

2.3.2.4 AQUATIC RESOURCES

The primary aquatic resource in Bidwell Park is Big Chico Creek. This section focuses on this important aquatic resource and is divided into three main subsections: These include overview of fisheries and aquatic macroinvertebrates, followed by an analysis of factors affecting the abundance and distribution of aquatic organism in Big Chico Creek. A brief description of Horseshoe Lake is also provided in this section. A description of the physical resources including geology and soils and hydrology and water quality is provided in section 2.3.1, “Physical Resources” and a description of swimming areas is provided in Section 2.4.2, “Recreational Facilities.”

The headwaters of Big Chico Creek originate from the southwest slope of Colby Mountain at an elevation of approximately 6,000 ft and encompass a watershed area of approximately 28 acres. The creek is approximately 45 miles in length, entering the Sacramento River west of the City of Chico at an elevation of approximately 120 ft. Mean precipitation in the watershed ranges from approximately 25 inches in the valley to 80 inches in the headwater region. The unimpaired average annual yield is approximately 54,000 acre-feet. Because of the precipitation gradient, the majority of the flow of Big Chico Creek enters in the upper third of the drainage, making stream size relatively constant thereafter.

Fisheries

Big Chico Creek provides fish spawning, rearing, and/or migratory habitat for a relatively diverse assemblage of native and introduced fish species (Table 2.3.2.4-1). Native species can be separated into anadromous (i.e., species that spawn in fresh water after migrating as adults from marine habitat) and resident species. Native anadromous species that occur in Big Chico Creek include four runs of chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), and Pacific lamprey (*Lampetra tridentata*). Native resident species include Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento splittail (*Pogonichthys macrolepidotus*), Sacramento sucker (*Catostomus occidentalis*), hardhead (*Mylopharodon conocephalus*), California roach (*Lavinia symmetricus*), riffle sculpin (*Cottus gulosus*), and rainbow trout (*Oncorhynchus mykiss*). Introduced species are all resident and include smallmouth bass (*Micropterus dolomieu*), white catfish (*Ameiurus catus*), green sunfish (*Lepomis cyanellus*), brown trout (*Salmo trutta*), and mosquitofish (*Gambusia affinis*).

Special-status Fish Species

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

- ▶ Species listed or proposed for listing as threatened or endangered under ESA or 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
- ▶ Species fully protected in California under the California Fish and Game Code.

Table 2.3.2.4-2 below provides information on special-status fish species known to occur in Big Chico Creek, including the species’ regulatory status and brief description of habitat use. A total of six special-status fish species are known to occur or have potential to occur in Bidwell Park. In some cases, it is an evolutionarily significant unit (ESU) of a fish species, rather than the entire population, that is listed. (An ESU is a distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout. ESU is further described below.) Special-status fish species potentially occurring in the vicinity of Bidwell Park include Central Valley spring-run chinook salmon ESU, Central Valley fall-/late-fall-run chinook salmon ESU, Sacramento River winter-run chinook salmon ESU, Central Valley steelhead ESU, Sacramento splittail, and hardhead. Many of these species are anadromous and spend various life stages in Big Chico Creek. The exceptions are splittail and hardhead, which are resident species.

**Table 2.3.2.4-1
Fish Species Occurring in Big Chico Creek**

Common Name	Scientific Name	Native / Nonnative ¹	Biotic Gradient Zone ²	Status
CATOSTOMIDAE – Sucker Family				
Sacramento sucker	<i>Catostomus occidentalis</i>	N	V, FH	Abundant
CENTRARCHIDAE – Sunfish Family				
Green sunfish	<i>Lepomis cyanellus</i>	NN	V	Common
Smallmouth bass	<i>Micropterus dolomieu</i>	NN	V	Abundant
COTTUAE – Sculpin Family				
Riffle sculpin	<i>Cottus gulosus</i>	N	V, FH	Abundant
CYPRINIDAE – Minnow Family				
Hardhead	<i>Mylopharodon conocephalus</i>	N	V, FH	Abundant
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	N	V	Occasional
Sacramento pikeminnow	<i>Ptychocheilus grandis</i>	N	V, FH	Common
California roach	<i>Lavinia symmetricus</i>	N	FH	Abundant
ICTALURIDE – Catfish Family				
White catfish	<i>Ameiurus catus</i>	NN	V	Occasional
SALMONIDAE – Salmon and Trout Family				
Chinook salmon	<i>Oncorhynchus tshawytscha</i>	N	V, FH	Common
Rainbow trout (includes steelhead)	<i>Oncorhynchus mykiss</i>	N	V, FH, Mt	Abundant (Mt)
Brown trout	<i>Salmo trutta</i>	NN	FH, Mt	Abundant (Mt)
PETROMYZONTIDAE – Lamprey Family				
Pacific lamprey	<i>Lampetra tridentatus</i>	N	V, FH	Common
POECILIEDAE – Livebearer Family				
Mosquitofish	<i>Gambusia affinis</i>	NN	V	Common
Native / Nonnative: N = Native NN = Nonnative Biotic Gradient Zone: V = Valley zone FH = Foothill zone Mt = Mountain zone Status: Abundant = Many observed in each appropriate habitat unit Common = A few observed in each appropriate habitat unit Uncommon = One or two observed in every 10 appropriate habitat units Occasional = Unusual, but has been reported from the creek or is common in the river nearby Source: BCCWA 1997				

Table 2.3.2.4-2 Special-Status Fish Known from or with Potential to Occur in Big Chico Creek																							
Species	Status ¹		Habitat use																				
	Federal	State																					
Chinook salmon – Central Valley spring run <i>Oncorhynchus tshawytscha</i>	T	T	Migration, holding, spawning, and rearing.																				
Chinook salmon – Central Valley fall/late fall run <i>Oncorhynchus tshawytscha</i>	SC	SSC	Migration, holding, spawning, and rearing.																				
Central Valley steelhead <i>Oncorhynchus mykiss</i>	T	--	Migration, holding, spawning, and rearing.																				
Chinook salmon – Sacramento River winter run <i>Oncorhynchus tshawytscha</i>	E	E	Juvenile non-natal rearing habitat.																				
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	DT	SSC	Limited use – rearing and possibly some spawning.																				
Hardhead <i>Mylopharodon conocephalus</i>	--	SSC	General – all life stages																				
¹ Legal Status Definitions <table> <tr> <th colspan="2">Federal</th><th colspan="2">State</th></tr> <tr> <td>E</td><td>Endangered</td><td>E</td><td>Endangered</td></tr> <tr> <td>T</td><td>Threatened</td><td>T</td><td>Threatened</td></tr> <tr> <td>DT</td><td>Delisted from Threatened</td><td>SSC</td><td>Species of Special Concern</td></tr> <tr> <td>SC</td><td>Species of Concern</td><td></td><td></td></tr> </table>				Federal		State		E	Endangered	E	Endangered	T	Threatened	T	Threatened	DT	Delisted from Threatened	SSC	Species of Special Concern	SC	Species of Concern		
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Source: CNDDDB 2005																							

Chinook Salmon

Four runs of Chinook salmon occur in Big Chico Creek, including spring-, fall-/late fall-, and winter-run. The distribution and abundance of each run is limited by the availability of suitable habitat during their respective migration, spawning, and/or rearing seasons. Chinook salmon use Big Chico Creek as a migratory pathway and spawning habitat for adults and as rearing habitat for emigrating juveniles. Under the ESA, an Ecologically Significant Unit (ESU) is considered a population (or group of populations) that is reproductively isolated from other populations of the same species and that contributes substantially to the ecological/genetic diversity of the species (Waples 1991). Different runs of the same salmon species are often considered separate ESUs because the populations are reproductively isolated due to different spawning times.

All chinook salmon require cold freshwater streams with suitable gravel for reproduction. Females deposit their eggs in nests, or “redds,” which they excavate in the gravel bottom in areas of relatively swift water (Moyle 2002). For maximum survival of incubating eggs and larvae, water temperatures must be between 39°F and 57°F. After emerging, chinook salmon fry tend to seek shallow, nearshore habitat with slow water velocities and move to progressively deeper, faster water as they grow (DFG 1998). Freshwater rearing habitat extends from upstream spawning reaches to the Bay-Delta and Suisun Bay (USFWS 1997). Juveniles typically rear in fresh water for up to 5 months before migrating to sea, although spring-run juveniles frequently reside in freshwater habitat for 12–16 months. Chinook salmon spend 2–4 years maturing in the ocean before returning to their natal streams to spawn. All adult chinook salmon die after spawning.

Central Valley spring-run Chinook salmon ESU – Spring-run Chinook salmon are currently listed as threatened under ESA and CESA. The portion of Big Chico Creek within the project study area (along with additional upstream areas) has been proposed as critical habitat for Central Valley spring-run chinook salmon in December 2004; a final rule is expected in 2005. Populations of spring-run Chinook salmon have declined throughout the Central Valley, and, in some places populations are maintained only by hatchery production (Moyle et al. 1989).

In California, the once abundant spring-run has been reduced to small populations in the Klamath, Trinity, and Sacramento-San Joaquin river drainages. Dams constructed in the 1940's and 1950's blocked access to holding areas, causing extinction of local historical populations (Moyle et al. 1989). A few Sacramento River tributaries still support viable natural runs of spring-run Chinook salmon. The most important have been Mill, Deer, and Butte Creeks. The historic run in Big Chico Creek was virtually extinct in the 1980's but appears to be recovering (BCCWA 1997).

Spring-run chinook salmon enter freshwater during late winter through spring, when river flows usually are high due to rain and snowmelt runoff. They typically migrate far upstream to areas where summer temperatures are cool. Adults hold in areas near spawning grounds during the summer months until their eggs fully develop and become ready for spawning. Spring-run Chinook use Big Chico Creek for migrating, summer holding, spawning, and juvenile rearing. Preservation of their habitat was the primary driving force in establishing the Big Chico Creek Ecological Reserve (BCCER) upstream of Bidwell Park (BCCWA 1997).

Central Valley fall-/late fall-run Chinook salmon ESU – The fall-/late fall-run of Chinook salmon is the largest run of Chinook salmon in the upper Sacramento River. The number of fall-run Chinook salmon returning annually to the Sacramento River exceeds that of all other runs combined. However, 20 to 40 percent is estimated to be due to hatchery production (National Marine Fisheries Service 1999).

In general, adult fall-/late fall-run Chinook salmon migrate into the Sacramento River and its tributaries from late summer through December, with a peak immigration occurring from mid-October through November. Adult fall-run chinook salmon may enter the Sacramento River as early as June. Spawning generally occurs from October through December, with fry emergence usually beginning in late December and January.

Fall-run salmon spawn in Big Chico Creek when fall rains raise the flow enough so that they can get upstream. This can be as early as mid-October, but may not occur before December. Fall-run spawn shortly after entering the creek and usually in the lower reaches (BCCWA 1997).

Sacramento River winter-run Chinook salmon ESU – Winter-run Chinook salmon are currently listed as endangered under ESA and CESA. The portion of Big Chico Creek within the project study area (along with additional upstream areas) is designated as critical habitat for winter-run Chinook salmon. Winter-run Chinook salmon generally only use Big Chico Creek as non-natal rearing habitat (Maslin et al. 1997 and 1998).

Central Valley Steelhead ESU

Central Valley steelhead are currently listed as threatened under ESA. The portion of Big Chico Creek within the project study area (along with additional upstream areas) has been proposed as critical habitat for Central Valley steelhead in December 2004; a final rule is expected in 2005. Steelhead (an anadromous variant of the rainbow trout) are closely related to Pacific salmon. Steelhead were once abundant in California coastal and Central Valley drainages from the Mexican to Oregon borders. Population numbers have declined significantly in recent history, especially in the tributaries of the Sacramento River. Unlike other Pacific salmon, steelhead are capable of spawning more than once before they die. Steelhead spawning season typically extends from December through April. After several months, fry emerge from the gravel and begin to feed. Juveniles rear in fresh water from one to four years (usually two), then migrate to the ocean as smolts. The period of emigration for steelhead juveniles varies, with the peak in January and February.

Steelhead migrate into Big Chico Creek between October and January. They usually spawn from Upper Bidwell Park to Higgin's Hole, but may spawn in the lower reaches during low-flow years (BCCWA 1997). Rainbow trout are very common in the foothill and mountain zones of Big Chico Creek. Some or even most of them may be steelhead, but the two are not easily differentiated.

Sacramento Splittail

Sacramento splittail were federally delisted from threatened status in 2003 and are state listed as a species of special concern. Sacramento splittail were historically widely distributed throughout much of the Central Valley, but dams and diversions have prevented them from reaching many upstream reaches, and the current population is concentrated in the Bay-Delta region. Recent data indicate that splittail occur in the Sacramento River as far upstream as the Red Bluff Diversion Dam (RM 240) (Sommer et al. 1997; Maslin et al. 1997), and that some adults spend the summer in the main stem Sacramento River rather than return to the estuary (Baxter 1999). Several adults were observed in Mud Creek and Kusal Slough in 1996 and 1997 (Maslin et al. 1997). The distribution and extent of spawning and rearing along the main stem Sacramento River is unknown. Splittail spawn over flooded terrestrial or aquatic vegetation (Moyle 2002; Wang 1986) in early March and May in the lower reaches of the Sacramento River (Moyle et al. 1989). Spawning has been observed as early as January and continues through July (Wang 1986). Larval splittail are commonly found in the shallow, vegetated areas where spawning occurs. Larvae eventually move into deeper open water habitats as they grow and become juveniles. Riparian vegetation in the study area that is prone to flooding provides potential splittail spawning and rearing habitat. Splittail have the potential to occur in Big Chico Creek.

Hardhead

Hardhead are state listed as a species of special concern. Hardhead are large (to 20 inches) torpedo-shaped minnows with a bluish tint to the dorsal surface. Hardhead occur mostly in large, undisturbed low- to mid-elevation rivers and streams (Moyle 2002). They are widely distributed throughout the Sacramento-San Joaquin River system. According to the limited literature, young hardheads eat invertebrates while larger ones feed on filamentous algae and submerged aquatic plants. Hardheads mature sexually following their third year. Hardhead are abundant downstream of the Iron Canyon Fish Ladder and were formerly the most abundant larger fish within the BCCER (BCCWA 1997). They were eliminated above the fish ladder by the 1986 rotenone treatment (see below for additional explanation) and have never recolonized (BCCWA 1997 and Maslin 1997a).

Other Native Fish Species

Pacific Lamprey

The anadromous Pacific lamprey is relatively common in Big Chico Creek. Little scientific data has been collected regarding the ecology of Pacific lamprey within California. Lampreys migrate nocturnally and are less limited by dams and waterfalls than are typical fish. Lampreys spawn in Big Chico Creek in March through May. The lamprey juvenile is a true larval form, having neither eyes nor teeth. They remain burrowed into sandy or silty backwater areas where they filter-feed on detritus. After about six years in this life stage, they metamorphose into a free-swimming, parasitic form (with eyes and teeth) that migrates to the ocean. Larval lampreys have been very common in Big Chico Creek but seem less common in recent years (BCCWA 1997).

Sacramento Pikeminnow

Sacramento pikeminnow, formerly known as squawfish, are very large slender minnows with large mouths. While specimens in the Sacramento River may get to 50 inches, they would not be expected to exceed 20 inches in smaller streams except in the lower reaches of tributaries where large fish migrate in for spawning in March. According to literature, juveniles feed on invertebrates, while individuals over 10 inches prefer small fish. Pikeminnow usually do not become sexually mature until their fourth year. Pikeminnow were eliminated from the BCCER area (above Bidwell Park) by the 1986 rotenone treatment (BCCWA 1997 and Maslin 1997a). A few juveniles have been observed since, but a viable population has not been re-established (BCCWA 1997).

California Roach

California roach are small (under 5 inches) minnows that mature at one year and seldom live more than two years. They generally do well in the lower elevation perennial portions of local streams including sections which dwindle to seasonal pools. They feed on invertebrates and filamentous algae and are believed to be an important primary food source for kingfishers, mergansers, and green-backed herons in the BCCER area above the Park (BCCWA 1997).

Sacramento Sucker

Sacramento suckers are a component of almost all local streams. Suckers use their specialized mouths to scrape epilithon and associated aquatic insects from the substratum. Like the hardhead and squawfish, suckers usually don't spawn until four years old.

Riffle Sculpin

Riffle sculpins are "lie-in-wait" predators of high gradient streams. They wait quietly under rocks for prey to move near enough, grabbing anything that moves and will fit into their ample mouths. Because they are small (under 6 inches) they often get preyed upon themselves, but their cryptic habits provide enough protection for them to co-exist with larger predators like smallmouth bass and rainbow trout (BCCWA 1997). Sculpins spawn under rocks; the male defends a cavity and the female attaches the eggs to the roof overhead. Sculpin populations are currently found in Big Chico Creek.

Nonnative Fish Species

Green Sunfish

Green sunfish, introduced from the Mississippi drainage, have become common inhabitants of California Central Valley streams with intermittent pools, often to the detriment of native fish through competition and predation. Green sunfish become sexually mature at one year of age (BCCWA 1997).

Smallmouth Bass

Within the Centrarchidae, smallmouths are the best adapted to streams. They have become the dominant predators in most low-gradient segments of tributaries to the Sacramento River including Big Chico Creek. Smallmouths hunt by ambush or slow stalking and will eat any animal that fits into their mouths, including fish nearly as large as themselves. They have eliminated or severely depleted populations of native fish in many local areas. Smallmouths typically mature in their second year (BCCWA 1997).

Brown Trout

Brown trout were introduced from Eurasia. In the upper foothill and mountain zones of Big Chico Creek they have become the dominant trout species, and have completely replaced the native rainbows in the headwaters (BCCWA 1997).

Aquatic Habitat

Fish species use habitats within Big Chico Creek for a number of functions including, but not limited to:

- ▶ adult and juvenile foraging;
- ▶ spawning;
- ▶ egg incubation and larval development;

- ▶ juvenile nursery areas; and
- ▶ migratory corridors.

Species use of aquatic habitats for any of these functions may vary in response to a suite of factors, and many of these factors may vary daily, seasonally, and/or annually.

The Big Chico Creek aquatic environment is dynamic, varying in response to factors such as physical geomorphic changes, the magnitude of flow from the headwaters and tributaries, water diversions, seasonal variation in water temperatures, and a variety of other physical and biological processes. The habitat use and functions of areas within and along the creek gradient vary in response to these physical factors as well as to differences in life history characteristics, habitat requirements, and native-nonnative interactions (e.g., predation and competition) for the variety of fish and aquatic macroinvertebrates inhabiting the creek.

Biotic Gradient Zones

The following description of the biotic gradient zones of Big Chico Creek was taken from the Big Chico Creek Watershed Project, Existing Conditions Report (BCCWA 1997).

