State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

Amphibian and Reptile Studies at Sites and Newville Projects

Progress Report
May 2003

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This report was prepared under Interagency Agreement #4600001158 between the Department of Water Resources and The Department of Fish and Game.

FOREWORD

In the 1990's the California Department of Water Resources (DWR) began to study locations and means of developing additional water projects in the northern Sacramento Valley of California. Storing water (mostly coming from the Sacramento River) in reservoirs on small streams on the west side of the Sacramento River was emphasized. This water would be stored in order to provide releases for local agricultural irrigation and wetland water use in exchange for diversions of water that would have come from the Sacramento River. Several alternatives for developing additional water sources have been identified, including the Sites and Newville projects. This report provides part of the input on amphibians and reptiles that would be required in the event that construction of one of these projects is pursued.

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CHAPTER 1

SUMMARY

Since October of 1997 California Department of Fish and Game (DFG) biologists have conducted surveys of the amphibian and reptile populations that may occur at two proposed "offstream storage" water projects: Sites and Newville. Field data was collected on all species observed in the project areas, with a focus on the following special status species:

- California tiger salamander (*Ambystoma californiense*)
- Western spadefoot toad (*Spea hammondii*)
- California red-legged frog (*Rana aurora draytonii*)
- Foothill yellow-legged frog (*Rana boylii*)
- Western pond turtle (*Clemmys marmorata*)
- Giant garter snake (*Thamnophis gigas*).

This report summarizes the findings from the surveys completed to date (April 2003).

No California tiger salamanders or California red-legged frogs were found during surveys in the Sites project area. DFG biologists consulted with United States Fish and Wildlife Service (USFWS) biologists and determined that giant garter snakes, a federally listed threatened species, are present in the Sites "new conveyance" component area. Giant garter snakes were not observed by DFG biologists. Foothill yellow-legged frogs and western spadefoot toads, both of which are federal and state

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"species of concern," were found throughout the Sites project area. Western pond turtles, a state "species of concern," were also found throughout the project area.

Eight species of amphibians and seventeen species of reptiles were found by DFG biologists in the Sites project area components. Bullfrogs (*Rana catesbeiana*) were the most common amphibian observed in the project area. Western fence lizards (*Sceloporus occidentalis*) were the most common reptile species observed throughout the study area.

The California red-legged frog, the foothill yellow-legged frog and the western pond turtle were the three special status species found in the Newville project area. A single California red-legged frog was sighted on Thomes Creek within the Newville Project's conveyance alignment. No California tiger salamanders, western spadefoot toads, or giant garter snakes were found. Five species of amphibians and eleven species of reptiles were found during the surveys of the Newville project area components. Bullfrogs were the most common amphibian species observed in the Newville project area. Western fence lizards were the most common reptile species observed in the Newville project area.

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CHAPTER 2

INTRODUCTION

History and Background

Late in1997, the Department of Water Resources began a two-year reconnaissance level study for North of the Delta Offstream Storage Investigations, authorized by Proposition 204 - the Safe, Clean, Reliable Water Supply Act which was approved by voters in 1996. The DFG began conducting amphibian and reptile surveys in 1997. Early in 1999, CALFED consolidated all storage investigations under a comprehensive program called Integrated Storage Investigations (ISI). The North of the Delta Offstream Storage Investigation was incorporated into one of seven ISI program elements.

The North of the Delta Offstream Storage Investigation analyzed engineering, economic, and environmental impacts to determine the feasibility of four north-of-the-delta storage projects (Figure 1):

- Sites Reservoir
- Colusa Project
- Thomes-Newville Project
- Red Bank Project.

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After preliminary field investigations, two of the four alternatives were dropped. The Red Bank and Colusa projects were removed from the investigation in 2000. Field surveys continued, focusing on the Sites and Newville projects.

Under Phase I, DFG biologists conducted studies of fish and wildlife resources in each project area. The Department of Water Resources selected Sites and Newville as preferred projects in 2001, allowing studies to focus on those projects in 2001, 2002 and 2003. This report summarizes the amphibian and reptile surveys completed to date (April 2003) in these two proposed project areas. The information gathered here will be used to describe impacts on fish and wildlife resources during the planning process.

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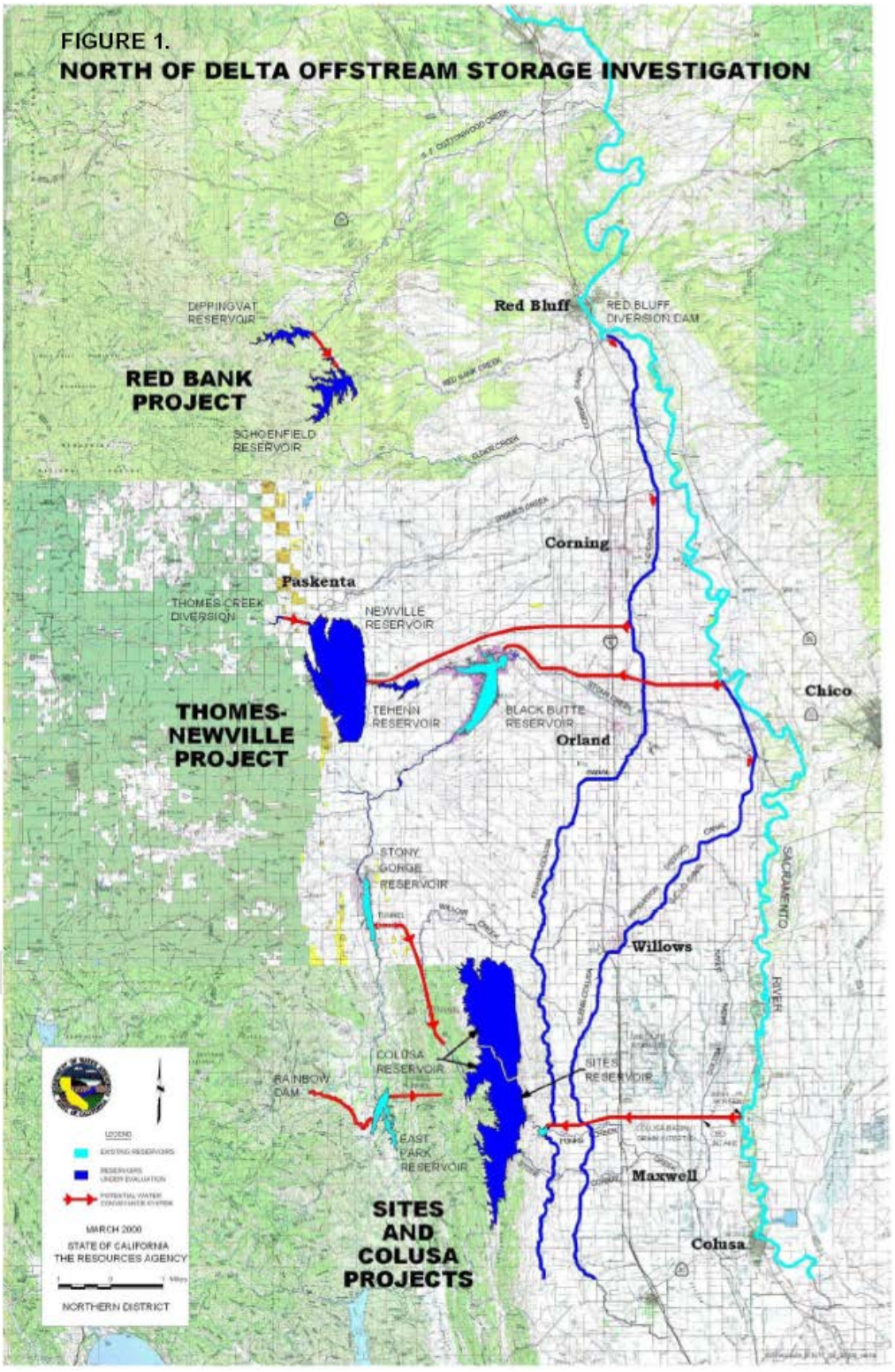
FIGURE 1.
NORTH OF DELTA OFFSTREAM STORAGE INVESTIGATION
DIPPINGVAT RESERVOIR
Red Bluff
RED BLUFF DIVERSION DAM
RED BANK PROJECT
SCHOENFIELD RESERVOIR
Corning
Paskenta
THOMES CREEK DIVERSION
NEWVILLE RESERVOIR
THOMES-NEWVILLE PROJECT
TEHEHN RESERVOIR
BLACK BUTTE RESERVOIR
Orland
Chico
STONY GORGE RESERVOIR
Willows
SACRAMENTO RIVER
COLUSA RESERVOIR
SITES RESERVOIR
RAINBOW DAM
EAST PARK RESERVOIR
Maxwell
Colusa
SITES AND COLUSA PROJECTS
LEGEND
EXISTING RESERVOIRS
RESERVOIRS UNDER EVALUATION
POTENTIAL WATER CONVEYANCE SYSTEM
MARCH 2000
STATE OF CALIFORNIA
THE RESOURCES AGENCY
NORTHERN DISTRICT

Project Description

This study area was identified in the August 2000 CALFED Programmatic Environmental Impact Study/Environmental Impact Report and Record of Decision. The CALFED Preferred Programmatic Alternative identified a need for up to 7.4 billion cubic meters (six million acre-feet) of new storage in California, including up to 3.7 billion cubic meters (three million acre-feet) of storage to be located North-of-the-Delta. The North-of-the-Delta Offstream Storage Investigation is a continuation of studies started by CALFED agencies and will be used to support the completion of a site specific Environmental Impact Study/Environmental Impact Report.

As a matter of policy, CALFED surface storage programs focus on offstream reservoir sites for new surface storage, as well as expansion of existing onstream reservoirs. New onstream reservoir sites are not being pursued due to environmental impacts and implementation difficulties. This policy decision is based on the CALFED Solution Principle that prohibits redirecting impacts. Since construction of new onstream reservoirs could significantly limit the success of the CALFED Ecosystem Restoration Program by redirecting impacts, onstream reservoirs were eliminated from further consideration.

Offstream Storage

Traditionally reservoirs are created by constructing dams on major streams. These reservoirs are considered onstream storage. In contrast, an offstream storage reservoir is typically constructed off a major stream, but at times may be located on a small or seasonal stream that contributes a minor share of the water supply of the reservoir. Offstream storage involves diverting water out of a major stream and transporting the

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water through various conveyance systems to a reservoir. Therefore, offstream storage investigations include extensive evaluation of diversions and conveyance facilities to carry the water to the reservoirs.

