Preconstruction Survey
Big Bend Hot Springs Resort
Big Bend, California

Prepared for:
Big Bend Hot Springs Project, LLC.
25322 Hot Springs Rd.
Big Bend, CA 96011

Prepared By:
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August 15, 2011

SUMMARY

Big Bend Hot Springs Project, LLC. is developing a commercial retreat center in the town of Big Bend, CA in Shasta County on land with a prior history of commercial use. The center will include hot spring soaking area, campsites, environmental education and meeting spaces, a manager's residence, and ADA upgrades. Improvements to existing roads and pedestrian bridge across Indian Creek will also be made.

A preconstruction survey was performed to inventory and map plant alliances, report all plant species, and note the presence of any detected special status species, migratory bird nesting areas, bat roosts located within the Big Bend Hot Springs Retreat (BBHSP) boundary that could be impacted by proposed construction. As per CDFG guidelines, occurrences of Blue Elderberry, *(Sambucus mexicana)*, were also noted.

Blue elderberry shrubs were found in one location along the Pit River embankment. The presence of Valley Elderberry Longhorn Beetle (VELB) was detected in the only one of the three shrubs that was accessible, and it is assumed that VELB occur in all three shrubs. Protective measures must be taken as outlined in *Conservation Guidelines for Valley Elderberry Longhorn Beetle*, Sacramento Fish and Wildlife, 1999. (See Appendix D for full document.)

Recommended avoidance, minimization and mitigation measures are summarized below:

1. During construction, areas containing the Elderberry should be isolated by a buffer zone greater than 100 feet from the drip-line of shrubs.
2. Fence and flag all areas to be avoided during construction.
3. Signs should be hung on fences warning about the penalties for disturbing this area, and instruction to contractors should be educated on the need to avoid damage.
4. Any damage within the buffer zone must be repaired.
5. Chemicals must not be used within the buffer zone.
6. Removal of vegetation may only be during the months of July through April within the buffer zone, with no vegetation removed within five feet of elderberry plant stems.
7. Any encroachment into the buffer zone must be approved by USFWS and monitored by a qualified biologist.
8. Any elderberry plant that must be transplanted or that is destroyed during construction must be replaced on a 6:1 ratio, with 2 additional associated native plants for every new elderberry seedling. New plants must be irrigated and maintained, and monitored by a qualified biologist.

Additional protective measures during construction should be taken to avoid damage to wildlife and plant communities:

1. All vegetation removal should take place between September 15 and March 1 to avoid the disruption of any nesting or roosting birds and bats. Any active nests must maintain a 300-foot buffer until young birds or bats have fledged.

2. Erosion has cumulative effects on clear rocky streams and rivers such as the Pit River and Indian Creek. Use wattles, erosion control mats and best practice methods during construction to prevent runoff.
3. Avoid the use of erosion control mats or wattles with mesh or netting to prevent the entrapment and/or killing of wildlife, including snakes, lizards, birds and mammals. If the use of mesh or netting is unavoidable, include only natural-fiber and biodegradable materials.
4. All areas beyond the minimum requirements for construction should be off-limits to heavy machinery and equipment, and fenced during construction when possible with a brightly colored fencing material.
5. Trees with trunk diameter >24 inches should be fenced at a distance of no less than 5 feet outside of the dripline wherever possible.
6. Avoid the removal of mature oaks whenever possible.
7. Avoid the use of heavy machinery during rainiest months to reduce soil compaction and soil erosion.
8. Avoid unnecessary soil disturbance whenever possible to minimize dispersal of the seeds of noxious weeds.
9. Measures should be taken to avoid the introduction of pests and pathogens to the site through soil, plant materials, clothing, and infected equipment.
10. The discharging of chemicals, including paint, paint thinners, gasoline, cement, etc, should not be permitted outside of designated waste containment units.

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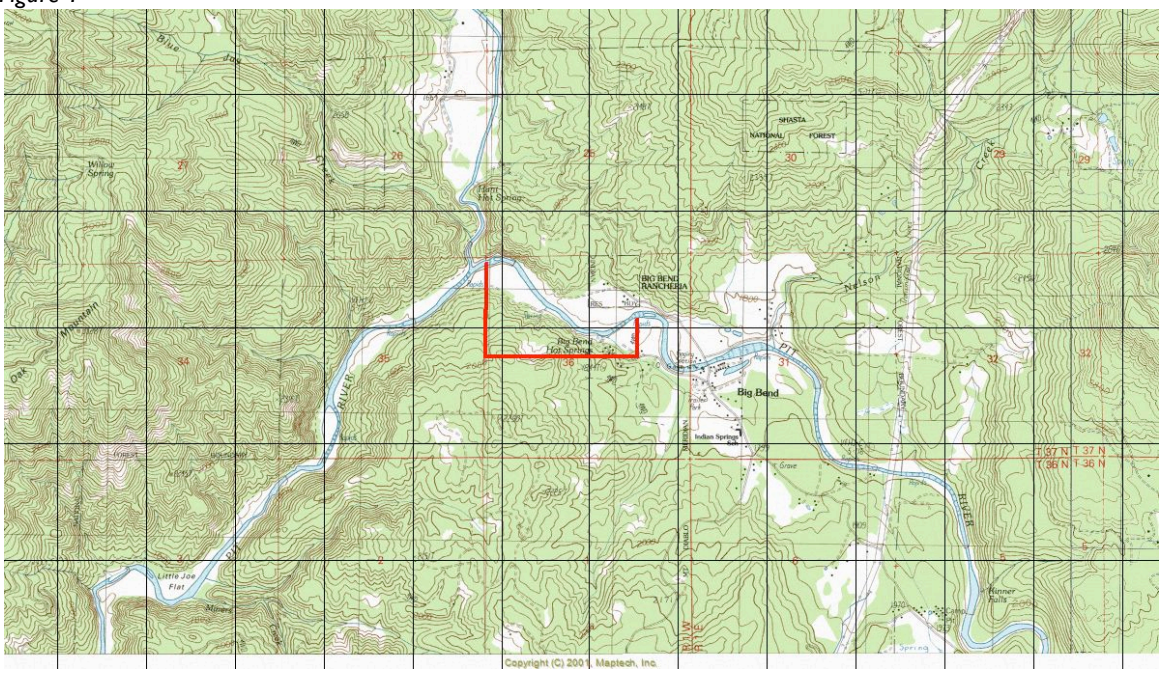
1. PROJECT DESCRIPTION

Big Bend Hot Springs Retreat (BBHSP) is located on 20 acres of a140-acre parcel (# 021-260-016), in the town of Big Bend in Shasta County, CA. The parcel lies just south of the Pit River, defining its northern border, with a small creek that runs through the proposed development area called out on maps as Indian Creek. All proposed development on the 140-acre parcel is within a 20-acre portion of the parcel that has a prior history of commercial and recreational use and continued zoning as such. (See Figure 1 for project vicinity and 140-acre parcel map.)

