April–December	Low; suitable freshwater marsh habitat may be lacking; known only from the Sacramento River.

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:

FT Federal Threatened
FE Federal Endangered

California Department of Fish and Game (CDFG) State Listing Categories:

CR California Rare
CT California Threatened
CE California Endangered

California Native Plant Society (CNPS) Listing Categories:

1B Plants rare, threatened, or endangered in California and elsewhere
2 Plants rare, threatened, or endangered in California but more common elsewhere
3 Plants for which more information is needed – a review list
4 Plants of limited distribution – a watch list

Sanborn's Onion

Sanborn's onion is a CNPS List 4 species and a member of the lily family (Liliaceae). This perennial bulb species is typically 7 to 23 inches tall and produces white to deep pink flowers that bloom from May to September. The typical habitat of this species is gravelly, granitic, volcanic, and serpentinite substrates within chaparral, cismontane woodland, or lower montane coniferous forest habitat at elevations ranging from 850 to 4,600 feet.

Depauperate Milkvetch

Depauperate milkvetch (*Astragalus pauperculus*) is a CNPS List 4 species and a member of the pea family (Fabaceae). This annual herb species is typically less than 4 inches tall and produces purple flowers that bloom from March to June. This species occurs in vernally mesic and volcanic soils within chaparral, cismontane woodland, and valley and foothill grassland habitats from 195 to 2,800 feet in elevation. This species has been documented in Upper Park near the north tower of the power lines that transect Upper Park (Oswald 1986).

Butte County Calycadenia

Butte County Calycadenia (*Calycadenia oppositifolia*) is a CNPS List 1B species. This member of the sunflower family (Asteraceae) is an annual herb species with a hairy stem that is generally less than 6 inches in height. The dense flowering heads are produced in the leaf axils and typically bloom from late April to July. This species is endemic to Butte County and grows in volcanic or serpentinite soils within chaparral, cismontane woodland, lower montane coniferous forest, meadow, and annual grassland habitats at elevations ranging from 700 to 2,800 feet. This species has been documented within Upper Park near Devil's Kitchen and near Brown's Hole (Oswald 2002) and also during surveys for the proposed Annie Bidwell Trail (SCU Research Foundation 2000).

Butte County Morning Glory

Butte County morning glory (*Calystegia atriplicifolia* ssp. *buttensis*) is a CNPS List 1B species. This perennial herb grows from a rhizome and is a member of the morning glory family (*Convolvulaceae*). The stems of this species are generally decumbent to erect, not climbing, and from 4 to 20 inches long. The large bell-shaped flowers are white to pink tinged and bloom from May to July. Butte County morning glory species occurs in dry rocky soils within chaparral or lower montane coniferous forest openings. The known elevation range of this species is from 1,950 to 5,000 feet, which is higher than the elevation of Bidwell Park. However, considering that the higher elevations of the park (1,600 feet) are within a few hundred feet of the species' known elevation range and the fact that a known population of this species occurs just north of the Upper Park boundary along SR 32, it is considered a potential candidate to occur within suitable habitat that is present in Upper Park.

Hoover's Spurge

Hoover's spurge (*Chamasaesyce hooveri*) is federally listed as threatened. This annual herb species belongs to the spurge family (Euphorbiaceae). The stems of this plant are prostrate and the tiny flowers bloom from July to August. This species occurs in vernal pool habitat at elevations ranging from 80 to 820 feet. There are no known occurrences of Hoover's spurge in Bidwell Park but suitable habitat is present.

White-stemmed Clarkia

White-stemmed clarkia (*Clarkia gracilis* ssp. *albicaulis*) is a CNPS List 1B species. This annual herb species is a member of the evening primrose family (Onagraceae). The erect stems of this species are up to 35 inches tall. The flowers, which bloom from May to July, have pinkish lavender petals that are white near the middle interior with a red base and are over an inch long. This species occurs in chaparral and cismontane woodland habitats from 800 to 3,500 feet elevation and is sometimes associated with serpentinite soils. There are reported occurrences (Friends of Bidwell Park website) of white-stemmed clarkia within Bidwell Park and ample habitat exists. A

known occurrence has been documented in the CNDDB at Ten Mile House at the junction of SR 32 and the road to Big Chico Creek just east of Bidwell Park.

Small Spikerush

Small spikerush (*Eleocharis Parvula*) is a CNPS List 4 species and a member of the sedge family (Cyperaceae). This small perennial grows from a rhizome and is generally less than 4 inches tall. The flowering spike is greenish to brownish and the flowers bloom from June to September. This species occurs on mudflats in marsh or swamp habitats from 3 to 8,300 feet elevation. This species has been reported to occur on the edge of Horseshoe Lake (Oswald 1986).

Butte County Fritillary

Butte County fritillary (*Fritillaria eastwoodiae*) is a CNPS List 3 species and a member of the lily family (Liliaceae). This perennial bulb species is typically grows from 10 to 30 inches tall. The large nodding flowers are pale greenish yellow to reddish and bloom from March to May. Butte County fritillary occurs in chaparral, cismontane woodland, and lower montane coniferous forest habitats at elevations ranging from 160 to 4,900 feet and is sometimes associated with serpentinite soils. There are no documented occurrences of Butte County fritillary in Bidwell Park; however, fritillary plants in the fruiting stage were observed in several locations during the Upper Bidwell Park expansion surveys (CSUC 2000) and at one location during the Bidwell Park Trails Project botanical surveys (Stuart 2002). One fritillary specimen in the fruiting stage was also observed in the proposed disc golf course study area during botanical surveys conducted by EDAW in 2005. Because these plants were observed after the blooming period, they could not be identified to species (flowers are required to distinguish species of Fritillaria). Suitable habitat for Butte County fritillary is present in Middle and Upper Parks and this species has potential to occur.

Bogg's Lake Hedge-hyssop

Bogg's Lake hedge–hyssop (*Gratiola heterosepala*) is state listed as endangered. This annual herb species belongs to the figwort family (Scrophulariaceae). The stems are erect to ascending and are typically less than 4 inches in height. The yellow and white flowers bloom from April to August. This species occurs on lake margins and in vernal pools in clay soils at elevations ranging from 30 to 7,800 feet. There are no known occurrences of Bogg's Lake hedge-hyssop in Bidwell Park but suitable habitat is present within the pools of Middle Park and around Horseshoe Lake.

Rose Mallow

Rose Mallow (*Hibiscus lasiocarpus*) is a CNPS List 2 species and a member of the mallow family (Malvaceae). This perennial shrub species is generally 3 to 6 feet tall and produces large white or rose colored flowers that bloom from June to September. Rose mallow occurs in freshwater marsh, swamp, and seep habitats at elevations ranging from 0 to 400 feet. This species has been documented in a hillside seep near Division Dam in Upper Park (Stuart 2002).

Butte County Meadowfoam

Butte County Meadowfoam (*Limnanthes floccosa* ssp. *californica*) is state and federally listed as endangered. This an annual herb species belongs to the meadowfoam family (Limnanthaceae). Stems of this species are typically less than 10 inches tall and the white cup-shaped flowers bloom from March to May. This species is differentiated from woolly meadowfoam (described below) by the shape of the flowers and by the fruits. This species occurs in mesic sites in grassland habitat, vernal pool edges, and along ephemeral drainages at elevations ranging from 160 to 3,050 feet. There are no known occurrences of Butte County meadowfoam in Bidwell Park

but suitable habitat is present and there are known occurrences very close to the park at the site of the former Chico Burn Dump.

Woolly Meadowfoam

Woolly Meadowfoam (*Limnanthes floccosa* ssp. *floccosa*) is a CNPS List 4 species and a member of the meadowfoam family. This annual herb species is typically less than 10 inches tall and has white bell-shaped to urn-shaped flowers that bloom from March to June. It gets its name from the woolly tufts of hairs on its sepals. Woolly meadowfoam is generally found on vernally mesic sites (e.g., vernal pools, ephemeral drainages, meadows) within chaparral, cismontane woodland, or valley and foothill grassland habitat at elevations ranging from 195 to 3,600 feet. This species has been reported to occur in Bidwell Park (Friends of Bidwell Park website) but there are no documented occurrences in the CNPS inventory or in the Specimen Management System for California Herbaria (SMASCH). This species is known to occur on Tuscan fanglomerate from the north edge of the county southward to near Bidwell Park (Oswald 1994) and suitable habitat for this species is present within the Park.

Humboldt Lily

Humboldt Lily (*Lilium humboldtii* ssp. *humboldtii)* is a CNPS List 4 species and a member of the lily family (Liliaceae). This perennial bulb species produces erect stems up to 8 feet tall and large and pendulous orange flowers with magenta spots. The blooming period of this species is from May to July and it typically occurs in chaparral and yellow pine forest habitats from 2,000 to 3,600 feet. This species has been documented in Upper Park at Alligator Hole and Brown's Hole (Stuart 2002, Oswald 1986).