Storing water in offstream reservoirs can provide opportunities to increase dry-year water supply reliability and improve the timing of its availability for multiple uses in an environmentally sensitive manner. Storing water under excess flow conditions can improve water supply reliability for environmental, urban and agricultural water users in dry years, and may also improve water quality for all beneficial uses.

Offstream storage would allow water to be diverted and stored outside of the irrigation season when streamflows are highest or at times that are not critical to fish migration. This stored water can be released for local agricultural and refuge water use in exchange for diversions that would have occurred from the Sacramento River when fish migration could be impaired. Such an exchange program would reduce diversions of water from the Sacramento River during the irrigation season, therefore reducing diversion impacts to the Sacramento River fishery.

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Project Areas

Sites Reservoir

Sites Reservoir would be located about 16 kilometers (10 miles) west of Maxwell (Figure 2) and formed by constructing dams on Stone Corral Creek and Funks Creek. Evaluation of a Sites Project has focused on a 2.22 billion cubic meter (1.8 million acre-foot [maf]) reservoir, although a 1480 cubic meter (1.2 maf) reservoir has also been considered. A 2.22 billion cubic meter (1.8 maf) Sites Reservoir would require construction of nine saddle-dams along the southern edge of the Hunters Creek watershed. Flows occurring outside the irrigation season in the Colusa Basin Drain, the Sacramento River, and local tributaries are potential sources of water supply for the Sites Project. Potential conveyance systems from these sources to the reservoir include existing and/or enlarged Tehama-Colusa and Glenn-Colusa Irrigation District canals and a new conveyance facility from the Sacramento River near Moulton Weir and/or from the Colusa Basin Drain to Funks Reservoir on the Tehama-Colusa canal. All conveyance alternatives would require enlargement of the existing Funks Reservoir. Major project facilities would be situated at the Funks Creek Damsite, including outlet works, powerplant, intake structure and maintenance facilities. The Sites Project would also require relocation of two county roads (Maxwell –Lodoga and Huffmaster Roads) and the community of Sites. Recreational use has not been identified as a project purpose; however, five potential recreation facility locations have been identified.

The site is predominantly non-native grassland and managed primarily for cattle grazing with some areas of dryland farming. Other habitats include ponds, streamside habitats and oak woodland.

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Figure 2. Sites Reservoir and surrounding features.

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Newville Reservoir

Newville Reservoir would be located about 29 kilometers (18 miles) west of the community of Orland on North Fork Stony Creek upstream from the existing Black Butte Reservoir (Figure 3). Constructing a dam on North Fork Stony Creek at Newville and a saddle dam at Burrows Gap would form Newville Reservoir. The alternative reservoir sizes being evaluated are 2.34 billion cubic meters (1.9 maf) and 3.7 billion cubic meters (3.0 maf). Up to five additional saddle dams would be required for the 3.7 billion cubic meter (3.0 maf) alternative. Potential water sources include the Sacramento River, Black Butte Reservoir, and Thomes Creek. Potential conveyances include the following:

- The existing or an enlarged Tehama-Colusa canal with a new conveyance between the Glenn-Colusa and Tehama-Colusa canals,
- a new conveyance from Tehama-Colusa canal to Black Butte Reservoir and from Black Butte Reservoir to Newville Reservoir, or
- diversion and conveyance from Thomes Creek at a location north and west of the Newville Reservoir.

Newville Reservoir would require relocation of portions of three county roads including Round Valley Road, Garland Road, and County Road 306. Recreational use has not been identified as a project purpose; however, five potential recreation areas have been identified.

The site is predominantly non-native grassland managed for cattle grazing. Other habitats include ponds, streamside habitats and oak woodland.

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Figure 3. Newville Reservoir and surrounding features.

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CHAPTER 3

METHODS

DFG staff has conducted surveys for amphibians and reptiles since August 1997 in the Sites and Newville project areas. Table 1 lists the dates for all the surveys that have been conducted to date (April 2003). Proposed inundation areas, road alignments, conveyance alignments, recreation areas and new conveyance alignments have been surveyed. The surveys were conducted to determine the presence/absence of common species of amphibians and reptiles as well as the following state and/or federal special status species:

- Endangered species,
- Threatened species,
- Species of Concern.

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Table 1. Timing of amphibian and reptile studies at the Sites and Newville projects.

Sites	**California red-legged frog**	**California tiger salamander**	**Giant garter snake**	**Common species**
Inundation area	May 1997 - October 1998	November 1997 - May 1998		April 1997 - September 2002
New road alignments	May 2000 - October 2001			April 1997 – April 2003
Recreation areas	May 2000 - October 2001			April 1997 – April 2003
New conveyance	May 1999 - October 2000		May 2001- June 2001	April 1997 - September 2002
Newville				
Inundation area	May 1999 - October 2000	November 1999 - May 2000		June 1998 - September 2002
New road alignments	May 2000 - October 2001			April 2000 - September 2002
Recreation areas	May 2000 - October 2001			May 2000-September 2002
Conveyance alignments	May 2000 - October 2001	November 2000 - May 2002		August 1998 - September 2002

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Species Occurrence

The Stebbins field guide (1985) was used to determine the historic ranges of the species for which the surveys were conducted. DFG staff also examined the habitat present at the study areas, historical records, and DFG's Natural Diversity Data Base to establish a list of potential species that could occur in the project areas. The major focus of field surveys was to locate the special status species that could occur in the project areas (Table 2).

Table 2. Special status species of amphibians and reptiles potentially occurring in the Sites and Newville project areas.

SPECIES	STATUS	SITES	NEWVILLE
	Amphibians		
California tiger salamander	Federal Candidate Species and State Species of Concern	X	X
Western spadefoot toad	Federal and State Species of Concern	X	X
California red-legged frog	Federally threatened	X	X
Foothill yellow-legged frog	Federal and State Species of Concern	X	X
	Reptiles		
Western pond turtle	State Species of Concern	X	X
Giant garter snake	State and federally threatened	X	

Habitat Assessment

All aquatic habitat at the selected survey sites was identified and categorized as to type of water body (e.g., pond, vernal pool, or stream). All ponds were measured for length, width and depth during the initial assessment in fall 1997. Aquatic vegetation, root-wads and characterization of the surrounding terrain (e.g., cover, steepness of embankment and soil type) were recorded during the initial assessment period and on all subsequent surveys

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in order to determine habitat suitability for special species. Staff visually inspected ponds at the time of the preliminary assessment to determine the presence of and/or likelihood of the habitat to support amphibians, reptiles and fish. Once ponds were located and assessed, they were assigned an identification code. Vernal pools were surveyed during spring 1998 and assigned an identification code. All ponds and vernal pools were marked on topographical quad maps by their appropriate code.

Data Collection

Surveys were conducted in all weather conditions and in all seasons to determine which species of amphibians and reptiles are present in the project areas. A variety of survey techniques were used, including the following:

- night driving,
- dip netting (Figure 4),
- seining,
- day and night ground searches.

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Figure 4. DFG staff conducting a dip-netting survey on a stream in the project area.

Staff obtained permission to survey on private property from the property owners at least a week in advance of all surveys. Photocopies of topographical maps of the specific areas to be surveyed were made for workers to take out into the field. Survey data were collected in standard 12.7 by 17.8 centimeter (5 by 7 inch) "Write in the Rain" notebooks. The following information was recorded for each survey:

- surveyors present,
- time of survey,
- weather conditions,
- emergent and aquatic vegetation,
- turbidity of water,
- condition and predominant type of surrounding vegetation,
- substrate,
- land use or alteration.

At the end of each day, data for the California red-legged frog, California tiger salamander and general herpetology surveys was transferred to a standardized data sheet from *A Standardized Protocol for Surveying Aquatic Amphibians, Technical Report NPS/WRUC/NRTRP-95-01* (Figure 5) and inserted into the appropriate binder. A photocopy of a topographical map with the area surveyed highlighted and marked with the location of any "Species of Concern" found was stapled to the data sheet. All data was transferred to a computer spreadsheet program.

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Figure 5. Standardized data sheet

Aquatic Survey Data Sheet

Site: ______________

Date: (mm-dd-yy)	Begin Time:	Total Time: min	Observer(s): 1 2 3 4

Locality:	Owner: ? NPS FS BLM St. Pvt. Oth.

County:	Elevation: m ft	North UTM: GPS Map	East UTM: 3 4 5 6 7 8 10 11
Topographic Map: 7.5' 15'		North UTM: GPS Map	East UTM: 3 4 5 6 7 8 10 11

Distance to Mapped trail: km	Distance to Public dirt road: km	Distance to Public paved road: km

Weather: Clear Overcast Rain Pt. Cloudy Mostly Cloudy Snow	Wind: (mph) 0 5 - 20 < 5 > 20	Air Temp.: (at 1 m) C F	Water Temp.: (0.5 m out) C F

Habitat: Natural Altered 1 2 3 4 5	Description: Lake River Woodland Meadow/Wetl. Ditch Pond Stream Grassland Spring			Drainage: Permanent Seasonal
Site Length: m	Aver. Width: m	Aver. Depth: m	Max. Depth: m	Water Flow sec./10 ft. 0 7-11 sec. < 7 sec. >11 sec.
Water Turbidity: Clear Turbid 1 2 3 4 5	Mid-day Shade: %	Emergent Vegetation: %		Floating Vegetation: %
Water-shed: ___ Natural ___ Grazed ___ Logged (last 15 yr.) ___ Urban ___ Agricul. ___ Other ______		Substrate: ___ Silt ___ < 2 mm ___ 75 - 300 mm ___ Bedrock ___ 2 - 75 mm ___ >300 mm		
Predominant Vegetation:				

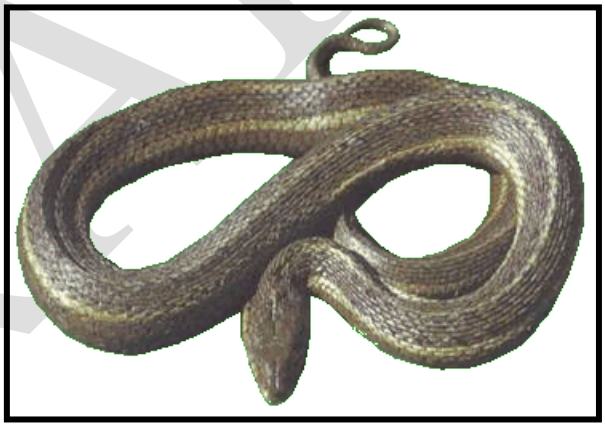
Fishing Tackle: Yes No	Fish Present: Yes No ?	Species and Approx. Number:

Species	Adults	Subadults	Larvae	Eggs	DNA #	Survey Method(s)	Other
					N A	Visual Hand Aural TCS Dip Net Seine	Voucher Pathology Photo
					N A	Visual Hand Aural TCS Dip Net Seine	Voucher Pathology Photo
					N A	Visual Hand Aural TCS Dip Net Seine	Voucher Pathology Photo
					N A	Visual Hand Aural TCS Dip Net Seine	Voucher Pathology Photo
					N A	Visual Hand Aural TCS Dip Net Seine	Voucher Pathology Photo
					N A	Visual Hand Aural TCS Dip Net Seine	Voucher Pathology Photo

Giant Garter Snake Surveys

DFG staff conducted some preliminary giant garter snake surveys in the Sites project area between April 22, 2002 and May 22, 2002. In March of 2002, DFG staff consulted with Mike Carpenter, a USFWS biologist on the Sacramento Wildlife Refuge, in regard to giant garter snake survey methods. It was determined that DFG should rely on the data collected by USFWS personnel in their surveys for giant garter snakes (Figure 6), rather than DFG staff conducting their own surveys. This decision was made because the USFWS has the personnel, equipment and expertise needed to conduct giant garter snake surveys.