Like most streams, Big Chico Creek shows a biotic gradient from source to mouth. This gradient can be broken into three zones based largely on fish populations. Boundaries to the zones are formed partly by physiological limitations of the aquatic organisms but mostly by physical geological barriers. As Big Chico Creek carved its canyon, it cut down through tilted layers of rock to its present gradient. The harder layers, being less readily eroded, formed narrow canyons with rapids or waterfalls which tend to act as filters to upstream movement of aquatic organisms. The most downstream filter occurs where the creek crosses the Lovejoy basalt between Bear Hole and Brown's Hole in Upper Park. In this stretch, known as Iron Canyon, the valley narrows abruptly and the stream gradient increases. At its upper end, where the basalt is undercut, mass wasting has brought huge boulders into a jumble in the creek bed. This jumble of boulders acts as an impassable barrier to upstream movement of fish during normal creek flows. Under conditions of high flow, water fills in around the boulders and Iron Canyon may not be a barrier. Steelhead, moving upstream between November and February, can usually pass the barrier. Spring-run Chinook salmon, pikeminnow, hardheads, and suckers, which migrate in March and April, are less likely to pass it most years. Smallmouth bass, which are inactive during the cold months, would likely never be expected to pass. A fish ladder, constructed in the forties, was repaired in the summer of 1993 and requires continual upkeep and additional repairs/improvements to maintain function. Even with the ladder maintained, sections of Iron Canyon remain impassable at base flow.

The next barrier begins at Higgin's Hole (about 984 ft upstream of Ponderosa Way) where the creek begins carving harder metamorphic rock. Again, the canyon narrows with big boulders, bedrock potholes, and waterfalls. In very unusual years when migration corresponded exactly with high flow, salmon or steelhead may get through this canyon to the waterfall at Bear Lake, but other fish species would not be expected to negotiate the barrier. The physical barriers divide Big Chico Creek into an upper (mountain) zone from the headwaters to Higgin's Hole (above Bidwell Park), a middle (foothill) zone between Higgin's hole and Iron Canyon (includes Upper and upper portion of Middle Park), and a lower (valley) zone between Iron Canyon and the Sacramento River (includes lower portion of Middle and Lower Park).

Mountain Zone

The mountain zone, located upstream of Bidwell Park, of Big Chico Creek supports only resident rainbow and brown trout; at its lower end the two are more or less co-dominant, but brown trout gradually becomes more dominant in an upstream direction and is the only fish species in small headwater tributaries. The two species are very similar in habitat requirements, but brown trout generally outcompete and prey upon rainbows. Brown trout spawn in the fall while rainbows spawn in early spring. The older (larger) young-of-the-year browns typically control the best feeding stations. Over a series of years with no major winter floods, browns gradually become

more and more prevalent. However, in years with winter floods (e.g., 96–97 and 97–98), brown trout reproduction can fail because eggs and fry are scoured out resulting in rainbow trout numbers increasing because of the reduced predation/competition. In the headwaters where the streams are spring fed and/or most precipitation falls as snow, winter floods aren't severe and browns have become the dominant species (Maslin 1997b).

Foothill Zone

The foothill zone, which includes portions of Upper and Middle Bidwell Park, was historically dominated by native migratory fish including three anadromous species, spring-run Chinook salmon, steelhead trout, and Pacific lamprey. In a September 1980 letter to the Army Corps former Game Warden Gene Mercer stated that good populations of salmon and steelhead trout were found in Big Chico Creek when he was transferred to Chico in 1938. In the same letter, he also stated that in 1938 and for many years after there were runs of steelhead and some salmon in Rock and Mud Creeks. Other long-time local residents have made similar statements. Only scattered anecdotes of people catching or observing steelhead and lampreys exist. DFG has planted both spring-run Chinook and steelhead trout in Big Chico Creek on a casual basis at least as far back as 1959. In the 1980s, DFG began making attempts to count adult spring-run Chinook and sporadic attempts to trap down-migrant juveniles. By then, populations of spring-run Chinook and steelhead trout were extremely low and continuing sporadic hatchery plantings made evaluation of the sustainability of populations difficult.

Electrofishing samples by DFG biologists in 1983 and 1984 demonstrated large populations of Sacramento sucker, hardhead, California roach, Pacific lamprey, and riffle sculpins. Also found were modest populations of Sacramento squawfish, low populations of rainbow trout (probably steelhead), and a few brown trout in the foothill zone of Big Chico Creek. The July–September timing of the sampling precluded finding salmon. In October 1986, DFG used the fish toxicant, rotenone to kill all fish in the foothill zone of Big Chico Creek. Subsequent to the pesticide treatment, excess fry from the Feather River Hatchery were planted at Ponderosa Way to try to re-establish populations of anadromous salmonids. Each spring from 1987 to 1992, 100,000 to 500,000 spring-run Chinook salmon fry were planted. In years 1987, 1988, and 1990, 50,000 to 100,000 steelhead fry were planted. Although surveys by DFG were not consistently done, lay observers noted that few, if any, of the planted fish returned to Big Chico Creek to spawn.

Populations of both rainbow and brown trout have increased in the foothill zone since the rotenone treatment, especially in the lower end. It is uncertain whether the rainbows are sea-run (steelhead) or resident fish, but their slightly lower growth rate relative to steelhead juveniles suggests they may be mostly resident fish (Maslin 1997a).

Re-establishment of native non-salmonid fish populations in the Big Chico Creek foothill zone has been slow. While all the other original species have been observed in the zone, hardheads, squawfish and suckers are scarce and the riffle sculpin has rebuilt its population only in the upper part of the zone. Only the California roach, with its high fecundity and short generation time, has re-established populations equal or above those present before treatment (Maslin 1997a).

The inability of resident populations of Sacramento sucker, Sacramento squawfish, and hardhead to rebuild after the rotenone treatment in the foothill zone of Big Chico Creek suggests that maintenance of foothill populations may depend on migration from downstream or even from the Sacramento River. These species can be highly migratory, often moving in mixed groups from pool to pool for nearly a mile (Grant 1992).

Valley Zone

The valley zones of Big Chico Creek in winter are utilized by Chinook salmon and steelhead for spawning and/or rearing. The warm water-loving minnows and smallmouth bass are relatively dormant in winter, resting under cover such as cut-banks and root wads. Fall- and late-fall-run Chinook salmon spawn in the valley zone, typically between November and February. Historically, salmon have rarely migrated up Big Chico Creek before

Thanksgiving, and valley reaches of the creeks are seldom cold enough for them to spawn successfully before that time.

In winter and early spring, juvenile Chinook salmon of all races move from the Sacramento River where they were spawned into the tributaries for rearing (Maslin et al. 1998). Some move upstream substantial distances (to Hicks Lane in Mud Creek; to Highway 99 in Rock Creek), although they are more numerous closer to the river. Maslin et al. (1998), estimated that around 50,000 juvenile Chinook salmon from the Sacramento River rear in the watershed. This number includes about 10,000 of the federally listed winter-run salmon race. Juvenile Chinook salmon rearing in the tributaries have been documented to grow faster and are in better condition than those remaining in the river, but in dry years they may become trapped. Spring-run juvenile Chinook, spawned in the foothill zone of Big Chico Creek, often move as fry down to the warmer and less turbulent valley zone where they rear to smolt size. Big Chico Creek spawned juvenile Chinook also move into Mud and Rock Creeks for rearing (Maslin et al. 1997; Maslin et al. 1998).

In summer, the valley zone of Big Chico Creek is generally too warm for salmonids and supports native suckers, hardheads, squawfish, and sculpins as well as the nonnative smallmouth bass and green sunfish. Smallmouth bass are abundant in the valley reach of Big Chico Creek. The predatory smallmouth bass eliminates the smaller California roach (found in valley reaches of many local streams) although the cryptic riffle sculpin, with its classic camouflage and habit of hiding, manages to coexist. In a series of drought years, smallmouth bass and green sunfish become more dominant and may consume nearly all young-of-the-year suckers and minnows during the summer. They likely also consume many juvenile salmon, particularly in late spring. However, in years with high winter flows most green sunfish and many smallmouth bass are pushed out of the streams due to high water velocities. When several high flow years occur sequentially, it is particularly hard on the smallmouth bass. They spawn later due to delayed warming of the higher flows and consequently the young-of-the-year fish are smaller next winter and less able to withstand those high flows. As a result, the exotic smallmouth is a severe problem for native species during dry years and only a minor nuisance after a series of wet winters (Maslin 1997a).

Many Sacramento River fish use the lower reaches of Big Chico Creek (including Lindo Channel) as spawning and rearing habitat in spring. They usually migrate back to the Sacramento River before the seasonal creeks dry up, but sometimes become trapped, serving as a bonanza for egrets, herons, and raccoons. Seasonal stream reaches seem to be preferred over permanent water reaches for spawning and rearing, perhaps because they warm earlier in the season or because they don't support resident populations of predators. Adult suckers, squawfish, and hardheads all migrate from the river into tributaries to spawn. Most spawn in the valley zone, although some move all the way into the foothill zone. Some, particularly the late-spawning hardheads, will remain in the tributary over summer and return to the river when the creek comes up again in fall.

Sensitive Habitats

Sensitive aquatic habitats include those that are of special concern to resource agencies or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, Section 404 of the CWA, ESA (critical habitat designations), and the Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat), as discussed further in Appendix I, Regulatory Context. Sensitive habitats are of special concern because they are of high value to plants, wildlife, and fish species and have high potential to support special-status species. Sensitive habitats also provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality.

Critical Habitat

Section 3(5)(A) of the ESA defines critical habitat as “the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and

specific areas outside the geographical area occupied by the species at the time it is listed that are determined by the Secretary to be essential for the conservation of the species.”

In determining what areas are critical habitat, regulations in 50 CFR 424.12(b) require that National Oceanic and Atmospheric Administration (NOAA Fisheries) must “consider those physical or biological features that are essential to the conservation of a given species including space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of a species.” The regulations further direct NOAA Fisheries to “focus on the principal biological or physical constituent elements that are essential to the conservation of the species,” and specify that the “known primary constituent elements shall be listed with the critical habitat description.” The regulations identify primary constituent elements (PCE) as including, but not limited to: “roost sites, nesting grounds, spawning sites, feeding sites, seasonal wetland or dryland, water quality or quantity, host species or plant pollinator, geological formation, vegetation type, tide, and specific soil types.” An area must contain one or more PCEs at the time the species is listed to be eligible for designation as critical habitat; an area lacking a PCE may not be designated in the hope it will acquire one or more PCEs in the future.

The PCEs identified in the proposed and designated critical habitat for salmon and steelhead in California include sites essential to support one or more life stages of the ESU(s) (sites for spawning, rearing, migration and foraging). These sites in turn are said to contain physical or biological features essential to the conservation of the ESU(s) (for example, spawning gravels, water quality and quantity, side channels, forage species).

Big Chico Creek serves as a migration corridor and provides spawning, holding, and rearing habitat for anadromous salmonids, which have been listed for protection under the California and/or federal ESA. As explained above, listed salmonids that occur seasonally in Big Chico Creek include spring-run Chinook salmon, winter-run Chinook salmon, and steelhead trout. Big Chico Creek is designated as critical habitat by NOAA Fisheries for winter-run Chinook salmon and a designation for spring-run Chinook salmon and steelhead was proposed in December of 2004.

Essential Fish Habitat

Portions of Big Chico Creek have also been designated as Essential Fish Habitat (EFH) by the Pacific Fisheries Management Council (PFMC) to protect and enhance habitat for coastal marine fish and macroinvertebrate species that support commercial fisheries. EFH is defined as waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. Under the Pacific Coast salmon fisheries management plan (Pacific Fishery Management Council 2003), Big Chico Creek, including portions within the study area, has been designated as EFH for spring- (migration, holding, spawning, and rearing), fall- (migration, holding, spawning, and rearing), late fall- (migration, holding, spawning, and rearing), and winter-run chinook salmon (nonnatal rearing).

Shaded Riverine Aquatic Habitat

While not considered a specific sensitive habitat per se, shaded riverine aquatic (SRA) vegetation and instream tree and shrub debris provide important fish habitat. SRA habitat is defined as the nearshore aquatic habitat occurring at the interface between a river and adjacent woody riparian habitat. The principal attributes of this cover type are: (1) an adjacent bank composed of natural, eroding substrates supporting riparian vegetation that either overhang or protrude into the water; and (2) water that contains variable amounts of woody debris, such as leaves, logs, branches, and roots and has variable depths, velocities, and currents. Riparian habitat provides structure (through SRA habitat) and food for fish species. Shade decreases water temperatures, while low overhanging branches can provide sources of food by attracting terrestrial insects. As riparian areas mature, the vegetation sloughs off into the rivers, creating structurally complex habitat consisting of large woody debris

(LWD) that furnishes refugia from predators, creates higher water velocities, and provides habitat for aquatic invertebrates. For these reasons, many fish species are attracted to SRA habitat. With the exception of canyon areas, important SRA habitat exists throughout Big Chico Creek.

Aquatic Macroinvertebrates

Aquatic macroinvertebrates are common and important inhabitants of Big Chico Creek. Insects are the main types typically present and commonly include mayflies (*Ephemeroptera*), stoneflies (*Plecoptera*), caddisflies (*Trichoptera*), and true flies (*Diptera*). Common non-insect invertebrates include snails, leeches, worms, and scuds (Herbst 2001). Most aquatic invertebrates can move over land or through the air during part of their life cycle, so are not restricted by barriers to specific zones. Instead, they are found wherever the habitat is suitable with feeding behavior playing an important role in habitat requirements. In general, increased densities of stoneflies, mayflies, caddisflies, and blackflies are found in colder, swifter, upstream areas, and more dragonflies, damselflies, beetles, bugs, midges, and mollusks are found in the warmer, lower-gradient areas. To some extent, the separation shifts downstream in winter, particularly for species with a short life cycle.

Interactions among aquatic invertebrates and their food resources vary among functional groups. Five functional groups are frequently identified based on feeding behavior: scrapers, shredders, collectors, filterers, and predators.

- ▶ Scrapers are animals adapted to graze or scrape materials (periphyton, or attached algae, and its associated microbiota) from mineral and organic substrates;
- ▶ Shredders are organisms that comminute primarily large pieces of decomposing vascular plant tissue (>0.03 inch diameter) along with the associated microflora and fauna, feed directly on living vascular macrophytes, or gouge decomposing wood;
- ▶ Collectors are animals that feed primarily on fine particulate organic matter (FPOM; <0.03 inch diameter) deposited in streams;
- ▶ Filterers are animals with specialized anatomical structures (e.g., setae, mouth brushes, fans, etc.) or silk and silk-like secretions that act as sieves to remove particulate matter from suspension; and
- ▶ Predators are organisms that feed primarily on animal tissue by either engulfing their prey or piercing prey and sucking body contents.

Aquatic invertebrates are essential to the proper ecological function of all types of aquatic systems. Many aquatic invertebrates exploit the physical characteristics of aquatic ecosystems to obtain their foods. As consumers at intermediate trophic levels, aquatic invertebrates are influenced by both bottom-up and top-down forces in streams and serve as the conduits by which these effects are propagated. Aquatic invertebrates can have an important influence on nutrient cycles, primary productivity, decomposition, and translocation of materials. Aquatic invertebrates constitute an important source of food for numerous fish, and unless outside energy subsidies are greater than in-stream food resources for fish, effective fisheries management must account for fish-invertebrate linkages and invertebrate linkages with resources and habitats.

Aquatic Ecosystem Monitoring and Bioassessment

Aquatic invertebrates serve as valuable indicators of stream health. Each aquatic invertebrate species has a different tolerance level to degradation. Some species have narrow and specific habitat requirements and are therefore restricted to certain habitat conditions, while others can survive in a wide variety of habitat conditions (Erman 1996). It is possible to use different invertebrate species and assemblages as indicators of water quality and habitat conditions (Herbst 2001).

Aquatic invertebrates have been shown to be sensitive and informative indicators of stream ecosystem health and water quality and have been used for many decades to monitor impacts on aquatic and terrestrial habitats (bioassessment). The principal behind bioassessment is to determine the biological integrity of an impacted site by comparing its biotic community to that of a known unimpacted or reference site. Aquatic invertebrates are becoming a critical component of bioassessment because they are more diverse and ubiquitous and abundant than fish and because these organisms are in contact with both the water and bottom substrate in streams. Aquatic invertebrate studies have contributed to an understanding and assessment of stream ecosystem health as related to land-use activities. Surveys of aquatic invertebrates in Big Chico Creek are on-going as part of a bioassessment monitoring program. Data generated during these surveys are analyzed using biological metrics that are commonly used in bioassessment procedures. Biological metrics used in bioassessment procedures include taxa richness measures, species composition measures, tolerance/intolerance measures, and functional feeding groups.

Aquatic Macroinvertebrate Distribution in Big Chico Creek

Big Chico Creek provides habitat to a diverse population of aquatic macroinvertebrates including insects and non-insects from 15 orders (Table 2.3.2.4-3) (BCCWA 1997).

Table 2.3.2.4-3 Aquatic Invertebrates Observed in Big Chico Creek	
Order	Name
<i>Ephemeroptera</i>	Mayflies
<i>Plecoptera</i>	Stoneflies
<i>Trichoptera</i>	Caddisflies
<i>Megaloptera</i>	Dobsonflies And Alderflies
<i>Lepidoptera</i>	Butterflies And Moths
<i>Coleoptera</i>	Beetles
<i>Diptera</i>	True Flies
<i>Odonata</i>	Damselflies
<i>Decapoda</i>	Shrimps, Lobsters, Crabs, Hermit Crab
<i>Oligochaeta</i>	Aquatic Worms
<i>Tricladia</i>	Flat Worms
<i>Hydracarina</i>	Water Mites
<i>Mesogastropoda</i>	Mollusk
<i>Lymnophila</i>	Mollusk
<i>Unionoida</i>	Freshwater Mussel
<i>Veneroida</i>	Venus Clam
Source: BCCWA 1997; Maslin 1997b	

Factors Affecting Abundance and Distribution of Aquatic Organisms in Big Chico Creek

As explained above, fish and aquatic invertebrate communities in aquatic ecosystems are determined by several factors. The size and composition of a community is governed by habitat type, quantity, and quality, historical events of geomorphic change and evolution, natural invasion, geographic isolation and breakdown, and human introductions and manipulations. The number and kinds of species can be attributed to several ecological mechanisms: dispersal, physiological tolerances, biological interactions among species, and environmental disturbances. Typically biological interactions (e.g., predation and competition) are important community structuring agents in physically stable and complex aquatic systems, whereas the ability to disperse and colonize may be more important in aquatic environments subject to harsh recurrent disturbances (Schloser 1987). Species

distribution across varying habitat types is typically attributed to specific habitat requirements and morphological characteristics. Several aquatic and riparian limiting factors have been identified by professionals and watershed residents (BCCWA 1997). A summary of limiting factors limiting factors is provided below.

Habitat Alterations

Streamflow patterns in particular play a significant role in determining the characteristics of all other stream habitat factors. Streamflow patterns are important in driving geomorphic processes that in turn create, maintain, and/or change aquatic habitats. Pool, riffle, and run habitat types and substrate composition are directly influenced by fluvial geomorphic processes and associated streamflow patterns. Streamflow patterns also dictate the abundance and types of organisms present in a system. Both the flow needs for sustaining fisheries and other aquatic life, and the amount, timing and variability of flow are important in relation to the overall ecosystem function. Salmonids such as Chinook salmon and steelhead trout require sufficient flows (and associated temperature) to queue spawning and to allow passage and provide spawning habitat. Eggs require sufficient flows during the incubation period to prevent egg exposure to desiccation, and to provide necessary water quality and temperature conditions. Rearing juveniles and resident adults both require flows necessary to maintain suitable water temperatures and dissolved oxygen concentrations.