Shield-bracted Monkeyflower

Shield-bracted monkeyflower (*Mimulus glaucescens*) is a CNPS List 4 species and a member of the figwort family. This annual herb species ranges from 2 to 30 inches in height and produces yellow flowers from February to August. This species typically occurs in serpentinite seeps within chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland habitats at elevations ranging from 200 to 4,000 feet. This species has been documented in numerous seeps and ephemeral drainages throughout Upper Park and also along Big Chico Creek and in upper Lindo Channel (Stuart 2002, Oswald 1986, CSU Research Foundation 2000).

Tehama Navarretia

Tehama navarretia (*Navarretia heterandra*) is a CNPS List 4 species and a member of the phlox family (Polemoniaceae). This annual herb species is typically from 1 to 3 inches in height and is wider than tall. The flowers are produced from April to June and have white corollas with purple spots below the lobes. This species occurs in heavy soils in mesic grassland habitats, wet or drying flats, and vernal pools at elevations ranging from 100 to 3,100 feet. This species has been documented on the north side of Horseshoe Lake (Oswald 2002).

Hairy Orcutt Grass

Hairy Orcutt Grass (*Orcuttia pilosa*) is state and federally listed as endangered. This is an annual herb species belonging to the grass family (Poaceae). The stems grow in tufts and are typically from 2 to 8 inches tall. Plants of this species are generally densely hairy, hence the name. The blooming period of hairy orcutt grass is from May to September. In this species, the upper spikelets are densely crowded while the lower spikelets are well separated. This species occurs in vernal pools at elevations ranging from 175 to 650 feet. There are no known occurrences of hairy orcutt grass in Bidwell Park but suitable habitat is present within the pools of Middle Park.

Slender Orcutt Grass

Slender Orcutt Grass (*Orcuttia tenuis*) is state and federally listed as endangered. This is an annual herb species belonging to the grass family. The stems of this species are typically from 2 to 6 inches tall and are not tufted or only weakly so. Plants of this species are only sparsely hairy. The blooming period of slender orcutt grass is from May to October and the spikelets are evenly spaced. This species occurs in vernal pools at elevations ranging from100 to 6,000 feet. There are no known occurrences of slender orcutt grass in Bidwell Park but suitable habitat is present. The nearest known occurrences are in Tehama County.

Bidwell's Knotweed

Bidwell's Knotweed (*Polygonum bidwelliae*) is a CNPS List 4 species. This annual herb species is a member of the knotweed family (Polygonaceae) and has an erect reddish stem that is from 1 to 8 inches tall. Plants produce tiny pink flowers that typically bloom between April and June. This species occurs in thin volcanic soils on gravelly ridge tops and outcrops of the Tuscan Formation at elevations ranging from 200 to 4,000 feet. Several occurrences of Bidwell's knotweed have been documented within Upper Park (CSU Research Foundation 2000, Stuart 2002 and 2003, EDAW 2005) and the original type specimen was collected from the area of the proposed disc golf course by Annie Bidwell. Outside of Bidwell Park, this species is known from roughly 30 to 50 sites, some of which may not longer be extant, scattered from Butte to Shasta County. This species is abundant in the wildflower field community in the disc golf course area and on the north side of Horseshoe Lake.

California Beaked-rush

California beaked-rush (*Rhynchospora californica*) is a CNPS 1B species and a member of the sedge family (Cyperaceae). This perennial herb species grows from a rhizome. California beaked-rush blooms from May to July but does not produce showy corollas but rather brownish-gold bristles that surround the ovary. The leaves are blade-like and the stems are three sided. This species occurs in marsh, bog, meadow, and seep habitats at elevations ranging from 150 to 3,300 feet. There are less than ten known occurrences of California beaked-rush (CNPS 2001) and three of these are in Bidwell Park. This species was originally discovered and described from Upper Park (Oswald 1994) and it has been documented at three seep locations within the Park: at Salmon Hole, just west of the power lines, and near Bear Hole (Stuart 2002, Oswald 2002).

Butte County Checkerbloom

Butte County checkerbloom (*Sidalcea robusta*) is a Federal Species of Concern and a CNPS List 1B species. This perennial herb species is a member of the mallow family (Malvaceae) and has a robust stem that typically grows up to three feet in height. Pale pink flowers with petals measuring up to 1.5 inches bloom from April to June. Mapping of known occurrences and historic occurrences show that the species is restricted to the relatively young soils of the Tuscan Formation in the southern Cascade Range foothills. Butte County checkerbloom is known from fewer than 20 occurring (CNPS 2001). It is often found growing under blue oak trees (at dripline or base of trunk), against rocks or at the base of ledges or rock benches, in small drainages, under the dripline of shrubs, and other similar habitats. Although it is found in a variety of slopes and exposures, it is found more frequently on north-facing slopes of 20% or more. This plant occurs almost exclusively in blue oaks and blue oak/foothill pine woodlands. Special-status plant surveys conducted in 2000, (CSU Research Foundation), and in 2002 and 2003 (Stuart 2002 and 2003) documented over 300 locations of Butte County checkerbloom in Upper Park and additional locations were identified during special-status plant surveys conducted at the proposed disc golf course study area in 2005 (EDAW 2005). Occurrences included populations ranging in size from a single individual to several hundred individuals. Outside of Bidwell Park the total number of populations is not known although the plant is likely restricted to a handful of sites (C. Hantelman, pers. comm., 2005).

Greene's Tuctoria

Greene's Tuctoria (*Tuctoria greenei*) is federally listed as endangered and state listed as rare. This is an annual herb species belonging to the grass family. The stems of this species are typically from 2 to 6 inches tall. The blooming period of Greene's tuctoria is from May to September and the upper spikelets are crowded while the lower spikelets are well spaced. This species occurs in vernal pools at elevations ranging from 100 to 3,500 feet. There are no known occurrences of Greene's tuctoria in Bidwell Park but suitable habitat is present.

Invasive Plants

Invasive plants are species that are not native to the region, persist without human assistance, and have serious impacts on their introduced environment (Simberloff et al. 1997, Davis and Thompson 2000). The term invasive plant differs from the classification terms nonnative, exotic, or introduced plant because it is (when applied correctly) used only to describe those exotic plant species that displace native species on a large enough scale to alter habitat functions and values. The California Invasive Plant Council (CalIPC) maintains a list of species that have been designated as invasive in California. The term noxious weed is used by government agencies to apply to exotic plants that have been defined as pests by law or regulation (California Department of Food and Agriculture [CDFA] 2005).

Many invasive plant species have been identified throughout Bidwell Park. The FOBP maintain a current comprehensive list of invasive species in Bidwell Park on their website (www.friendsofbidwellpark.org/invasivetable.html). The list includes rankings of each plant by level of priority for treatments. FOBP recommends these top priorities for Lower Park include river and English Ivy and that top priorities for Middle and Upper Park include olives, broom, and yellow starthistle at selected locations. Invasive weed management in the Park is addressed in the Natural Resources Management Plan (NRMP) included in Appendix C of this document.

2.3.2.3 TERRESTRIAL WILDLIFE

This section focuses on three key elements of terrestrial wildlife resources in Bidwell Park: 1) wildlife habitat and communities, 2) special-status wildlife species, and 3) other ecologically significant wildlife resources.

Terrestrial Wildlife Habitat and Communities

The hydrologic, topographic, and elevation gradients present in Bidwell Park support a diverse mix of plant communities and wildlife habitats, including riparian corridors along streams, oak woodland, pine-oak woodland, chaparral, and grassland. In addition to biophysical gradients, several other factors affect the distribution and quality of wildlife habitats, abundance, and distribution of species, and animal community structure in Bidwell Park. These include: 2) recreation use, 3) land use patterns and management activities, 4) livestock grazing, 5) natural disturbances (e.g., fire history), and 6) demographic processes.

The overall wildlife habitat value of the park is considered high. The Big Chico Creek watershed, which includes Bidwell Park, supports or is likely to support approximately 350 wildlife species (BCCWA 1997). Because the Park includes most of the habitat types found over the larger watershed, most of these species are expected to occur in the Park. Many of the wildlife species found there are common, but some of the species are considered to have significant resource value.

Wildlife habitats in the Big Chico Creek watershed have been described in terms of four biotic zones: valley, foothill, canyon, and mountain (BCCWA 1997). Two of these zones – valley and foothill – are represented in Bidwell Park. The following summary of habitat zones in Bidwell Park was taken from the Big Chico Creek Watershed Project, Existing Conditions Report (BCCWA 1997).