Figure 6. Giant garter snake



Giant garter snake searching surveys must be conducted by properly trained personnel in suitable habitat and at the right time of year (Brode 1993). Spring air and water temperatures are ideal for spotting giant garter snakes basking along canals. Giant garter snakes are extremely wary and therefore very difficult to positively identify.

Trapping these snakes is less efficient than searching surveys and is effective only in areas of high population density. Trapping must be conducted when temperatures, canal flows, field flooding and emergent vegetation are at ideal conditions. On the refuge, the USFWS can control canal flows and field flooding to maximize trapping efficiency (Mike Carpenter, USFWS, personal communication).

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USFWS provided DFG with a map highlighting the areas giant garter snakes have been observed. The Sites new conveyance alignment runs directly through the middle of this area (Figure 1, Figure 2). Therefore, surveys were not necessary to conclude that giant garter snakes occur in this area. Specific information from the USFWS surveys will not be available to DFG until the USFWS publishes a report on their findings. This report will probably not be published until 2004 or 2005.

California Red-legged Frog Surveys

Surveys for the California red-legged frog (Figure 7), a federally threatened species, were conducted from August 1997 through October 2001 in the Sites and Newville project areas following the protocol guidelines of the USFWS. Surveys were not conducted during the breeding or rearing period of red-legged frogs to avoid disturbing breeding frogs, eggs, or larvae. Day surveys were performed on clear, sunny days with minimal wind. Night surveys were conducted on warm, still nights from an hour past sunset until midnight (USFWS 1997).

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Figure 7. California red-legged frog

Crews of two to nine people conducted surveys. The surveyors would break up into teams or work as individuals to walk the perimeter of the pond or the length of the stream for both day and night surveys. Taking care not to disturb habitat, the shoreline of each pond or stream section was thoroughly inspected, with particular care taken to examine overhangs, root-wads, emergent vegetation, or other structures that are used as shelter by red-legged frogs. Two surveyors would walk in opposite directions at the water's edge, while another two surveyors would walk in opposite directions at a distance of 5.2 to 10.1 meters (17 to 33 feet) from the water's edge. During night surveys, six-volt battery lamps were used to scan the water surface for eye-shine (USFWS 1997). Day surveyors used binoculars to scan ahead a distance of 15.2 meters (50 feet) in order to spot frogs before they jumped into the water. The survey team also used auditory identification of frog calls during day and night surveys. A camera was used to photograph any specimens of interest for identification verification. Photographs were taken of the environment in which animals were found, to confirm field notes and to document the state of the habitat when it was surveyed (Bury and Corn 1991). All ponds and creeks in each study area were surveyed a minimum of four times during the five-month period when surveys would cause the least disturbance to the frogs.

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California Tiger Salamander Surveys

California tiger salamanders are fully protected as a state "Species of Concern" and are a candidate species for federal listing. The historic range of California tiger salamanders was determined using the Stebbins field guide (1985). A preliminary survey of the study area was done to assess the habitat potential for California tiger salamanders. Vernal pools and ponds that contained water for only part of the year were examined along with grasslands as potential California tiger salamander habitat sites.

California tiger salamander surveys and visual pond inspections were completed according to Brode's protocol between the months of November and May from 1997-2002. Visual pond and grassland inspections were conducted at night during rain storms that continued from the day into the night. Surveys were conducted on nights when the air temperature was between 7.2-10°C (45-50° F) or warmer (Brode 1993).

During surveys, all areas surrounding ponds and vernal pools which had been previously identified as potential California tiger salamander habitat were inspected for burrows and log debris. The type of terrestrial vegetation present was recorded. For ground searches, the team members formed a line, keeping a distance of approximately 5.2 meters (17 feet) between them. Six-volt flashlights were used to scan the terrain. All mammal burrows, cracks, logs and debris in the area were inspected for California tiger salamanders (Brode 1993).

Visual pond surveys were performed by 2-4 biologists who walked concentric circles around a pond, starting with an inner circle at the water's edge and spanning out 10.1 meters (33 feet) from the pond. Surveyors walked in opposite directions around the

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pond, utilizing six-volt flashlights to scan back and forth for salamanders. Any burrows or logs in the vicinity were inspected. A camera was brought on all surveys to photograph any adult specimens that might be found and to photograph the area in which they were found.

Only ponds that would hold water for at least ten weeks during the survey time interval were inspected for California tiger salamander larvae. Initial samples were made using a 30.5 centimeter (12-inch) dip net with a 3.2 millimeter (1/8-inch) mesh. Each pond was divided so that the dip net sweeps would sample fifty percent of the surface area (Brode 1993). Seining was then done using one of the following nets:

- The largest ponds were seined using a seine 18.3 meters (60 feet) long and 1.5 meters (5 feet) high, with a 6.4 millimeter (1/4-inch) mesh and a 2.1 meter by 2.1 meter (7 foot by 7 foot) pocket.
- Medium-sized ponds were seined using a seine 8.8 meters (29 feet) long and 1.8 meters (6 feet) high, with a 6.4 millimeter (1/4-inch) mesh and a 2.1 meter by 1.5 meter (7 foot by 5 foot0 pocket.
- The smallest ponds were seined using a seine 3.7 meters (12 feet) long and 1.2 meters (4 feet) high, with a 6.4 millimeter (1/4-inch) mesh and a 2.1 meter by 1.5 meter (7 foot by 5 foot) pocket.

When possible, the seine would be pulled through the pond in an arc from one point around and back again, sweeping the whole pond at once. Large ponds had to be seined in sections. Aquatic dip netting and seining surveys were conducted twice a year for each vernal pool and seasonal pond. Surveys were conducted at least fifteen days apart (Brode 1993). When seining vernal pools, if any species of shrimp was encountered, seining was immediately discontinued.

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Western Pond Turtle Surveys

DFG biologists looked for western pond turtles (Figure 8), a federal and state "Species of Concern", when seining and during daytime visual encounter surveys (Crump and Scott 1994) in the project areas. A general lookout for western pond turtles was established while driving or walking near creeks. During periods of warm weather, biologists watched the creek whenever possible while traveling to and from work stations. This yielded positive results in locating western pond turtles. Carapaces (shells) of dead turtles were also noted and measured to determine age class (adult versus juvenile).

Figure 8. Western pond turtle

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General Amphibian and Reptile Surveys

General amphibian and reptile surveys were conducted year-round throughout the project areas when the weather was appropriate (25-30°C) for amphibian and reptile activity (Ministry of Environment, Lands and Parks 1998). Surveys were performed in the Sites and Newville project areas using one of the following methods:

- ground searches and transects,
- pond searches,
- night driving.

Ground searches were conducted both during the day and at night. Seining was done during the day. Driving surveys were only done at night.

Pre-determined transects were walked by team members in a line, 5.2 meters (17 feet) apart. All logs, trees, burrows, rocks, and crevices were inspected for animals (Stebbins 1954) (Figure 9). Transect areas included streamside, grassland, and oak woodland habitats. Binoculars were used to scan ahead for animals such as turtles and frogs (Bury and Corn 1991). Night transects were walked in the same manner, using six-volt flashlights for illumination. During the warmer seasons, biologists traveling to and from transect survey areas kept a general watch for reptiles and amphibians.

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Figure 9. DFG staff conducting a general herpetological survey in oak woodland habitat.

Ponds were inspected by ground searching, dip-netting and seining. Teams of two to nine members spread out a distance of 10.1 meters (33 feet) from the pond's edge to conduct ground searches. A fine mesh minnow seine was pulled from one bank to the other to seine ponds (Shaffer et al 1994). Trapped animals were identified by species and tallied. Hand-held dip nets were used to capture animals near the shore for identification and tallying. Frog calls at ponds were noted as an auditory identification of species.

Night-driving surveys were conducted from dusk until early morning from a motor vehicle traveling at speeds between 24-40 kilometers per hour (15-25 miles per hour)

(Brown et al 1987). Night drive routes included roads both within and surrounding the project areas. These roads were traveled in both directions. Specimens found on the shoulder were identified and counted. During the warmer seasons, a general watch was kept out along the roadsides whenever surveyors were driving in the study area. A camera was used to photograph specimens for species verification and to maintain a general record of the find.

Catch per unit effort (CPUE) was calculated for all species observed by dividing the total number of individuals of each species seen by the survey hours. Survey hours were calculated by multiplying the number in the crew by the total hours spent searching. CPUE is an index of availability (Hayek 1994), not a population estimate.

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CHAPTER 4

RESULTS

Sites Project Area

Surveys for reptiles and amphibians were conducted by DFG employees from August 1997 through April 2003 in the Sites project area. The major objectives of these surveys included the following:

- to search for California red-legged frogs, a federally threatened species,
- to search for California tiger salamanders, a candidate for federal listing and a State "Species of Concern,"
- to conduct general herpetology surveys.

The following three species which are listed as federal and/or California State "Species of Concern" and that could potentially occur in the Sites project area were also surveyed for:

- western spadefoot toads (Figure 10),
- foothill yellow-legged frogs,
- western pond turtles.