Figure 1



Proposed Project. The hot spring soaking area will be located at an existing hot tub site, 25 feet from the Pit River within a setback, exemption granted by Sacramento Office of Fish and Game 3/16/11. Two campground areas with a total of 16 campsites will be developed. Development is limited to grading an area less than approximately 80 square feet and installing a picnic table, metal food storage container and low profile lighting at each campsite. Two parking areas with a total of 22 parking stalls will be developed, totaling approximately 1530 square feet, and will include grading and surface treatment. Environmental education, meeting spaces, and a manager's residence are proposed in previously disturbed areas on the site along existing roads. Existing roads and paths will be improved for fire access, environmental quality, and ADA compliance. Improvements in utilities will take place at this time and will be located under roads and

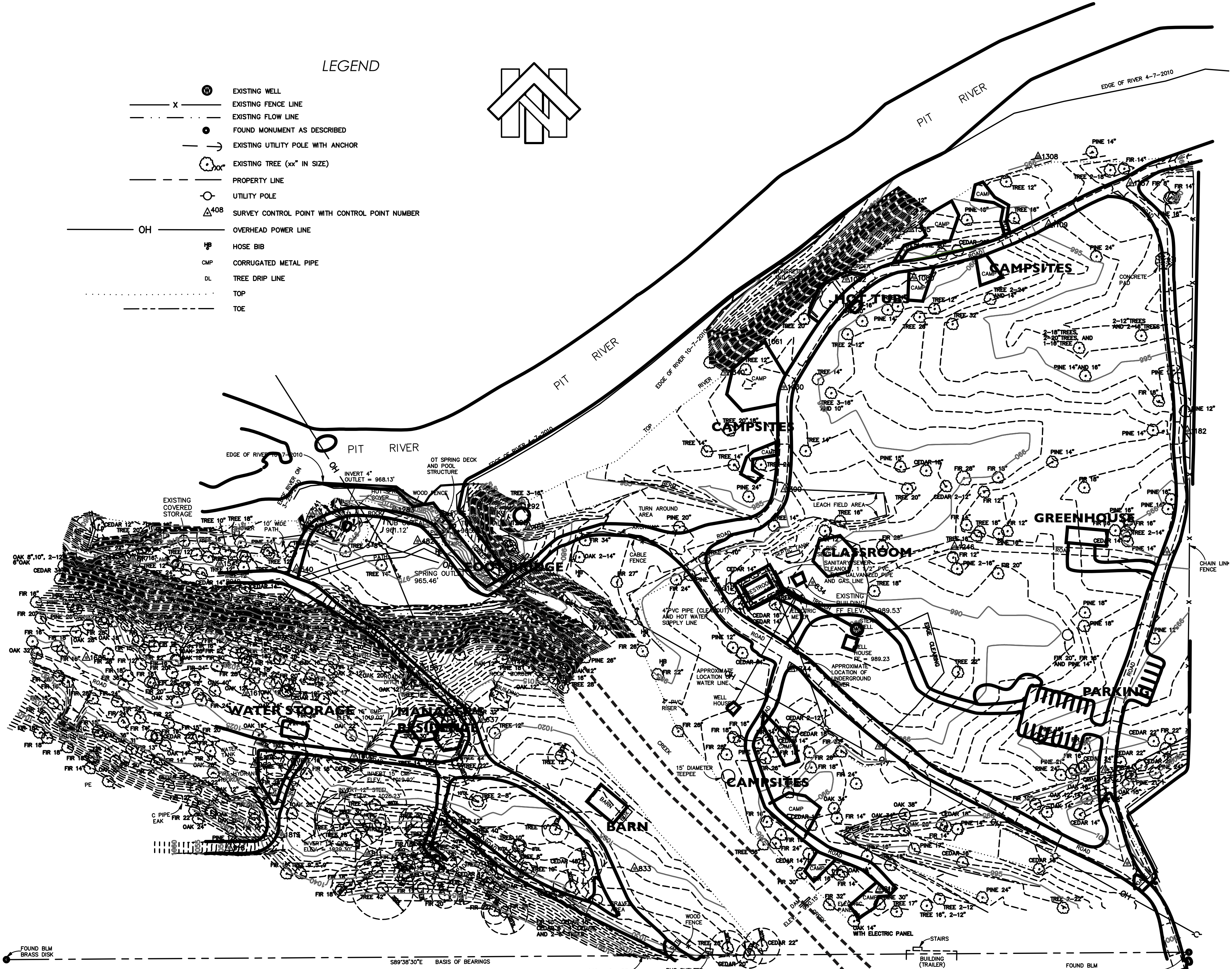

LEGEND
EXISTING WELL
EXISTING FENCE LINE
EXISTING FLOW LINE
FOUND MONUMENT AS DESCRIBED
EXISTING UTILITY POLE WITH ANCHOR
EXISTING TREE (xx" IN SIZE)
PROPERTY LINE
UTILITY POLE
SURVEY CONTROL POINT WITH CONTROL POINT NUMBER
OVERHEAD POWER LINE
HOSE BIB
CORRUGATED METAL PIPE
TREE DRIP LINE
TOP
TOE
PIT RIVER
EDGE OF RIVER 4-7-2010
EDGE OF RIVER 10-7-2010
CAMPSITES
HOT TUBS
GREENHOUSE
CLASSROOM
PARKING
WATER STORAGE
MANAGERS RESIDENCE
BARN
LEACH FIELD AREA
TURN AROUND AREA
EXISTING COVERED STORAGE
SEPTIC TANK
WELL HOUSE
CHAIN LINK FENCE
FOUND BLM BRASS DISK
S89°38'30"E BASIS OF BEARINGS
BUS SHELTER
WOOD AND WIRE FENCE
BUILDING (TRAILER)
STAIRS
FOUND BLM BRASS DISK ELEVATION = 1000.00' (ASSUMED)
CREEK

FIGURE 2

BBHSP
COMMUNITY RETREAT

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BIG BEND HOT SPRINGS PROJECT
25322 HOT SPRINGS RD.
BIG BEND, CA 96011

DATE 07.19.11

PROPOSED SITE PLAN

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in areas of prior disturbance. Improvements to existing pedestrian bridge across Indian Creek will also be made. (See Figures 2 and 3 for proposed project plan.)

1.1 Study Area

The project is located south of the Pit River near the community of Big Bend, in Shasta County. The Study Area encompasses approximately 20 acres of the proposed area zoned for commercial and recreational use with a history of prior disturbance in the eastern portion of the 140-acre parcel. Sacramento Fish and Game recommended study of the approximately 3 acres along previously constructed roads and disturbed fields where new construction will occur. However, for the purpose of this study the entire 20-acre commercial/recreational zoned parcel was surveyed, as the designs for BBHSP were not yet finalized during this survey period. See Figure 4 for Survey results.

2. METHODS

Pre-construction Biological Assessments such as this one are typically conducted after a Comprehensive Biological Assessment of the proposed site has been conducted to determine the presence or non-presence of federally listed special status species. A Comprehensive Survey has not been conducted for this site. Ecologist Jennifer Berry consulted Richard Lis at the Sacramento office of California Department of Fish and Game (CDFG) to discuss the season, duration and extent to which a Pre-construction Survey would satisfy the requirements for the proposed construction at BBHSP. The objectives of this Pre-construction Assessment were determined to be the following: inventory and map plant alliances, report all plant species, and note the presence of any detected special status species, migratory bird nesting areas, bat roosts located within the BBHSP boundary that could be impacted by proposed construction. As per CDFG guidelines, occurrences of Blue Elderberry were also noted.