Valley Zone

Wildlife habitats within the valley zone occur on the valley floor in the lower portions of Bidwell Park. Vegetation communities in the valley zone include annual grassland, valley oak and mixed riparian woodland, and mixed oak woodland. These vegetation types are described in section above under plant communities. Habitats within the valley zone, particularly riparian woodlands, have been affected by a long history of human land uses, including cattle grazing and residential development (BCCWA 1997). Habitat conversion and degradation of grasslands, riparian woodlands, and wetlands by development and agricultural practices have affected the distribution and quality of habitats in Bidwell Park. The near complete replacement of the native understory by invasive non-native species has lead to a decline in habitat quality in Lower Park.

Grasslands and oak woodlands support a variety of small mammals and provide high quality foraging habitat for several raptor species, including red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus cyaneus*), burrowing owl (*Athene cunicularia*) and Ferruginous hawk (*Buteo regalis*). Riparian woodlands within the valley zone support an exceptionally rich avian and mammal community and contribute a disproportionately high amount to landscape-level species diversity. Riparian woodlands throughout much of Bidwell Park are comprised of multi-aged woodland structure and a well-developed understory with shrub and herbaceous components. These conditions provide suitable foraging and breeding habitat for several ecological functional groups, including insectivores (e.g., warblers, flycatchers), seed-eaters (e.g., finches), raptors, and cavity-nesters (e.g., woodpeckers). Also, riparian woodlands in Bidwell Park provide important habitat for numerous neotropical migrant bird species during the breeding season, as well as during spring and fall migration.

Foothill Zone

The foothill zone ranges in elevation from the valley floor to approximately 2,000 feet. Portions of Upper and Middle Bidwell Park are located in this zone. Land uses in the foothill zone in the general vicinity include cattle ranching, recreation and residential development. Land uses in the foothill zone within the park are limited to various levels of recreational uses and development.

Vegetation communities in the foothill zone include blue oak woodland, buckbrush chaparral, foothill pine-woodland, and interior live oak woodland. These vegetation types are described above under plant communities. The oak woodlands present in this zone function as important winter habitat for the Eastern Tehama Deer Herd (BCCWA 1997). Also, native wildlife species that forage primarily on acorns, including acorn woodpecker (*Melanerpes formicivorus*), Western scrub-jay (*Aphelocoma californica*), and western gray squirrel (*Sciurus griseus*), are well-represented in this zone foothill zone. Large trees for perching and nesting, adjacent to open foraging areas, provide suitable habitat for a diverse raptor community, including red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), Cooper's hawk (*Accipiter cooperii*), and great horned owl (*Bubo virginianus*).

The foothill zone also provide habitat for a variety of reptiles and amphibians such as western fence lizard (*Sceloporus occidentalis*), ringneck snake (*Diadophis punctatus*), and Pacific tree frog (*Hyla regilla*), and mammals such as black bear (*Ursus americanus*), mule deer (*Odocoileus hemionus*), mountain lion (*Puma concolor*), raccoons, and squirrels.

Special-status Wildlife Species

Special-status wildlife species include terrestrial animals that are legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status species addressed in this section include:

- species listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA);

- species considered as candidates for listing as threatened or endangered under ESA or CESA;
- species identified by DFG as California Species of Special Concern and/or USFWS as a Species of Concern; and
- animals fully protected in California under the California Fish and Game Code;

Special-status species were identified through a review of existing documentation and reconnaissance-level field surveys conducted by an EDAW biologist on March 9 and May 5, 2005. Sources of information reviewed included the California Natural Diversity Database (DFG 2005), A Resource Inventory of Upper Bidwell Park Expansion Area (CSUC 2000), Big Chico Watershed Alliance's *Existing Conditions Report* (BCCWA 1997), biological resource information provided in the Friends of Bidwell Park website (http://www.friendsofbidwellpark.org), and a current USFWS list of threatened, endangered, proposed, and candidate species that may be present in the area.

A list of special-status animal species known or likely to occur at Bidwell Park is included in Table 2.3.2-3 below. A thorough inventory or focused surveys for wildlife have not been completed for Bidwell Park. However, based on the result of a field reconnaissance and other biological studies, it has been determined that Bidwell Park may provide important habitat for the following special-status terrestrial animal species: (1) riparian-associated songbirds including yellow warbler (*Dendroica petechia*) and yellow-breasted chat (*Icteria virens*); (2) other special-status avian species including oak titmouse (*Baeolophus inornatus*), tricolored blackbird (*Agelaius tricolor*), and loggerhead shrike (*Lanius ludovicianus*); (3) a diverse special-status raptor community including American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), Swainson's hawk, Cooper's hawk, sharp-shinned hawk (*Accipiter striatus*), golden eagle (*Aquila chrysaetos*), northern harrier, and white-tailed kite (*Elanus leucurus*); (4) rare invertebrates including valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*); and (5) a rare mammal community including badger (*Taxidea taxus*), two bat species, and ringtail (*Bassaricus astutus*). Special-status wildlife species that are state or federally listed as threatened or endangered, as well as special-status species that are known to occur in Bidwell Park, are described below. Special-status raptors and riparian bird species that are known or have potential to occur in Bidwell Park are described under the headings "Raptor Community" and "Riparian Bird Communities and Neotropical Migrant Landbirds," respectively, as they are part of these broader ecologically significant resources.

A thorough inventory of, or focused surveys for, wildlife have not been completed for Bidwell Park. However, based on the results of a field reconnaissance of habitats and other biological studies, it has been determined that Bidwell Park may provide important habitat for several special-status terrestrial animal species. A list of special-status animal species known or likely to visit or inhabit Bidwell Park and a summary of their habitat associations and regulatory status is included in Table 2.3.2-3 of the BPMMP. Special-status wildlife species that are state or federally listed as threatened or endangered, as well as special-status species that are known to occur in Bidwell Park are discussed in Section 2.3.2-3 of the BPMMP. Existing conditions for special-status wildlife species with potential to be affected by the Park Improvement Projects are described below.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is federally listed as threatened. These beetles are patchily distributed throughout the remaining riparian forests of the Central Valley, from Redding to Bakersfield. They appear to be only locally common (i.e., found in population clusters that are not evenly distributed across the Central Valley). Although wide-ranging, the valley elderberry longhorn beetle has been thought to be in a long-term decline due to human activities that have resulted in widespread alteration and fragmentation of riparian habitats and, to a lesser extent, upland habitats that support the beetle (USFWS 1984). USFWS released a 5-year status review for the valley elderberry longhorn beetle on October 2, 2006 (USFWS 2006a). This review reported an increase in known beetle locations from 10 at the time of listing in 1980 to 190 in

Table 2.3.2-3
Special-Status Terrestrial Wildlife Species Known from or with Potential to Occur Bidwell Park

Species	Status		Habitat	Potential for Occurrence in Study Area
	Fed.	State		
AMPHIBIANS AND REPTILES				
Foothill Yellow-Legged Frog *Rana boylii*	--	CSC	Shallow flowing water preferentially in small to medium sized streams with rocky substrates.	Known to occur.
Western spadefoot toad *Spea hammondii*	--	CSC	Vernal pools and other seasonal ponds in valley and foothill grasslands.	Likely to occur; suitable habitat present on site and known from adjacent sites (Shedd 2005).
Coast-horned lizard *Phrynosoma blainvillii*		CSC	Open abundant vegetation such as chaparral or coastal sage scrub.	Known to occur in the vicinity of the North Rim Trail.
Northwestern pond turtle *Astinemys marmorata marmorata*	--	CSC	Freshwater marsh, ponds, lakes, and rivers.	Known from in and near Big Chico Creek, most commonly in the foothills of Upper Park (Shedd 2005).
INVERTEBRATES				
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		Elderberry shrubs, typically in riparian habitats.	Known to occur in several locations, including along Big Chico Creek.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	--	Vernal pools in valley and foothill grasslands.	Could occur; suitable habitat present on-site.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	--	Vernal pools in valley and foothill grasslands.	Could occur; suitable habitat present on-site.
Conservancy fairy shrimp *Branchinecta conservatio*	FE	--	Large vernal pools in valley grasslands.	Could occur; suitable habitat present on-site.
BIRDS				
Cooper's hawk *Accipiter cooperii*	--	CSC	Nests in oak woodlands, other mixed evergreen forest, or coniferous forest. Forages in a variety of habitats-from open areas to dense forests.	Known to occur.
Sharp-shinned hawk *Accipiter striatus*	--	CSC	Nests in coniferous or mixed forests, usually selecting a conifer for the nest tree. Forages in a wide variety of coniferous, mixed, or deciduous woodlands.	Known to occur.
Tricolored blackbird *Agelaius tricolor*	FC	CSC	Forages in grasslands, seasonal wetlands, agricultural fields, cattle feedlots, and dairies; nests in flooded, thorny, or spiny vegetation within matrix of foraging habitat.	May occur; documented in the Big Chico Creek Watershed.
Golden Eagle *Aquila chrysaetos*	--	FP, CSC	Rolling foothills and mountain areas. Nests on cliffs and in large trees.	Known to occur.
Burrowing owl *Athene cunicularia*	FC	CSC	Grasslands with relatively sparse vegetation and agricultural fields.	Likely to occur; documented in the Big Chico Creek Watershed
Oak titmouse *Baeolophus inornatus*	FC		Oak woodlands.	Known to occur; observed during field surveys.