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Figure 10. Western spadefoot toad

Red-legged frog surveys in the Sites project area have yet to be completed. DFG still needs to do a "mile-around" survey for red-legged frogs. This survey would include all the land area extending out for 1.6 kilometers (1 mile) around the inundation area. General herpetological surveys, red-legged frog surveys, western pond turtle surveys and giant garter snake surveys must still be completed on Stone Corral Creek below the proposed dam.

DFG staff spent a total of 3273 hours in the Sites Project area surveying for reptiles and amphibians. A total of twenty-five species –eight amphibians and seventeen reptiles - were found in the various project components (Table 3). The spadefoot toad, the foothill yellow-legged frog and the western pond turtle were the only special status species that were found in the project area. No California tiger salamanders, California red-legged frogs, or giant garter snakes were found during surveys of the project area. However, from the consultation with the USFWS and from interviews with local land owners, the DFG determined that giant garter snakes do occur within the Sites "new conveyance" alignment.

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Table 3. Amphibian and reptile species found in the Sites project area.

COMMON NAME	SCIENTIFIC NAME
Amphibians	
California newt	*Taricha torosa*
California slender salamander	*Batrachoseps attenuatus*
Black salamander	*Aneides flavipunctatus*
Western spadefoot toad	*Spea hammondii*
Western toad	*Bufo boreas*
Pacific chorus frog	*Pseudacris regilla*
Foothill yellow-legged frog	*Rana boylii*
Bullfrog	*Rana catesbeiana*
Reptiles	
Western pond turtle	*Clemmys marmorata*
Western fence lizard	*Sceloporus occidentalis*
Sagebrush lizard	*Sceloporus graciosus*
Western skink	*Eumeces skiltonianus*
Southern alligator lizard	*Elgaria multicaranata*
Ringneck snake	*Diadophis punctatus*
Sharptail snake	*Contia tenuis*
Racer	*Coluber constrictor*
California whipsnake	*Masticophis lateralis*
Gopher snake	*Pituophis catanifer*
Common kingsnake	*Lampropeltis getula*
Western terrestrial garter snake	*Thamnophis elegans*
Western aquatic garter snake	*Thamnophis couchii*
Common garter snake	*Thamnophis sirtalis*
Giant garter snake	*Thamnophis gigas*
Western rattlesnake	*Crotalus viridus*

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Seasonal Abundance

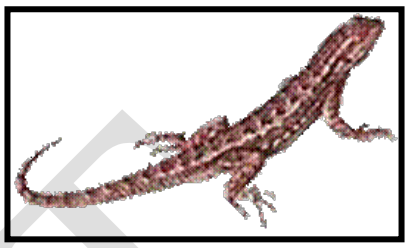

Figure 11. Western fence lizard

DFG staff conducted general herpetology surveys year-round and recorded data on the seasonal abundance of reptile and amphibian species in the Sites project area. Spring was the most productive season in terms of observing amphibian species diversity, while the most reptile species diversity was observed during winter surveys (Table 4). Several species were observed in one season only. The sharptail snake (*Contia tenuis*), and the black salamander (*Aneides flavipunctatus*) were observed only in the winter. The spadefoot toad, sagebrush lizard (*Sceloporus graciosus*), and ringneck snake (*Diadophis punctatus*) were observed only in the spring. The foothill yellow-legged frog was observed only in the summer. The highest CPUE overall was 8.3947 for bullfrogs in the fall. The highest reptile CPUE for the fall was 0.1603 for western fence lizards (Figure 11). The most prevalent amphibian species in the summer was the Pacific chorus frog (*Pseudacris regilla*), with a CPUE of 5.3088. The western fence lizard was the most prevalent reptile species observed in the summer, with a CPUE of 0.7300. The most prevalent amphibian species in the winter was the Pacific chorus frog, with a CPUE of 1.5061. The western fence lizard was the most prevalent reptile in the winter, with a CPUE of 0.4131. In the spring, the most prevalent amphibian species was the bullfrog, with a CPUE of 0.7488, while the western fence lizard was the most prevalent reptile, with a CPUE of 0.9167.

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Table 4. Seasonal abundance of amphibian and reptile species observed in the Sites project area.

Species	Spring		Summer		Fall		Winter	
	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE
	Amphibians							
California newt	4	0.0049	1	0.0013	10	0.0132	9	0.0100
California slender salamander	5	0.0061			17	0.0225	368	0.4080
Black salamander							3	0.0033
Western spadefoot toad	1	0.0012						
Western toad	5	0.0061	75	0.0938	11	0.0146	29	0.0322
Pacific chorus frog	291	0.3566	4247	5.3088	237	0.3139	1360	1.5078
Foothill yellow-legged frog			1	0.0013				
Bullfrog	611	0.7488	4005	5.0063	6388	8.3947	172	0.1907
	Reptiles							
Western pond turtle	21	0.0257	4	0.0050			6	0.0067
Western fence lizard	748	0.9167	584	0.7300	121	0.1603	373	0.4135
Sagebrush lizard	1	0.0012						
Western skink	28	0.0343			2	0.0026	7	0.0078
Southern alligator lizard	6	0.0074	3	0.0038	8	0.0106	39	0.0432
Ringneck snake	2	0.0025						
Sharptail snake							3	0.0033
Racer	12	0.0147	3	0.0038	1	0.0013	1	0.0011
California whipsnake	3	0.0037			1	0.0013		
Gopher snake	11	0.0135	6	0.0075	1	0.0013	1	0.0011
Common kingsnake	5	0.0061	7	0.0088			2	0.0022
Western terrestrial garter snake	10	0.0123	10	0.0125	3	0.0040	2	0.0022
Western aquatic garter snake	20	0.0245	3	0.0038	1	0.0013	2	0.0022
Common garter snake	72	0.0882	17	0.0213	1	0.0013	6	0.0067
Giant garter snake								
Western rattlesnake	50	0.0613	39	0.0488	1	0.0013	10	0.0111
Total effort (hours)	815.78		799.58		755.08		902.57	

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Habitat Abundance

DFG staff surveyed the following habitat types in the Sites project area:

- grassland,
- oak woodland,
- ponds,
- streamside.

Table 5 displays the species diversity of the various habitats surveyed in this area. Streamside was the most diverse habitat, with a total of nineteen species observed. Pond habitat was least diverse with only thirteen species observed. Eight of the twenty-five species observed in the Sites project area were observed in all four habitat types. The western spadefoot toad, the black salamander, the foothill yellow-legged frog, the sagebrush lizard and the giant garter snake were the least common species across habitat types. The western spadefoot toad was observed only in streamside habitat. The black salamander observed only in oak woodland habitat. The foothill yellow-legged frog and the sagebrush lizard were observed only in grassland habitat. The giant garter snake was determined to occur only in streamside habitat.

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Table 5. Species diversity of the various habitat types surveyed in the Sites project area.

SPECIES	OAK WOODLAND	GRASSLAND	PONDS	STREAMSIDE
Amphibians				
California newt	X	X	X	X
California slender salamander	X		X	X
Black salamander	X			
Western spadefoot toad				X
Western toad		X	X	X
Pacific chorus frog	X	X	X	X
Foothill yellow-legged frog		X		
Bullfrog		X	X	X
Reptiles				
Western pond turtle			X	X
Western fence lizard	X	X	X	X
Sagebrush lizard		X		
Western skink	X	X		
Southern alligator lizard	X	X		X
Ringneck snake	X			X
Sharptail snake	X	X		
Racer	X	X	X	X
California whipsnake	X	X		X
Gopher snake	X	X		X
Common kingsnake	X	X	X	X
Western terrestrial garter snake	X	X	X	X
Western aquatic garter snake			X	X
Common garter snake	X	X	X	X
Giant garter snake				X
Western rattlesnake	X	X	X	X
Number of species	16	17	13	19

Pond Habitat

Fourteen of the twenty-five total species of reptiles and amphibians found in the Sites project area were found in pond habitat including six of the eight amphibian species and nine of the seventeen reptile species (Tables 5 and 6). The western pond turtle was the only special status species found within pond habitat. The most prevalent amphibian species

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found in pond habitat was the bullfrog, with a CPUE of 10.7759. Rattlesnakes (*Crotalus viridus*) and aquatic garter snakes (*Thamnophis couchii*) were the most prevalent reptiles, each with a CPUE of 0.0241.

Table 6. Relative abundance of amphibians and reptiles in pond habitats of the Sites project area 1997-2003.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt	4	0.0046
California slender salamander	6	0.0069
Black salamander	0	
Western spadefoot toad	0	
Western toad	38	0.0437
Pacific chorus frog	1365	1.5690
Foothill yellow-legged frog	0	
Bullfrog	9375	10.7759
Reptiles		
Western pond turtle	15	0.0172
Western fence lizard	6	0.0069
Sagebrush lizard	0	
Western skink	0	
Southern alligator lizard	0	
Ringneck snake	0	
Sharptail snake	0	
Racer	3	0.0034
California whipsnake	0	
Gopher snake	1	0.0011
Common kingsnake	1	0.0011
Western terrestrial garter snake	6	0.0069
Western aquatic garter snake	21	0.0241
Common garter snake	17	0.0195
Giant garter snake	0	
Western rattlesnake	21	0.0241

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Streamside Habitat

Streamside habitat had the most species diversity. Nineteen species of reptiles and amphibians were found in streamside habitat. These included six of the eight amphibian

species found in the Sites project area and of all but four of the reptile species (Tables 5 and 7). The western spadefoot toad and the western pond turtle were the only special status species that were found in streamside habitat. However, giant garter snakes were also determined to occur within this habitat type from consultation with USFWS and interviews with local landowners. Again, the most prevalent amphibian species found in streamside habitat was the bullfrog, with a CPUE of 1.6218. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.2332.

Table 7. Relative abundance of amphibians and reptiles in streamside habitats of the Sites project area 1997-2003.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt	1	0.0015
California slender salamander	1	0.0015
Black salamander	0	
Western spadefoot toad	1	0.0015
Western toad	65	0.0972
Pacific chorus frog	195	0.2915
Foothill yellow-legged frog	0	
Bullfrog	1085	1.6218
Reptiles		
Western pond turtle	15	0.0224
Western fence lizard	156	0.2332
Sagebrush lizard	0	
Western skink	0	
Southern alligator lizard	5	0.0075
Ringneck snake	1	0.0015
Sharptail snake	0	
Racer	2	0.0030
California whipsnake	1	0.0015
Gopher snake	2	0.0030
Common kingsnake	3	0.0045
Western terrestrial garter snake	12	0.0179
Western aquatic garter snake	2	0.0030
Common garter snake	39	0.0583
Giant garter snake	0	
Western rattlesnake	15	0.0224

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Grassland Habitat

Surveyors observed sixteen of the species found in the Sites project area in grassland habitat (Tables 5 and 8). The foothill yellow-legged frog was the only special status species found there. In grasslands, the most prevalent amphibian species found was the Pacific chorus frog (CPUE of 0.2973), and western fence lizards were the most prevalent reptiles, with a CPUE of 0.5309.