Preliminary research prior to field surveys included consulting the CDFG database for Shasta County, the U.S. Fish and Wildlife Service (USFWS) and California Natural Diversity Database (CNDDB), a database managed by CDFG, to identify special status species that occur or could potentially occur within a 9-quadrangle range of BBHSP. Protocols for data collection for this report were also obtained from these agencies. In addition, several Comprehensive Surveys by other groups within a 10-mile radius have been conducted, and were consulted to inform this assessment, including the *Botanical Resource Report Pit 3,4,and 5 Hydroelectric Project FERC Project No. 233*, prepared by Pacific Gas and Electric Company in April 2011.

Botanical nomenclature in this report utilizes the Jepson Manual of Higher Plants. Plant community classification follows the Community Alliance list by CDFG and is cited along with all other references in Appendix C.

2.1 Species and Plant Alliances Considered for this Survey

The results of preliminary research for this project produced a list of 42 special status species having potential to occur within the Study Area, including 8 animals and 34 plants. (See Appendix A for list.) Major plant communities (Alliances) were found and mapped. Several bird nests, one bat roost, areas of animal use, and zones of noxious weeds dominated areas are mapped out in (Figure 4). A species list has been developed for all species observed in the Study Area, (Appendix B).

2.2 Field Surveys

A biological survey was conducted systematically on foot to ensure total coverage, over a time period (Study period) beginning July 18, 2011 and ending July 23, 2011 by Jennifer Berry and followed protocols listed by CDFG, USFWS, and USFS, (See Appendix C). Tracking utilized GPS, datum WGS 84 with 3-meter accuracy.

A survey was carried out on the first day to determine the major plant alliances and was used to inform other surveys.

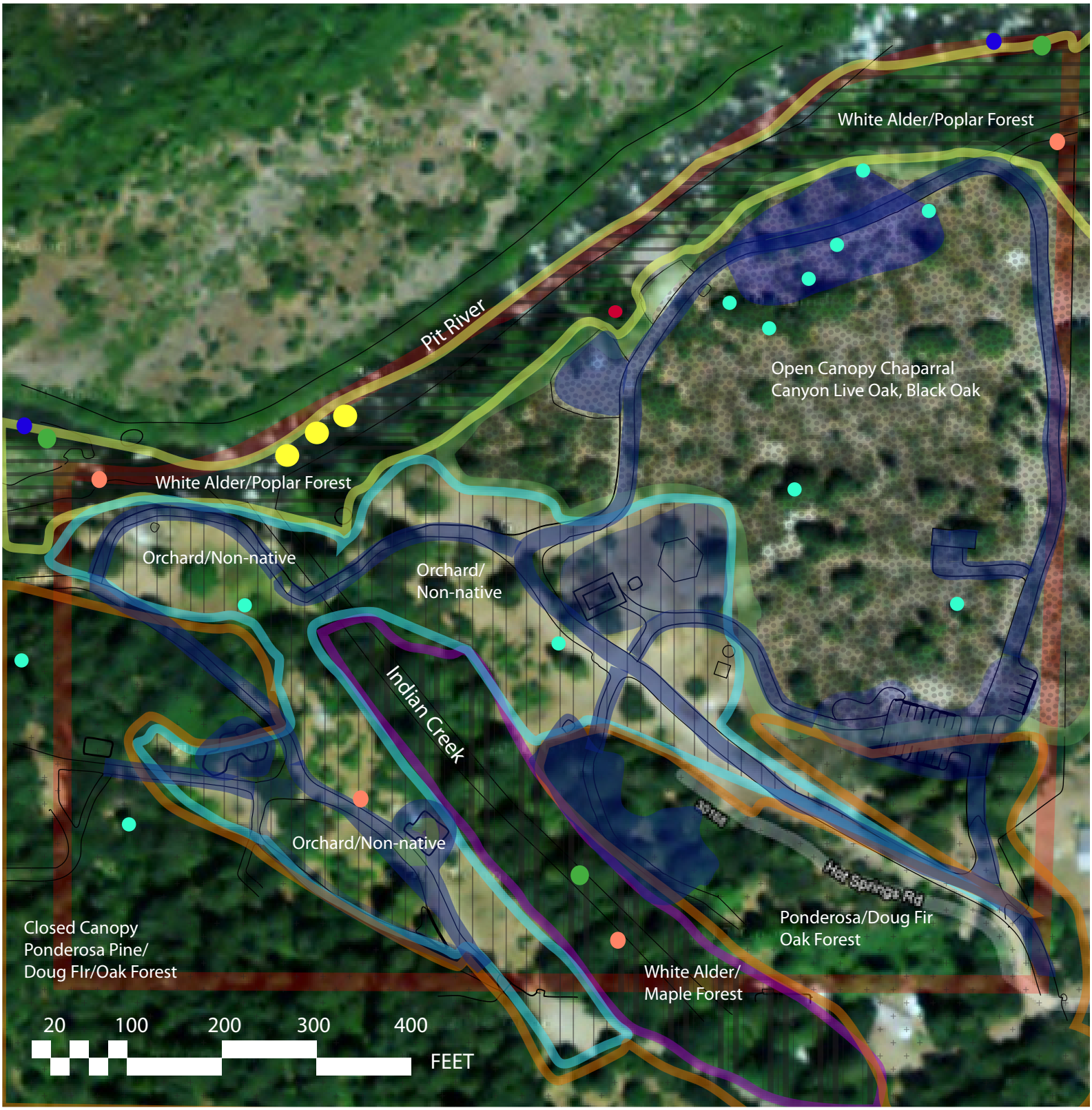
A preliminary survey was conducted to detect Pacific Fisher *(Martes pennanti).* Data collection on mammalian predator species was conducted with two infrared camera traps and two soot traps baited with chicken, blood and a commercial fisher lure located in separate locations. Traps were in place each night of the survey period. Traps were placed in two distant locations at the eastern and westernmost edges of the 20-acre parcel. The eastern trap was located at a break in property fences at location where several species were accessing the river, with signs of deer, rodents, and fox detected. The western trap was located west of the Indian Creek at possible creek crossing locations. Weather conditions were favorable four out of the five nights the traps were in place, with positive Grey fox *(Urocyon cinereoargenteus)* indications at the eastern trap four out of the five nights, and one of five nights at the western locations.

Bald Eagle nests. Due to the open nature of the isolated forest patches in the Study Area, it was possible to conduct searches for Bald Eagle *(Haliaeetus leucocephalus)* nests on foot during the Study period. Tree-tops were scanned with binoculars for possible nests, as well as within the canopies of tree stands containing large trees. Searches for adult eagles were also conducted in the mornings beginning an hour before dawn on three of the five mornings of the survey, and continued throughout the survey during daylight hours. The Pit River was also surveyed from the project Study Area during the Study period with binoculars to detect flying adults. Ospreys were observed above the Pit River on two separate occasions, but Bald Eagles were not seen.

Field surveys for bat roosts were carried out one hour before sunset on three nights during the Study period. Bird nest surveys were conducted before dawn to determine locations. Plant species surveys were carried out each day and the observation of any other incidental species was noted, (See Appendix B.)