Flow Control Structures

Several flow control structures have been constructed along Big Chico Creek for flood control purposes. These flow control structures have resulted in alterations to streamflow patterns, associated geomorphic processes, and subsequent habitat quality and quantity. Two of the primary flow control structures located in the Park are explained below.

Five-Mile Area Flow Control Structure

Flows at the Five-Mile Area Flow Control Structure are regulated for flood control by diversion of high flows from a single stilling basin into Big Chico Creek and two bypass channels: Lindo Channel and the Sycamore Creek Bypass Channel. The Five-Mile flood control system is designed to create a pool in the stilling basin thereby allowing controlled flows through the Big Chico Creek and Lindo Channel flow control structures and the Sycamore Bypass Channel. During high flow periods Big Chico Creek exits the narrow foothill canyon at very high velocities carrying a large bedload until it encounters the Five-Mile Area stilling basin. Velocity and bedload mobilizing capacity is significantly reduced, allowing for the larger, entrained sediment to quickly fall out of the water column depositing the large gravel just upstream of the Five-Mile Area Flow Control Structures. During the next high flow period the previously deposited gravels flow in the direction of least resistance, bypassing Big Chico Creek proper and flowing down Lindo Channel or Sycamore Bypass instead (BCCWA 1997). Effects of the Five-Mile Area Flow Control Structure on aquatic habitat are as follows:

- ▶ Lindo Channel, maintained primarily as a floodway, lacks sufficient riparian vegetation to maintain stream structure, provide shade to moderate temperatures, and provide input of terrestrial food for fish.
- ▶ Gravel recruitment downstream of the Five-Mile flood diversion complex is reduced, perhaps impacting spawning by fall-run salmon.
- ▶ Extreme flows sent down Mud Creek from Big Chico Creek via the Sycamore Bypass scour out gravel, reducing potential spawning habitat for fall-run Chinook salmon, suckers, squawfish, and hardheads.
- ▶ Early de-watering of Lindo Channel in dry years may strand anadromous and resident juvenile fish, tadpoles of western toads, and many aquatic insects. The resultant failure of emergence of adult insects reduces redistribution and the food supply for insectivorous fish, riparian bats, and fly catching birds. This de-watering is caused by diversion of low-flow due to buildup of gravel in the Five-Mile area just upstream of

the Big Chico weir. The problem becomes severe when gravel removal is neglected. By contrast, increase in flow down Lindo Channel reduces the volume flowing via the Big Chico Creek channel, reducing habitat volume and permitting more temperature fluctuation, thereby degrading conditions for salmonids. While some sort of optimal flow split may be possible, there will never be enough flow to maintain “live” streams in both channels in summer. DFG required Big Chico to be the main channel; historically, Lindo Channel has always been a flow channel only during times of sufficient flow.

One-Mile Area Flow Control Structure (Sycamore Pool)

The flow control structure at the One-Mile Recreation Area (also known as Sycamore Pool) was constructed within Big Chico Creek in 1929. It consists of a 500-foot long in-stream, flow-through swimming pool (Sycamore Pool) with a flashboard dam. The dam is fitted on the north side with a concrete-step pool/flashboard fish ladder that DFG found to be adequate for year round fish passage. The One-Mile Area flashboard dam lies on a concrete apron and is formed by an angle iron frame holding removable timber flashboards. From the week before Memorial Day to the week after Labor Day, a flashboard dam that raises the water for the swim season is installed. After Labor Day, a lower dam is installed in anticipation of high winter flows. During high flow periods pooling of water behind the One-Mile channel restriction occurs and allows entrained/suspended sediment to drop out of the water column. However, with a portion of the bedload and suspended sediment having already been deposited at the Five-Mile Area, a reduced amount of gravel to cobble-sized sediment are deposited at the One-Mile Area. The city of Chico’s current maintenance practices include cleaning out sediment and debris at the start of the summer season, setting up the high flashboard dam, and performing weekly cleaning. In the past, the DFG and RWQCB raised concerns over the city’s spring-cleaning practices, which result in notable discharges of suspended sediment and organic debris (Mitchell Swanson and Associates 1994). In 1997, the City of Chico designed and installed a box culvert beneath the Sycamore Pool to decrease downstream turbidity from pool cleaning activities (BCCWA 1997). Additional effects of the One-Mile Area Flow Control Structure on aquatic habitat are as follows:

- ▶ Gravel becomes trapped in the One-Mile Pool, from which it is customarily removed, rather than moved downstream.

Stream Temperature Limitations

Summer temperatures in Big Chico Creek are marginal at best for holding spring run salmon. Relatively high temperatures limit their ability to tolerate other stresses such as harassment by swimmers. This is most severe in drought years when temperatures tend to be higher and salmon may have been forced by passage problems to over-summer in pools downstream of the Iron Canyon ladder.

Fish Passage Problems

Habitat alterations and associated fish passage problems are as follows:

- ▶ The Lindo Channel Weir blocks upstream movement under low-flow conditions.
- ▶ The fish ladders in Iron Canyon on Big Chico Creek need reconstruction and continued maintenance to remain functional.
- ▶ Under spring low-flow conditions, down-migrant salmon and steelhead can enter the upper end of Lindo Channel but are limited by high temperature or insufficient water. This can result in the potential for increased fatalities due to lack of water or elevated temperatures in summer months.

Native-Nonnative Fish Species Interactions

Limiting factors associated with native – nonnative fish species interactions that have been identified are as follows:

- ▶ Smallmouth bass are believed to exclude California roach from the valley zone. They also may take a significant toll of young-of-the-year hardhead, squawfish, and suckers, and probably prevent steelhead trout from rearing downstream of Iron Canyon (although temperatures there are above optimum for steelhead). Smallmouth bass become more of a problem after a series of dry years since high winter flows tend to scour out many of them.
- ▶ Green sunfish impact populations of native fishes.
- ▶ Brown trout eliminate rainbow trout in the headwater tributaries, and substantially reduce their populations in other parts of the mountain zone of Big Chico Creek.

Horseshoe Lake ¹

Horseshoe Lake is located near the golf course in Middle Park. It was constructed about 1930 as a reservoir to provide storage of water diverted by gravitational flow from Big Chico Creek for irrigating the golf course. Its original purpose was abandoned after a few years when it became apparent that maintaining the diversion flume cost more than pumping water. Horseshoe Lake has remained as a shallow, turbid pond, fed by winter and spring runoff, gradually losing water between wet seasons, but never going completely dry. Horseshoe Lake water is usually turbid and quite green due to a dense bloom of bluegreen bacteria of the genera *Microcystis* and *Coelosphaerium*. This water bloom is undoubtedly a result of the large quantity of nutrients entering the lake in the feces of the domestic ducks and geese.

The food web of Horseshoe Lake, while simple compared to most natural ecosystems, is still complex. Energy enters the lake by photosynthesis of three groups:

- ▶ Phytoplankton (single celled algae, diatoms, and bluegreen bacteria) can be used directly by zooplankton which also use bacterioplankton from the detritus chain. While relatively little energy may move this way, the planktonic chain is vital to the fish community since zooplankton provide food essential to the fry of most species.
- ▶ The abundant submerged plant (*Najas graminea*) forms the base of a grazing food chain, being eaten by crayfish, snails and the amphipod, *Hyalella azteca*.
- ▶ Bluegreen bacteria, such as *Microcystis* and *Coelosphaerium*, produce huge amounts of biomass which mostly contributes to the detritus chain since their colonies are too large for zooplankton to handle.

Energy in detritus is not lost however; the sediments are mined by Oligochaete worms and Chironomid larvae. From this complex base, energy passes through the food web according to the feeding habits of the component fishes. While the majority of the energy is dissipated as metabolic heat within the food web, some leaves the lake in the form of fish caught by egrets, herons, and people.

Many species of fish have been introduced into the lake in its 60+ year lifespan, but only the golden shiner and a handful of centrarchids have established significant breeding populations. In the last few years, several

¹ The description of Horseshoe Lake was taken entirely from Maslin 1997c. Available: <http://www.csuchico.edu/~pmaslin/rsrch/Horseshoe.Lake/Horseshoe.html>.

thousand 1–3 lb. channel catfish have been planted annually into the lake for a kid’s fishing day (“Hooked on Fishing”).

Although all the Horseshoe Lake fish are exotic to California, they evolved more or less together in the eastern United States, so have had time for evolutionary adjustment to one another and consequently form a reasonably stable community.

For a number of years, biology classes from CSU, Chico have been monitoring physical and biological features of the lake. While techniques have varied slightly over the years, they have all been similar: Physical/chemical measurements were made with electronic instruments, invertebrates and fish were captured with plankton nets, dipnets and beach seines, and water samples were examined microscopically. Fish collected were identified to species and measured to the nearest millimeter. Subsamples of each species were weighed to the nearest gram on an electronic balance. Stomach contents were examined from a few Horseshoe Lake fish and this data was supplemented with information from the literature to create a probable food web for the lake.

On the advice of Dr. Paul Maslin and based on years of study, the City now attempts to keep a minimum lake level during the summer and fall seasons.

2.3.3 CULTURAL RESOURCES

Bidwell Park and its vicinity have been occupied and used by diverse peoples for thousands of years. The varied natural setting and accessibility to other areas of the valley, the Sierra Nevada foothills, and the coastal regions have attracted a wide range of native and immigrant cultural groups. Evidence for prehistoric and historic patterns of land use are frequently encountered within the Park, however few systematic cultural resource investigations have been conducted within Park boundaries. Topography, vegetation, and water sources have all contributed to the heavy use throughout prehistoric, early historic, and contemporary times. Given such a landscape, it is almost certain that additional undocumented archaeological sites, features, and artifacts are present within the Park. As such, encountering such resources during ongoing and future development and utilization of the Park needs to be addressed if these resources are to be preserved for future generations.

Patterns of historic and prehistoric land-use and activities within the Park and the surrounding area have been dictated to a great extent by the nature of the area’s geomorphology and the biotic resources that are found in the varied and dynamic settings within the park. Big Chico Creek and its immediate vicinity have constituted a great attraction for settlement, resulting in the deposition of many cultural remains spanning the prehistoric and historic eras. Areas of the Park previously surveyed for cultural resources are shown in Exhibits 2.3.3-1a, 2.3.3-1b, and 2.3.3-1c and a list of cultural resource studies previously conducted in Bidwell Park is provided in Table 2.3.3-1.

2.3.3.1 CULTURAL SETTING

In order to place the prehistoric and historic resources of Bidwell Park into a broader context, they need to be discussed within a larger cultural framework. The presence of a variety of natural resources and varied topography made the area an ideal location for prehistoric and historic settlement, and as a transportation corridor. Consequently, the Park is rich with sites, features or artifacts that reflect these early themes.

2.3.3.2 PREHISTORIC CONTEXT

Numerous cultural resource management studies have been performed in the general area, and constitute the bulk of what is known regarding early Native American cultural sequences in the region. Relatively little is known about specific variations in early Native American subsistence, technological, and ritual practices. The following broad patterns of material culture have been documented over large geographic regions in California, including the area around Bidwell Park.

The earliest well-documented entry and spread of humans into California occurred at the beginning of the Paleo-Indian Period (12,000–8000 Before Present [BP]). Social units are thought to have been small and highly mobile. Known sites have been identified within the contexts of ancient pluvial lake shores and coast lines evidenced by such characteristic hunting implements as fluted projectile points and flaked stone crescent forms. Prehistoric adaptations over the ensuing centuries have been identified in the archaeological record by numerous researchers working in the area since the early 1900s, as summarized by Fredrickson (1974), Moratto (1984), and White (2003).

Beardsley (1948) and Lillard, Heizer and Fenenga (1939) and others conducted numerous studies that form the core of our early understanding of upper Sacramento Valley archaeology. Little has been found archaeologically which dates to the Paleo-Indian or the subsequent Lower Archaic time periods (White 2003:11–12). The lack of sites from these earlier periods may be due to high sedimentation rates, which have left the earliest sites deeply buried and inaccessible.

However, archaeologists have recovered a great deal of data from sites occupied by the Middle Archaic period (7500–2500 BP). During this time, the broad regional patterns of foraging subsistence strategies gave way to more intensive procurement practices. Subsistence economies were more diversified, possibly including the introduction of acorn processing technology. Human populations were growing and occupying more diverse settings. Permanent villages that were occupied throughout the year were established, primarily along major waterways. The onset of status distinctions and other indicators of growing sociopolitical complexity mark the Upper Archaic Period (Ca 2500–1500 BP). Archaeological evidence suggests exchange systems became more complex and formalized and evidence of regular, sustained trade between groups was seen for the first time (White 2003:Fig. 4).

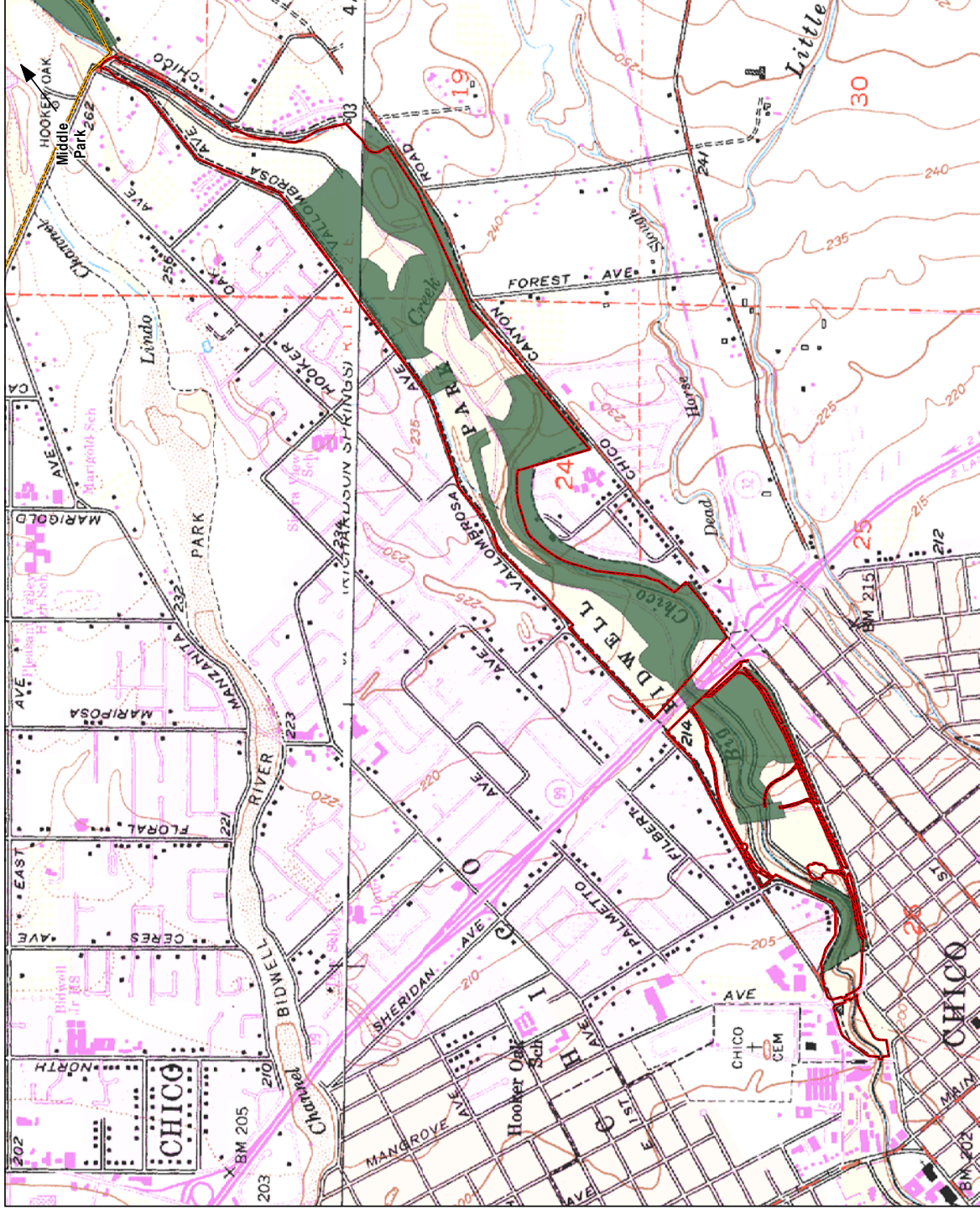
Several technological and social changes characterized the Emergent Period (1500–100 BP) when bow and arrow technology was introduced, ultimately replacing the dart and atlatl. Territorial boundaries between groups became well established and were recorded in early historic and ethnographic accounts. It became increasingly common that distinctions in an individual's social status could be linked to acquired wealth. Exchange of goods between groups became more regularized with more goods, including raw materials, entering into the exchange networks. In the latter portion of this period (200–100 BP), exchange relations became highly regularized and sophisticated. The clamshell disk bead became a monetary unit for exchange, and increasing quantities of goods moved greater distances just prior to large-scale European settlement of California (White 2003:13–14).

2.3.3.3 ETHNOGRAPHIC CONTEXT

Overview

Ethnographically, the area in the vicinity of Bidwell Park was inhabited primarily by the sovereign Nation of the Mechoopda, an ethnic sub-group of the Maidu, who controlled extensive territory in the region, particularly on the east side of the Sacramento River (Dreyer 1984:41, 43; White 2003:21; Heizer 1967). The most extensive documentation of the Maidu has been compiled by Dixon (1905), with other works by Hill (1978), Kroeber (1925, 1932), Riddell (1978), and Voegelin (1942), with a general overview presented by Kowta (1988).

The name Mechoopda refers to peoples whose territory included sections of the Sacramento Valley floor and portions of the Sierra foothills east of the present-day city of Chico (White 2003:21, Fig. 11). Formal delineations of the territory may have included prominent physiographic features and landforms. According to tribal accounts, ancestral lands extend from just south of Nord to south of Durham and east from the Sacramento River to the Sierra Nevada foothills and contained at least 23 village loaded (Sovereign Nation of the Mechoopda Indian Tribe, 2005).