Table 8. Relative abundance of amphibians and reptiles in grassland habitat of the Sites project area 1997-2003.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt	6	0.0116
California slender salamander	0	
Black salamander	0	
Western spadefoot toad	0	
Western toad	11	0.0212
Pacific chorus frog	154	0.2973
Foothill yellow-legged frog	1	0.0019
Bullfrog	138	0.2664
Reptiles		
Western pond turtle	0	
Western fence lizard	275	0.5309
Sagebrush lizard	1	0.0019
Western skink	1	0.0019
Southern alligator lizard	13	0.0251
Ringneck snake	0	
Sharptail snake	1	0.0019
Racer	4	0.0077
California whipsnake	1	0.0019
Gopher snake	10	0.0193
Common kingsnake	4	0.0077
Western terrestrial garter snake	1	0.0019
Western aquatic garter snake	0	
Common garter snake	9	0.0174
Giant garter snake	0	
Western rattlesnake	27	0.0521

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Oak Woodland Habitat

Oak woodland habitat was observed to support sixteen of the species found in the Sites project area (Tables 5 and 9). No special status species were found within this habitat. The amphibian species found most often in oak woodland habitat was the slender salamander, with a CPUE of 0.2348. Western fence lizards were the most prevalent reptiles, with a CPUE of 1.6661.

Table 9. Relative abundance of amphibians and reptiles in oak woodland habitat of the Sites project area 1997-2003.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt	12	0.0191
California slender salamander	378	0.6010
Black salamander	3	0.0048
Western spadefoot toad	0	
Western toad	0	
Pacific chorus frog	77	0.1224
Foothill yellow-legged frog	0	
Bullfrog	0	
Reptiles		
Western pond turtle	0	
Western fence lizard	1048	1.6661
Sagebrush lizard	0	
Western skink	35	0.0556
Southern alligator lizard	87	0.1383
Ringneck snake	1	0.0016
Sharptail snake	2	0.0032
Racer	5	0.0079
California whipsnake	2	0.0032
Gopher snake	2	0.0032
Common kingsnake	3	0.0048
Western terrestrial garter snake	3	0.0048
Western aquatic garter snake	0	
Common garter snake	13	0.0207
Giant garter snake	0	
Western rattlesnake	22	0.0350

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SPECIES ABUNDANCE IN PROJECT COMPONENTS

The western fence lizard, Pacific chorus frog and bullfrog were the only species found in all Sites project components. The highest CPUE overall was 18.4484 for Pacific chorus frogs in the new conveyance alignment. Pacific chorus frogs were also the most prevalent amphibians found in the Southeast Road relocation alignment. Bullfrogs were the most prevalent amphibian species found in the Funks Reservoir enlargement area, the Sites inundation area, the Sites recreation areas, the North Road relocation alignment, and the Southwest Road relocation alignment (creek). Slender salamanders were the most prevalent amphibian species observed in the Southwest Road relocation alignment (ridge). Western fence lizards were the most prevalent reptiles in all Sites project components. However, the western pond turtle was equally prevalent in the Southwest Road relocation alignment (creek).

Inundation Area

DFG staff spent a total of 1873 hours surveying the inundation area of the Sites project area for reptiles and amphibians. A total of nineteen species were observed during these surveys. The western pond turtle was the only special status species found within the inundation area. The most prevalent amphibian species found in the Sites inundation area was the bullfrog, with a CPUE of 4.0614. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.2200 (Table 10).

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Table 10. Relative abundance of reptiles and amphibians in the inundation area of the Sites project 1997-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt	3	0.0016
California slender salamander	9	0.0048
Black salamander	0	
Western spadefoot toad	0	
Western toad	91	0.0486
Pacific chorus frog	1638	0.8745
Foothill yellow-legged frog	0	
Bullfrog	7607	4.0614
Reptiles		
Western pond turtle	3	0.0016
Western fence lizard	412	0.2200
Sagebrush lizard	1	0.0005
Western skink	4	0.0021
Southern alligator lizard	5	0.0027
Ringneck snake	0	
Sharptail snake	1	0.0005
Racer	10	0.0053
California whipsnake	3	0.0016
Gopher snake	13	0.0069
Common kingsnake	8	0.0043
Western terrestrial garter snake	13	0.0069
Western aquatic garter snake	2	0.0011
Common garter snake	70	0.0374
Giant garter snake	0	
Western rattlesnake	79	0.0422

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New Road Alignments

DFG staff observed a total of nineteen species in the new road alignments of the Sites project area (Table 11). The western spadefoot toad, foothill yellow-legged frog and western pond turtle were the special status species found within the new road alignments. Overall, the most prevalent amphibian species found was the bullfrog, and western fence lizards were the most prevalent reptiles.

Table 11. Occurrence and relative abundance of amphibians and reptiles in new road alignments of the Sites project 1997-2003.

SPECIES	CPUE			
	North Road Relocation	Southeast Road Relocation	Southwest Road Relocation (creek)	Southwest Road Relocation (ridge)
Amphibians				
California newt		0.0853	0.0085	
California slender salamander	0.0914	0.0078		0.5306
Black salamander				
Western spadefoot toad			0.0085	
Western toad	0.0617		0.0169	
Pacific chorus frog	0.3185	0.6589	0.4831	0.1837
Foothill yellow-legged frog	0.0025			
Bullfrog	3.8049	0.3643	3.1356	0.2245
Reptiles				
Western pond turtle		0.0155	0.1695	
Western fence lizard	1.3185	0.2326	0.1695	0.4082
Sagebrush lizard				
Western skink		0.0078		0.0408
Southern alligator lizard	0.0519			0.0408
Ringneck snake	0.0025			
Sharptail snake				
Racer	0.0049	0.0155		
California whipsnake				
Gopher snake	0.0074			
Common kingsnake	0.0074			0.0204
Western terrestrial garter snake	0.0074	0.0078	0.0508	0.0204
Western aquatic garter snake	0.0049	0.0853	0.0339	
Common garter snake	0.0247		0.0254	
Giant garter snake				
Western rattlesnake	0.0074	0.0310	0.0424	

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North Road Relocation

DFG staff spent a total of 405 hours surveying the North Road relocation alignment of the Sites project area for reptiles and amphibians. A total of fifteen species were observed during these surveys, with the foothill yellow-legged frog being the only special status species found. The most prevalent amphibian species was the bullfrog, with a CPUE of 3.8049. Western fence lizards were the most prevalent reptiles, with a CPUE of 1.3185 (Table 11).

Southeast Road Relocation

DFG staff spent a total of 129 hours surveying the Southeast Road relocation alignment of the Sites project area for reptiles and amphibians. A total of ten species were observed during these surveys. The western pond turtle was the only special status species found in this alignment. The most prevalent amphibian species found was the Pacific chorus frog, with a CPUE of 0.6589. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.2326 (Table 11).

Southwest Road Relocation (creek)

DFG staff spent a total of 118 hours surveying the Southwest Road relocation (creek) alignment of the Sites project area for reptiles and amphibians. A total of eleven species were observed during these surveys, only two of which (the western spadefoot toad and the western pond turtle) were special status species. The most prevalent amphibian species

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found was the bullfrog, with a CPUE of 3.1356. Western fence lizards and western pond turtles were the most prevalent reptiles, both with a CPUE of 0.1695 (Table 11).

Southwest Road Relocation (ridge)

DFG staff spent a total of 49 hours surveying for reptiles and amphibians in the Southwest Road relocation (ridge) alignment of the Sites project area. A total of eight species were observed during these surveys. No special status species were found. The most prevalent amphibian species was the slender salamander, with a CPUE of 0.5306. Western fence lizards were the most prevalent reptiles observed, with a CPUE of 0.4082 (Table 11).

New Conveyance Alignment

DFG staff spent a total of 223 hours surveying the new conveyance alignment of the Sites project area for reptiles and amphibians. A total of twelve species were determined to occur within the new conveyance alignment. The western pond turtle was the only special status species observed during surveys of the new conveyance alignment. However, through consultation with USFWS and interviews with local landowners, giant garter snakes were also determined to occur within this area. The most prevalent amphibian species found in the Sites new conveyance alignment was the Pacific chorus frog, with a CPUE of 18.4484. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.2960 (Table 12).

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Table 12. Relative abundance of reptiles and amphibians in the new conveyance alignment of the Sites project 1997-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt	0	
California slender salamander	0	
Black salamander	0	
Western spadefoot toad	0	
Western toad	0	
Pacific chorus frog	4114	18.4484
Foothill yellow-legged frog	0	
Bullfrog	476	2.1345
Reptiles		
Western pond turtle	1	0.0045
Western fence lizard	66	0.2960
Sagebrush lizard	0	
Western skink	0	
Southern alligator lizard	2	0.0090
Ringneck snake	0	
Sharptail snake	0	
Racer	2	0.0090
California whipsnake	0	
Gopher snake	1	0.0045
Common kingsnake	1	0.0045
Western terrestrial garter snake	1	0.0045
Western aquatic garter snake	2	0.0090
Common garter snake	9	0.0404
Giant garter snake	0	
Western rattlesnake	0	

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Funks Reservoir Enlargement

DFG staff spent a total of 36 hours surveying for reptiles and amphibians in the Funks Reservoir enlargement area of the Sites project area. A total of seven species were observed. The western pond turtle was the only special status species found. The most prevalent amphibian species found in the Funks Reservoir enlargement area was the bullfrog, with a CPUE of 1.4444. Western fence lizards were the most prevalent reptiles

with a CPUE of 0.8333 (Table 13). Due to the relatively low number of survey hours completed in this area, the numbers in Table 13 may not accurately represent the species that could occur in this area. As the Funks Reservoir enlargement area consists of grassland and streamside habitats, the results for the more extensive surveys of those habitat types in other areas (Table 8 and Table 7) are probably a more accurate representation of what could be found here.