Preliminary surveys for Shasta Crayfish *(Pacifastacus fortis)* and California Red-Legged Frog *(Rana draytonii)*were conducted from two locations (Figure 4) from the shore of

Big Bend Hot Springs Resort, Study Area



Proposed Development
White Alder Forest
Orchard/Non-native
Chaparral/Mixed Forest
White Alder Forest/Poplar
Pine/ Doug Fir/ Oak Mix
Elderberry & VELB
Bat Roost in Oak
River Surveys
Bird Nest/Cavity
Fisher Traps
Water Access

JENNIFER BERRY
ECOLOGICAL LANDSCAPE CONSULTATION

Figure 4

the Pit River with no presence detected at this time. The entire length of Indian Creek was also surveyed with no positive results.

2.3 Report Preparation

This report was prepared by Jennifer Berry, ecologist. Jennifer received her Bachelors of Science from Northern Michigan University and has 5 years experience in biological surveys, biotic resource impact analysis, and biological resource management in California. Jennifer has 15 years experience in habitat restoration.

3. SETTING

The BBHSP parcel lies within the Southern Cascades Range, (Skinner at al. 2006). There are a number of plant alliances on this parcel due to mixed topography and two riparian corridors: the Pit River forming an oxbow that borders the Study Area, and Indian Creek dividing the Study Area into two distinct halves. Hot springs and geothermal activity are present in the Study Area.

There are five dominant plant alliances present in the Study Area. (See Figure 4.) California Black Oak Forest with Black Oak *(Quercus kelloggii)*, Canyon Live Oak *(Quercus chrysolepis)*, and poison oak *(Toxicodendron diversilobum)*. Ponderosa pine/Douglas Fir Forest of predominately Douglas Fir *(Pseudotsuga menziesii)*, Ponderosa Pine *(Pinus ponderosa)* and Western Cedar *(Calocedrus decurrens)*. White Alder Riparian Forest, with White Alder *(Alnus rhombifolia)*, Big-Leaf Maple *(Acer macrophyllum)*, Doug Fir, and Western Cedar. Canyon Live Oak Forest of Canyon Oak with Pale-leaved Manzanita *(Arctostaphylos viscida)*. Oregon white Oak *(Quercus garryana)* and Interior Live Oak *(Quercus wislezenii)* were also found present in the Black Oak and Canyon Live Oak forests, as well as a number of potential oak hybrids and subspecies not identified in this survey. A novel Orchard alliance can be found and is also noted on Figure 4.

Just to the west outside of the 20- acre parcel, the plant alliance is comprised of primary and secondary Ponderosa Pine/Doug Fir Forest with Black Oak interspersed in a closed canopy characteristic. Inside the Study Area to the west of Indian Creek is an Orchard with various mature and seedling Prunus and Malus trees and a mix of noxious weeds such as Black locust *(Robinia pseudoacacia)*. This land has been greatly altered, with evidence that a large road cut and extensive grading occurred just west of the mouth of Indian Creek. Here at the western edge of Indian Creek there is mix of planted native Buckeye *(Aesculus californicus)* and non-native trees and plants such as Mulberry *(Morus nigra)* and Kentucky bluegrass *(Poa pratensis spp. pratensis)*.

Riparian edges along Indian Creek are comprised of White Alder Riparian Forest, with Big Leaf Maples and California hazel *(Corylus cornuta var. californica)* and the creek understory dominated by noxious weeds including Boston Ivy *(Parthenocissus quincuefolia)*, Lemon balm, *(Melissa officinalis)* Himalayan blackberry *(Rubus armeniacus, syn Rubus discolor)* and Nightshade *(Solanum dulcamara)* along a narrow band of approximately 25 feet along the edge of the creek. Access to the creek is limited by wide bands of the blackberry and a steep embankment at the mouth of the Pit River.

The Pit River is typically lined with White Alder Riparian Forest, with wetland plants such as Narrow-leafed Willow *(Salix exugua)* and Narrow leafed Cattail *(Typha angustifolia)* limited to water edges and more drought tolerant species such as Black Cottonwood *(Populus balsamifera ssp. trichocarpa)*, Blue Elderberry, Pine, Fir and Oaks lining the steep rocky embankments in a narrow band 25 feet to 30 feet along the edge of the river with Himalayan blackberry in isolated patches. Much of the Pit River in inaccessible to humans and large mammals due to the steep rocky embankment, grade as sharp as 1:1 where large boulders line the embankments with very few trees.

The habitat to the east of Indian Creek is predominately comprised of mixed Chaparral of Canyon Live Oak, Pale-leafed Manzanita and Greenleaf Manzanita *(Arctostaphylos manzanita*), with Skunkbush Sumac *(Rhus trilobata),* Poison Oak, Cascara *(Rhamnus purshiana, syn. Frangula purshiana),* and native and non-native annuals as the predominant understory. Interspersed are small patches of Black Oak Alliance, with all four species of Oak, plus Ponderosa Pine, Doug Fir, and Western Cedar. These patches vary from as little as two to as many as 20 trees of various levels of maturation, but with an open canopy between these isolated stands. In areas of prior disturbance, ruderal areas in smaller patches and along roads and pathways are dominated by native species favoring disturbance such as Yerba Santa *(Eriodictyon californicum)* and noxious weeds such as Knapweed *(Centaurea maculosa),* Yellow Star thistle *(C. sostitialis)* and Prickly Lettuce *(Lactuca serriola)*. To the east of BBHSP is the parcel containing Big Bend Community Center with a plant alliance much like that just described, and it is likely that many of the invasive Aster family plants are drifting from this parcel. BBHSP is flanked on the southern border by Hot Springs Road and a group of residences.

4. RESULTS AND DISCUSSION

4.1 General Habitat Impacts

The Orchard areas and Chaparral are an important resource by providing forage and/or fruit to deer, foxes, the occasional bear and many birds. This increase in human activity at this site, there is a potential to decrease native resources by limiting access to those animals who avoid contact with human environments.

Riparian corridors are important wildlife habitats by providing flowing water year-round. Due to topography and noxious weeds, BBHSP has just three main locations where animals are accessing this water source. Both proposed camping areas for BBHSP are within 100 feet of the two major riparian access points used by mammals, and while these campsites will have minimal impact on the area in terms of construction, human use of these areas will increase. Removal of noxious weeds along Indian Creek would greatly improve the access to this water source for mammals.

For the purpose of this report, a noxious weed is defined as a plant that has the potential to displace endemic plants and habitats, affect the quality of forage, and reduce access to resources. Classification as noxious was determined by the California Native

Plant Society listing for Shasta County, by observations made during the Study period that demonstrated negative impact to endemic species.

Noxious weeds are present in all areas of this Study Area, those having the most severe degradation along roadsides, paths, areas with prior soil disturbance, and the creek corridor. Wind carried seeds of the Aster family, such as Prickly Lettuce and Star-thistle have the potential to propagate with soil disturbance, as well as seeds whose mechanisms rely on being carried on the clothing of humans, such as the non-native grasses, clovers, hemlock, and comfrey. With increased human activity at this site, there is a great potential for the spread of these weeds into the 140 acres outside the Study Area. Measures to reduce the spread of noxious weeds should be taken during construction and anywhere soil is being disturbed. Clothing should be monitored for seeds before entering areas outside the commercial and recreational areas of the proposed project.