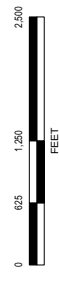
Bidwell Park Master Management Plan
Previous Survey Coverage
Lower Park

- LEGEND**
- Previously Surveyed for Cultural Resources
 - Lower Park
 - Middle Park

Sources: City of Chico Parks Department 2005, NWIC, CSU Chico 2005



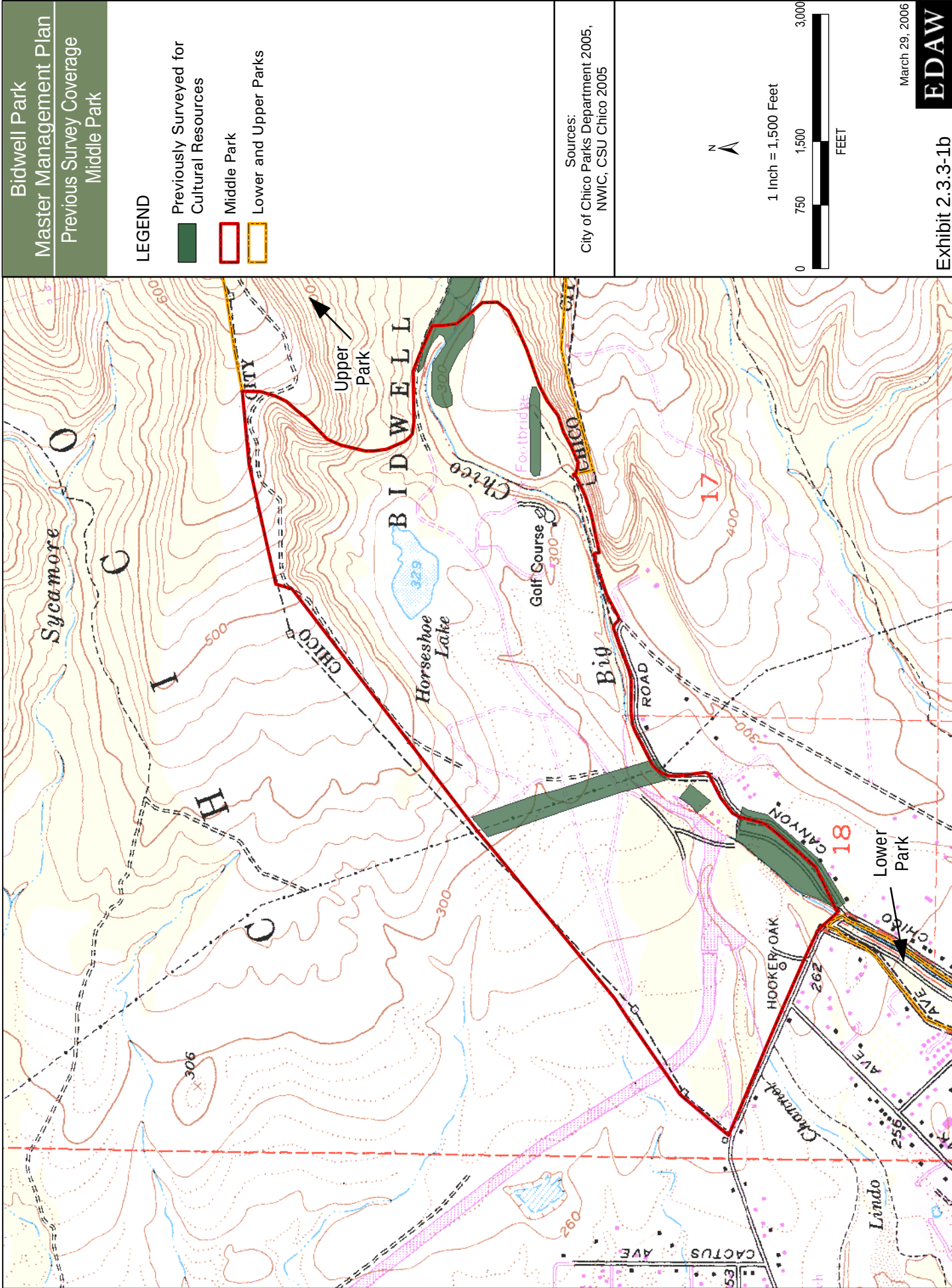
1 inch = 1,250 Feet



March 29, 2006

EDAW

Exhibit 2.3.3-1a



**Table 2.3.3-1
Documented Cultural Resource Studies Previously Conducted in Bidwell Park**

Report	Author / Date	NEIC No.
Archaeological Reconnaissance of John Paul (AP# 41-49-12/ERD) Log 80-07-14-02), Lynn Smith (AP# 46-31-10/ERD Log 80-07-01-01) Properties, Butte County, California.	Manning 1980	6019
An Archaeological Survey of the Cottonwood-Elverta #3 Transmission Line in Shasta, Tehama, and Butte Counties, California.	Offerman and Orlins 1980	407
Archaeological Reconnaissance of a Portion of Bidwell Golf Course.	Shapiro 1985	6144
A Report Concerning an Archaeological Inventory of Select BLM Sale Parcels in Trinity, Tehama, and Butte Counties.	Ritter 1986	1641
Archaeological Survey, c. 5.6-acre Commercial Development Site, Chico, Butte County, California.	Jensen 1988	1987
Archaeological Inventory Survey for the City of Chico's Proposed Bicycle/Pedestrian Bridge Across Big Chico Creek, Near Sycamore Pool, within Bidwell Park, City of Chico, Butte County, California.	Jensen 1993	B-L-572
Archaeological Reconnaissance of Lower and Upper Bidwell Park Vegetation Management Plan, Butte County, California.	Hamusek and Jenevein 1994	1188
Simmons Ranch Property Cultural Resources Assessment, Northern California, Volume 1.	Lobdell & Associates, Inc., 1994	1295
Archaeological Reconnaissance of Entrance Corridor to Five-Mile Recreation Area, Bidwell Park, City of Chico, Butte County, California.	Hamusek and Jenevein 1995	B-L-589
Archaeological Survey of the Proposed Forest Ranch Fire Safe Project, Butte County, California.	Huberland 1999	2549
Archaeological Inventory Survey for the Proposed 40-ac Disc Golf Course in Upper Bidwell Park, City of Chico, Butte County, California.	Jensen and Jensen 2001	3207
Archaeological Inventory Survey, City of Chico's Lindo Channel Existing Conditions Study, Cultural Resources Component, Chico, Butte County, California.	Jensen and Jensen 2001	3446
Archaeological Inventory Survey of the City of Chico's Proposed Manzanita Avenue Widening Project, Chico, Butte County, California.	Jensen and Jensen 2001	3550
Phase I Archaeological Testing Report, the Bluetrunk Rock Shelter (CA-BUT-951) in Upper Bidwell Park, City of Chico, Butte County, California.	Jensen and Jensen 2002	4364
Source: EDAW 2005		

Previous Survey Coverage Upper Park

Previously Surveyed for Cultural Resources

Middle Park

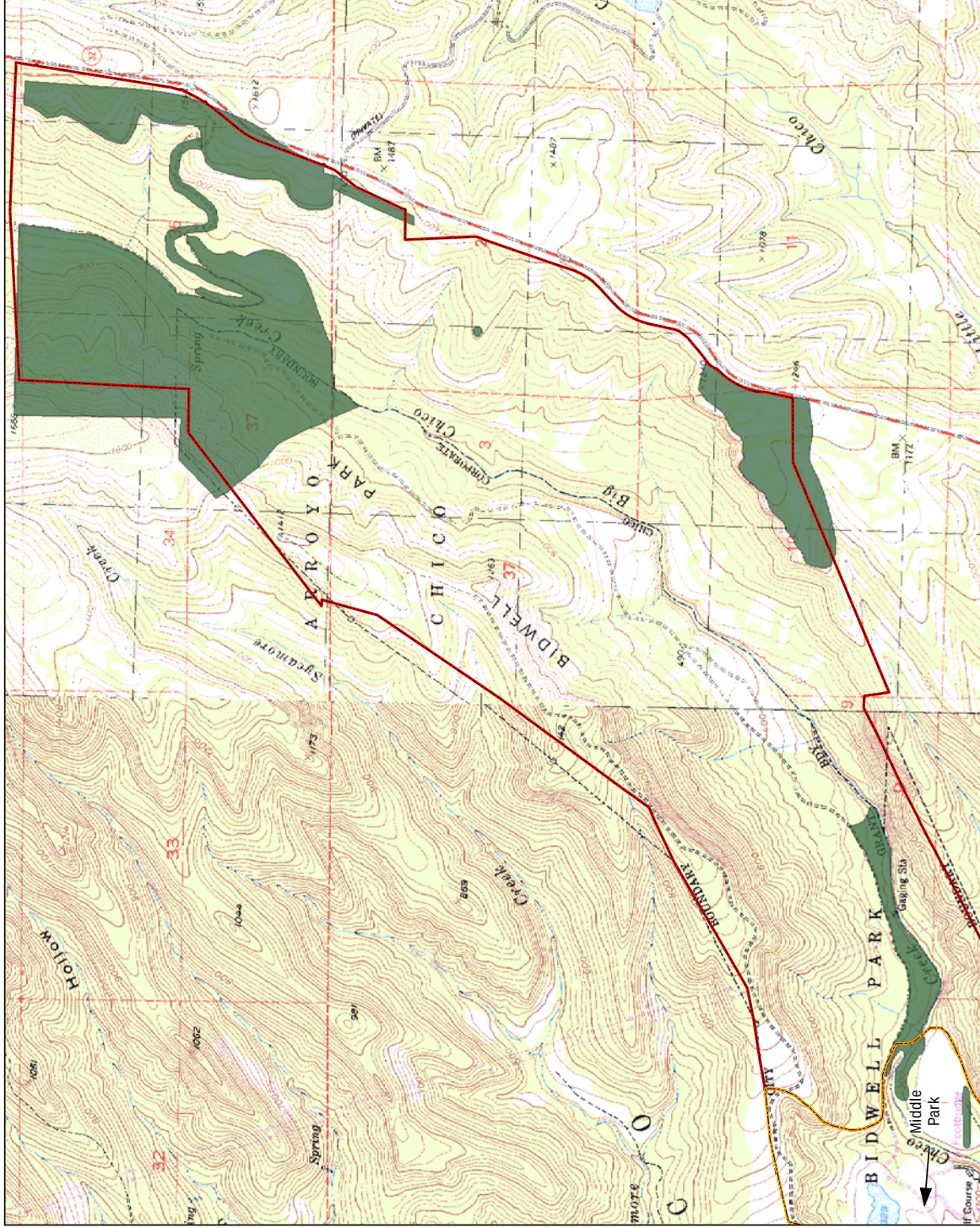
Upper Park

 $\mathbf{z} \triangleleft$

N	FFTs
0	900
900	1,800
1,800	2,700
3,600	3,600

EDAW

Exhibit 2.3.3-1c



Sovereign Nation of the Mechoopda economic and subsistence patterns were largely based on a seasonal cycle that involved residence in winter village sites in the valley and summer journeys into the mountains for hunting. In the spring, various types of roots, stems, leaves, seeds, and fruits were gathered in large quantities to be dried for winter consumption (Dixon 1905:187). As with many Native American groups in California, the acorn, gathered from a variety of oak species, formed the staple food of the Mechoopda diet.

Mechoopda settlement conformed to a “village community” pattern which served as the only formal political structure of the tribe (Kroeber 1925:398). Village communities, which consisted of several closely spaced small settlements and a larger village containing a semi-subterranean earth-covered ceremonial lodge, were autonomous and self-sufficient units (White 2003:21). Individual communities probably numbered around 200 inhabitants and “owned” or controlled specific territories in which hunting, gathering, and fishing areas were considered common property. Two ethnographic village locales (*Tse’lim-nah* and *Yow’-koo*) documented in Riddell (1978:Figure 1) appear to be located within the present day boundary of Bidwell Park, and other *Otah-ke* is located approximately ½ mile downstream of Sandy Gulch Creek (Arlene Ward 2006).

The most politically influential man of each community lived in the central village. The head-man acted as an advisor and spokesman for his group although he possessed little in the way of concrete power. This individual was not selected by members of the village community nor was the position hereditary. Rather, the head-man was chosen by the village shaman with the aid of various messenger spirits who could also remove him as they saw fit (Dixon 1905:223–224).

With a few notable exceptions, the lifeways of the sovereign Nation of the Mechoopda differed little from those of their neighbors in the valley. Probably the main difference, other than linguistic variation, occurred in the spiritual realm as the sovereign Nation of the Mechoopda adhered to the ritual and belief systems associated with the Kuksu cult involving the impersonation of deity figures (White 2003:21). Many other groups in the area did not practice these rituals although the Nisenan and other non-Maiduan central California peoples did (Dixon 1905:322).

Sovereign Nation of the Mechoopda Ethnohistory

The following is summarized from information supplied by the sovereign Nation of the Mechoopda Indian tribe of Chico Rancheria. Sovereign Nation of the Mechoopda oral tradition refers to the beginnings of this world at a place known as Tadoiko, a few miles south of the ancestral village of Mechoopda at the town of Durham. It was here that a raft carrying Kodoyampeh (Earth Maker) and Turtle first came ashore on the soft newly created earth resulting in a large circular depression in the ground. This depression was visible there for centuries until leveled for agriculture in the early 20th century as noted by Roland B. Dixon in 1902. The archaeological site designated as 4-But-5 may coincide with Tadoiko. Surveyed in 1949 by Arnold Piling, records indicate that local residents claimed a depression (identified as a dance house) was still visible until the 1920s.

There is a location and identification of Mitchopdo (i.e., Mechoopda), as a village located at Patrick’s Road on Little Butte Creek about three miles south of Chico. The ancestral village of sovereign Nation of the Mechoopda averaged about 20 homes (150–175 people), and included a large ceremonial roundhouse. Archeological evidence indicated that dwellings were primarily round, earth-covered structures, and averaging 20 feet in diameter, excavated to about three feet in depth. The antiquity of the site is estimated at approximately A.D. 1400.

Jedediah Smith was likely the first non-Indian to pass through sovereign Nation of the Mechoopda country, in early 1828, although there is no evidence they had contact. The ancestral village of sovereign Nation of the Mechoopda is likely the location of the village at the time John Bidwell and other early non-Indian explorers entered the region in the mid-1840’s. This is a well-known archaeological site also known as the Patrick Rancheria. Members of the Patrick family claimed to have attended a ceremonial dance in the roundhouse at the site about 1880, and stated that most of the village population left the place about 1885, taking up permanent

residence on Bidwell's Rancho del Arroyo Chico. The last occupation of the Patrick Rancheria was thought to be about 1890 (The Patrick Rancheria; The Masterkey 37(1):30-34; Abraham Gruber, 1963).

John Bidwell lived in the Mechoopda village for a period before establishing himself on Chico Creek (Chico Record, March 8, 1950). By 1850, following Bidwell's acquisition of the Spanish Land Grant, Rancho del Arroyo Chico, the sovereign Nation of the Mechoopda moved to a former summer camp site located on the south side of Chico Creek near First and Flume Streets in what is now downtown Chico. With the establishment of the ranchos, the introduction of agriculture and cattle, local native people soon entered into a working relationship with the newcomers as ranch hands.

The discovery of gold in California resulted in major changes to native societies like sovereign Nation of the Mechoopda. With the massive influx of immigrants, access to the range of traditional foods necessary for survival became much more limited. Indians often met with violence in efforts to hunt and gather in accustomed places. Mining also resulted in serious environmental damage, such as the silting of streams, which damaged crucial salmon runs. Even the course of Little Butte Creek, upon which the village of sovereign Nation of the Mechoopda rested, was altered after a build-up of deposits from dredging gold upstream blocked its normal flow, diverting the stream into another channel. Most markedly, these series of changes forced the sovereign Nation of the Mechoopda and other native people out of a hunting and gathering economy into the cash economy very quickly. People had to learn new skills, a new language, and adapt to new foods as matters of immediate survival (Sovereign Nation of the Mechoopda Indian Tribe 2005). Ironically, many of the sovereign Nation of the Mechoopda participated in the mining of gold, accompanying John Bidwell to the Feather River at a place that became known as Bidwell Bar. Bidwell's Native laborers helped him extract some \$100,000 in gold between 1848 and 1849, for which they were compensated in trade goods such as handkerchiefs, cigars, scissors, brandy, glass beads, and pants.

Amid a climate of growing tensions and conflict between Indians and non-Indians, the U.S. Congress authorized a commission to negotiate a series of treaties. On August 1, 1851, headmen for nine tribal communities of the region, including Luck-y-an of the sovereign Nation of the Mechoopda, signed the U.S. Treaty of 1851 at Bidwell's ranch. Succumbing to opposition mounted by the California State Senate and the Governor, who objected to the reservation of lands for Indians that might be of either agricultural or gold bearing value, the U.S. Senate secretly rejected the treaties on July 8, 1852.

A few years later the village of sovereign Nation of the Mechoopda was moved downstream to the north bank of Big Chico Creek, closer to Bidwell's residence. The next decade saw a dramatic rise in conflict between Indians and non-Indians throughout Butte County. In 1863, implementation of the plan for (near) complete removal of Indians from Butte County began. Some 461 Indians rounded up from small villages throughout the foothills left Camp Bidwell, four miles north of Chico, on the long march to Round Valley in Mendocino County. Fourteen days later, only 277 Indians reached their destination. Most of the Mechoopda were not forced into removal due to their association with John Bidwell, and in effect received his protection. In fact, several of those who managed to escape, either en-route, or later from Round Valley, sought asylum at Bidwell's ranch. In 1868, the village was moved one-half mile west to its final location along Sacramento Avenue, eventually becoming the Chico Rancheria. The sovereign Nation of the Mechoopda became an officially federally recognized tribe in 1992.

2.3.3.4 HISTORIC CONTEXT

The earliest documented European entry into the region occurred in 1808. That year, Gabriel Moraga led an expedition that eventually traveled up the Feather River and then proceeded north along the banks of the Sacramento River, possibly to the current location of Butte City (Beck and Haase 1974). The purpose of Moraga's travels was largely to search for suitable locations for new missions and to further establish Spanish rule in the face of increasing foreign pressure, from the Russians in particular. Thirteen years would pass before another formal exploratory expedition into the region was launched. In 1821, Mexican governor Pablo Vicente de Sola

sent Captain Luis Arguello with 55 soldiers to drive out reported American and Russian intruders from the areas north and east of San Francisco. Although Arguello's route is somewhat speculative, it appears he and his party may have eventually followed the Sacramento River north towards the general region west of Chico.

While Hudson Bay trappers probably were in the area during the early decades of the nineteenth century (Mansfield 1918:36), the next major exploratory or emigrant group to venture into the area was the Charles Wilkes expedition, led by Lieutenant George Emmons. This party led a group of emigrants into California from the Columbia River, passing south along the west bank of the Sacramento River in October of 1841 (Bancroft 1886:Vol. XXI:243–45). Lansford W. Hastings, (best known for his scouting of the "Hastings Cut-off" in Utah that eventually doomed the Donner Party) and Joseph B. Chiles, led an emigrant party into California from Oregon, traveling along the west side of the Sacramento River, west of Chico in 1843. This was the same year that John Bidwell, who would have a dramatic impact on the area, first viewed the area surrounding the current town of Chico.

One of the most important series of events in shaping the economic and cultural landscape during the nineteenth century was the formation of Mexican land grant ranchos. In 1844 Rancho del Arroyo Chico, which included a portion of lands now occupied by the Park, was awarded to William Dickey. John Bidwell who achieved success through his gold mining operations for William Dickey, purchased rancho del Arroyo Chico in 1849 (Chico Heritage Association 2007). By 1852 Bidwell has 200–300 acres under cultivation.

Initially, transportation of goods into and out of the region was by steamer via the Sacramento River. However, with completion of the California and Oregon Railroad to Chico a faster and more efficient means of bringing produce and cattle to market came with it. Although railroads were being built in the Central Valley of California during the 1850s and 1860s, rail lines were not built into the vicinity of the Park until the early 1870s. The California and Oregon Railroad (a subsidiary of the Central Pacific) finally extended its lines from Marysville to Chico in the summer of 1870 (White 2003:50-51). As the area became more connected by rail to Sacramento, commercial river traffic soon decreased. While carrying some freight, one of the more notable passenger lines in the area was the Northern Electric Railroad that connected Chico directly with Sacramento and Oakland. This line ceased to exist as a separate company in 1940 when it was absorbed by the Southern Pacific Railroad, which still operates in the area today as the Union Pacific (Chico Heritage Association 2007).