Table 2.3.2-3
Special-Status Terrestrial Wildlife Species Known from or with Potential to Occur Bidwell Park

Species	Status		Habitat	Potential for Occurrence in Study Area
	Fed.	State		
Ferruginous hawk *Buteo regalis*	FC	SCS	Grasslands and agricultural fields.	Likely to occur during winter; documented in the Big Chico Creek Watershed.
Swainson's hawk *Buteo swainsoni*	FC	CT	Forages in grasslands and agricultural fields; nests in open woodland or scattered trees.	Could occur.
Lawrence's goldfinch *Carduelis lawrencei*	FC		Open woodlands, chaparral.	Likely to occur.
Northern harrier *Circus cyaneus*	--	CSC	Grasslands, marshes, and agricultural fields.	Known to occur.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	E	Riparian forest, typically with mature cottonwoods and willows.	Could occur.
Yellow warbler *Dendroica petechia*	--	CSC	Riparian woodland and scrub.	Known to occur.
White-tailed kite *Elanus leucurus*	FC	FP	Forages in grasslands and agricultural fields; nests in isolated trees or small woodland patches.	Known to occur.
American peregrine falcon *Falco peregrinus anatum*	FC	E, FP	Cliffs or rocky outcrops for nesting. Forages over a variety of habitats but mostly prefers aquatic associated areas where abundant aerial prey is present.	Likely breeding in the Park. Pair observed off cliff on south side of park during 2005 field surveys.
Bald eagle *Haliaeetus leucocephalus*	T, FPD	E, FP	In western North America, nests and roosts in coniferous forests within 1 mile of lake, reservoir, stream, or ocean.	Known to occur.
Yellow-breasted chat *Icteria virens*	--	CSC	Well-developed riparian woodland and scrub with dense shrub cover.	Known to occur.
Loggerhead shrike *Lanius ludovicianus*	FC	CSC	Forages in grasslands and agricultural fields; nests in scattered shrubs and trees.	Known to occur.
Black Rail *Latterallus jamaicensis coturniculus*	T FP		Wetlands and seeps with emergent marsh vegetation.	Known to occur.
Nuttall's woodpecker *Picoides nuttallii*	FC		Oak and riparian woodlands.	Known to occur; observed during field surveys.
Purple martin *Progne subis*	--	CSC	Riparian woodland, oak woodland, cismontane woodland, and coniferous forests.	Known to occur.
MAMMALS				
Badger *Taxidea taxus*		CSC	Foothill and valley grasslands and meadows with friable soils.	Could occur, though highly unlikely; mostly extirpated from Butte County.
Small-footed myotis *Myotis ciliolabrum*	FC		Arid upland habitats; associated with woodland or brushy areas; roosts in buildings, caves, and crevices.	Could occur.

Table 2.3.2-3
Special-Status Terrestrial Wildlife Species Known from or with Potential to Occur Bidwell Park

Species	Status		Habitat	Potential for Occurrence in Study Area
	Fed.	State		
Yuma myotis *Myotis yumanensis*	FC		Forest and woodland habitats; forages over open water; roosts in buildings, caves, mines, and crevices.	Could occur.
Townsend's big-eared bat *Plecotus townsendii*	--	CSC	Found in all but alpine and subalpine habitats but prefers mesic habitats; roosts and nests in caves, tunnels, mines, hollow trees, buildings and other man-made structures.	Could occur.
Ringtail *Bassaricus astutus*		FP	Riparian forest, chaparral, and rocky hillsides.	Known to occur.

Source: DFG 2005, Friends of Bidwell Park website, BCCWA 1997

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:
FE Federally listed as Endangered
FPD Federally listed as Proposed for Delisting
FT Federally listed as Threatened
FC Federal Candidate for Listing

California Department of Fish and Game (DFG) State Listing Categories:
CE State listed as Endangered
CT State listed as Threatened
CSC California Species of Concern
FP Fully Protected Species

2006. Because of this observed population increase and the concurrent protection and restoration of several thousand acres of riparian habitat suitable for valley elderberry longhorn beetles, the USFWS status review determined that this species is no longer in danger of extinction, and recommended that the species no longer be listed under the ESA. This recommendation is not a guarantee that the species will be delisted, however, because formal changes in the classification of listed species require a separate USFWS rulemaking process distinct from the 5-year review. If valley elderberry longhorn beetles are removed from the ESA list, it will likely be more than a year before this decision is finalized.

Valley elderberry longhorn beetles require blue elderberry shrubs for reproduction and survival and are rarely seen because they spend most of their life cycle as larvae within the stems of the shrubs. Females lay their eggs on the bark; larvae hatch and burrow into the stems. The larval stage may last 2 years, after which the larvae enter the pupal stage and transform into adults. Adults are active (feeding and mating) from March to June (USFWS 1984). It appears that in order to function as habitat for the valley elderberry longhorn beetle, host elderberry shrubs must have stems that are 1.0 inch or greater in diameter at ground level. Use of the plants by the beetle is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just before the pupal stage.

Valley elderberry longhorn beetle has been documented at several locations within the Park, including locations in Middle Park along Big Chico Creek in the vicinity of Horseshoe Lake (CNDDB 2005). However, no parkwide inventory of VELB has been conducted, so elderberry shrubs may exist elsewhere in the Park.

Vernal Pool Fairy Shrimp, Vernal Pool Tadpole Shrimp, and Conservancy Fairy Shrimp

Vernal pool tadpole shrimp (*Lepidurus packardi*) and Conservancy fairy shrimp (*Branchinecta conservatio*) are federally listed as endangered; vernal pool fairy shrimp (*Branchinecta lynchi*) is federally listed as threatened. These are small crustaceans (½ - 2 inches long) that are restricted to vernal pools, swales, and other seasonal pools. Eggs of the species lie dormant during most of the year in the form of cysts, which are capable of withstanding extreme environmental conditions, such as heat, cold, and prolonged desiccation. The cysts hatch when the pools fill with rainwater, and the young rapidly develop into sexually mature adults. Not all of the cysts hatch with the first rainfall; some remain dormant to hatch during subsequent events or in later years.

Generally, vernal pool invertebrates occupy a variety of seasonal aquatic habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. Conservancy fairy shrimp are associated more with highly turbid vernal pools. Vernal pool invertebrates can live in wetlands ranging from small pools several square feet in area to large vernal lakes of more than 50 acres (USFWS 2005). Habitat for vernal pool invertebrates has become highly fragmented and continues to be threatened by conversion to urban and agricultural uses. Almost three-quarters of vernal pool habitat in the Central Valley were estimated to have been lost by 1997 (USFWS 2005). Vernal pool fairy shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp have not been documented in the Park, but the vernal pools present around Horseshoe Lake and on the south rim near the Disc Golf/Trailhead Area provide potentially suitable habitat for this species.

Western Spadefoot

Western Spadefoot (*Spea hammondii*) is a DFG species of special concern. This species occurs in dry shortgrass grassland habitat close to seasonal wetlands such as vernal pools. Although spadefoot populations primarily occur in grassland settings, they occasionally occur in valley-foothill woodlands (Zeiner et al. 1988). Western spadefoots require seasonal wetlands for reproduction and metamorphosis. The specific physical attributes that make such wetlands suitable for spadefoots are not well known, but such attributes probably include ponds with sufficient depth and surface area to persist at least several weeks, submerged vegetation, and possibly a large invertebrate macrofauna to support spadefoot tadpoles, which are sometimes carnivorous (Stebbins 1951, Jennings and Hayes 1994, Morey 1998). Wetlands that sustain spadefoot recruitment generally lack introduced aquatic predators such as centrarchid fishes, mosquitofish, bullfrogs, and crayfish (Jennings and Hayes 1994). Western spadefoot has not been documented in Bidwell Park; however suitable vernal pool habitat occurs there and this species is known from adjacent sites (Shedd 2005).