Table 13. Relative abundance of reptiles and amphibians in the Funks Reservoir enlargement area of the Sites project 1997-2003.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt		
California slender salamander		
Black salamander		
Western spadefoot toad		
Western toad		
Pacific chorus frog	13	0.3611
Foothill yellow-legged frog		
Bullfrog	52	1.4444
Reptiles		
Western pond turtle	3	0.0833
Western fence lizard	30	0.8333
Sagebrush lizard		
Western skink		
Southern alligator lizard	1	0.0278
Ringneck snake		
Sharptail snake		
Racer		
California whipsnake		
Gopher snake		
Common kingsnake		
Western terrestrial garter snake		
Western aquatic garter snake	1	0.0278
Common garter snake		
Giant garter snake		
Western rattlesnake	1	0.0278

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Recreation Areas

DFG staff spent a total of 410 hours surveying the recreation areas of the Sites project area for reptiles and amphibians. A total of seventeen species were observed during these surveys. No special status species were found within the recreation areas. The most prevalent amphibian species found was the bullfrog, with a CPUE of 2.4927. Western fence lizards were the most prevalent reptiles with a CPUE of 1.6951 (Table14).

Table 14. Relative abundance of reptiles and amphibians in the recreation areas of the Sites project 1997-2003.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
California newt	9	0.0220
California slender salamander	317	0.7732
Black salamander	3	0.0073
Western spadefoot toad	0	
Western toad	2	0.0049
Pacific chorus frog	88	0.2146
Foothill yellow-legged frog	0	
Bullfrog	1022	2.4927
Reptiles		
Western pond turtle	0	
Western fence lizard	695	1.6951
Sagebrush lizard	0	
Western skink	30	0.0732
Southern alligator lizard	25	0.0610
Ringneck snake	1	0.0024
Sharptail snake	2	0.0049
Racer	1	0.0024
California whipsnake	1	0.0024
Gopher snake	1	0.0024
Common kingsnake	1	0.0024
Western terrestrial garter snake	0	
Western aquatic garter snake	0	
Common garter snake	3	0.0073
Giant garter snake	0	
Western rattlesnake	8	0.0195

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Newville Project Area

Surveys for reptiles and amphibians were conducted by DFG employees from 1998 through summer 2002 in the Newville project area. The major objectives of these surveys included the following:

- to search for California red-legged frogs, a federally threatened species,
- to search for California tiger salamanders, a candidate for federal listing and a state "Species of Concern,"
- to conduct general herpetology surveys.

The following three species which are listed as federal and/or California State "Species of Concern" and that could potentially occur in the Newville project area were also a focus of these surveys:

- the western spadefoot toad,
- the foothill yellow-legged frog,
- the western pond turtle.

A total of 1209 hours were spent in the Newville Project area surveying for reptiles and amphibians. A total of sixteen species – five amphibians and eleven reptiles - were found during the surveys of the various project components (Table 15). The California red-legged frog, the foothill yellow-legged frog and the western pond turtle were the three special status species that were found in the project area. No California tiger salamanders, western spadefoot toads or giant garter snakes were found in the project area. A single California

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red-legged frog was sighted on Thomes Creek within the Thomes Creek diversion and conveyance alignment.

Table 15. Amphibian and reptile species found in the Newville project area.

COMMON NAME	SCIENTIFIC NAME
Amphibians	
Western toad	*Bufo boreas*
Pacific chorus frog	*Pseudacris regilla*
California red-legged frog	*Rana aurora draytonii*
Foothill yellow-legged frog	*Rana boylii*
Bullfrog	*Rana catesbeiana*
Reptiles	
Western pond turtle	*Clemmys marmorata*
Western fence lizard	*Sceloporus occidentalis*
Western skink	*Eumeces skiltonianus*
Southern alligator lizard	*Elgaria multicarinata*
Racer	*Coluber constrictor*
Gopher snake	*Pituophis catanifer*
Common kingsnake	*Lampropeltus getula*
Western terrestrial garter snake	*Thamnophis elegans*
Western aquatic garter snake	*Thamnophis couchii*
Common garter snake	*Thamnophis sirtalis*
Western rattlesnake	*Crotalus viridus*

Seasonal Abundance

DFG staff conducted general herpetology surveys year-round and recorded data on the seasonal abundance of reptile and amphibian species in the Newville project area. Summer was the most productive season in terms of observing amphibian species diversity, while the most reptile species diversity was observed during spring and summer surveys (Table 16). No species were observed year-round. The highest CPUE overall was 18.8958 for bullfrogs in the summer. In contrast, the highest reptile CPUE for the summer was 0.1515 for western fence lizards. The most prevalent amphibian species in the fall was the bullfrog, with a CPUE of 6.5208, and the western fence lizard was the most prevalent reptile species, with a CPUE of 0.2713. No amphibian species were observed in the winter. The most

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prevalent reptile species observed in the winter was the western terrestrial garter snake, with a CPUE of 0.0851. The most prevalent amphibian species in the spring was the bullfrog, with a CPUE of 4.5827. The western fence lizard was the most prevalent spring reptile species, with a CPUE of 0.4866.

Table 16. Seasonal abundance of amphibian and reptiles species observed in the Newville project area.

Species	**Spring**		**Summer**		**Fall**		**Winter**	
	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE
	Amphibians							
Western toad	119	0.3097	17	0.0248				
Pacific chorus frog	894	2.3265	29	0.0422	6	0.0525		
California red-legged frog			1	0.0015				
Foothill yellow-legged frog	12	0.0312	789	1.1493				
Bullfrog	1761	4.5827	12972	18.8958	745	6.5208		
	Reptiles							
Western pond turtle	16	0.0416	14	0.0204	1	0.0088		
Western fence lizard	187	0.4866	104	0.1515	31	0.2713		
Western skink	9	0.0234						
Southern alligator lizard	2	0.0052	1	0.0015	2	0.0175		
Racer	15	0.0390	6	0.0087				
Gopher snake	8	0.0208	4	0.0058			1	0.0426
Common kingsnake			3	0.0044	1	0.0088		
Western terrestrial garter snake	17	0.0442	35	0.0510			2	0.0851
Western aquatic garter snake	19	0.0494	13	0.0189				
Common garter snake	19	0.0494	69	0.1005			1	0.0426
Rattlesnake	5	0.0130	27	0.0393				
Total effort (hours)	384.27		686.5		114.25		23.5	

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Habitat Abundance

DFG staff surveyed the following habitat types in the Newville project area:

- grassland,
- oak woodland,
- ponds,
- streamside.

Table 17 diagrams the species diversity of the various habitats surveyed in the Newville project area. Streamside was the most diverse habitat with a total of fourteen species observed. Grassland and pond habitats were least diverse with only eleven species observed. Seven of the sixteen species observed in the Newville project area were observed in all four habitat types. The California red-legged frog and the western skink (*Eumeces skiltonianus*) were the least common species across habitat types. The California red-legged frog was observed only in streamside habitat and the western skink was observed only in oak woodland.

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Table17. Species diversity of the various habitat types surveyed in the Newville project area.

SPECIES	OAK WOODLAND	GRASSLAND	POND	STREAMSIDE
Amphibians				
Western toad	X		X	X
Pacific chorus frog	X	X	X	X
California red-legged frog				X
Foothill yellow-legged frog		X	X	X
Bullfrog	X	X	X	X
Reptiles				
Western pond turtle			X	X
Western fence lizard	X	X	X	X
Western skink	X			
Southern alligator lizard	X	X		X
Racer	X	X	X	X
Gopher snake	X	X		X
Common kingsnake			X	
Western terrestrial garter snake	X	X	X	X
Western aquatic garter snake	X	X		X
Common garter snake	X	X	X	X
Western rattlesnake	X	X	X	X
Number of species	12	11	11	14

Streamside Habitat

Streamside habitat yielded the greatest diversity of species. Fourteen of the sixteen species of reptiles and amphibians found in the entire Newville project area were found in this type of habitat (Table 18). The California red-legged frog, the foothill yellow-legged frog and the western pond turtle were the special status species found in streamside habitat. The most prevalent amphibian species found here was the bullfrog, with a CPUE of 3.7854. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.2992.

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Table 18. Relative abundance of amphibians and reptiles in the streamside habitats of the Newville project area 1999-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
Western toad	71	0.1398
Pacific chorus frog	379	0.7461
California red-legged frog	1	0.0020
Foothill yellow-legged frog	796	1.5669
Bullfrog	1923	3.7854
Reptiles		
Western pond turtle	21	0.0413
Western fence lizard	152	0.2992
Western skink	0	
Southern alligator lizard	1	0.0020
Racer	6	0.0118
Gopher snake	1	0.0020
Common king snake	0	
Western terrestrial garter snake	47	0.0925
Western aquatic garter snake	20	0.0394
Common garter snake	44	0.0866
Western rattlesnake	9	0.0177

Oak Woodland Habitat

Twelve species of reptiles and amphibians were found in oak woodland habitat. This included three of the five species of amphibians found in the Newville project area and nine of the eleven reptile species (Table 19). No special status species were found in this habitat type. The most prevalent amphibian species found in oak woodland habitat was the bullfrog, with a CPUE of 0.2688. Western fence lizards were the most prevalent reptiles, with a CPUE of 1.1720.

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Table 19. Relative abundance of amphibians and reptiles in the oak woodland habitat of the Newville project area 1999-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
Western toad	1	0.0108
Pacific chorus frog	1	0.0108
California red-legged frog	0	
Foothill yellow-legged frog	0	
Bullfrog	25	0.2688
Reptiles		
Western pond turtle	0	
Western fence lizard	109	1.1720
Western skink	9	0.0968
Southern alligator lizard	1	0.0108
Racer	2	0.0215
Gopher snake	4	0.0430
Common kingsnake	0	
Western terrestrial garter snake	1	0.0108
Western aquatic garter snake	1	0.0108
Common garter snake	1	0.0108
Western rattlesnake	6	0.0645

Grassland Habitat

Surveyors observed eleven of the species found in the entire Newville project area in grassland habitat (Table 20). The foothill yellow-legged frog was the only special status species found within this habitat. The most prevalent amphibian species was the bullfrog, with a CPUE of 0.0307. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.2763.