The Humboldt Road was in use by 1865. Before this road, the only transportation to Chico was by the stage road from Oroville to Marysville and by riverboat up the Sacramento River. John Bidwell and three other prominent Chico men developed a franchise and raised enough money to develop a road that would go into the Humboldt Mining District in the Nevada Territory, for which the road was named. Like many historic roads built in California, the route most likely followed trails used by Native Americans inhabiting the area for which the road was named. From the district near the current town of Winnemucca, the road provided a link with other routes, such as the Idaho Stage, which provided links to the mines in Idaho. Within the Park, approximately 1,900 feet of the route have been documented. Elsewhere in Butte County various segments totaling several miles have been recorded as having associated rock walls and wheel ruts. The road was in use year-round, a feat that usually did not occur with many early wagon roads over the Sierra Nevada. John Bidwell was also able to recruit the military for patrols, thus insuring safe passage to Honey Lake on the east side of the Sierras. Stopping places along the route were Ten-Mile House (located within Bidwell Park), Fourteen-mile House, and Sixteen-mile House. Butte County became a leading producer of pine by the 1870s, and Chico served as a terminus for the lumber industry, with five lumber yards, two planing mills, and a sash, door and blind factory. Completion of the Big Chico Creek Flume in 1874, with a western terminus at East 8th Street, greatly reduced the cost of transporting lumber from the mills to the valley. With the exception of a section at the western end of Upper Park the flume generally followed Big Chico Creek. The Sierra Flume and Lumber Company extended the flume into the town of Chico, following a route along the south side of 8th Street to Pine Street, where the flume turned north discharging water back into Big Chico Creek (California Heritage n.d.). Flume Street retains the name of another flume, constructed

by John Bidwell to supply power to his flour mill on Big Chico Creek and on The Esplanade (Chico Heritage Association 2007).

2.3.3.5 BIDWELL PARK HISTORY

Bidwell Park had its beginning in 1905, when Annie Bidwell granted approximately 1,902 acres to the people of Chico to be used as a public park and in 1911 granted approximately 301 additional acres to be included in the park upon her death. While she could have sold the property, it was her intention the waters and trees of Big Chico Creek be preserved (Excerpt of Chico Record July 18, 1905 in Chico Heritage Association 2007). An additional 29 acres, now the site of Chico Creek Nature Center and formerly the Forestry Station were added in 1921. A parcel known as the Kennedy Estate field, consisting of 24 acres, was acquired in the 1930s or 40s. In 1995 the City purchased approximately 40 acres adjacent to State Route 32 and an additional 1,417 acres primarily located along the south side of Upper Park.

Various recreational facilities, water conveyance facilities, roads, and other landmarks have been constructed or installed since the park was established. These consist of:

- ▶ California Historical Landmark 313, the former Hooker Oak, is located in the Hooker Oak Recreation Area. The tree was named by Annie Bidwell in 1887 in honor of Sir Joseph Hooker, and English botanist. The tree was claimed to be the oldest in the world (326 years), prior to falling on May 1, 1977.
- ▶ One-Mile pool (Sycamore Pool) was constructed in 1923–24.
- ▶ Entrance gates at East 4th Street and gates at Vallombrosa Way were constructed in 1934;
- ▶ An historic water conveyance system was constructed in 1937 to divert water to the Park reservoir (now Horseshoe Lake) for use at the municipal golf course. The route parallels trails within the Park and reportedly the remains of this system consist of concrete and rock walls and lining, diversion gates and numerous rock bridges (Friends of Bidwell Park 2007).
- ▶ Two of the main roads within the Park are North Park Drive, originally constructed by the Work Progress Administration (WPA) in 1939, and South Park Drive with an unknown date of original construction. North Park Drive was renamed Petersen Memorial Drive in 1951.
- ▶ In 1937, a diversion dam and ditch was constructed to divert water to the park reservoir (now Horseshoe Lake) for use at the municipal golf course;
- ▶ In 1938 the Bidwell Bowl was built by the Works Progress Administration;
- ▶ The old day-camp and archery-range was located approximately one-third mile east of the high-voltage line in Upper Park;
- ▶ A rifle range built in 1926 for the local militia and a later skeet shooting area were established in 1936 near Horseshoe Lake;
- ▶ A small-bore range built in 1950 is located at what is now parking area E just north of the gate in Upper Park;
- ▶ Annie's Glenn was constructed in the 1950s when Pine Street Bridge was built;
- ▶ A pistol range was constructed in 1953–54 south of the eastern 9-hole portion of the golf course;

- ▶ The 9-hole municipal golf course was established by 1921 with construction of a clubhouse occurring in 1925, 1945, and 1952. The addition of 9 more holes occurred in 1954–57;
- ▶ The current golf course was re-aligned in the early 1990's to improve the play. As a result, Upper Park Road was also realigned to its current location;
- ▶ WPA constructed a dam for a reservoir, now Horseshoe Lake, by 1937, with modifications occurring in the - late 1950s;
- ▶ Camp Chi-da-ca was established at Hooker Oak Park in 1951;
- ▶ The Bear's Lair, scout island and horseshoe pits were constructed at unknown dates;
- ▶ The campfire Council Ring was erected in 1954;
- ▶ The Cedar Grove Picnic Area was constructed in 1954;
- ▶ The Easter Cross was originally constructed of wood sometime before 1958 when it was replaced with metal recycled from surplus light standards;
- ▶ During the 1960s a dam was built to replace the first Five-Mile dam which was built on Big Chico Creek around 1859 to supply water to Bidwell's flour mill. A sheep camp was located below the dam and two dressing rooms constructed by Bidwell in 1887 were replaced in 1922;
- ▶ In the past, Live Oak Grove has been used by a local midget-car racing group and motorcycle group beginning in 1955;
- ▶ A riding area was established just west of Live Oak Grove as early as 1958, however the facilities have been rebuilt recently;
- ▶ Experimental plantings were grown on a 29 acre tract known as the Forestry Station beginning in 1888 on land donated by John Bidwell. In 1893 title passed to the University of California which added the still-extant grove of Spanish Oak cork trees. Also present on the property was an old barn reportedly used for storage by John Bidwell (the barn burned down in 2006), and a deer pen. The Chico Forestry Station and Nursery have been designated California Historical Landmark 840-2;
- ▶ Walnut trees located on the 24 acres owned by the Kennedys, relatives of Annie Bidwell, were planted in 1953;
- ▶ A dam forming the Sycamore Swimming Pool adjacent to Vallombrosa Way was built in 1923–24. Addition of a fish ladder at this location occurred in 1957.

Today, evidence of these previous projects range from no visible remains or scant archaeological deposits and isolated features, to intact features and structures, such as the old barn at the Forestry Station and the dam at Sycamore Swimming Pool.

2.3.3.6 BACKGROUND RESEARCH

Numerous sources were contacted and consulted in order to gather information regarding the existing conditions and cultural resources that may be located within the Park. These included but are not necessarily limited to the following:

- ▶ National Register of Historic Places – Listed properties and Determined Eligible Properties (NPS: 1988, Computer Listings 1966 through March 2004)
- ▶ California Register of Historical Resources (2004)
- ▶ California Inventory of Historic Resources (1976)
- ▶ California Historical Landmarks (1996)
- ▶ California Points of Historical Interest (1992)
- ▶ Historic Spots in California (1966)
- ▶ Directory of Properties in the Historic Property Data File for Butte County (2004)
- ▶ A Collection of Places in Butte County, California (1977)

A records search was conducted at the Northeast Information Center at CSU Chico in January of 2005. Historic maps consisted of General Land Office (GLO) plat maps, Rancho del Arroyo Chico 1859, and 1878 GLO Plat Map for Township 22 North, Range 2 East, and historic Butte County maps dated 1886, 1894, 1901, and 1913.

Input to the Master Plan was solicited from the Native American Heritage Commission, and the sovereign Nation of the Mechoopda Indian Tribe of Chico. Correspondence with the Native American Heritage Commission is presented in Appendix J. A review of the Sacred Land files by the Native American Heritage Commission did not reveal the presence of sensitive resources within Bidwell Park. A meeting with sovereign Nation of the Mechoopda tribal members, Dennis Beardsley, City General Services Director, and Richard Deis, archaeologist with EDAW, was conducted on April 11, 2005. Tribal members pointed out an ethnographic village location that was previously not mentioned in the ethnographic data, and provided valuable comments and recommendations for the management of cultural places and areas of use.

Several cultural resource inventories and three evaluations have been conducted within the Park, and have resulted in the identification of 31 archaeological resources associated with the prehistoric and early historic eras, and the suspected location of one additional prehistoric site. These inventories have been primarily project driven, associated with the construction of power transmission lines, recreational facilities, and road upgrades and re-alignments, and represent less than 20 percent of the area within the Park. A cultural resources inventory was conducted by students under the supervision of faculty affiliated with CSUC. Areas of the Park previously surveyed for cultural resources are shown in Exhibits 2.3.3-1a, 2.3.3-1b, and 2.3.3-1c and a list of cultural resource studies previously conducted in Bidwell Park is provided in Table 2.3.3-1.

Archival research indicates a rich historic relationship between early ranching and agriculture, lumbering, and transportation within the region. Undocumented sites, features, and artifacts associated with these periods and activities likely exist within the Park. An additional 13 prehistoric and 5 historic sites have been documented within 1/4 mile of the project.

The Office of Historic Preservation Archaeological Determinations of Eligibility lists the following sites within the Park, CA-BUT-809 and CA-BUT-892H. Of the two sites, CA-BUT-809 has been determined to be not eligible for listing on the CRHR; however, CA-BUT-892H (Humboldt Road portions located within the park), is listed as eligible for listing on the NRHP and CRHR. A third site CA-BUT-951 has been assessed and recommended not significant for listing on the CRHR (Jensen and Jensen 2002).

2.3.4 INTERPRETATIVE AND EDUCATIONAL RESOURCES

2.3.4.1 FACILITIES AND OTHER RESOURCES

Bidwell Park provides many opportunities for education and nature interpretation for park users, including groups from local schools, Butte Community College, CSU, and others. Several facilities provide outreach, interpretive and other natural resource-related programs to the public, as described below. While educational and interpretive facilities are generally located in Lower Park due to easier access, planned activities such as nature hikes and bicycle tours make use of Upper, Middle and Lower Park.

With the exception of interpretive and regulatory signage and publications, such as brochures, maps and the BPMMP, the City of Chico has delegated the interpretive and educational functions of Bidwell Park to supporting organizations that lease and operate facilities within the Park. The Chico Creek Nature Center is an independent non-profit organization that was created by the Altacal Audubon Society in 1982. Since that time, the Chico Creek Nature Center has grown into a unique attraction enjoyed by the local community as well as by out of town visitors.

The Chico Creek Nature Center has been serving as the primary interpretive and information center for the entire Park since it was authorized to do so in the 1990 BPMMP. In 1996, the Chico Creek Nature Center separated from the Audubon Society to form its own separate entity. The facility hosts exhibits and workshops attended by visitors from the community and the region. Throughout the school year, naturalists lead K–6 students from a five-county area on a variety of hikes and outdoor education programs. The Chico Creek Nature Center's Environmental Education Programs are consistent with the Science Framework for California Public Schools. Programs for adults are offered on a monthly basis throughout the year. During the summer, the Chico Creek Nature Center offers day camps for area school children.

Another educational facility, not operated by the City, is the Kiwanis Chico Community Observatory located adjacent to Horseshoe Lake in Middle Park. The observatory hosts starwatching programs throughout the year as well as summer children's programs.

The Chico Area Recreation District (CARD) offers occasional natural history and interpretive programs that include Bidwell Park.

2.3.4.2 THEMES

The Park's natural resources comprise the dominant educational and interpretive theme. Some of the educational messages developed in the 1990 BPMMP include utilizing natural processes and phenomena to explain why certain activities are encouraged and others are discouraged. The Park's rich natural and cultural history are other theme variations that receive attention.

2.3.4.3 PROGRAMS AND SPECIAL EVENTS

Bidwell Park hosts a wide range of programs and events organized by various groups and organizations. Examples of organized programs include art and exercise classes, nature hikes, and field trips. Organized events taking place in developed areas include bike and foot races, observatory events, fairs, theatrical productions and concerts. Many holiday celebrations also take place in the Park.

CARD organizes and sponsors a range of activities throughout Chico including activities in Bidwell Park. These programs are designed for a range of age groups from toddlers to seniors. In addition, a series of centennial events took place in 2005, celebrating 100 years of Bidwell Park's history.

Adult programs at Bidwell Park include golf classes, organized softball, baseball, and soccer leagues. Youth programs include summer day camps, field trips and other events.

2.3.4.4 RULES AND REGULATIONS

Park visitors can learn about the rules and regulations for Bidwell Park in a number of ways. City of Chico Ordinance Titles 12 and 12R provide the Park's rules and regulations. These can be found on the City of Chico Website (www.chico.ca.us). The Friends of Bidwell Park website (www.friendsofbidwellpark.org) answers frequently asked questions about the Park and provides information on Park rules and regulations.

Most visitors to the Park obtain information either at the Chico Creek Nature Center, City of Chico Chamber of Commerce, or via Park signs. Several informational Park signs are located along North and South Park Drive in Lower Park, with clusters located near recreational facilities (e.g., CARD Community Center, One-Mile Recreation Area) and at entrances to the Park. These signs display interpretive messages and Park rules. Park Watch volunteers (see section 2.6) also provide visitors with information on the Park and its rules.

2.3.5 AESTHETIC RESOURCES

2.3.5.1 VISUAL RESOURCES AND SCENIC CHARACTERISTICS

The visual character of Middle and Upper Park is dominated by the rolling hills, sloped terrain and natural vegetation of the foothill region comprised of grasslands, vernal pools, chaparral, and woodlands. Lower Park is characterized visually by a flatter terrain and both natural scenery and recreational facilities.

2.3.5.2 VIEWSHEDS

Bidwell Park's beauty can be seen from almost infinite vantage points. From grand sweeping vistas to the more intimate visual presence of a single tree, a network of trails, bike paths, and roads within and alongside the Park provide access to these visual wonders.

Upper Bidwell Park includes the South Rim Trail and Humboldt trail, which run along the south ridge line. Ten Mile House Road and Rain Forest Trail ascend to the top of the hill. SR 32 runs along the southern border of the Park at the top of the hill. From points on these trails and along SR 32, visitors have access to panoramic views of the Park and of the nearby areas. On the north side, the North Rim Trail provides views of the canyon, while Lower Trail and the Yahi Trail provide access to views of the sloping terrain and Big Chico Creek.

Viewpoints in Lower Bidwell Park are more constrained, due to the flatter terrain and the increased presence of structures and vegetation. At the same time, the quality of Lower Park's viewshed is unique by virtue of its riparian vegetation characterized by dramatic mature trees and thick understory. Lower Park is also frequented by many more people due to its proximity to the urban core of Chico. Many viewpoints exist along North Park Drive and South Park Drive, both of which parallel the Park and offer views of Big Chico Creek. Most of the Park's structures are visible from these two roadways. In addition, there are numerous pedestrian, bicycle, and equestrian trails in Lower Bidwell Park, as well as along adjacent Vallombrosa Avenue, East 8th Avenue, Centennial Avenue, and Woodland Avenue, that allow visitors to catch glimpses of virtually every part of Lower Bidwell Park.

For those traveling on adjacent or intersecting roadways (e.g., SR 99, Manzanita Avenue, Mangrove Avenue, and Camellia Way), but not visiting the Park, the Park nonetheless is part of the viewshed and contributes to the visual character of the City. In short, Lower Bidwell Park is an important visual component of the viewsheds as seen from inside and outside the Park.

2.3.5.3 NIGHT SKY

The night sky above Bidwell Park and the surrounding areas comprises an important visual resource. Stargazing events are offered weekly (weather permitting) at the Kiwanis Community Observatory located in Middle Park near Horseshoe Lake.

2.3.6 RECREATIONAL RESOURCES

2.3.6.1 RECREATIONAL ACTIVITIES

Bidwell Park includes various community buildings, a golf course, several playgrounds, an instream swim area (Sycamore Pool), lawn space, and other recreational facilities. These facilities provide a wide range of recreational opportunities. Section 2.4.2 contains a detailed description of Bidwell Park's developed recreational facilities.

The community buildings on site host a variety of programs and activities such as school field trips for nature study, family activities, and community events. Other facilities provide opportunities for golfing, swimming, baseball/softball, open space activities and playground use. Occasional camping events organized by the CARD provide the opportunity for camping in Bidwell Park.

2.3.6.2 TRAILS

The Park currently provides approximately 80 miles of trails that provide opportunities for walking, running, hiking, mountain biking, cycling and horseback riding. Trails vary in length and difficulty from leisurely strolls along paved pathways in Lower Park to strenuous hikes in steep terrain in Upper Park. All trails in Upper Park are open to hikers, mountain bikers, and horseback riders, except for the Yahi Trail which is only open to hikers. Other popular trails in Upper Park include the North Rim Trail, Upper Trail, Middle Trail, Lower Trail, and South Rim Trail. The World of Trees Nature Trail in the Cedar Grove Picnic Area is a popular trail in Lower Park. It is American Disabilities Act (ADA) accessible as is the portion of South Park Drive between Sycamore Field and Cedar Grove which is closed to vehicular traffic.

2.3.6.3 PATTERNS AND LEVELS OF RECREATIONAL USE

Bidwell Park receives approximately 200,000 to 250,000 visitors per year. Lower Park receives the most use, as it is closest to the population core, the most developed, and provides a wide variety of activities and has the greatest number of access points. There are generally fewer visitors to Middle Park and Upper Park because these areas are less developed, are more remote, and have fewer access points. However, the Park can be accessed from many locations, making it difficult to accurately count the number of visitors.

A 1995 Opinion Survey for the City of Chico showed the relative use levels of the different Park zones. The survey did not designate Middle Park as a separate area; however, it did ask about the Hooker Oak Recreation Area which represents some of the usage in Middle Park (Table 2.3.6-1).

Bidwell Park attendance levels fluctuate with the seasons. During the fall, spring and early summer, temperatures are moderate, encouraging more outdoor use. The spring months are popular for wildflower viewing. The winter season is wet and colder contributing to decline in Park attendance. During the hottest months of the year, use also tapers off; however, swimming is popular during those months. A 1989 CSUC survey indicated that use of Lower Bidwell Park is most dominant in spring (CSUC 1989).

Table 2.3.6-1 Percentage of Areas Visited	
Park Area	Percentage of Areas Most Frequently Used
Lower Bidwell Park	58
Upper Bidwell Park	30
Hooker Oak	11
Source: EDAW 2005	

2.4 FACILITIES

2.4.1 BUILDINGS

Bidwell Park includes several buildings including the Chico Creek Nature Center, the Rod and Gun Club, the Kiwanis Community Observatory, and restrooms. Maintenance buildings are located off site at the Municipal Services Corporation Yard.