Northwestern Pond Turtle

Northwestern pond turtle (*Astinemys marmorata marmorata*) is a DFG species of special concern. This species is generally associated with permanent or near-permanent aquatic habitats, such as lakes, ponds, streams, freshwater marshes, and agricultural ditches. They require still or slow-moving water with instream emergent woody debris, rocks, or similar features for basking sites. Pond turtles are highly aquatic but can venture far from water for egg-laying. Nests are typically located on unshaded upland slopes in dry substrates with clay or silt soils (Jennings and Hayes 1994). Pond turtle is known to occur in and near Big Chico Creek, most commonly in the foothills of Upper Park (Shedd 2005).

American Peregrine Falcon

American peregrine falcon (*Falco peregrinus anatum*) is state listed as endangered. This species breeds along the coast and in the mountains of California and is a winter resident of the Central Valley, migrating into the region around September and leaving around April or May. In winter, American peregrine falcons occur in open grasslands, agricultural fields, desert sagebrush flats, and similar open country in low-lying valleys and foothills. They commonly occur in habitats associated with tall cliffs, wide open views, and a nearby water body. Typical

nesting sites include cliffs, ledges, caves, crevices, and small holes. They feed primarily on waterfowl, shorebirds, seabirds and other birds but occasionally feed on mammals, insects, and fish.

The tall cliffs and open woodlands, savannas, and grasslands along with the nearby water source of Big Chico Creek make Upper Bidwell Park excellent habitat for peregrine falcon. During the field survey conducted on March 9, 2005, a peregrine falcon pair was observed copulating on a cliff below the southern ridgetop, adjacent to the Disc Golf/Trailhead Area Concept Plan area in Upper Bidwell Park. During a follow-up survey on May 5, 2005, the pair was observed using the same cliff location consistently.

Bald Eagle

Bald eagle (*Haliaeetus leucocephalus*) is federally listed as threatened and state listed as endangered and is a California fully protected species. It is currently proposed for delisting under the ESA. Bald eagles are typically associated with permanent water bodies (e.g., lakes, reservoirs, rivers) with nearby perching, roosting, and nesting sites such as snags and large rocks. They feed primarily on fish, but will also prey on mammals, water birds, and carrion. Bald eagles have been observed in Bidwell Park, mostly in Upper Park. They are not known to breed in the Park (Johnson, pers. comm., 2006)

Golden Eagle

Golden eagle (*Aquila chrysaetos*) is a California fully protected species and DFG species of special concern. Typical breeding habitat for golden eagles includes steep cliffs and medium to tall trees in open woodland with nearby grasslands for foraging. Outside of the breeding season, golden eagles frequently move into agricultural lands, grasslands, chaparral, sagebrush flats, savannas, desert edges, and montane valleys. They avoid dense coastal and montane coniferous forests. Golden eagles feed primarily on small mammals but also prey on birds and occasionally on large mammals. This species has been observed in Upper Park. They are not known to breed in the Park, but suitable breeding habitat is present in the bluffs of the Tuscan formation (Johnson, pers. comm., 2006), including those in the vicinity of the Disc Golf/Trailhead and Horseshoe Lake areas.

White-tailed Kite

White-tailed kite (Elanus leucurus) is a California fully protected species and a federal species of special concern. White-tailed kites forage in open grasslands, meadows, farmlands, and emergent wetlands. They nest in trees in grasslands, agricultural lands, wetlands, oak woodland, oak savanna, and riparian habitats associated with open areas. Nest sites range from relatively small isolated trees to large woodland patches. This species has been documented in Bidwell Park. It is known to breed in the Bruce Road area outside the Park and possibly in Middle Park (Johnson, pers. comm., 2006)

Northern Harrier

Northern harrier (*Circus cyaneus*) is a DFG species of special concern. Northern harriers frequent grasslands, wetlands, and other open habitats and are seldom found in wooded areas. They nest on the ground in dense, low-lying vegetation, typically in wetland habitats, but also in grasslands and grain fields. Northern harriers are year-round residents in the Central Valley, typically found in marshes and agricultural areas. This species has been observed in open areas in Middle and Upper Park. It is not known to breed in the Park (Johnson, pers. comm., 2006), but suitable habitat is provided by Park grasslands.

Cooper's Hawk

Cooper's hawk (*Accipiter cooperii*) is a DFG species of special concern. Cooper's hawks occur in riparian and other woodland habitats. Though rarely found in areas without at least patchy woodland habitat, Cooper's hawks are known to sometimes hunt in parks and residential areas that support trees. In winter, they also forage in open

fields. This species typically nests in riparian and other woodland habitat, but nests can also be found in isolated groves of trees (City of Sacramento et al. 2003). Cooper's hawk is a year-round resident throughout most of the state, although individuals from more northern areas also migrate into California for the winter. This species has been observed in Bidwell Park, but most likely breeds in the mountain region above the eastern park boundary (Johnson, pers. comm., 2006).

Sharp-shinned Hawk

Sharp-shinned hawk (*Accipiter striatus*) is a DFG species of special concern. The range of this species in California extends throughout the length of the state but breeding populations in California are rare and are apparently restricted to the northern portion of the state. Sharp-shinned hawks are uncommon to fairly common transient and winter visitors to the state from mid-September to mid-April (Small 1994). This species nests in coniferous or mixed forest habitats and typically nests in conifer trees. Foraging habitat includes a variety of coniferous, mixed, or deciduous forest types. Sharp-shinned hawks prey primarily on small birds but also eat rodents and insects. Sharp-shinned hawks have been observed in all sections of Bidwell Park but mostly breed in the mountain regions to the east of the park boundary (Johnson pers. comm., 2006).

Burrowing Owl

Burrowing owl (*Athene cunicularia*) is a DFG species of special concern. Throughout their life cycle, burrowing owls require habitat with three basic attributes: open, well-drained terrain outside areas at risk of flooding; short, sparse vegetation; and underground burrows or burrow facsimiles. Burrowing owls inhabit grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands, and urban vacant lots, as well as the undeveloped margins of airports, golf courses, roads, and railroad beds. Burrowing owls typically occur in habitats with less than 30% tree or shrub cover (DeSante et al. 1996). In California, four community types most frequently occupied by burrowing owls are: grasslands adjacent to intensive agriculture; intensive agriculture where owls nest along irrigation banks; large, unfragmented grasslands; and small grassland and ruderal patches surrounded by and adjacent to urban development (Rosenberg and DeSante 1997, Rosenberg 2003). The proximity of nest sites to suitable foraging habitat is especially important, as burrowing owls tend to forage near their burrows (Gervais et al. 2003).

The most important habitat consideration for burrowing owls is the availability of underground burrows throughout their life cycle. While western burrowing owls nest and roost in these burrows, they do not typically create them. Throughout their range, they use burrows excavated by fossorial mammals or reptiles, including ground squirrels, prairie dogs, badgers, skunks, armadillos, marmots, foxes, coyotes, and tortoises (Karalus and Eckert 1987). In the Central Valley of California, burrowing owl occurrence is closely associated with the presence and abundance of ground squirrel populations. Where the number and availability of natural burrows are limited (e.g., where burrows have been destroyed or ground squirrels eradicated), owls may occupy other natural and unnatural sites such as rock outcrops (Gleason and Johnson 1985, Rich 1986), concrete and asphalt (Trulio 1994), cavities under piles of rubble, drainage culverts, discarded pipe and other tunnel-like structures, and human-made artificial burrows (Collins and Landry 1977).

Burrowing owls have been documented in the Big Chico Creek watershed and are likely to occur in Bidwell Park.

Yellow Warbler, Yellow-Breasted Chat, and Western Yellow-Billed Cuckoo

Yellow warbler (*Dendroica petechia*) and yellow-breasted chat (*Icteria virens*) are both DFG species of special concern. Yellow warblers typically nest in riparian deciduous habitats with small trees and shrubs typical of low, open-canopy riparian woodland (California Department of Fish and Game 1990Zenier et a. 1990). Yellow-breasted chats typically nest in riparian habitats with a dense shrub layer. Both of these species are known to occur in Bidwell Park along Big Chico Creek.

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is state listed as endangered and is a candidate for federal listing. This species requires large patches (25 acres or larger) of mixed old-growth riparian forests composed of willow and cottonwood trees with dense understory (The Nature Conservancy 1997). Foraging occurs in cottonwood trees while nesting occurs almost exclusively in willows. The historic range of this species spanned throughout the state, and cuckoos were widespread and abundant until the early 1900s. It is currently estimated that only 50 to 75 pairs breed in California annually (Small 1994) and these are restricted to the remaining stands of old growth riparian forest. The largest stands of suitable habitat occur along the upper Sacramento River between Red Bluff and Colusa, including portions of Glenn, Sutter, and Butte Counties. Other significant breeding areas occur along the Colorado River in Riverside County and the South Kern River Preserve in Kern County. There are known occurrences in Butte Sink on the Feather River in Sutter and Butte Counties, along the Amargosa River and Baker Creek in Inyo County, and at Mojave Narrows in San Bernardino County (Small 1994). There are no recorded occurrences of this species within Bidwell Park; however suitable habitat is present along Big Chico Creek.