With increased human use, there is the potential for the resort to increase as a food source in the form of food waste, making the area more enticing for bears and other carnivores that take advantage of urbanization, plus raccoons and various rodents. Black bears in particular pose a threat to humans when they are dependant on garbage as a food source, as studies have shown that these bears can be up to 30% larger in size, are more active both at night and in the spring and fall, and lose their fear of humans (Beckman et al. 2003).

Rodents such as shrews, mice, squirrels and chipmunks have been shown to be reservoir hosts of Lyme disease (Brisson et al. 2007, Keesing et al 2009) with an increased incidence of Lyme disease in urban areas where habitat has been fragmented and these animals have adapted to human co-habitation (Keesing et al, 2002). Western fence lizards have been shown to cleanse the Lyme disease parasite from the blood of ticks, the disease vector for humans and pets (Lane et al 1998). Intact biodiversity and habitat can benefit predators of these rodents, such as raptors, coyotes and foxes. Studies have shown that native predators also have a top-down effect on controlling non-native mammals from colonizing new places (Johnson et al, 2010) and could prevent the increased potential of raccoon and opossum conflict as a result of human food sources.

4.2 Special Status Species

One federal or state special status species was observed within the Study Area, though several species have an historic or present day range, and two species have been observed within a 10 mile radius of the BBHSP and within the same plant alliances as found on this site. See Appendix A for special status plant list.

4.2.1 Elderberry Shrubs

Blue elderberry shrubs, *(Sambucus mexicana),* are host plant of the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus)*. The VELB was listed as a threatened species in 1980 by USFWS. VELB utilizes only Sambucus species as its host plant, with a larval stage of one to two years inside the stems before emerging as a short

lived adult. Adults emerge from late March through June. It is assumed that VELB are likely to be present on all plants with one or more stems measuring 1.0 inch or greater in diameter.

Three Elderberry shrubs were observed and mapped in one location, as presented in Figure 4. These shrubs are of medium to large-size, with the majority of branches larger than 1 inch in diameter at ground level, indicative of the potential for VELB. Exit holes indicative of the VELB were detected on the only one of the three shrubs that could be surveyed closely.

Per USFWS 1999 Conservation guidelines, complete avoidance may be assumed when a 100-foot buffer is established and maintained around elderberry plants, excluding firebreaks. The shrubs in this Study Area are located on a steep embankment along the Pitt River within the riparian setback in White Alder Forest, and are only visible with binoculars from the western bank of Indian creek along the Pit River. The shrubs are on a slope that makes any access to the shrubs difficult, located at greater than 100 foot distance from any proposed construction areas.

Proper avoidance measures must be maintained to assure that none VELB will not be impacted by construction. USFWS, CDFG may determine that monitoring surveys are necessary for follow-up post construction.

Protective Measures, USFWS 1999 (See Appendix C for VELB Guidelines.)

1. Fence and flag all areas to be avoided during the construction activities at a radius of no less than 100 feet from shrubs.
2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
3. Erect signs every 50 feet along the edge on the avoidance area with the following information: "This is habitat of the Valley Elderberry Longhorn Beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of the construction.
4. Instruct crews about the status of the beetle and the need to protect the elderberry host plant.
5. Restore any damage done within the buffer zone during construction. Prevent erosion control and revegetate with associated native plants.
6. Buffer areas must continue to be protected after construction from adverse effects of the project, including fencing, signs, weeding, and trash removal.
7. No insecticides, herbicides, fertilizers, or and other chemicals that may harm the beetle of its host plant should be used within 100 feet of any elderberry plant.
8. Removal of vegetation may only be during the months of July through April within the buffer zone, with no vegetation removed within five feet of elderberry plant stems.
9. Any encroachment into the buffer zone must be approved by USFWS and monitored by a qualified biologist.

10. Any elderberry plant that must be transplanted or that is destroyed during construction must be replaced on a 6:1 ratio, with 2 additional associated native plants for every new elderberry seedling. New plants must be irrigated and maintained, and monitored by a qualified biologist.

4.2.2 Pacific Fisher

The Pacific Fisher, *(Martin pennanti)*, is a 20-35 pound weasel that occupies old growth and secondary growth coniferous and mixed forests with a closed canopy and high level of structural variability, and avoids openings in the forest. Fishers historically occurred throughout much of the Northern United States, but were drastically reduced in number due to over-trapping and changes in forest management practices. There are generally known to occur two separate populations of Fisher in California, one occurring in the north to Shasta county to the west of the Pit River.

Based on the findings of the CDFG Fisher report in 2010, the proposed project area occurs within 10 miles of occurring fisher sightings from mapped 1988-2008 study period. Areas of suitable secondary growth with a closed canopy characteristic are found within the 140 acre parcel, but not within the proposed area for development. The proposed project occurs in an area previously disturbed, with a predominantly open canopy not found to be favored by Fishers.

Soot-traps and camera traps were set through the Survey Period with no positive Fisher results. Animals found to be attracted to the traps were domesticated dogs and grey fox, a known prey of Fishers. It should be noted that the duration of this study is in no way exhaustive in determining the non-presence of Fishers. However, there is little potential for this project to disrupt the dispersal of Fishers due to lack of habitat. The proposed project therefore is not expected to impact the fisher.

4.2.3 Shasta Crayfish

The Shasta Crayfish is listed as endangered species by USFWS. This small crayfish occurs at present solely in the Pit River drainage system, including the Pit River, Fall Creek and Hat Creek and populations exist within 10 miles of the proposed project. This species is endangered due to changes in habitat, predation, and the introduction of non-native species. Shasta crayfish are found in cool, clear, streams and rivers below 3400 feet in elevation with a low gradient and rocky beds, and prefer areas with large boulders and few plants; of which describes the portion of the Pit River that borders this proposed project. Two locations along the Pit River were surveyed at this time, as well as the Indian Creek, with no presence detected. It must be assumed that Shasta Crayfish are present until a Comprehensive Survey can indicate otherwise.

Proposed construction for BBHSP on the land adjacent to the river will be low impact and temporary. Riparian setbacks will be observed in all but one location on the Pit River, with one exemption granted by CDFG at a location with a history of prior development. (See Figure 3.) This exemption is located a distance of 30 feet from the Pit River at the edge of a steep embankment with a gradient of 1:1. Best Managements

Practices and erosion control measures will be utilized to prevent the direct impact to riparian corridors during construction. Water for construction will not be sourced from the river or creek. Therefore no impact is expected to the Shasta Crayfish at this time.

4.2.4 California Red-Legged Frog

The California Red-Legged Frog (CRLF) is listed as threatened under the Endangered Species Act. CRLF inhabits aquatic environments and will utilize riparian area adjacent to those environments. CRLF has been found in elevations ranging form sea level to elevations of 5000 ft. While the CRLF had historic ranges within Shasta County, there have not been any positive sightings in the county since 1985, according to the USFW CRLF 2002 report. This project occurs well within historic ranges and elevations for CRLF, and appropriate habitats exist for this species to potentially occur in the future. However, there is little impact expected by the proposed project on the Pit River. Based on the very low potential for CRLF to occur at this time, no impact is expected to the California Red-legged Frog by this proposed project.

4.2.5 Central Valley Spring-Run Chinook Salmon and Winter-Run Chinook Salmon, Central Valley Steelhead.

Chinook salmon and steelhead were historically found in the Pit River prior to the construction of several dams along the Pit, and are considered federally threatened by USFWS. The Pit River could provide adequate spawning habitat for both fish species were they are present. At the present time however, all Chinook salmon and Steelhead upstream of the Keswick Dam are resident hatchery-lake fish and do not migrate up the Pit River as far as the riparian edges within this proposed project. Therefore no impact is expected for the special species fishes at this time.