2.4.1.1 CHICO CREEK NATURE CENTER

The Chico Creek Nature Center, operated by an independent non-profit organization, is located near Cedar Grove in Lower Park between Highway 99 and Manzanita Avenue. The Center operates as a natural history museum, nature center, and visitor/information center, offering a variety of programs for students and families that include weekend hikes, interactive wildlife exhibits, day camps for kids, a living animal museum, University internships, and a volunteer program.

2.4.1.2 ROD AND GUN CLUB

The Chico Rod and Gun Club was founded in 1954 and leases a building in Middle Park near Horseshoe Lake which houses an indoor pistol range. An outdoor shooting range previously present adjacent to the building was decommissioned in 1982, and cleanup effort for lead and polynuclear aromatic hydrocarbons (PAHs) was completed in November 2005.

2.4.1.3 KIWANIS COMMUNITY OBSERVATORY

Also located near Horseshoe Lake in Middle Park, the Chico Community Observatory was built in the summer of 2001 and is maintained by the Kiwanis Club of Greater Chico. The observatory structure houses two telescopes. The facility also includes a parking lot, outdoor viewing platforms, and an outdoor seating area.

2.4.1.4 RESTROOMS

Restrooms (both flush toilets and porta potties) are available at a variety of locations throughout the Park. Wheelchair accessible bathrooms are located at One-Mile Recreation Area, Cedar Grove, Chico Creek Nature Center, Hooker Oak Recreation Area, Five-Mile Recreation Area, Horse Arena, and Horseshoe Lake. Port-a-Pots are available at Parking Area E, Day Camp, Alligator Hole parking area, Bear Hole parking area, Salmon Hole parking area, and Brown's Hole parking area.

2.4.2 RECREATIONAL FACILITIES

2.4.2.1 PLAYGROUNDS

Children's playgrounds and play equipment can be found in both Lower and Middle Park. In Lower Park, the One-Mile Recreation Area is an activity hub that accommodates special events, playing fields, a playground, parking and restrooms. Caper Acres at One-Mile is a fantasy play area specifically for young children.

At Manzanita Avenue, in Middle Park, 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. The site is named after the famous Hooker Oak tree, a pair of 222 and 226 year old valley oaks grown together, that graced the north end of the parking lot until it fell in a wind storm in 1977. The tree was named for Sir Robert Dalton Hooker, a botanist from England, who was a guest of Annie and John Bidwell several times. Neither the Bidwells nor any of their guests named the tree; it was named by an out-of-town writer.

2.4.2.2 GOLF COURSE

The City of Chico's 18-hole Municipal Golf Course is located just south of Horseshoe Lake and has been in continuous operation since about 1930. The City of Chico leases the property to Bidwell Park Golf Club, Inc.

2.4.2.3 CHICO EQUESTRIAN ASSOCIATION ARENA

The Chico Equestrian Association Arena is located in Middle Park north of Five-Mile Recreation area. The current site was selected by a riding club as early as 1958, but a temporary arena was not built until approximately 1968. It fell into disuse during the 1970s, but the facilities have been rebuilt since then. The arena is open to the public two days a week from dawn until dusk at no charge. The Equestrian Association maintains the arena and surrounding areas. The City of Chico leases the property to the Equestrian Association.

2.4.2.4 SWIMMING AREAS

Lower Park provides numerous places to swim in Big Chico Creek. Sycamore Pool, a concrete pool that was constructed within Big Chico Creek in 1923–24, provides a unique in-stream swimming experience at the One-Mile Recreation Area. Lifeguards are on duty from 11:00 am to 7:00 pm daily (except Thursdays) from Memorial Day to Labor Day.

A reservoir at Five-Mile Recreation Area in Middle Park was created when a dam was built on Big Chico Creek, around 1859, in order to supply water to Bidwell's flour mill. Numerous improvements have been implemented over the years to enhance the amenities available to Park users at the site. The area used to be dammed during the summer month to create a deeper pool for swimming. While the City no longer dams the creek for swimming, Five-Mile Recreation Area still is popular for swimmers.

Upper Park provides swimming at several swimming holes including Alligator Hole, Bear Hole, Salmon Hole, and Brown's Hole. Opportunities for swimming are also available at various spots along the Yahi Trail, some of which offer shallow water areas and sandy beaches. These swimming areas are accessible only by trail.

2.4.2.5 HORSESHOE LAKE FISHING PIER

The Horseshoe Lake Fishing Pier is a fun place for children to fish year-round; it is the site of the local "Get Hooked on Fishing Not on Drugs" program.

2.4.2.6 DISC GOLF (UNOFFICIAL)

Disc golf has occurred on the 40 acres of former BLM land along SR 32 since 1989. In 1994, the City of Chico purchased the 40 acres from the BLM. On 10/26/98 Bidwell Park and Playground Commissioner Sheley made a notion for the BPPC to declare its intent to consider a proposal to allow disc golf to remain at the existing site, pending environmental review. The notion passes unanimously. Funding for improvements was also allocated at this time.

The disc golf course currently consists of a short and long course with 39 “holes” in place over about a 25 acre area. The course offers no site improvements other than a few benches and tone poles. Parking to access this area is informal, located along an abandoned Caltrans right-of-way paralleling SR 32.

2.4.2.7 PICNIC TABLES

Picnic tables and picnic areas are concentrated in Lower Park where approximately 37 sites are available along Big Chico Creek and near the One-Mile Recreation Area. The Cedar Grove Area offers opportunities for group picnics and special events. Hooker Oak Recreation Area, Five-Mile Recreation Area, and the Horseshoe Lake area offer picnic facilities in Middle Park. No official picnic areas or tables are currently available in Upper Park, except for one table adjacent to Ten Mile House Road.

As with the funding of many of the Park’s maintenance and operational needs, the Park Division accepts monetary donations for the purchase of new picnic tables and/or memorial/dedication/recognition plaques as approved by the BPPC.

2.4.2.8 BENCHES

Benches are located throughout the Park, with the highest concentration located in Lower Park. As in the case with picnic tables, members of the public may apply to the Park Division to place a new memorial/dedication/recognition bench and plaque. The cost for a bench and plaque is currently \$1,500 and there is a limit of three bench installations per year. The City’s policy regarding benches is included in Appendix M of the BPMMP Update.

2.4.2.9 ADA ACCESSIBILITY

The majority of wheelchair accessible sites and parking facilities are located in Lower Park. There are accessible picnic sites at Vallombrosa at Mangrove, One-Mile group picnic area, Cedar Grove (group picnic area), sites 6, 12, 14, 15, 17, 19, 20, 26, 27, 28, 30, 33, and 34, and the Five-Mile Recreation Area. Wheelchair accessible bathrooms are located at the One-Mile Recreation Area, Cedar Grove, Chico Creek Nature Center, Hooker Oak Recreation Area, Five-Mile Recreation Area, Horse Arena, and Horseshoe Lake. Paved handicapped parking areas are at the One-Mile Recreation Area (north of Sycamore Pool, at the group picnic area the in cul-de-sac south of the pedestrian bridge), at Caper Acres, Cedar Grove, Five-Mile Recreations Area, and at Horseshoe Lake. The World of Trees Independence Trail, South Park Drive and Petersen Drive are fully accessible trails. The Horseshoe Lake Fishing Pier and the Chico Community Observatory are also accessible. ADA accessible bathroom units are available at Bear Hole during the summer month. Bear Hole bathroom units are available all winter. The units further up Upper Bidwell Park are removed or locked for the winter.

2.4.3 CIRCULATION AND ACCESS

This section describes the existing transportation facilities in Bidwell Park, including vehicle access, roadways, and parking as well as pedestrian and bicycle access points. Each element is described by location, (Lower Park,

Middle Park, and Upper Park). Exhibits 2.4.3-1a, 2.4.3-1b, and 2.4.3-1c depict the existing circulation system and parking locations.

Bidwell Park contains an extensive trail system and non-motorized travel to, from, and within the Park accounts for many Park visits, especially in Lower Park. A brief overview of the trails system is given in Section 2.3.6.2 above and a trail master plan is included in Appendix E of this BPMMP. Bicycle and pedestrian entrance points to each Park section are discussed below.

2.4.4 PARK ACCESS

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 are described below.

2.4.4.1 ACCESS TO LOWER PARK

Vehicular Access

Two one-way vehicle roads are present in Lower Park, one on each side of the creek. Neither traverses the entire length of Lower Park. The road south of Big Chico Creek, South Park Drive, is for eastbound vehicles while the north road, Petersen Memorial Drive, is for westbound. The speed limit is 20 miles per hour (mph).

South Park Drive

South Park Drive is a one way road heading west to east and is divided into three segments. The westernmost entrance for South Park Drive is at the intersection of Pine and East 4th Streets. It can also be accessed slightly further east on Woodland Avenue between Alder and Sycamore Streets at One-Mile Way. This vehicle segment terminates on Woodland Avenue at the eastern end of Sycamore fields. This road segment is open to vehicles from 9:00 a.m. to one hour after sunset. The second segment of South Park Drive extends from Woodland Avenue to Cedar Grove. While this segment is a paved roadway and is driven by maintenance vehicles, is not open to vehicle use by the public. The third and easternmost vehicle segment starts at the Cedar Grove entrance off at Cedar Way off East 8th Street and terminates on Centennial Avenue near the east end of Lower Park. The gate to this segment of the road is opened at 11:00 a.m. and closed one hour after sunset. The entrance to the Chico Creek Nature Center does not provide access to South Park Drive. South Park Drive can also be accessed from East 8th Street at the entrances to the Cedar Grove Area. The gate to the Cedar Grove parking area opens at 5:30 a.m. and closes one hour after sunset.

Petersen Memorial Drive

Petersen Memorial Drive is a one way road heading east to west. It starts at the intersection of Vallombrosa Avenue west of Manzanita Avenue and terminates at the Sycamore Pool parking lot. The parking lot at the entrance to Petersen Drive is always open. The gate for Petersen Drive is opened at 11:00 a.m. and closed one hour after sunset. The parking lot at Sycamore Pool is accessed from Vallombrosa Way off Vallombrosa Avenue. It is open from 5:30 a.m. to 11:00 p.m.

Vallombrosa Avenue

Vallombrosa Avenue is a two-lane street that acts as the north boundary of Lower Park, extending from Manzanita Road south to Memorial Way. Vallombrosa Avenue is a public roadway that also serves as a major connector between the downtown and the eastern part of Chico.

Bicycle and Pedestrian Access

In addition to the vehicular access points above which can also be used by bicycles and pedestrians, pedestrian and/or bicycle access points to Lower Park are present at Annie's Glen/Camellia Way, Pine Street, Cypress Street, an unnamed trail access point east of Cypress Street, Sycamore Street, Linden Street, Woodland Avenue, East 8th Street, Forest Ave, El Monte Avenue and Centennial Way on the south side of Big Chico Creek. Bicycle and pedestrian access points on the north side of Big Chico Creek are located along Vallombrosa Avenue at two unnamed access points near the eastern edge, Lilac Street, an unnamed access point just west of Lilac Street, Larch Street, Madrone Avenue, an unnamed access point west of Madrone Avenue, Crister Avenue, Vallombrosa Lane, 2 unnamed access points west of Vallombrosa Lane, Bryant Avenue, Rey Way, Sheridan Avenue, and an unnamed access point just west of Pine Street.

Parking in Lower Park

Parking is available in Lower Park at locations along South Park Drive and Petersen Memorial Drive. Major lots serve Sycamore Pool, Sycamore Field, and Caper Acres Playground. Parking along the roadside is allowed along South Park Drive in areas where vehicles are able to completely pull off the paved road way. East of SR 99 in Lower Park, off-street parking is available at Cedar Grove and at the Chico Creek Nature Center. The approximate capacity of parking lots in Lower Park is provided in Table 2.4.4.1-1.

2.4.4.2 ACCESS TO MIDDLE PARK

Vehicular Access

Vehicular access to Middle Park is available via Manzanita Avenue, Wildwood Avenue, Centennial Avenue, and Upper Park Road. Manzanita Avenue is a two-lane road that provides access in the eastern area of Chico. Wildwood Avenue and Centennial Avenue, both of which extend in a generally east-west orientation into Middle and Lower Park from Wildwood Avenue, provide direct access to Middle Park. Upper Park Road begins at the eastern end of Wildwood Avenue and continues in a northeasterly direction, traversing Middle Park into Upper Park in the vicinity of Horseshoe Lake.

Manzanita Avenue

Manzanita Avenue is a two-lane roadway serving the eastern area of the City of Chico and bisecting Bidwell Park. It also serves as the separation between Lower Park and Middle Park. Access into the Park is available from Manzanita Avenue via intersections with Centennial Avenue, Vallombrosa Avenue, and Wildwood Avenue. The City of Chico is currently considering improvements to Manzanita Avenue that may include widening and installation of roundabouts at Hooker Oak Drive and Vallombrosa Avenue in the Park area.

Wildwood Avenue

Wildwood Avenue extends in an easterly direction from Manzanita Road to a point where it curves southerly and turns into Upper Park Road. It is a paved, two-lane roadway with a gate controlling access at the beginning of Upper Park Road. The gate at this location opens one hour before sunrise and closes at 11:00 p.m. Upper Park Road continues easterly as a paved facility through Middle Park to just past the Horseshoe Lake parking area.

Centennial Avenue

Centennial Avenue extends from East 8th Street in the east across Manzanita Avenue south of Big Chico Creek. It is a two-lane public roadway that serves as the southern boundary of the Middle and Lower Park. Centennial Avenue provides access to a pedestrian bridge crossing Big Chico Creek east of Manzanita Park.

EDAW

Exhibit 2.4.3-1a

Bidwell Park Master Management Plan

CIRCULATION - MIDDLE PARK

LEGEND

-  Parking
-  Main Trails
-  Roads
-  Middle Park
-  Lower and Upper Parks

Source: City of Chico 2004



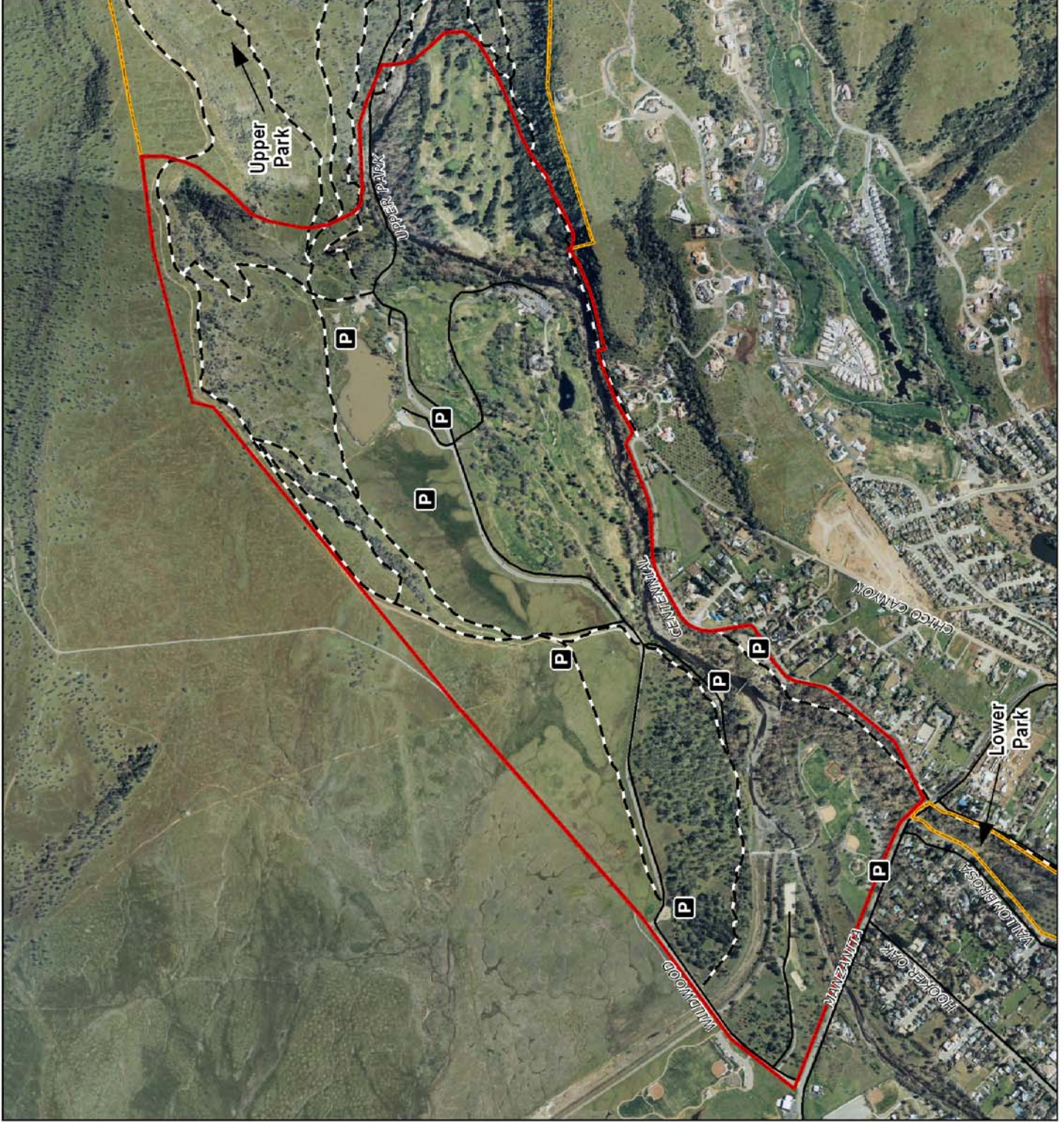
1 Inch = 1,300 Feet



March 29, 2006

EDAW

Exhibit 2.4.3-1b



**Table 2.4.4.1-1
Lower Park Parking Capacity**

Parking Lot	Capacity
North Side of Big Chico Creek:	
Sycamore Pool	37
Petersen Memorial Drive east of former Walnut Orchard	2
Vallombrosa Avenue Entrance Gate	8
South Side of Big Chico Creek:	
Sycamore Pool	59
South Park Drive between Alder Street and Woodland Avenue (4 lots)	32
Cedar Grove	27
Cedar Grove Overflow	xx
Chico Creek Nature Center	35
Off Street Parking along South Park Drive	Approximately 151 spaces
Cedar Grove Overflow	40
Former Deer Pen on East 8 th Street	35
Manzanita / Vallombrosa SW corner	7
Sycamore Field / 1-Mile reservation area	50
Caper Acres	50
South Park Drive Picnic sites	20
Petersen Memorial Drive Picnic sites	43
Source: City of Chico 2006, EDAW 2006	

Bicycle and Pedestrian Access

Bicycle and pedestrian access in Middle Park is available along the roadways described above. Trail access is also available from the subdivision on the south side of the Hooker Oak Recreation Area and from parking in Middle Park. Parking areas in Middle Park are provided at locations off Manzanita Avenue, Wildwood Avenue, Wildwood Trail, Middle Trail, and at the Observatory and Horseshoe Lake areas. The approximate capacity of each parking area in Middle Park is provided in Table 2.4.4.2-1.