California Black Rail

California black rail (*Laterallus jamaicensis coturniculus*) is state listed as threatened and is a DFG fully protected species. Its historic distribution in California included the San Francisco Bay area; the Sacramento and San Joaquin Deltas and coastal areas south to northern Baja, California; and inland areas of southern California, including the Salton Sea, Riverside and San Bernardino areas, and along the lower Colorado River. In 1994, a black rail population was discovered in the Sierra Nevada foothills in Butte County (Aigner et al. 1995). Surveys conducted since then documented scattered populations in freshwater marshes in Butte, Nevada, Yuba and Placer Counties (Tecklin 2000, J. Tecklin unpublished data). Over its range, California black rail is associated with freshwater, brackish/tidal, and pickleweed salt marsh. Interior foothill populations of black rail use freshwater marshes typically dominated by cattail (*Typha* spp.) or bulrush (*Scirpus* spp.).

Black rail is known to occur in Bidwell Park. In 2006, five black rails were detected in a seep spring marsh above Bear Hole, on the north side of Big Chico Creek (Johnson, pers. comm., 2006).

Loggerhead Shrike

Loggerhead shrike (*Lanius ludovicianus*) is a DFG species of special concern. Loggerhead shrikes occur in dry, open habitats including grasslands, pastures with fence rows, agricultural fields, open woodlands (savannahs), scrub, and riparian areas. Suitable breeding habitat has the following characteristics: 1) short, sparse vegetation; 2) scattered or isolated low trees or large shrubs for nest sites; and 2) available hunting perches with an open view (Yosef 1996, Cade and Woods 1997). Loggerhead shrikes typically avoid completely treeless and shrubless areas (Cade and Woods 1997), and urbanized and densely wooded areas (Grinnell and Miller 1944). Winter foraging habitat is similar to summer breeding ad foraging habitat, however shrikes additionally use idle pastures and hayfields in the winter (Bartgis 1992). In many areas, Loggerhead shrike abundance is correlated with the amount of pastureland and available perches (Gawlik and Bildstein 1993, Yosef 1996). Hunting perches are especially important for Loggerhead shrike foraging (Brooks and Temple 1990, Yosef and Grubb 1994).

This species is known from the areas around the North Rim Trail, Horseshoe Lake and the diversion channel. Loggerhead shrikes likely breed in Bidwell Park (Johnson, pers. com., 2006).

Purple Martin

Purple martin (*Progne subis*) is a California species of special concern. This swallow species is 7 to 8 inches long with a notched or shallowly forked tail and short bill. Males of the species are glossy purplish black while females are duller with grayish undersides. Purple martins are rare to very uncommon summer visitor arriving mid- to late March and departing from August to mid-October. Its range in California extends through the northern and central portions of the state (Small 1994) and discontinuously throughout most of the state. It is extremely rare east of the

Sierra Nevada crest and on the immediate coastal areas south of Sonoma County. Its summer range also includes most of the eastern and Midwestern US.

Purple martins occur in riparian woodlands, oak woodlands, mixed deciduous-coniferous forests, and coniferous forests. This species typically nests in abandoned woodpecker holes and naturally occurring crevices. Although this species is known to nest readily in bird houses and other artificial sites in other parts of the country, there has been little success in introducing purple martins to artificial nesting sites in California. This species has been largely displaced by the introduced European starling. Purple martins feed on insects. Purple martins are not currently known to breed in Butte County, but could fly over the Park in migration (Johnson, pers. Com.).

Oak Titmouse

Oak titmouse (*Baeolophus inornatus*) is a federal species of concern and is generally described as a plain, or drab, brown bird. The range of oak titmouse extends from southwest Oregon through California to northwestern Baja California, Mexico.

Typical habitat for this species is intact, low- to mid-elevation oak or oak-pine woodland with a relatively open tree canopy. Nests are made in naturally occurring tree holes or holes excavated by woodpeckers. They sometimes excavate their own nest holes in soft or rotten wood. They also nest readily in nest boxes or other artificial sites. This species forages in trees and captures insects primarily by gleaning bark but occasionally forages aerially to capture flying insects. Seeds, including acorns, pine nuts, thistles, and poison oak also make up a high proportion of the oak titmouse diet. This species is a known resident of Bidwell Park and was observed in oak during reconnaissance surveys conducted for the BPMMP Update in 2005.

Nuttall's Woodpecker

Nuttall's woodpecker (*Picoides nuttallii*) is a federal species of concern. Nuttall's woodpeckers are small (6 to 8 inches long) with black and white barred backs, wings, and outer tails. They have white undersides with spotted flanks and black and white striped face. The males have a red crown. The species' range extends from southern Oregon to Baja California west of the southern Cascades and the Sierra Nevada.

Oak woodlands are the preferred habitat of this species but they also commonly occur in riparian woodland habitats. They are less commonly found in scrub and chaparral habitats. Nest holes are typically excavated in willow, cottonwood, alder, sycamore, or oak trees and range from 2.5 to 60 feet above ground. Although they prefer to forage in oak woodlands, acorns make up only a small portion of their diet with insects making up the bulk of their diet. This species has been documented in Bidwell Park and was observed during reconnaissance surveys conducted in 2005.

Foothill Yellow-legged Frog

Foothill yellow-legged frog (*Rana boylii*) is a California species of special concern. These are moderately sized frogs that are generally dark to light gray, brown, green, or yellow. The color is highly variable and mottled often with reddish pigments, and rough, tubercled skin (Zweifel 1955; unpubl. data). A light band is present between the eyelids and often appears as a pale triangle between the eyelids and the nose. Undersurfaces of the legs and lower belly are yellow or orange-yellow. The yellow-legged frog occurs in the Coast Ranges from the Oregon border south to the Transverse Range, throughout northern California west of the Cascade crest, and on the west flank of the Sierra south to Kern County.

Habitat requirements of this species include a permanent source of water, preferably shallow flowing water in small to medium sized streams, with rocky substrates and exposed rocks for basking. Adult frogs eat both aquatic and terrestrial invertebrates. This species has been documented along Big Chico Creek in Bidwell Park.

Ringtail

Ringtail (*Bassariscus astutus*) is a Fully Protected Species under the California Fish and Game Code. Ringtails are cat-sized mammals with raccoon-like tails that are flattened and about as long as their bodies. Ringtails are widely distributed common to uncommon permanent residents of California. They occur in mixed riparian and other forest and shrubby habitats in close association with permanent water and rocky areas. They nest in rock crevices, hollow trees, logs, snags, abandoned burrows, or woodrat nests, with young typically born in May and June. They are carnivorous, feeding primarily on rodents and rabbits but also preying on birds, eggs, reptiles, fruits, nuts, insects, and some carrion. Ringtails are known to occur in Upper Park.

Ecologically Significant Wildlife Resources

A resource is considered ecologically significant if it is:

- important to the essential character of the unit, and contributes, in part, to its statewide significance; or
- regionally significant, is an important component of a systemwide plan, or contributes to the persistence of regional or statewide biodiversity; or
- documented as significant on recognized preservation or protection lists or otherwise designated with special status by a recognized authority.

Four other resources at Bidwell Park are considered ecologically significant: the Eastern Tehama Deer Herd, the raptor community, the riparian bird community and neotropical migrant landbirds, and wildlife movement corridors. These resources are discussed below along with associated special-status wildlife species that are state or federally listed as threatened or endangered or that are known to occur in Bidwell Park.

Eastern Tehama Deer Herd

Bidwell Park occurs within the range of the Eastern Tehama Deer Herd. This herd's range includes eastern Tehama, southeastern Shasta, southwestern Lassen, northwestern Plumas, and northern Butte Counties. The Eastern Tehama Deer Herd is comprised primarily of a subspecies of mule deer, the Columbian black-tailed deer (*Odocoileus hemionus columbianus*) (Ramsey 1981). It is the largest migratory herd in California, and its range is considered to be the most extensive in the state (Longhurst et al. 1952).