4.2.6 Bald Eagle Nesting Sites

Bald Eagles typically nest in mature Ponderosa pines of 100 feet or more in height, in small stands of live, Pine associated species. They typically build nests in the top third of the nest in areas with access to waterfront within a mile of nest site. They will also use Quercus, Pseudotsuga, and Black Cottonwood of significant size, all of which are found present at the proposed project site. The Pit River has historically been considered a crucial location for nesting Bald Eagles, and though they prefer riparian areas with populations of sizeable fish, they will seek opportunistic prey, including carrion and rodents. Therefore, BBHSP has considerable potential for Bald Eagle habitat. Tree-tops and canopies were scanned for the nests of Bald Eagles during this survey. No nests were detected at the time of this survey, and the potential to negatively impact Bald Eagles is low at this time. Repeat surveys should be conducted each spring for new nesting sites for any raptors during the construction period for this project to ensure no impact to Bald Eagles. Should nesting raptors be observed, CDFG will require the appropriate mitigation or avoidance measures to ensure the continued existence and reproductive success of the eagles as per CDFG code 2080 and 3500.

4.2.7 Northern Spotted Owl

The Northern Spotted Owl *(Strix occidentalis caurina)* (NSO) is a federal species of concern and a California species of special concern. There are currently two distinct populations that are known to occur in California, with the Pit River being the southern boundary of the northern population. The USDA reported in 2003 that extensive surveys for NSO south of the Pit River have located one pair, though nesting pairs have not been located recently as far south in the northern population as Big Bend. NSO will inhabit a wide range of forest types and will typically frequent mature or old-growth forest. They prefer the complex and multi-layered structures of mixed conifer and evergreen forests for nesting and roosting. They frequently nest in the cavities of trees with large diameters in dense old-growth forest. Rodents are their preferred prey. Foraging habitat can consist of more open and fragmented forest near nesting and roosting sites near nesting sites. The 140-acre parcel could potentially provide NSO habitat for nesting and roosting, though not within the 20 acres proposed for development for BBHSP. There is however, a potential for foraging habitat within the 20-acres proposed for development. It is recommended that in absence of a Comprehensive Survey, removal of any vegetation for construction should take place between September 1 and March 1 to ensure that active nests are not removed.

4.2.8 Special Status Plants

The Study Area was surveyed for a total of 34 special status plants. None of these plants were detected. See Appendix A for complete list.

4.3 Community/Alliance Impacts

Five plant alliances were found present within the 20-acre Study Area. None of the plant alliances found present in the Study Area are of particular priority by federal or state agencies, but are either ranked 4th or 5th in level of concern.

The Ponderosa Pine/Doug Fir and Black oak alliances are of particular value to this site due to the potential of these mature and somewhat senescent trees to provide habitat for birds and mammals. Oaks in particular have a root system that is susceptible to soil compaction. Impact to this and all other plant communities should be minimized through fencing measures to limit the use of heavy machinery and equipment and the storing of materials during construction.

Oak woodlands are protected under Senate Resolution No 17, January 18, 1989. The CDFG typically requires 10:1 mitigation for the removal of mature oaks. At this time there are no oaks to be removed for construction.

The Chaparral community in the Study Area is characterized by Arctostaphylos viscida and A. manzanita with patches of Oak, Ponderosa Pine, Doug Fir, and Western Cedars. Associated shrubs here include poison oak, skunkbush, prunus species, and Cascara. These shrubs are important food sources for mammals and birds, and many of these plants rely solely on those animals to disperse their seeds. Non-native fruit-bearing plants associated with Chaparral such as Cotoneaster species and blackberry are absent here, indicating that animals are relying heavily upon native food sources. Isolated

patches of Oaks and Conifers possess characteristics such as open cavities and snags that are ideal nesting sites for many of these mammals and birds utilizing the Chaparral. The proposed project will include a parking area and campsites within this Chaparral. There is a potential of temporary disruption of wildlife during construction periods, though direct impacts from development will be minimal.

There is a potential for indirect impacts to occur, with the potential for human presence to eliminate access to this area as a food source and/or increase human intrusion into these potential nesting areas. This impact could be mitigated by planting of additional forage plants in locations outside of project boundaries. In addition, this community has a high level of invasive annual and perennial species that favor disturbance whose seeds are carried by clothing and the wind, such as grasses, clovers, knapweed and yellow star thistle. Protective measures during construction to reduce soil disturbance and the introduction of non-native seeds will be necessary to prevent further degradation of understory in this community.

Vernal pools were not found present within the Study Area.

4.4 Nesting Birds

CDFG and the International Migratory Bird Treaty Act of 1918 require the protection of all nesting birds. The nests of birds were found to be present in several areas and are marked on Figure 4. Nests of plant material were typically found in low understory shrubs and in the orchard and vicinity, with fledgling and adults present but no nesting activity at this time. Cavity nests of birds were found typically in dead pines and the cavities of live mature oaks with a trunk diameter of 24 inches or more in the forest stands to the east of Indian Creek.

There is potential throughout the Study Area for nests and roosts in mature trees and shrubs. The removal of any vegetation for construction should take place between September 1 and March 1 to ensure that active nests are not disturbed. Any active nests detected during construction must be fenced at a radius of 300 feet within which no construction activities may occur until the young have fledged. Several species of birds found in the Study Area nest in the dead snags and open cavities of oaks and pines, and care should be taken to avoid any removal of these types of nesting sites. Wherever possible to avoid fire and hazards to public safety, all dead trees should be left standing for habitat.

4.5 Bat Roosts

There are 24 species of bats in California, all of which are in decline due to habitat loss and disease. Riparian corridors are important foraging habitat for most bats. Although the bat species observed were not identifiable during this survey, there is a potential for the following bats to occur at this site: spotted bat, western red bat, fringed myotis, long-legged myotis, Yuma myotis, long-eared myotis, small-footed myotis, pallid bat, and Townsend's big-eared bats. All are all considered species of concern by USFWS.

Bats will roost in groups or individually, and in trees, embankments, caves, crevices, and built structures, depending on the species. One significant bat roost was located in a

mature oak at the edge of the embankment to the Pit River near existing hot tub, and housed many flying adults. This oak should be fenced during construction at a distance of no less than 5 feet outside of the drip-line to prevent negative impact to roots. Construction at this location should be limited to September though April to avoid the disturbance of any nesting during the maternity season.

5. Regulations

Comprehensive Survey.

CDFG requires that a Comprehensive Biological Survey be conducted at this site. This comprehensive survey will include those species for which adequate surveys have not been conducted, including the Northern Spotted Owl, Shasta Crayfish, and California Red-Legged Frog. Of these species, the Spotted Owl require surveys of duration no less than two years and, with 6 visits per year. Biologists who undertake this survey must be qualified as per protocols for each species.