2.4.4.3 ACCESS TO UPPER PARK

Vehicular access to Upper Park is provided primarily by Upper Park Road. Alternative access to the South Rim is available off SR 32 in the area of the proposed disc golf facility and Ten-Mile-House Road.

- LEGEND
-  Parking
 -  Main Trails
 -  Roads
 -  Middle Park
 -  Upper Park

Source: City of Chico 2004



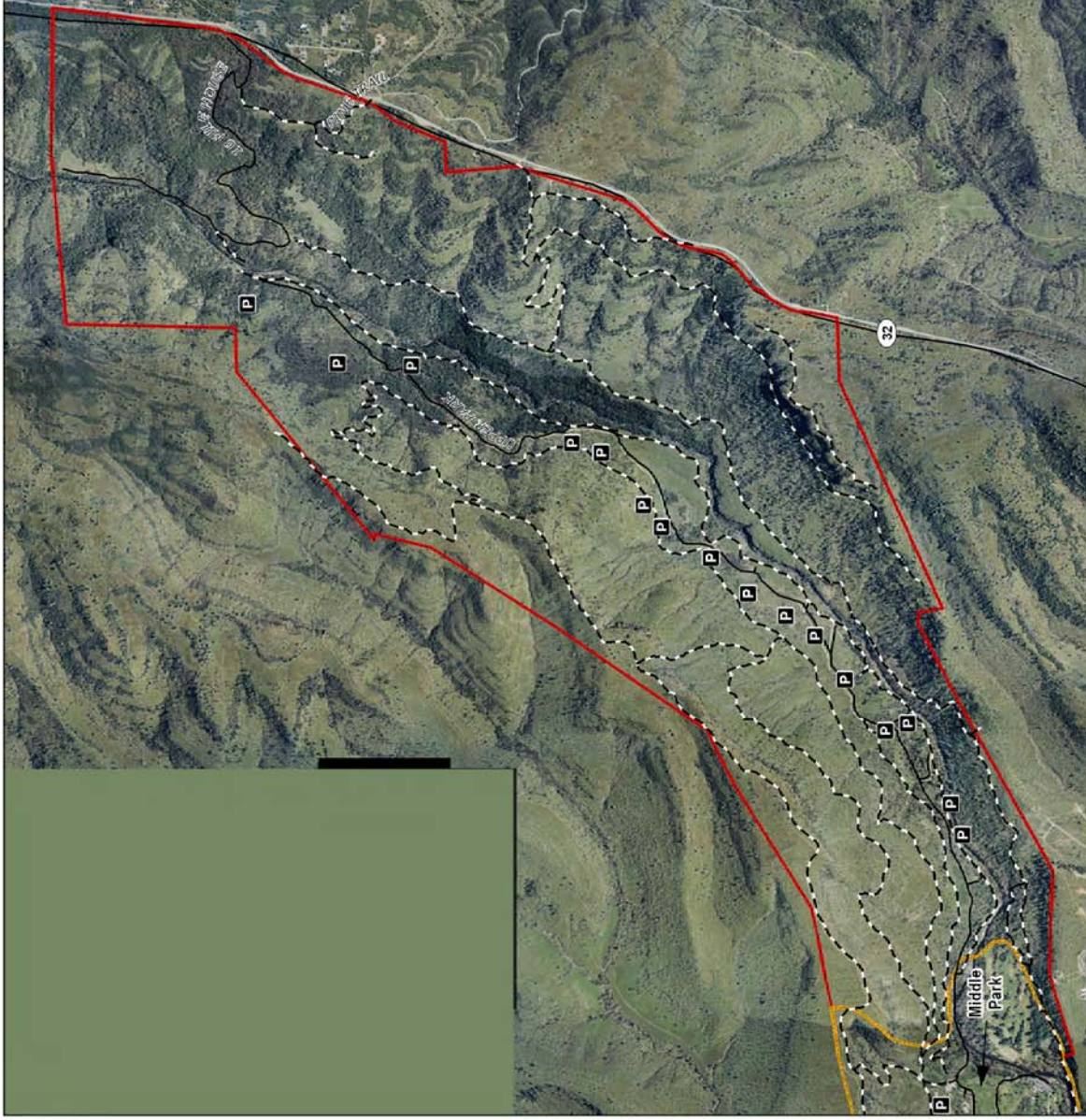
1 Inch = 2000 Feet



March 29, 2006

EDAW

Exhibit 2.4.3-1c



**Table 2.4.4.2-1
Middle Park Parking Capacity**

Parking Lot	Capacity
Chico Canyon Road Trailhead Parking Lot	9
Chico Equestrian Association Arena	25 (or 10 cars and 10 trucks with horse trailers)
A	13
B (Easter Cross)	25
C (Kiwanis Community Observatory)	22
D (Rod and Gun Club)	40
E (Horseshoe Lake)	59
V (Hooker Oak)	170
W (5 Mile Recreation Area North)	26
X (5 Mile Recreation Area South)	79
Bidwell Municipal Golf Course	110
Source: City of Chico 2006, EDAW 2006	

Upper Park Road

Most of Upper Park is accessed via Upper Park Road. Upper Park Road is paved through Parking Area E and turns to gravel at a point slightly east of Area E. The road gate past Area E opens at 7:00 a.m. and closes one hour after sunset. This graveled portion of Upper Park Road is closed to motor vehicles all day Sunday and Monday and during rainy weather. A gate further east, at the Diversion Dam, closes the easternmost part of the road throughout the rainy season. The Park's gravel road is passable by vehicles with normal road clearance, but it is somewhat rough, especially at the end of winter and summer.

Access to the south side of Upper Park is available at Centennial Drive, Chico Canyon Road, the Pine Trail trailhead and various unofficial points along SR 32 as well as the two points described below.

Bicycle and Pedestrian Access

Bicycle and pedestrian access to Upper Park is available from the roadways and trailheads described above. In addition, users access Upper Park from unmarked trails from parking areas. From Parking Area E, an unmarked trail leads towards Big Chico Creek, along the edge of the golf course, across the bridge crossing the creek, along an old road, then back on the trail to the end of the Park's eastern boundary. (Friends of Bidwell Park website). Hikers and bikers also access the Park from a small parking lot located where Centennial Avenue becomes Chico Canyon Road. Pedestrian access is also available from the Canyon Oaks subdivision and from Simmons Ranch and trespassing through private property is a concern (Chico Park Department 2000).

Parking in Upper Park

Parking in Upper Park is provided at numerous locations along Upper Park Road. These parking areas are generally small, consisting generally of pull-offs from Upper Park Road, although several larger lots are located at Diversion Dam, Bear Hole, and in the oak grove at Salmon Hole. An undesignated parking area off SR 32 on the south side of Upper Park serves the eastern area of Upper Park and the disc golf course. The approximate capacity of each parking area in Upper Park is provided in Table 2.4.4.3-1.

Table 2.4.4.3-1 Upper Park Parking Capacity	
Parking Lot	Capacity
F	4
G (Alligator Hole)	12
H (Day Camp)	10
I	4
J	6
K (Bear Hole)	100
L (Diversion Dam)	10
M	3
N (Salmon Hole)	18
O	1
P	8
Q	7
R	4
S (Brown's Hole)	9
T	3
U (end of Upper Park Road)	3
Disc Golf/old Hwy 32 ROW	88
Ten Mile House Road	26
Wildwood *	159 and 10 ADA
Centennial Drive picnic sites/parking	Informal parking along road
* Wildwood is located outside of Bidwell Park, but used during special events. Source: City of Chico 2006, EDAW 2006	

2.4.4.4 ACCESS OFF SR 32

Ten-Mile-House Road

Vehicular access to Upper Park from the east is available at Ten Mile House Road. However, this road is not open to the public and restricted to service or emergency vehicles only. The road enters Upper Park at its far northeast area. It is a steep unpaved road leading from SR 32 towards the adjacent property to the north, owned by the CSU Chico Research Foundation. Ten-Mile-House road does not cross Big Chico Creek or connect to Upper Park Road.

Proposed Disc Golf Facility/Trailhead

The City is considering plans for a formal access off SR 32 at the proposed disc golf site/trailhead. Informal access is currently available by a left turn off SR 32 into an old abandoned Right-of-Way (ROW) of SR 32 which also serves as an informal parking lot for disc golfers, mountain bikers, hikers, and other users of the site.

Humboldt Road

Upper Park can also be accessed via the historic Humboldt Road located directly across from Santos Ranch Road on SR 32.

Rain Forest Trail

The Rain Forest Trail is another access trail east of the BLM property that traverses from the ridges to the South Rim Trail.

2.4.5 UTILITIES AND SERVICES

2.4.5.1 LIGHTING

Pathway lights are present at the One-Mile Recreation Area. Temporary lights are put up at the Cedar Grove Picnic Area parking lot for the annual Shakespeare in the Park Festival.

2.4.5.2 HIGH VOLTAGE POWER LINES

Electricity is provided to buildings in the Park by Pacific Gas & Electric (PG&E) via power lines. Two high-voltage power lines cross Upper Park, one near the Easter Cross, and the other about a third of a mile east of the east end of the golf course. The western line was built by the U.S. Bureau of Reclamation in 1944, and the eastern line by PG&E in 1964.

2.4.5.3 OTHER UTILITIES

Solid Waste

There are bins for collecting solid wastes and recyclables from visitors at various locations throughout the Park. Table 2.4.5.3-1 below shows the number of receptacle by locations within the Park. The City contracts for transporting the trash and recyclables from these bins to the Butte County Neal Road Landfill for sorting, recycling, and landfilling.

Table 2.4.5.3-1	
Trash Receptacles Location in Bidwell Park	
Locations	# of Receptacles
Camellia Way	3
Observatory Parking Lot	2
Annie's Glen	3
Equestrian Arena	1
North Side of Five-Mile	7
Parking Area E (Former Rifle Range)	2
Parking Area B (Easter Cross)	1
Campfire Council Ring	1
Parking Area C (Horseshoe Lake)	1
Parking Area D (Rod & Gun Club)	2
Upper Park - end of paved road	2
South Side of Five-Mile	12
Deer Pen	2
Chico Creek Nature Center	4
Cedar Grove	5
One Mile Recreation Area	12
Caper Acres	4
Bidwell Bowl Amphitheater	5
Individual Picnic Sites off North Park and South Park Drives	45
TOTAL	114
Source: City of Chico 2006	

The City's and Butte County's Integrated Waste Management Plans (IWMP) comply with state-mandated waste reduction goals, requiring local agencies to implement source reduction, recycling, and composting activities to reduce solid waste generation by 25 percent by the year 1995, and by 50 percent by the year 2000 (City of Chico 1999a).

Vegetation Waste

A majority of the material from downed trees is chipped and used within the Park. Large woody material that cannot be chipped is transported to the City's compost facility.

Wastewater

The Water Pollution Control Plant, located at Chico River Road southwest of the City, is owned and operated by the City to treat wastewater collected in the city. The gravity-flow system consists of collection, conveyance, treatment, and disposal facilities with ultimate discharge of treated effluent into the Sacramento River, approximately 1.7 miles from the treatment plant site. The Water Pollution Control Plant (WPCP) has an existing capacity of 9 million gallons per day (mgd), and operates with current average flows of approximately 6.5 mgd. A population of approximately 60,000 is currently served by the WPCP, with average per capita sewage generation of 107 gallons per day (gpd). An upgrade to the WPCP is planned to begin construction within 5 years. The upgrade will expand the plant's capacity to 12 mgd.

Chemical toilets (port-o-pots) are used in Upper Park, while a combination of chemical toilets and sewer are used in Lower Park, depending on location.

Water Use

Cal Water is the water service provider to the majority of the Park, except for the Rod and Gun Club and the Chico Municipal Golf Course, both of which use well water. Cal Water's sole source of the water it provides to the City of Chico is groundwater. Cal Water supplies approximately 7.6 billion gallons of potable water per year to the Chico area. Sixty deep water wells and five storage tanks capable of storing a total of 1.38 million gallons of water are employed by Cal Water. (City of Chico 1999a). Drinking fountains in the Park are available at Sycamore Pool, Cedar Grove, Petersen Drive, Parking Area E, One-Mile Recreational Area restrooms and Five-Mile Recreation Area restrooms.

2.4.6 PUBLIC SAFETY AND EMERGENCY SERVICES

2.4.6.1 FIRE PROTECTION

The City of Chico Fire Department provides fire protection at the Park. The Chico Fire Department operates four fire stations in the Chico area, and currently has plans to add two more stations. On a mutual aid request basis, the Butte County Fire Department also provides fire protection. The Butte County Fire Department operates four stations in the Planning Area and one new fire station west of Chico is planned. Except for Upper Bidwell Park, there is a fire station within seven minutes of the Park. (City of Chico 1999b). In an emergency, surrounding agencies would also respond under a mutual agreement.

The Park and the land surrounding it are areas prone to wildland fires. No fire protection plan for Bidwell Park currently exists. The City of Chico, Butte County, and the California Department of Forestry (CDF) consider these areas to be major fire threats. Each agency responds according to the location of the fire and mutual aid agreements. (City of Chico 1999b). Wildland fires often require special equipment, such as four wheel drive vehicles, to reach inaccessible areas. The City currently does not have specialized equipment specifically for

wildland fires; it employs a combination of the standard City fire fighting equipment with forces of fire fighters doing work on the ground to effectively fight wildland fires. (City of Chico 1999b).

CDF operates an Air Attack Base Station on property leased from the Chico Municipal Airport. This station assists ground crews in fighting wildland fires. It currently houses one federal airtanker and leases additional privately-owned tankers as necessary during the high fire risk season (approximately June–November). The station also houses an air attack (command) plane and a large mobile command post. Relocation of this facility has been discussed, but there are no current plans to move it within a specific time period. (City of Chico 1999b).

Flood Control

Flood control for the City of Chico is provided by a flood control structure at the Five-Mile Recreation area. The structure was installed by the U.S. Army Corps of Engineers in the mid-1960s and is designed for a maximum allowable flow down Big Chico Creek through the Big Chico Culvert at 1,500 cfs. The primary purpose of the structure is to divert potentially damaging peak flows around the central portion of the City of Chico. The flood control structure is maintained by Butte County in conjunction with the DWR.

The Five-Mile flood control system is designed to create a pool in the stilling basin thereby allowing controlled flows through the Big Chico Creek and Lindo Channel flow control structures and the Sycamore Bypass Channel. During high flow periods Big Chico Creek exits the narrow foothill canyon at very high velocities carrying a large bedload until it encounters the Five-Mile Area stilling basin. Velocity and bedload mobilizing capacity is significantly reduced, allowing for the larger, entrained sediment to quickly fall out of the water column, depositing the large gravel just upstream of the Five-Mile Area Flow Control Structures. During the next high flow period the previously deposited gravels flow in the direction of least resistance, bypassing Big Chico Creek proper and flowing down Lindo Channel or Sycamore Bypass instead (BCCWA 1997).

Park Security

Park Rangers and City of Chico police officers are the primary providers of public safety services in the Park. In addition, a private security company is responsible for closing the gates in Bidwell Park.

Medical Aid

Park Rangers can provide first-aid response to minor injuries. For more serious medical emergencies, the City of Chico Fire Department provides first response service. The City of Chico Fire Department has achieved minimum EMTI certification for all fire fighters. Currently ambulance service is provided privately by area hospitals. For medical emergencies in areas that are difficult to access by automobile, helicopters may be used for medical transport. Helicopter landing zones in Upper Park have been identified adjacent to the Bear Hole Parking Area, 10-Mile House Road and Horseshoe Lake Area.

2.5 MAINTENANCE AND OPERATIONS STAFF

The City of Chico Park Division is responsible for the management and maintenance of Bidwell Park. All of the Park's operating expenditures are paid through the City of Chico General Fund. In 2002–2003, the Park Division operating budget — encompassing all its facilities — was \$2.5 million. This funding supports a staff of 24.4 full-time permanent positioned employees and 5.6 full-time hourly positioned employees. The Park Division strategic plan, identifying operating income and expenses, is posted on the City of Chico website.

2.5.1 FUNDING

2.5.1.1 FUNDING STRATEGIES

As with most other large Parks in the country, Bidwell Park is under-funded and under-staffed. Creating a funding strategy for maintenance, staffing and new construction in the Park will be a key to the Park's continued success. Bidwell Park is unique in that it is a very large Park being managed and funded by a relatively small municipality. Many Parks of this size are managed by larger agencies that have an array of revenue generating mechanisms to draw from, i.e., daily user fees, campgrounds, etc. Even after exhausting all available sources for funding, most agencies still have a shortfall. Many of these Parks and agencies are in the process of expanding their revenue generation capabilities to offset these shortfalls. Most large Parks are now requiring some user fees, as costs to maintain these heavily used areas and user expectations of quality experiences increase drastically. Appendix B contains examples of other Parks and their maintenance and operations budgets, staff per site, fees charged per user, volunteers per site, revenue generated per site and shortfall strategies.

In order to continue maintaining an acceptable level of service to the public, the City should:

- ▶ Review current annual maintenance expenditures.
- ▶ Review annual maintenance expenditures and budgets for other trail systems and Parks.
- ▶ Create an annual maintenance and operations budget based on past expenditures.
- ▶ Complete cost estimates for desired new construction.
- ▶ Create a capital expenditure budget for new construction, including phasing for the next several years' projects.
- ▶ Identify shortfalls between available budget and desired maintenance and capital expenditures.
- ▶ Develop funding strategies to address shortfalls.
- ▶ Develop volunteer opportunities for trail maintenance.

A brief summary of some of the methods that other Parks and agencies use to secure funding for their Parks or save money, either on a long term basis or for specific project as the needs arise are discussed below. Many of these mechanisms were created by efforts undertaken by the public or agency to make them happen, i.e., petitioning signatures to get a bond issue added to a local ballot. These recommendations should be explored by City staff and then a proposal developed to share with City departments that dedicate funds to the Park, so that a comprehensive funding strategy may be developed.

- ▶ Federal, state, and local grants. Many of these are available for trails (pedestrian transportation) and recreation projects. Two major sources available on a nationwide basis are the federal Recreational Trails Program Grants; <http://www.fhwa.dot.gov/environment/rectrails/> and IMBA Grants; <http://www.imba.com/resources/grants/index.html>.
- ▶ Development or impact fees. Assessed as a per unit charge on new construction. Can be set aside specifically for trails or for larger maintenance within the Park.
- ▶ User fees. These can be dealt with in a number of ways.

- Annual or day passes required for all users. User fees can be used as the Parks Department sees fit, for staff, maintenance, or new construction.
 - Annual or day passes free or at a reduced rate for City residents only. All non-residents pay an increased fee. This reduces the burden on those already paying property or other taxes or fees to the City for salaries and maintenance. User fees can be used as the Parks Department sees fit, for staff, maintenance, or new construction.
 - Bonds. Bonds are generally used for specific projects, such as the purchase or acquisition of new land or design and construction of improvements (i.e., Annie Bidwell Trail). A description of the use of the Bond income is required and must be followed.
 - Taxes. Sales or other taxes at a very low percentage i.e., 1/10th of one percent can be used over the long term to cover staff, maintenance, or new construction. This method shares the funding burden with visitors to the local community.
 - Special funding efforts for specific projects.
- ▶ Use of volunteers and non-profit organizations such as the Friends of Bidwell Park or IMBA.
 - ▶ Public involvement and support. Once budget shortfalls are established, the public can often be the greatest resource for leading efforts to provide funding. Publishing and marketing potential projects gets the public excited and gives them a sense of ownership in the project.
 - ▶ Public-private or inter-agency partnerships.