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Table 20. Relative abundance of amphibians and reptiles in grassland habitat of the Newville project area 1999-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
Western toad	0	
Pacific chorus frog	1	0.0077
California red-legged frog	0	
Foothill yellow-legged frog	1	0.0077
Bullfrog	4	0.0307
Reptiles		
Western pond turtle	0	
Western fence lizard	36	0.2763
Western skink	0	
Southern alligator lizard	1	0.0077
Racer	11	0.0844
Gopher snake	4	0.0307
Common kingsnake	0	
Western terrestrial garter snake	8	0.0614
Western aquatic garter snake	1	0.0077
Common garter snake	4	0.0307
Western rattlesnake	4	0.0307

Pond Habitat

Surveyors observed twelve of the species found in the Newville project area in pond habitat (Table 21). The foothill yellow-legged frog and the western pond turtle were the two special status species that were found in this habitat. The most prevalent amphibian species found was the bullfrog, with a CPUE of 28.3173. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.0272.

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Table 21. Relative abundance of amphibians and reptiles in pond habitat of the Newville project area 1999-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
Western toad	64	0.1341
Pacific chorus frog	548	1.1484
California red-legged frog	0	
Foothill yellow-legged frog	4	0.0084
Bullfrog	13513	28.3173
Reptiles		
Western pond turtle	10	0.0210
Western fence lizard	13	0.0272
Western skink	0	
Southern alligator lizard	0	
Racer	11	0.0231
Gopher snake	0	
Common kingsnake	4	0.0084
Western terrestrial garter snake	8	0.0168
Western aquatic garter snake	10	0.0210
Common garter snake	9	0.0189
Western rattlesnake	7	0.0147

SPECIES ABUNDANCE IN PROJECT COMPONENTS

The bullfrog, the western fence lizard, the western terrestrial garter snake (*Thamnophis elegans*) and the common garter snake (*Thamnophis sirtalis*) were the four species found in all project components. The highest CPUE overall was 48.5706 for bullfrogs in the North Road relocation alignment, with western fence lizards being the most prevalent reptiles in that alignment. Bullfrogs and western fence lizards were the most prevalent amphibian and reptile species, respectively, in the North Road relocation alignment, the Newville inundation area, the Newville recreation areas, the Tehama Colusa Canal (TCC) to Black Butte conveyance and the Black Butte to Newville conveyance. The only amphibian species found in the South Road relocation alignment was the bullfrog. Western rattlesnakes were the most prevalent reptiles in the South Road relocation alignment. The

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most prevalent amphibian species found in the Thomes Creek diversion and conveyance alignment was the bullfrog. Common garter snakes were the most prevalent reptiles. A single California red-legged frog was sighted on Thomes Creek within the conveyance alignment.

Inundation Area

DFG staff spent a total of 252 hours surveying the inundation area of the Newville project area for reptiles and amphibians. A total of fourteen species were observed during these surveys. The western pond turtle and the foothill yellow-legged frog were the only special status species that were found within the inundation area. The most prevalent amphibian species found was the bullfrog, with a CPUE of 18.3940. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.6241 (Table 22).

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Table 22. Relative abundance of amphibians and reptiles in the inundation area of the Newville project area 1999-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
Western toad	0	
Pacific chorus frog	24	0.0954
California red-legged frog	0	
Foothill yellow-legged frog	494	1.9638
Bullfrog	4627	18.3940
Reptiles		
Western pond turtle	10	0.0398
Western fence lizard	157	0.6241
Western skink	9	0.0358
Southern alligator lizard	1	0.0040
Racer	9	0.0358
Gopher snake	7	0.0278
Common kingsnake	3	0.0119
Western terrestrial garter snake	11	0.0437
Western aquatic garter snake	13	0.0517
Common garter snake	14	0.0557
Western rattlesnake	5	0.0199

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New Road Alignments

DFG staff observed a total of eleven species in the new road alignments of the Newville project area (Table 23). The foothill yellow-legged frog and the western pond turtle were the only special status species that were found within these areas. Overall, the most prevalent amphibian species found was the bullfrog and western fence lizards were the most prevalent reptiles. Due to the relatively low number of survey hours completed in the new road alignments, the numbers in Table 23 may not accurately represent the species that could occur in these areas. As the new road alignments consist of grassland and oak woodland, the results for the more extensive surveys of these habitat types (Table 20 and

Table 19) are probably a more accurate representation of what could be found in the new road alignments.

Table 23. Occurrence and relative abundance of amphibians and reptiles in the new road alignments of the Newville project area 1999-2002.

SPECIES	CPUE	
	North Road Relocation	South Road Relocation
Amphibians		
Western toad		
Pacific chorus frog	0.0489	
California red-legged frog		
Foothill yellow-legged frog	1.0275	
Bullfrog	48.5706	3.0544
Reptiles		
Western pond turtle	0.0489	0.0070
Western fence lizard	0.1957	0.0559
Western skink		
Southern alligator lizard	0.0140	
Racer		
Gopher snake		0.0349
Common kingsnake		
Western terrestrial garter snake	0.1608	0.0210
Western aquatic garter snake		0.0070
Common garter snake	0.0140	0.0070
Western rattlesnake		0.0699

North Road Relocation

DFG staff spent a total of 143 hours surveying the North Road relocation alignment of the Newville project area for reptiles and amphibians. A total of eight species were

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observed during these surveys. The foothill yellow-legged frog and the western pond turtle were the only special status species found. The most prevalent amphibian species found in the North Road relocation alignment was the bullfrog, with a CPUE of 48.5706. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.1957 (Table 23).

South Road Relocation

DFG staff spent a total of 143 hours surveying the South Road relocation alignment of the Newville project area for reptiles and amphibians. A total of eight species were observed during these surveys, with the western pond turtle the only special status species found. The only amphibian species found in this alignment was the bullfrog, with a CPUE of 3.0544. Western rattlesnakes were the most prevalent reptiles, with a CPUE of 0.0699 (Table 23).

Conveyance Alignments

DFG staff observed a total of fourteen species in the conveyance alignments of the Newville project area, including three special status species (the California red-legged frog, the foothill yellow-legged frog and the western pond turtle). The most prevalent amphibian species found in the Newville conveyance alignments overall was the bullfrog. Western fence lizards were the most prevalent reptiles found overall (Table 24).

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Table 24. Relative abundance of amphibians and reptiles in the conveyance alignments of the Newville project area 1999-2002.

SPECIES	CPUE		
	TCC to Black Butte Conveyance	Black Butte to Newville Conveyance	Thomes Creek Diversion and Conveyance
Amphibians			
Western toad	0.0045	0.5970	0.0164
Pacific chorus frog	0.5008	1.9869	0.0576
California red-legged frog			0.0082
Foothill yellow-legged frog			1.2829
Bullfrog	3.5904	7.1044	5.3947
Reptiles			
Western pond turtle	0.0089	0.0046	0.0822
Western fence lizard	0.2906	0.1322	0.0740
Western skink			
Southern alligator lizard			
Racer	0.0045	0.0182	0.0247
Gopher snake		0.0046	
Common kingsnake		0.0046	
Western terrestrial garter snake	0.0224	0.0137	0.0411
Western aquatic garter snake	0.0089	0.0456	0.0164
Common garter snake	0.0447	0.0456	0.3865
Western rattlesnake	0.0134	0.0137	0.0740

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TCC to Black Butte Conveyance

DFG staff spent a total of 224 hours surveying the TCC to Black Butte Conveyance alignment of the Newville project area for reptiles and amphibians. A total of ten species were observed during these surveys. The western pond turtle was the only special status species that was found in this alignment. The most prevalent amphibian species found was the bullfrog, with a CPUE of 3.5904. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.2906 (Table 24).

Black Butte to Newville Conveyance

DFG staff spent a total of 219 hours surveying the Black Butte to Newville Conveyance alignment of the Newville project area for reptiles and amphibians. A total of twelve species were observed during these surveys. The western pond turtle was the only special status species found. The most prevalent amphibian species in this alignment was the bullfrog, with a CPUE of 7.1044. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.1322 (Table 24).

Thomes Creek Diversion and Conveyance

DFG staff spent a total of 122 hours surveying the Thomes Creek diversion and conveyance alignment of the Newville project area for reptiles and amphibians. A total of twelve species were observed during these surveys. The California red-legged frog, foothill yellow-legged frog and the western pond turtle were the special status species found in this alignment. The most prevalent amphibian species was the bullfrog, with a CPUE of 5.3947. Common garter snakes were the most prevalent reptiles, with a CPUE of 0.3865 (Table 24). A single California red-legged frog was sighted on Thomes Creek within the conveyance alignment.

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Recreation Areas

DFG staff spent a total of 99 hours surveying the recreation areas of the Newville project area for reptiles and amphibians. A total of eleven species were observed during these surveys. The foothill yellow-legged frog was the only special status species that was

found within the recreation areas. The most prevalent amphibian species found was the bullfrog, with a CPUE of 4.7427. Western fence lizards were the most prevalent reptiles, with a CPUE of 0.5348 (Table 25). Due to the relatively low number of survey hours completed in the recreation areas, the numbers in Table 25 may not accurately represent the species that could occur in these areas. As these areas consist of grassland and oak woodland, the results for the more extensive surveys of these habitat types (Table 20 and Table 19) are probably a more accurate representation of what could be found in the recreation areas.

Table 25. Relative abundance of amphibians and reptiles in the recreation areas of the Newville project area 1999-2002.

SPECIES	NUMBER CAUGHT	CPUE
Amphibians		
Western toad	1	0.0101
Pacific chorus frog	445	4.4904
California red-legged frog	0	
Foothill yellow-legged frog	3	0.0303
Bullfrog	470	4.7427
Reptiles		
Western pond turtle	0	
Western fence lizard	53	0.5348
Western skink	5	0.0505
Southern alligator lizard	0	
Racer	1	0.0101
Gopher snake	1	0.0101
Common kingsnake	0	
Western terrestrial garter snake	1	0.0101
Western aquatic garter snake	2	0.0202
Common garter snake	1	0.0101
Western rattlesnake	0	

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CHAPTER 5

DISCUSSION

Sites Project Area

Unobserved species

The DFG believes that this survey effort found most, if not all, of the different amphibian and reptile species occurring within the Sites reservoir site and surrounding areas. However, a number of species that could potentially occur in this area based on habitat descriptions and range maps presented in Stebbins (1986) were not observed. Perhaps the project area is situated at the outermost limits of these species' ranges. Perhaps environmental conditions were not optimal at the time surveys were conducted for these species. Possibly these species are just uncommon in the project area. The notably absent species were the following:

- Oregon salamander (*Ensatina escholtzii oregonensis*)
- coast horned lizard (*Phrynosoma coronatum*)
- western whiptail (*Cnemidophorus tigris*)
- northern alligator lizard (*Elgaria coerulea*)
- rubber boa (*Charina bottea bottae*)
- California mountain king snake (*Lampropeltis zonata*)
- night snake (*Hypsiglena torquata*).