The following regulations and policies are relevant to biological resources occurring within the BBHSP:

1. Federal Endangered Species Act (16 USC 1531-1544)

2. California Endangered Species Act (Fish and Game Code §§2050–2068, 2126)

3. California Native Plant Protection Act (Fish and Game Code §1900 et seq.)

4. Senate Concurrent Resolution No. 17, January 18, 1989. California Department of Forestry and Fire Protection, CNPS, and the Nature Conservancy have identified the conservation and management of oak woodlands to be of major concern. This resolution makes the preservation of oak woodland a priority for state agencies regarding the authorization of projects.
5. The Carlson-Foley Act of 1968 (43 USC 12241–1243); Federal Noxious Weed Act of 1974 (7 USC 2814 et seq.); Executive Order 13112 (64 FR 6183, February 8, 1999). The Carlson-Foley Act deals with the identification, prevention, and control of invasive pest species, including noxious weeds.

APPENDIX A

Special Status Plant Species List
For Big Bend Hot Springs Project
Preconstruction Survey

Common Name	Scientific Name	Blooming Period	Elevation Range	Habitat Type	CNPS ranking
Shasta ageratina	Ageratina shastensis	Jun-Oct	1,312 ft-5,906 ft	Habitat is chaparral on rocky, carbonate soils.	4.2
Henderson's bent grass	Agrostis hendersonii	Apr-Jun	250 ft – 1,000 ft	Habitat is valley grassland, freshwater marsh, wetland riparian. Wetland	3.2
Scabrid alpine tarplant	Anisocarpus scabridus		1650ft- 2300ft		1B.3
Shasta County arnica	Arnica venosa	May-Jul	1,312-48888 ft	Disturbed areas, road cuts, lower montane coniferous forests	4.2
Susanville milk-vetch	Astragalus inversus	May-Sept	2000-6100 ft	Yellow pine forests, sagebrush scrub	4.3
Depauperate milk-vetch	Astragalus pauperculus	Mar-May	196-3674 ft	Blue oak woodland, grassland, volcanic soils, chaparral	4.3
Watershield	Brasenia schreberi		30ft- 7000ft	wetland-riparian community	N/A
Hair-like bulbostylis	Bulbostylis capillaris	June-Aug	1,295-6810 ft	Coniferous forest, meadows and seeps, grassland, vernally wet granitic or basaltic rock	4.2
Green Bug-on-a-Stick Moss	Buxbaumbia viridis	Rainy season	Lower to mid-level mountains	Decayed coarse woody material near shaded creeks, moist soil	
Butte County morning-glory	Calystegia atriplicifolia ssp. buttensis	May-Jul	1,970-5000 ft	Chaparral or coniferous forest	1B.2
Woolly-fruited sedge	Carex lasiocarpa		1800ft- 2100ft	wetland-riparian community	2.3
California Lady's Slipper	Cypripedium californicum	Apr-Aug	95-9025 ft	Mesic habitats, stream sides, seeps, bogs in coniferous forests.	4.2
Clustered Lady's Slipper	Cypripedium fasciculatum	Mar-Aug	328-8000 ft	Mesic habitats, stream sides, seeps, bogs in coniferous forests.	4.2
Mountain Lady's Slipper	Cypripedium montanum	Mar-Aug	67-7300 ft	Broad-leafed forest, coniferous forest	4.2
Tracy's Eriastrum	Eriastrum tracyi	Apr-Aug	1001ft- 3379 ft	Chaparral, volcanic soils.	1B.2
Tripod Buckwheat	Eriogonum tripodum	Jul-Sept	655 ft-55250 ft	Woodland and Chaparral	4.2
Butte County fritillary	Fritillaria eastwoodiae	Mar-May	164 ft-4,921 ft	Habitat is chaparral, openings in coniferous forest. Sometimes associated with serpentine or gabbro soils.	3.2
Yellow avens	Geum aleppicum	Jun-Aug	1,476 ft – 4,921 ft	Yellowpine forest	2.2
Baker's globe mallow	Iliamna bakeri		1000ft- 2500ft	Chaparral	1B.2
Dudley's Rush	Juncus dudleyi	July-Aug	1493- 6562 ft	yellow pine forest, wetland-riparian	2.3
Cantelow's lewisia	Lewisia cantelovii	May-Oct	1,083 ft- 4,495 ft	Chaparral, Yellow pine mixed forest, mixed evergreen forest, wetland-rpiarian. Wetland likeley	1B.2

Elmer's lupine	Lupinus elmeri		1218ft- 2000ft		1B.2
Elongate copper moss	Mielichhoferia elongata		1,640 ft – 4,265 ft	Usually found on vernally mesic metamorphic rock in cismontane woodland. Known range largely scattered.	
Egg-lake monkeyflower	Mimulus pygmaeus	May-Aug	1,640 ft -6,037 ft	wet areas such as stream sides with volcanic or clay substrates, yellow pine forest	4.2
Awl-leaved navarretia	Navarretia subuligera	May-Aug	490 ft – 3,610 ft	Foothill forest, yellow pine forest	4.3
Veined water lichen	Peltigera hydrothyria	Summer	Lower to mid-level forest	Rocks in riparian	
Scott Mountain phacelia	Phacelia dalesiana		1025ft- 2105ft	Subalpine forest, yellow pine forest	4.3
Engelmann spruce	Picea engelmannii		1065ft- 2135ft	wetland-riparian	2.2
Bidwell's knotweed	Polygonum bidwelliae	Apr-Jul	195 ft -3,940 ft	Habitat is open areas in chaparral, valley grassland, pine, foothill woodland	4.3
Slender-leaved pondweed	Potamogeton filiformis	May-Jul	984 ft – 7,054 ft	Wetlands. Freshwater marsh, wetland-riparian	2.2
Eel-grass pondweed	Potamogeton zosteriformis	Jun-Jul	0 ft – 6,102 ft	Wetlands. Freshwater marsh, wetland-riparian	2.2
Pacific fuzzwort	Ptilidium californicum	Moss	1,275 ft - 5,725 ft	Middle elevation old growth forest; an old-growth forest indicator. Epiphytic on Doug-fir, or occasionally on newly-downed tree trunks.	
Yellow triteleia	Triteleia crocea var. crocea		1200ft- 2000ft	yellow pine forest	4.3

APPENDIX B

Species Observation List
For Big Bend Hot Springs Project
Preconstruction Survey

Species Observation List

Common Name	Genus	Species	Lifeform
Plants			
Big Leafed Maple	Acer	macrophylum	Tree
Yarrow	Achillea	millefolium	Perennial
Barbed Goatgrass	Aegilops	triuncialis	Grass
Buckeye	Aesculus	californica	Tree
Spike bentgrass	Agrostis	exarata	Grass
White Alder	Alnus	rhombifolia	Tree
Western Service Berry	Amelanchier	utahensis	Tree/Shrub
Angelica	Angelica	arguta	Perennial
Pale leaved Manzantia	Arctostaphylos	viscida	Shrub
Manzanita	Arctostaphylos	manzanita	Shrub
California Ginger	Asarum	caudatum	Perennial
Slender Oats	Avena	barbata	Grass
Oregon Grape	Berberis	aquifolium var. repens	Shrub
Western Cedar	Calocedrus	decurrens	Tree
Morning Glory	Calystegia	malacophyla	Vine
Deer brush	Ceanothus	integerrimus	Shrub
Yellow Star Thistle	Centaurea	solstitialis	Perennial
Knapweed	Centaurea	maculosa	Perennial
Western Redbud	Cercis	occidentalis	Tree
Mountain Mahogany	Cercocarpus	betuloides	Shrub
Chickory	Cichorium	intybus	Perennial
Virgin's Bower Vine	Clematis	ligustifolia	Vine
Poison Hemlock	Conium	maculatum	Annual
Brown Dogwood	Cornus	glabrata	Tree
Pacific Dogwood	Cornus	nuttallii	Tree
Western Dogwood	Cornus	serisea spp occidentalis	Tree
Western Hazel	Corylus	cornuta var. californica	Tree
Bermuda Grass	Cynodon	dactylon	Grass
Indian Rhubarb	Darmera	peltata	Perennial
Stream Orchid	Epipactus	gigantea	Perennial
Yerba Santa	Eriodictyon	californicum	Shrub
Foothill Poppy	Eschscholzia	caespitosa	Annual
Oregon Ash	Fraxinus	latifolia	Tree

All sections in red denote noxious weeds as defined by California Native Plant Society.