2.5.1.2 BIDWELL PARK ENDOWMENT FUND

Bidwell Park Endowment Fund has been set up with the Northern Valley Community Foundation to accept donations. The fund is intended to ultimately provide a source of funding augmenting City and other funds to maintain Bidwell Park. Information on how to donate to the fund is available at the North Valley Community Foundation.

2.5.2 MAINTENANCE STAFF

In 2003–2007, the Park Division supported the following funded, permanent positions for maintenance dedicated to Parks and Open Spaces:

- ▶ One Volunteer Coordinator
- ▶ One Field Supervisor
- ▶ Six Maintenance Workers
- ▶ Two Senior Maintenance Workers

In addition, the Department hires hourly employees, including:

- ▶ .75 Maintenance Worker
- ▶ 1.15 Maintenance Aide

2.5.3 RANGERS/LIFE GUARDS

In 2007, the Park Division supported 2.81 permanent Park Ranger positions, as follows:

- ▶ One Senior Park Ranger
- ▶ 0.81 Seasonal Park Ranger

In addition, the 2.2 FTE Lifeguards are employed by the City.

All of these staff are committed to Bidwell Park as well as other Greenways throughout the City.

2.6 VOLUNTEERS

The Chico Park Division invites the help of community members and frequently looks to volunteers to implement special projects and ongoing tasks. In 2004, over 15,000 volunteer hours were spent in Bidwell Park. The contributions made by these volunteers who gave their time and in some cases money, made immeasurable contributions to not only the pleasure of visitors enjoying Bidwell Park, but also to the health and vitality of the resources themselves. While the Park Division encourages and recruits volunteers, individuals, groups, and service organizations also frequently approach the City and ask how they can help. These unselfish offers are very important to the spirit of volunteerism throughout the community. In response to these offers, the Park Division will tailor specific volunteer activities based on the available time, skill level, and number of helping hands. The goal is to make the volunteer experience enjoyable and positive and to encourage future volunteerism.

Volunteers are utilized in a number of ways to assist with various improvement and vegetation management projects throughout the Park. Recent projects include the construction of shade structure at Caper Acres, installation of split rail fencing, significant removal of invasive/non-native flora, public assistance, and individual and group service projects. The addition of the volunteer coordinator position to the City's park staff was approved by the City Council in 2005 and a volunteer coordinator was hired in February of 2006.

Current volunteer opportunities include the following: maintenance activities, trail work, litter removal, invasive weed removal, Park Watch, and volunteering at the Big Chico Creek Nature Center.

2.6.1 PARK WATCH

Park Watch members patrol Bidwell Park on foot, bicycle, or, if they have one, by horse. Members report suspicious or unusual activities or conditions to Park Rangers. Members also provide Park visitors with information on Bidwell Park including rules and regulations. Members also assist with special projects and public information needs.

2.6.2 MAINTENANCE ACTIVITIES

2.6.2.1 TRAIL MAINTENANCE

Volunteers provide an important role in trail maintenance. The work performed by volunteers includes brush clearance, installation of water bars and causeways, and restoration work. Trail volunteers also eradicate and revegetate unofficial trails and perform small construction projects to encourage usage of authorized trails.

2.6.2.2 LITTER CONTROL

Individuals or groups may volunteer to remove litter in a specific area of Bidwell Park. In addition to these projects, up until 2005 the City sponsored two community-wide cleanups each year, one in the spring and the other in the fall. In 2005, a single cleanup event was held in September to try to increase participation.

2.6.2.3 VEGETATION MANAGEMENT

To help the Park Division reduce the amount of herbicides used in Bidwell Park, volunteers are sought to help with the manual removal of non-native invasive plants and trees. Vegetation management projects are normally confined to Lower Park; however, specialized removal of target species also occurs in Middle and Upper Park.

2.6.2.4 PAINTING

Winter weather as well as the summer sun damage the paint on park facilities. Volunteers are used to help keep the Park looking attractive by repainting these items.

2.6.3 CHICO CREEK NATURE CENTER

Volunteer programs for individuals interested in animal care or environmental education are available through the Chico Creek Nature Center. The Chico Creek Nature Center volunteer roster includes home-schooled students, retired people, and college students.

2.7 PLANNING INFLUENCES

2.7.1 DEMOGRAPHIC PROFILE

2.7.1.1 LOCAL AND REGIONAL RESIDENTS

Bidwell Park draws visitors primarily from the local and regional area. For the purposes of the BPMMP, the local population using Bidwell Park consists of the residents of the City of Chico. The residents of Butte County comprise the regional population, although the Park also serves residents from throughout Sacramento Valley.

Population Trends and Projections

Many parts of California, including the City of Chico and surrounding area, experienced a dramatic rate of population growth between 1970 and 2000. Table 2.7.1-1 below lists the past population trends for Chico, the Chico Sphere of Influence (SOI) (existing areas within the City plus City planning area), and Butte County. The 2000 U.S. Census indicates that the City of Chico population increased from 40,079 in 1990 to 59,954 in 2000, representing a 50% rate of growth over the ten years. This growth rate was similar to the 1980 to 1990 rate of 51%. The growth in the SOI was 17% during the same period (72,526 to 84,985). The City grew at a faster rate between 1990 and 2000, in part due to annexation, which added 2,827 housing units to the City. Using an average household size of 2.4 persons, the total population added to the City from annexation, from 1990 to 2000, is estimated at 6,776. If this group is removed from the City's population, the growth rate is 33%, still twice the rate for the SOI (City of Chico Housing Element 2003).

Table 2.7.1-1 Historic Population Growth Trends			
Year	City of Chico	Chico Sphere of Influence	Butte County
1970	19,580	43,682	101,969
1980	26,603	58,319	143,851
1990	40,079	72,526	182,120
2000	59,954	84,985	203,171
Source: City of Chico Housing Element 2003			

According to the Butte County Association of Governments, the population of the City of Chico is expected to grow at an annual rate of 2.5%, which is higher than the 1.9% projected growth rate for Butte County as a whole. Projected population growth is presented in Table 2.7.1-2 below.

Table 2.7.1-2 Population Projections by Jurisdiction 2005–2025			
Year	City of Chico	Chico Sphere of Influence	Butte County
2005	67,448	n/a	222,613
2010	75,879	n/a	244,004
2015	85,364	n/a	267,546
2020	96,035	n/a	293,467
2025	108,039	n/a	322,017
Source: BCAG 2005. Estimated growth rates of 2.5% for City of Chico and 1.9% for Butte County are based on General Plans.			

Demographic Diversity

The City's population is predominantly white, with 18% of the population identified as non-white. The percentage of the non-white population increased by over 50% over the ten-year period from 1990 to 2000. The fastest growing ethnic group between 1990 and 2000 was Asian and Pacific Islanders, which increased from 355 persons in 1990 to 1,602 persons in 2000 (City of Chico Housing Element 2003). Table 2.7.1-3 below illustrates the ethnic breakdown of Chico, the SOI and Butte County for the year 2000.

Table 2.7.1-3 Ethnic Characteristics						
	City of Chico		Chico's Sphere of Influence		Total Butte County	
	Number	% of Total Number	Number	% of Total Number	Number	% of Total Number
Total Persons	59,954	100%	84,985	100%	203,171	100%
White	49,377	82%	71,879	84%	171,728	85%
Black	1,215	2%	1,495	2%	2,816	1%
American Indian Eskimo & Aleut	782	1%	1,170	1%	3,866	2%
Asian & Pacific Islander	2,639	4%	3,225	4%	7,048	3%
Other Races	3,390	6%	4,595	6%	9,790	5%
Two or More Races	2,551	4%	3,525	4%	7,923	4%
Hispanic Origin*	7,351	12%	10,523	12%	21,339	11%
* 2000 Census did not classify Hispanic Origin in a separate category. Persons of Hispanic Origin may be of any race. Source: City of Chico Housing Element 2003; 2000 Census						

According to the 2000 U.S. Census, the City of Chico has a relatively young population, median age of 24.6 years, when compared to the state median age of 31.5 years. The age group between 15–24 years accounts for 35% of the City's population and 27% in the SOI. The presence of the California State University, Chico and Butte Community College help explain the relatively young population. It is estimated that between the university and the community college, 14,500 students live in the City and 19,973 live in the SOI. The City defines the

student population as persons between 18 and 24 years of age who have located in the SOI to attend school (City of Chico Housing Element 2003). However, this group makes up a smaller percentage of the total population in 2000 as compared to 1990.

The age profile demonstrates a slight overall aging of the population since 1990. The percentage of the City's population under 20 years of age has remained fairly constant with 28% currently, compared to 26% in 1990. The largest age cohort, the 20 to 24 year old group, currently represents 20% of the population, which is a decline from 26% in 1990. The major increase occurred in the 45 to 54 age group, which went from 5% to 10% of the population and numerically increased from just under 2,000 persons to over 6,000. The percentage of persons over 60 years of age increased slightly from 9% to 10% (City of Chico Housing Element 2003).

Local Market Analysis

Bidwell Park is one of the largest municipal parks in the country. Because its primary service population is relatively small compared to other municipalities with large parks, the Park gives the City the highest park acreage per capita ratio in the country (see Table 2.7.1-4 below). In addition, there are large parks and open space areas along the Sacramento River and in the foothills available for use by City of Chico residents. The City of Chico is well served with park space and many residents of Chico are particularly active in the use of parks. Likely, some of the City's residents have chosen to stay or move to Chico, in part for the abundance of park space. Given the popularity of the Park, it appears that there is a large existing demand for park space. However, it is not known if there is additional unmet demand for both general park space and for particular recreational facilities.

Table 2.7.1-4 Acres per Capita of Large Municipal Parks				
Park Name	Location	Size (acres)	2000 Population	Acres Per Capita
South Mountain Park	Phoenix, AZ	16,500	1,321,045	0.013
Cullen Park	Houston, TX	10,534	1,953,631	0.005
Newport News Park	Newport News, VA	8,000	180,150	0.044
Mission Trails Park	San Diego, CA	5,760	1,223,400	0.005
Forest Park	Portland, OR	5,000	529,121	0.010
Fairmont Park	Philadelphia, PA	4,180	1,517,550	0.003
Griffith Park	Los Angeles, CA	4,107	3,694,820	0.001
Eagle Creek Park	Indianapolis, IN	3,930	781,870	0.005
Bidwell Park	Chico, CA	3,670	59,954	0.061
Mill Creek Park	Youngstown OH	2,530	82,026	0.030
Swope Park	Kansas City, MO	1,769	441,545	0.004
Forest Park	St. Louis, MO	1,300	348,189	0.004
Golden Gate Park	San Francisco, CA	1,017	776,733	0.001
Central Park	New York City, NY	843	19,157,532	0.00004
Source: Friend of Bidwell Park 2004				

Park Interest Groups

The City of Chico is home to many civic organizations. Well-known Bidwell Park interest groups, organizations, and stakeholders including, but not limited to the following:

- ▶ Altacal Audubon Society
- ▶ Bidwell Municipal Golf Club
- ▶ Big Chico Creek Ecological Reserve
- ▶ Big Chico Creek Watershed Alliance
- ▶ Butte Environmental Council
- ▶ California Department of Fish and Game
- ▶ California Native Plant Society Mt. Lassen Chapter
- ▶ Chico Area Council on Aging
- ▶ Chico Area Recreation and Park District
- ▶ Chico Cat Coalition
- ▶ Chico Chamber of Commerce
- ▶ Chico Creek Nature Center
- ▶ Chico Disc Golf Club
- ▶ Chico Dog Fanciers
- ▶ Chico Equestrian Association
- ▶ Chico Museum
- ▶ Chico Paddleheads
- ▶ Chico Rod & Gun Club
- ▶ Chico Running Club
- ▶ Chico State Cycling Club
- ▶ Chico Velo Cycling Club
- ▶ Friends of Bidwell Park
- ▶ Hooked on Fishing, Not on Drugs
- ▶ Kids and Creeks
- ▶ Kiwanis Community Observatory
- ▶ Sovereign Nation of the Mechoopda Indian Tribe
- ▶ Park Watch
- ▶ Save Bidwell Ranch
- ▶ Sierra Club Yahi Group
- ▶ Streaminders
- ▶ Theatre of Chico/Shakespeare in the Park
- ▶ Tuesday Thursday Ride

Many of these groups actively participated in the planning process as members of the CAC or by providing written comments and suggestions.

2.7.1.2 EXISTING AND POTENTIAL FUTURE PARK VISITORS

Park Visitor Demographics

Community and visitor surveys were conducted as part of BPMMP Update public outreach process. The results of the 2005 Surveys are reported in Appendix B. In general, Bidwell Park visitors represent a typical cross section of the population of Chico and Butte County.

Visit Characteristics

Based on the 2005 BPMMP Update Surveys, the average visit of survey respondents was 2 to 3 hours. Duration of some activities may be longer than others. For example, visitors participating in equestrian trail riding may spend a longer time in the park than parents visiting a playground with toddlers, but equestrians may visit less frequently due to the preparation involved. Based on the survey, it appears that most visitors are coming from Chico or Butte County.

2.8 KEY PLANNING ISSUES AND OPPORTUNITIES

This section identifies key planning issues and opportunities addressed in the BPMMP Update. Issues and opportunities were identified through the following sources:

- ▶ Initial list of planning issues approved by the BPPC;
- ▶ CEQA NOP public scoping process;
- ▶ Input from the Citizen's Advisory Committee;
- ▶ Visitor and Community surveys (Appendix B);
- ▶ Written comments received throughout the BPMMP Update planning process;
- ▶ Issues identified by the planning team during literature reviews and research.

The overarching planning issue driving the future management of Bidwell Park is defining and achieving a balance between resource protection and recreation uses for an active and growing community. Achieving this balance requires applying different management goals by Park Zone (i.e., Lower, Middle and Upper Park), and dispersing uses to other parks in the region. The 1995 south side addition to the Park, encompassing approximately 1,400 acres, created the need for a BPMMP update to address management issues for the new addition in Upper Park, along with a need to review and update goals, objectives, and recommendations for the Park as a whole. To more clearly define roles and responsibilities and achieve efficiencies in Park management, another key issue addressed in the BPMMP Update is division of the plan into policy components (goals and objectives) to be overseen by the City Council, and implementation components (implementation strategies and guidelines) to be overseen by the BPPC and General Services Director. This change from the 1990 BPMMP is reflected in Chapter 3.

Various issues pertaining to this overall theme are identified below, by general topic, and are addressed in Chapter 3 and various Appendices of the document.

2.8.1 LAND USES

A key issue related to land uses addressed in the BPMMP Update is the protection of the Park from adverse effects resulting from off-site development, including encroachment, visual and auditory effects, and access issues. Measures identified for the protection of the Park are cooperation with adjacent landowners and establishment of a Bidwell Park Sphere of Influence (BPSI) to preserve, protect, and enhance the experiential value of Bidwell Park. Park expansion through acquisition of the addition of Bidwell Ranch is also an important interest of stakeholders.

2.8.2 PHYSICAL AND BIOLOGICAL RESOURCES

Protection of the Park's many resources was identified as a key planning issue by all participants in the planning process. Protection of water quality, thin erosive soils, natural communities, special-status species and native flora and fauna were all identified as high priorities for the management of Bidwell Park. A Natural Resources Management Plan (NRMP) that addresses oak community management, invasive species management, and fire management was developed as part of the BPMMP Update (see Appendix C). The NRMP is intended to build the

foundation for future expansion to include other resource management topics and to ultimately form the baseline for sound resource management in the Park.

2.8.3 CULTURAL RESOURCES

Cultural resource protection was identified as a planning issue that was not adequately addressed in past planning efforts. While some work toward inventorying and adequate management of cultural resources has been done in the past, a complete cultural resources inventory as well as the development of a Cultural Resources Management Plan (CRMP) (Appendix D) have been identified as needed tools for the sound management of the Park's many historic, ethnographic, and prehistoric resources. This BPMMP update contains an annotated outline for a CRMP to be developed in the future. Ongoing dialogue with the sovereign Nation of the Mechoopda Tribe and consideration of the use of the Park for gathering of botanical resources by the native people have also been identified as important planning issues to be addressed.

2.8.4 AESTHETIC RESOURCES

Bidwell Park is well known for its scenic beauty. Preserving the Park's visual and aesthetic resources is a key planning issue for many stakeholders. Preservation of the local viewshed, protection of the night sky for stargazers, the use of natural materials that blend into the environment and a consistent Park design were identified as important issues to be considered in future management of the Park. In addition, the BPPC recently drafted a Bidwell Park Sphere of Influence resolution which is up for adoption by the City Council.

2.8.5 INTERPRETIVE AND EDUCATIONAL RESOURCES

The need for a comprehensive interpretive and educational program was clearly identified during the planning process. Specific issues identified include the need for interpretive themes (principal messages), a docent program, community and school involvement, coordination with groups (e.g., the sovereign Nation of the Mechoopda Tribe) regarding Native Peoples' use of the Park, signage to clarify rules and regulations, and interpretive signs and other materials to convey the importance of the Park's natural, cultural and other environmental resources and the need for their protection.

2.8.6 RECREATION

Many issues related to recreation uses were identified during the planning process. Balancing the need for recreational opportunities with resource protection is a key issue affecting recreation planning. Providing diverse high quality recreational uses, preserving current opportunities, and planning ahead for new uses all ranked high on the list of issues to be addressed. Determining what uses and the level of intensity that would be allowed in different Park zones (Upper, Middle, and Lower parks) were key issues, along with a desire to define/clarify terms for recreation uses. Developing a comprehensive official Park trail network, reviewing existing trails, and developing approaches to fix and upgrade, reroute, or close unofficial trails with a focus on protecting sensitive natural and cultural resources was a priority planning concern. The Update contains a Trails Master Plan (Appendix E) that addresses issues related to trail maintenance, construction, and closure. Determining the future of disc golf in Bidwell Park is a high priority issue, and the BPMMP update includes a number of disc golf concept plans (see Appendix H) for potential future disc golf facilities, integrated with other important uses of the disc golf site, including trail use, scenic viewing of the Park, and nature observation.

2.8.7 UPPER PARK ROAD

The future of Upper Park Road is a planning concern identified as requiring further evaluation. Proposed scenarios include: paving the road; shortening it and closing or upgrading parking and other facilities; and closing

it seasonally or year-round to private vehicle use while replacing access with public transportation. Issues relating to public safety (i.e., speeding on the road, conflicts between users) and air quality (from dust generated by motor vehicles) also were identified as important concerns to address.

2.8.8 SITE SPECIFIC PLANNING

The BPMMP Update contains specific area plans for the Horseshoe Lake area (Appendix F) and the Cedar Grove Area (Appendix G). These specific plans focus on accommodating and facilitating current uses of these sites and allowing for future improvement. The Horseshoe Lake Area Specific Plan is closely integrated with the Trails Master Plan developed as part of the BPMMP Update, since the Horseshoe Lake area serves as an important staging area for trails in Upper Park.