The Eastern Tehama Deer Herd is an important hunting resource and produces some of the largest mule deer in California (Ramsey 1981). Hunting zones within the range of this herd have traditionally been highly pursued by hunters (California Department of Fish and Game 1998). This herd is of particular economic value to the communities in or near its range (Ramsey 1981). However, the deer population in the Northeast California Deer Assessment Unit (DAU 2), which includes the Eastern Tehama Deer Herd, has declined dramatically in recent years. The population size in DAU 2 declined from approximately 90,000 deer in 1992 to 25,000 deer in 1996. This population decline has resulted in decreased hunter opportunity over this period (California Department of Fish and Game 1998). Causes for this decline are not fully understood, but likely result from habitat changes as brush stands and more open forest stands have been replaced by denser forest. These changes have occurred as a result of long term fire suppression, conversion of brushfields to timber stands, and reduction in clearcut logging.

DFG defined three broad vegetation types that predominate over the herd's range: grass, woodland grass, and ponderosa pine (Ramsey 1981). Winter range consists primarily of the grass type (which includes substantial areas of chaparral and oak woodland); summer and transitional ranges are dominated by the ponderosa pine type (which includes a variety of conifer forest habitats). Migration routes between summer and winter range are the longest such routes in California (Ramsey 1981). Distances between summer and winter range are as long as 100 miles in northwestern Lassen County, and movements exceeding 50 miles are common near Chester, Plumas

County (Ramsey 1981). Migration corridors often follow ridge lines between major west slope Sierra-Cascade drainages. Migration from summer to winter range begins in early September, and most of the herd is on the winter range by mid-October. Spring migration begins around early April. Spring migration is casual, and the timing of deer movements coincides with the availability of forage at succeeding elevations. Most of the herd is on the summer range by early June.

Between October and March, the Big Chico Creek watershed and Bidwell Park provide critically-important migration and wintering habitat for the Eastern Tehama Deer Herd (BCCWA 1997). Migration corridors within the watershed have been documented, and their importance to successful deer migration and survival cannot be overemphasized (BCCWA 1997).

Raptor Community

Raptors are considered ecologically significant as a group because they:

- function at a high trophic level and their populations are typically sensitive to the distribution and local abundance of prey populations;
- represent a wide range of life histories with respect to nesting, foraging, and habitat-use requirements;
- include several species sensitive to habitat disturbance and loss; and
- are generally visible and an important component of a wildlife viewing experience. Also, raptor nests are protected by the California Fish and Game Code.

The extent and mix of grassland, woodland, riparian, and cliff habitats found in Bidwell Park provide important winter, breeding, and migration habitat for a high proportion of the raptor species known to occur over the larger region. These species include great horned owl, red-tailed hawk, ferruginous hawk, Swainson's hawk, red-shouldered hawk, Cooper's hawk, sharp-shinned hawk, American peregrine falcon, American kestrel (*Falco sparverius*), and golden eagle.

Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is state listed as threatened and is a federal species of concern. This species usually nests in large trees, primarily valley oak, cottonwood, and willow. Most nests in the Central Valley are located in remnant riparian habitat along drainages. This is primarily a function of tree availability and not a preference for large riparian stands or the presence of other components of a riparian forest. Swainson's hawks also nest in small groves, roadside trees, and isolated trees. Swainson's hawks generally return to the same area in which they previously nested and often reuse existing nests. They investigate several nest sites within this territory and choose one nest, based on local disturbances, surrounding habitat variables, the proximity of other nesting raptors (e.g., great horned owls, red-tailed hawks), and nest condition. Some pairs may repair several nests before settling on one nest site (Estep 2003).

During the breeding season, Swainson's hawks require suitable foraging habitat in association with suitable nesting habitat. Suitable foraging habitats include field crops (e.g., alfalfa and wheat), fallow fields, grassland, pasture, and some row crops. Recent observations by DFG indicate that rice fields are also used by Swainson's hawks for foraging, particularly where there is vegetation at the perimeter of the fields (City of Sacramento et al. 2003). Agricultural fields provide particularly good foraging habitat during and soon after harvest. Swainson's hawks have been observed foraging behind farm machinery (moving harvester blade or disk) and capturing rodents exposed by ground disturbance. Unsuitable foraging habitats include vineyards, mature orchards, cotton, thistle in fallow fields, and any crop where prey are unavailable due to high vegetation height and density.

The area required for foraging depends on the season and crop cycle, as the species' foraging ranges depend on the dynamics of the agricultural system and how it affects prey abundance and availability. Swainson's hawks' highly active foraging behavior can result in birds traveling as far as 18 miles from a nesting site. Swainson's hawk foraging areas during the breeding season have been estimated at 1,000 acres to almost 7,000 acres (City of Sacramento et al. 2003). In the Central Valley, their primary diet consists of small rodents such as California meadow vole (*Microtus californicus*), or meadow mice. During the summer months, the hawks consume large quantities of insects and eat birds. Swainson's hawks typically occur in California only during the breeding season (March through September) and winter in Mexico and South America, although a small number of individuals have been wintering in the San Francisco Bay–Delta for several years (City of Sacramento et al. 2003). The Central Valley population migrates only as far south as Central Mexico. Swainson's hawks begin to arrive in the Central Valley in March. Nesting territories are usually established by April, with incubation and rearing of young occurring through June. The earliest fledging of young occurs in July and the young remain with the parents for approximately 1 month following fledging, or until the southern migration in early fall (Estep 2003).

Historically, Swainson's hawks nested throughout lowland California, although the current nesting distribution is limited to the Mojave Desert, northeastern California, the Central Valley, and a few isolated locations in the Owens Valley. As many as 17,000 Swainson's hawk pairs may have nested in California at one time (DFG 1994). Currently, there are 700–1000 breeding pairs in California, of which 600–900 are in the Central Valley (Estep 2003). The overall Swainson's hawk population is considered to be declining (DFG 1994), although individuals in the Central Valley appear to have adapted relatively well to certain agricultural patterns in areas where suitable nesting habitat remains (Estep 2003). There are no recorded occurrences of Swainson's hawk in Bidwell Park but suitable habitat is present.

American Peregrine Falcon

American peregrine falcon (*Falco peregrinus anatum*) is state listed as endangered and a federal species of concern. Adult males of the species measures 14 to 16 inches and are generally blue-gray on the upper parts and whitish on the under parts with barring on the legs and belly but unmarked on the breast. The head is generally dark with thick mustache-like markings and white cheek patches. The cere, eye rings, and legs are yellow. Females are larger, measuring 16 to 18 inches, and are similar in color.

This species breeds along the coast and in the mountains of California and is a winter resident of the Central Valley, migrating into the region around September and leaving around April or May. In winter, American peregrine falcons favor open grasslands, agricultural fields, desert sagebrush flats, and similar open country in low-lying valleys and foothills. They commonly occur in habitats associated with tall cliffs, wide open views, and a nearby water body. Typical nesting sites include cliffs, ledges, caves, crevices, and small holes. They feed primarily on waterfowl, shorebirds, seabirds and other birds but occasionally feed on mammals, insects, and fish.

During the field survey conducted on March 9, 2005, a peregrine falcon pair was observed copulating on a cliff below the southern ridge top in Upper Bidwell Park. During a follow-up survey on May 5, 2005, the pair was observed using the same cliff location consistently. The tall cliffs and open woodlands, savannas, and grasslands along with the nearby water source of Big Chico Creek make Upper Bidwell Park ideal habitat for the American peregrine falcon.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is federally listed as threatened and state listed as endangered and is a California fully protected species. It is currently proposed for delisting under the ESA. Adult bald eagles typically measure from 30 to 40 inches in length with wing spans up to 8 feet. This species is distinguished by the white head and tail and dark brown body and wings that are characteristic of adult bald eagles. Juvenile bald eagles, however, do not exhibit this distinctive plumage and rather resemble golden eagles being dark brown with varying degrees of white mottling. Juvenile bald eagles are distinguished from golden eagles by white patches where the

wings meet the body (the wing pits) and diagonal white lines extending outward from the wing pits toward the wing tips.

The breeding range of bald eagles includes the Alaskan coast, southern Canada and the Great Lakes, the eastern coast of the US and Canada, and throughout Florida and the Gulf Coast. In the western US, their breeding range extends from southern Alaska through the Pacific Northwest to Northern California. The bald eagle's winter range includes most of the US including all of California. In California, wintering populations are most numerous in the lakes and marshes of the Klamath Basin (Small 1994).

Bald eagles are typically associated with permanent water bodies (e.g., lakes, reservoirs, rivers) with nearby perching, roosting, and nesting sites such as snags and large rocks. They feed primarily on fish, especially salmon, but will also prey on mammals, water birds, and carrion. Bald eagles have been observed in Bidwell Park, mostly in Upper Park. They are not know to breed in the Park (Johnson, pers. com)

Golden Eagle

The golden eagle (*Aquila chrysaetos*) is a California fully protected species and California species of special concern. Golden eagles are very large, measuring 30 to 40 inches in length with up to 7 foot wing spans. Adults are dark brown with golden buff feathers on the backs of their heads. Juveniles are dark brown with white patches on the wings and at the base of the tail.