Species Observation List

English Ivy	Hedera	helix	Vine
Velvet Grass	Holcus	lanatus	Grass
St. John's Wort	Hypericum	perforatum	Perennial
Mexican Rush	Juncus	mexicana	Perennial
Prickly Lettuce	Lactuca	serriola	Annual
Lilac	Syringa	hybrid	Shrub
Orange Honeysuckle	Lonicera	ciliosa	Vine
Money Plant	Lunaria	annua	Annual
Silver Lupine	Lupinus	albifrons	Shrub
Rose Campion	Lychnis	coronaria	Perennial
Lemon Balm	Melissa	officinalis	Perennial
Layne's Monkeyflower	Mimulus	layneae	Annual
Seep Spring Monkey Flower	Mimulus	gutatus	Perennial
Mustang Mint	Monardella	lanceolata	Perennial
Evening Primrose	Oenothera	elata	Perennial
Boston Ivy	Parthenocissus	quinquefolia	Vine
Yampah	Perideridia	gairdneri	Annual
Ponderosa Pine	Pinus	ponderosa	Tree
Plantain	Plantago	lanceolata	Perennial
Kentucky Bluegrass	Poa	pratensis spp. pratensis	Grass
Western Bistort	Polygonum	bistortoides	Perennial
Western Sword Fern	Polystichum	munitum	Fern
Black Cottonwood	Populus	balsamifera ssp. trichocarpa	Tree
Slender cinquefoil	Potentilla	gracilis var. fastigiata	
Western Choke Cherry	Prunus	virginiana var, demissa	Shrub
Bitter Cherry	Prunus	emarginata	Tree
Douglas Fir	Pseudotsuga	menzesii	Tree
Canyon Live Oak	Quercus	chrysolepis	Tree
Oregon White Oak	Quercus	garryana	Tree
Black Oak	Quercus	kellogii	Tree
Interior Live Oak	Quercus	wislezenii	Tree
Cascara	Rhamnus	purshiana	Shrub
Lemonade Berry	Rhus	trilobata	Shrub
Smooth Sumac	Rhus	glabrata	Tree
Current	Ribes	californicum	Shrub

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Gooseberry	Ribes	roezlii	Shrub
Black Locust	Robinia	pseudoacacia	Tree
Western Rose	Rosa	california	Shrub
California Blackberry	Rubus	unsinus	Vine
Himalayan Blackberry	Rubus	discolor	Vine
Cutleaf Blackberry	Rubus	lactiniatus	Vine
Sorrel	Rumex	acetosella	Perennial
Willow Leaved Dock	Rumex	salicifolius var. salicifolius	Perennial
Narrow Leafed WIllow	Salix	exigua	Tree
Yellow Willow	Salix	lucida ssp. lasiandra	Tree
Blue Elderberry	Sambucus	mexicana	Shrub
California figwort	Scrophularia	californica	Perennial
Field Mustard	Sinapis	arvensis	Annual
California greenbriar	Smilax	californica	Vine
Nightshade	Solanum	dulcamara	Perennial
California goldenrod	Solidago	californica	Perennial
Rose spiraea	Spiraea	douglasi	Shrub
Snowberry	Symphorocarpus	albus var. laevigatus	Shrub
Comfrey	Symphytum	× uplandicum	Perennial
Poison Oak	Toxicodendron	diversiloba	Shrub
Medusahead	Taeniantherum	caput-medusae	Grass
Goatsbeard	Tragopogon		
Clover	Trifolium	hirtum	Annual
Red Clover	Trifolium	pratense	Perennial
Narrow Leafed Cattail	Typha	angustifolia	Grass
Moth Mullein	Verbascum	blattaria	Biennial
Common Mullein	Verbascum	thapsis	Biennial
Blue Vervain	Verbena	hastata	Perennial
Periwinkle	Vinca	major	Vine
Pioneer violet	Viola	glabella	Perennial

Invertebrates

Anise Swallowtail Butterfly	Papilio	zelicaon	Butterfly
Pale Swallowtail Butterfly	Papilio	eurymedon	Butterfly
Chalcedon Checkerspot	Occidryas	chalcedona	Butterfly

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Wood Nymph Butterfly	Cercyonis	pegala	Butterfly
California Sister Butterfly	Adelpha	californica	Butterfly
Callippe Fritillary Butterfly	Speyeria	callippe	Butterfly
Buckeye Butterfly	Junonia	coenia	Butterfly
California Prionus beetle	Prionus	californicus	Beetle
Pine Sawyer Beetle	Monochamus	clamator latus	Beetle
Western Sculptured Pine Borer	Chalcophora	angulicollis	Beetle

Birds

Bushtit	Psaltriparis	minimus	Songbird
Western Tanager	Piranga	ludoviciana	Songbird
American Robin	Turdus	migratorius	Songbird
Nothern Flicker	Colaptes	auratus	Woodpecker
Stellar's Jay	Cyanocitta	stelleri	Jay
Mourning Dove	Zenaida	macroura	Dove
Band-Tailed Pigeon	Patagioenas	fasciata	Dove
Cassin's Vireo	Vireo	cassinii	Songbird
Darl-eyed Junco	Junco	hyemalis	Songbird
Hammonds Flycatcher	Empidonax	hammondii	Songbird
Spotted Towhee	Pipilo	maculatus	Songbird
Yellow Warbler	Dendroica	petechia	Songbird
Lesser Goldfinch	Spinus	psaltria	Songbrid
Great Blue Heron	Ardea	herodias	Aquatic
Osprey	Pandion	haliaetus	Raptor
Western Wood Peewee	Contopus	sordidulus	Songbird
Red breasted Sapsucker	Sphyrapicus	ruber	Woodpecker
American Dipper	Cinclus	mexicanus	Songbird
Mallard	Anas	platyrhynchos	Duck

Reptiles

Southern Alligator Lizard	Elgaria	multicarinata	Lizard
Western Fence Lizard	Sceloporus	occidentalis	Lizard
Gopher Snake	Pituophis	catenifer catenifer	Snake
Terrestrial Garter Snake	Thamnpohis	elegans	Snake

All sections in red denote noxious weeds as defined by California Native Plant Society.

APPENDIX C

Protocols for Surveys

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3. California Department of Fish and Game. 2010. Natural Communities List Arranged Alphabetically by Life Form. Sacramento, CA.
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