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Western pond turtles were found in the project area as well as outside the reservoir footprint, both upstream and downstream. California red-legged frogs, which generally occupy habitats similar to those occupied by western pond turtles (Jennings, Hayes, and Holland 1985), were not found during these surveys; although the surveys were done to protocol. Further surveys of the streams and pools surrounding the reservoir inundation area should be conducted for California red-legged frogs. While giant garter snakes were not observed by DFG staff, they were determined to occur within the Sites new conveyance alignment through consultation with USFWS and interviews with local landowners.

Newville Project Area

Unobserved species

The DFG believes that this survey effort found most, if not all, of the different amphibian and reptile species occurring within the Newville reservoir site and surrounding areas. However, a number of species that could potentially occur in this area based on habitat descriptions and range maps presented in Stebbins (1986) were not observed. Several of the species listed below were found in the Sites project area and it is likely that they do occur in the Newville project area. A greater amount of effort was expended on the Sites project in terms of survey hours. Fewer survey hours in the Newville project area may account for some of the species not found there. However, it is also possible that the Newville project area is situated at the outermost limits of these species' ranges, or that environmental conditions were not optimal at the time surveys were conducted for these species. Possibly these species are just uncommon in the project area. The notably absent species were the following:

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- Oregon salamander
- California slender salamander (*Batrachoseps attenuatus*)
- black salamander
- western spadefoot toad
- sagebrush lizard
- coast horned lizard
- western whiptail
- northern alligator lizard
- rubber boa
- ringneck snake
- sharp-tailed snake
- California whipsnake (*Masticophis lateralis*)
- California mountain kingsnake
- night snake

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Previous studies

In 1979, DFG initiated studies of the impacts on fish and wildlife of the Newville Project as part of DWR's Newville Reservoir planning studies. However, the planning studies were halted in 1982. DFG completed a report of its abbreviated studies in 1983 (Brown et al 1983).

The pre-1982 survey of the Newville project area found twenty-two species, seven amphibians and fifteen reptiles, occurring within the habitats of the project area and

surrounding areas (Table 26). The higher number of species observed in this previous study was probably due to the larger crew available to conduct the surveys at that time and the larger area covered by the surveys.

The reptile and amphibian species that were expected in the Newville project area in these previous studies but were not observed include the following:

- northern alligator lizard
- rubber boa
- ringneck snake
- California mountain kingsnake
- night snake.

No estimate of population sizes was possible in the pre-1982 surveys, because of the small number of recaptures that occurred during the pitfall trapping utilized during these surveys.

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Table 26. Species of amphibians and reptiles found in the Newville project area in pre-1982 studies.

COMMON NAME	SCIENTIFIC NAME
Amphibians	
California slender salamander	*Batrachoseps attenuatus*
Black salamander	*Aneides flavipunctatus*
Western spadefoot toad	*Spea hammondii*
Western toad	*Bufo boreas*
Pacific chorus frog	*Pseudacris regilla*
Foothill yellow-legged frog	*Rana boylii*
Bullfrog	*Rana catesbeiana*
Reptiles	
Western pond turtle	*Clemmys marmorata*
Western fence lizard	*Sceloporus occidentalis*
Sagebrush lizard	*Sceloporus graciosus*
Western skink	*Eumeces skiltonianus*
Western whiptail	*Cnemidophorus tigris*
Southern alligator lizard	*Elgaria multicarinata*
Sharp-tailed snake	*Contia tenuis*
Racer	*Coluber constrictor*
California whipsnake	*Masticophis lateralis*
Gopher snake	*Pituophis catanifer*
Common kingsnake	*Lampropeltus getula*
Western terrestrial garter snake	*Thamnophis elegans*
Western aquatic garter snake	*Thamnophis couchii*
Common garter snake	*Thamnophis sirtalis*
Western rattlesnake	*Crotalus viridus*

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Ground searching was the most successful survey method in the pre-1982 surveys in terms of the number of species it produced. This method yielded sightings of 90.9 percent of all species expected to occur in the area. Night driving yielded 63.6 percent of these species, and searches of aquatic habitats produced 40.9 percent of these species.

Three “Species of Concern” to the State of California were found this area in the pre-1982 surveys. These species were the western spadefoot toad, the foothill yellow-legged frog, and the western pond turtle. These species complete their reproductive cycles in both temporary and permanent ponds found throughout the Newville project area.

Survey Methods Suitability

The combination of survey methods used for the surveys conducted in the Sites and Newville project areas proved adequate for their purpose. The methods used are well suited for short-term surveys such as this, since they allow a great deal of territory to be covered in a brief period of time. Although accurate estimates of amphibian and reptile species populations are difficult or impossible to make using these methods, the surveys appear to have provided a reliable qualitative inventory of which species are present in these areas.

Summary of Special Species Findings

The western spadefoot toad and foothill yellow-legged frog, both federal and State "Species of Concern", were found in the Sites project area. The western pond turtle, a State "Species of Concern" was also found. No other special status species were found in the Sites project area during these surveys. However, the California red-legged frog, a federally threatened species, is generally expected to occupy the same habitat areas as western pond turtles, which were found in the area. Therefore, DFG should conduct further surveys of suitable habitat in the area.

A total of three special status species were observed by surveyors at the Newville project area: the foothill yellow-legged frog, the western pond turtle and the California red-legged frog (A single California red-legged frog was observed on Thomes Creek, within the conveyance alignment).

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Conclusions and Recommendations

1. Damming Thomes Creek would reduce habitat for California red-legged frogs and foothill yellow legged frogs. California red-legged frogs are listed as a federally threatened species and foothill yellow-legged frogs are a federal and California State "Species of Concern."
2. Creation of the Sites or Newville projects would destroy habitat for and displace western pond turtles. Western pond turtles are a California State "Species of Concern."
3. The proposed Sites project would eliminate habitat for and displace twenty-five species – eight amphibians and seventeen reptiles.
4. The proposed Newville project would eliminate habitat for and displace sixteen species – five amphibians and eleven reptiles.
5. Project appurtenances such as diversion canals, road realignments and recreation areas would cause additional impacts on amphibians and reptiles.
6. Additional studies should be required for California red-legged frogs for one mile around the chosen project.
7. Additional studies should be required for western pond turtles, California red-legged frogs and giant garter snakes in Stone Corral Creek below the proposed Sites dam site.
8. Mitigation areas should be identified and their populations of amphibians and reptiles studied.
9. After completion of additional studies and after further site specific studies within potential habitat improvement areas, specific amphibian and reptile compensation plans should be prepared.

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APPENDIX I

Classification of amphibian and reptile species surveyed for and/or observed in the Sites and Newville project areas.

Special status species listed in Table 2 are denoted by an asterisk (*).

Common name	Phylum	Class	Order	Family	Genus	Species
California tiger salamander*	Craniata	Amphibia	Caudata	Ambystomatidae	*Ambystoma*	*californiense*
California newt	Craniata	Amphibia	Caudata	Salamandridae	*Taricha*	*torosa*
Oregon ensatina	Craniata	Amphibia	Caudata	Plethodontidae	*Ensatina*	*eschscholtzii oregonensis*
California slender salamander	Craniata	Amphibia	Caudata	Plethodontidae	*Batrachoseps*	*attenuatus*
Black salamander	Craniata	Amphibia	Caudata	Plethodontidae	*Aneides*	*flavipunctatus*
Western spadefoot toad*	Craniata	Amphibia	Anura	Pelobatidae	*Spea*	*hammondii*
Western toad	Craniata	Amphibia	Anura	Bufonidae	*Bufo*	*boreas*
Pacific chorus frog	Craniata	Amphibia	Anura	Hylidae	*Pseudacris*	*regilla*
California red-legged frog*	Craniata	Amphibia	Anura	Ranidae	*Rana*	*aurora draytonii*
Foothill yellow-legged frog*	Craniata	Amphibia	Anura	Ranidae	*Rana*	*boylii*
Bullfrog	Craniata	Amphibia	Anura	Ranidae	*Rana*	*catesbeiana*
Western pond turtle*	Craniata	Reptilia	Testudines	Emydidae	*Clemmys*	*marmorata*
Western fence lizard	Craniata	Reptilia	Squamata	Phrynosomatidae	*Sceloporus*	*occidentalis*
Sagebrush lizard	Craniata	Reptilia	Squamata	Phrynosomatidae	*Sceloporus*	*graciosus*
Coast horned lizard			Squamata	Phrynosomatidae	*Phrynosoma*	*coronatum*
Western skink	Craniata	Reptilia	Squamata	Scincidae	*Eumeces*	*skiltonianus*
Western whiptail	Craniata	Reptilia	Squamata	Teiidae	*Cnemidophorus*	*tigris*
Southern alligator lizard	Craniata	Reptilia	Squamata	Anguidae	*Elgaria*	*multicaranata*
Rubber boa	Craniata	Reptilia	Squamata	Boidae	*Charina*	*bottae*
Ringneck snake	Craniata	Reptilia	Squamata	Colubridae	*Diadophis*	*punctatus*
Sharp-tailed snake	Craniata	Reptilia	Squamata	Colubridae	*Contia*	*tenuis*
Racer	Craniata	Reptilia	Squamata	Colubridae	*Coluber*	*constrictor*
California whipsnake	Craniata	Reptilia	Squamata	Colubridae	*Masticophis*	*lateralis*
Gopher snake	Craniata	Reptilia	Squamata	Colubridae	*Pituophis*	*catanifer*
Common kingsnake	Craniata	Reptilia	Squamata	Colubridae	*Lampropeltis*	*getula*
California mountain kingsnake	Craniata	Reptilia	Squamata	Colubridae	*Lampropeltis*	*zonata*
Western terrestrial garter snake	Craniata	Reptilia	Squamata	Colubridae	*Thamnophis*	*elegans*
Western aquatic garter snake	Craniata	Reptilia	Squamata	Colubridae	*Thamnophis*	*couchii*
Common garter snake	Craniata	Reptilia	Squamata	Colubridae	*Thamnophis*	*sirtalis*
Giant garter snake*	Craniata	Reptilia	Squamata	Colubridae	*Thamnophis*	*gigas*
Night snake	Craniata	Reptilia	Squamata	Colubridae	*Hypsiglena*	*torquata*
Western rattlesnake	Craniata	Reptilia	Squamata	Viperidae	*Crotalus*	*viridis*

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