Golden eagles are year-round residents throughout California but are rare along the immediate coast, open deserts, flat portions of the Central Valley away from the foothills, along the lower Colorado River, and the Salton Sea. They are extremely rare on the Farallon and Channel Islands. Golden eagles are summer residents from southern and eastern Alaska across northern Canada. They are year-round residents across the western US and western Canada and winter residents of the northeastern and Midwestern US into central Canada.

Typical breeding habitat for golden eagles includes steep cliffs and medium to tall trees in open woodland with nearby grasslands for foraging. Outside of the breeding season, golden eagles frequently move into agricultural lands, grasslands, chaparral, sagebrush flats, savannas, desert edges, and montane valleys. They avoid dense coastal and montane coniferous forests. Golden eagles feed primarily on small mammals but also prey on birds and occasionally on large mammals. This species has been observed in Upper Park. They are not know to breed in the Park, but suitable breeding habitat is present in the bluffs of the Tuscan formation (Johnson, pers. com).

White-tailed Kite

White-tailed kite (*Elanus leucurus*) is a California fully protected species and a federal species of special concern. White-tailed kites forage in open grasslands, meadows, farmlands, and emergent wetlands. They nest in trees in grasslands, agricultural lands, wetlands, oak woodland, oak savanna, and riparian habitats associated with open areas. Nest sites range from relatively small isolated trees to large woodland patches. White-tailed kites are year-round residents in the Central Valley, typically found near agricultural areas (City of Sacramento et al. 2003). This species has been documented in Bidwell Park. It is know to breed in the Bruce Road area outside the Park and possibly in Middle Park (Johnson, pers. com)

Northern Harrier

Northern harrier (*Circus cyaneus*) is a California species of special concern. Northern harriers frequent grasslands, wetlands, and other open habitats and are seldom found in wooded areas. They nest on the ground in dense, low-lying vegetation, typically in wetland habitats, but also in grasslands and grain fields. Northern harriers are year-round residents in the Central Valley, typically found in marshes and agricultural areas. This species has been observed in open areas in Middle and Upper Park. They are not known to breed in the Park (Johnson, pers. com).

Cooper's Hawk

Cooper's hawk (*Accipiter cooperii*) is a California species of special concern. Cooper's hawks frequent riparian and other woodland habitats. Though seldom found in areas without at least patchy woodland habitat, Cooper's hawks are known to sometimes hunt in parks and residential areas that support trees. In winter, they also forage in open fields. This species typically nests in riparian and other woodland habitat, but nests can also be found in isolated groves of trees (City of Sacramento et al. 2003). Cooper's hawk is a year-round resident throughout most of the state, although individuals from more northern areas also migrate into California for the winter. This species has been observed in Bidwell Park, but most likely breeds in the mountain region above the eastern park boundary (Johnson, pers. com.).

Sharp-shinned Hawk

Sharp-shinned hawk (*Accipiter striatus*) is a California species of special concern. These birds are 10 to 14 inches long with rounded wings and a long tail that is notched or square tipped. Adults of this species are blue-gray above and white barred and rusty below. Juveniles are brown with pale spots above and white and brown barred below.

The range of this species in California extends throughout the length of the state but breeding populations in California are rare and are apparently restricted to the northern portion of the state. They are uncommon to fairly common transient and winter visitors to the state from mid-September to mid-April (Small 1994). The summer range of this species extends from southeast Alaska across Canada and its winter range extends across the southern and midwestern US.

This species nests in coniferous or mixed forest habitats and typically nests in conifer trees. Foraging habitat includes a variety of coniferous, mixed, or deciduous forest types. Sharp-shins prey primarily on small birds but also eat rodents and insects. Sharp-shinned hawks have been observed in all sections of Bidwell Park but mostly breed in the mountain regions to the east of the park boundary (Johnson pers. com).

Riparian Bird Communities and Neotropical Migrant Landbirds

Riparian areas provide some of the most important habitat for neotropical migrants that breed in or migrate through the western United States. These areas function as breeding habitat, as well as important stopover areas during spring and fall migration. Riparian habitat degradation and loss may be the most important cause of landbird population declines in western North America (Riparian Habitat Joint Venture [RHJV] 2004). Conservation of neotropical migrants has received considerable attention over the past 15 years due to local and widespread population declines of species within this group (see Hagen and Johnston 1992). The high quality of riparian habitats and diversity of neotropical migrants in Bidwell Park, particularly along Big Chico Creek, indicates the importance of this area to regional avian conservation and management. At least 108 bird species use Bidwell Park either year round or for part of their yearly life cycle (Johnson, per. com.) Special-status bird species that are known to utilize the riparian habitat within Bidwell Park, as well as the federally-listed yellow-billed cuckoo that could potentially occur in riparian habitat within the park, are described below.

Western Yellow-billed Cuckoo

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is state listed as an endangered species and is a candidate for federal listing. The yellow-billed cuckoo 11 to 12 inches long with grayish brown head and back, dark gray lores and auricle region, and white under parts. The tail is gray above and black below with white on the outer edges. This species requires large patches (25 acres or larger) of mixed old-growth riparian forests composed of willow and cottonwood trees with dense understory (The Nature Conservancy 1997). Foraging occurs in cottonwood trees while nesting occurs almost exclusively in willows. This species is a summer resident typically arriving about mid-May and departing early September.

The historic range of this species spanned throughout the state and they were widespread and abundant until the early 1900s. It is currently estimated that only 50 to 75 pairs breed in California annually (Small 1994) and these are restricted to the remaining stands of old growth riparian forest. The largest stands of suitable habitat occur along the upper Sacramento River between Red Bluff and Colusa, including portions of Glenn, Sutter, and Butte Counties. Other significant breeding areas occur along the Colorado River in Riverside County and the South Kern River Preserve in Kern County. There are known occurrences in Butte Sink on the Feather River in Sutter and Butte Counties, along the Armagosa River and Baker Creek in Inyo County at Mojave Narrows in San Bernardino County (Small 1994). There are no recorded occurrences of this species within Bidwell Park but suitable habitat is present along Big Chico Creek.

Yellow Warbler and Yellow-breasted Chat

The yellow warbler (*Dendroica petechia*) and yellow-breasted chat (*Icteria virens*) are both California Species of Special Concern. Yellow warblers typically nest in riparian deciduous habitats with small trees and shrubs typical of low, open-canopy riparian woodland (California Department of Fish and Game 1990). Yellow-breasted chats typically nest in riparian habitats with a dense shrub layer. Both of these species are known to occur in Bidwell Park along Big Chico Creek.

Wildlife Movement Corridors

Bidwell Park is located within a transitional area between montane and valley biotic zones. The Big Chico Creek watershed, and particularly the riparian corridor along Big Chico Creek, functions as a linkage or wildlife movement corridor between higher and lower elevation habitats.

Ecological corridors have been addressed in several conservation biology and landscape planning applications. As landscapes become increasingly fragmented, organisms that occupy remaining patches of suitable habitat may experience a reduction in habitat quality and area, and become at risk to processes that affect small or isolated populations (see Soule 1987, Hanski and Gilpin 1997). These processes may include changes in microclimates, limits to daily or seasonal movements, inbreeding depression, and random demographic or environmental catastrophes. These factors can result in increased mortality or local extinction of populations. Protecting and managing ecological corridors that link core areas of habitat, and facilitate movement or dispersal among habitat patches, has been widely proposed to reduce the adverse effects of habitat fragmentation. By maintaining or increasing connectivity among habitat patches or distinct regions, corridors may play an important role in maintaining population persistence (Petit et al. 1995) and genetic diversity (Hobbs 1992), facilitating recolonization of sites where populations have gone extinct (Wiens 1996), or allowing for traditional seasonal movements within a population's overall range.

Although corridors are widely proposed, few empirical studies conclude that corridors fulfill their function as movement conduits between core areas (see Simberloff and Cox 1987, Rosenberg et al. 1997). However, several studies have demonstrated their effectiveness in particular applications (e.g., Beier 1995, Haddad 1999). Whether protecting corridors are an effective conservation measure would partly depend on their spatial design, the species and landscapes they are planned for, and the management goals directing their implementation.

Traditional migration corridors for the Eastern Tehama Deer Herd within the Big Chico Creek watershed have been documented; and the watershed is recognized as a critical migration corridor for the herd (BCCWA 1997). The extent to which Bidwell Park functions as a movement corridor for other wildlife species is unknown. However, its composition of large, well-connected, and high-quality habitats across biophysical gradients suggest that its potential value in facilitating local and regional wildlife movements is high.