

**COST IMPLICATIONS OF PROTOCOLS SPECIFIED IN
CDFG HATCHERY AND STOCKING PROGRAM EIR/EIS**

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Proposal Number: 1687-001
CARF Comments on CDFG Hatchery and Stocking Program EIR/EIS

California Fish and Game Commission
P.O. Box 944209
Sacramento, California 94244-2090

SUBJECT: California Association for Recreational Fishing Comments on
Estimated Cost of Compliance with Protocols Specified in the CDFG
Hatchery and Stocking Program EIR/EIS

On behalf of the California Association for Recreational Fishing (CARF), Sapphos Environmental, Inc. has completed a case study for four lakes of diverse sizes and locations to understand the cost implications of the protocols specified in the California Department of Fish and Game (CDFG) Hatchery and Stocking Program Final Environmental Impact Report (EIR) / Environmental Impact Statement (EIS). The estimated cost, based on the results of the study, when applied to 24,000 potentially regulated water bodies in California, could exceed \$3 billion, with recurring costs to occur on 5-year cycles. The CDFG Hatchery and Stocking Program seeks to implement new protocols and changes to the current Private Stocking Regulations (California Code of Regulations Title 14, Section 238.5) for water impoundments that are stocked by CDFG or private industry for the purpose of freshwater recreational sport fishing. CARF believes that the proposed changes to the regulations and permitting process would result in significant and undisclosed effects on the commercial viability of recreational sport fishing in California and a corresponding reduction in the economic and recreational value of sports fisheries to Californians. As a result, CARF retained Sapphos Environmental, Inc. to prepare the estimated cost for four potentially regulated water bodies to assist CARF and the California Fish and Game Commission in understanding the potential economic and operational effects of the proposed regulations and permitting process on the commercial viability of recreational sport fishing in California.

Sapphos Environmental, Inc. is a full-service environmental consulting firm with extensive experience in the preparation and peer review of documents and technical analyses pursuant to the California Environmental Quality Act, the National Environmental Policy Act, and the federal and California Endangered Species Acts. Sapphos Environmental, Inc. has nearly 20 years of experience in providing professional environmental and technical services to clients in the southwestern United States, focusing on California. Since 1992, Sapphos Environmental, Inc. has provided environmental and technical services worth approximately \$40 million for projects in California. Sapphos Environmental, Inc. has retained the services of San Marino Environmental Associates to assist in the preparation of the estimated cost for aquatic species surveys.

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Thank you for this opportunity to provide this report and testimony to the California Fish and Game Commission. Should there be any questions regarding the contents of this proposal or should additional information be required, please contact Ms. Marie Campbell at (626) 683-3547.

Respectfully submitted,
SAPPHOS ENVIRONMENTAL, INC.

A handwritten signature in black ink that reads "Marie C. Campbell". The signature is written in a cursive style with a large, stylized initial 'M'.

Marie Campbell
Principal

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SECTION ES **EXECUTIVE SUMMARY**

Private Stocking Regulations proposed by the California Department of Fish and Game (CDFG) and U.S. Fish and Wildlife Service (USFWS) pursuant to the Hatchery and Stocking Program Environmental Impact Report / Environmental Impact Statement would impose significant new regulations. The potential associated costs of implementation may substantially reduce the number of viable lake and freshwater operations in California and the corresponding opportunity for recreational sport fishing, thereby impacting millions of anglers and affecting the economic benefit of sport fishing. The CDFG Hatchery and Stocking Program seeks to implement new protocols and changes to the current Private Stocking Regulations (California Code of Regulations Title 14, Sections 238.5) for California lakes and ponds stocked by CDFG and private property owners for the purpose of freshwater recreational sport fishing, and properties stocked by the CDFG that are not exempt. As proposed, new protocols would require periodic environmental assessments of all lakes and ponds in California to determine the environmental impact of stocked fish on native species, whether or not the species are listed as threatened or endangered.

As currently envisioned, the new protocols and changes to the current Private Stocking Regulations proposed by CDFG would impose significant new regulations and costs that the California Association for Recreational Fishing (CARF) believes may substantially reduce the number of viable lake and freshwater operations in California and the corresponding opportunity for recreational sport fishing. Cost estimates were prepared to complete biological surveys at four water bodies that would potentially be subject to the protocols specified in Appendix K of the Environmental Impact Report / Environmental Impact Statement (EIR/EIS) (Table ES-1, *Summary of Estimated Cost*).

TABLE ES-1
SUMMARY OF ESTIMATED COST

Lake	Acres	Feet	Fish	Birds	Herpetofauna	Total
Cakebread Lake	2.1	1,200	\$21,694	N/A	\$122,692.22	\$144,386.22
Knickerbocker Lake	8.2	3,771	\$22,281	N/A	\$24,234.78	\$46,515.78
Dixon Lake	63.2	10,109	\$25,919	\$15,490.74	\$139,677.06	\$181,086.80
Irvine Lake	579.4	43,124	\$31,456	\$14,479.36	\$115,458.14	\$161,393.50

FINDINGS

- All cost estimates were based on USFWS and CDFG survey protocols.
- The studies show that the size of the water body is not a predictor of regulatory costs.
- A records search of the California Natural Diversity Database (CNDDDB) indicated a potential presence of 3 to 13 Decision Species within the four case study lakes.
- The State of California has over 4,000 lakes and reservoirs, and over 20,000 registered ponds.
- In 2006, California had approximately 1,224,000 Freshwater Anglers.¹

¹American Association of Fishing. Accessed 13 December 2011. *Sport Fishing in America*. Available at: <http://www.asafishing.org/images/statistics/resources/Sportfishing%20in%20America%20Rev.%207%2008.pdf>

- Freshwater sport fishing activities generate \$2 billion annually in economic activity to California's economy.²
- In 2006, state and local tax revenues generated by California Sport Fishing was approximately \$336,307,302.³
- Appendix E of the EIR/EIS highlights approximately 80 Decision Species.
- The average estimated cost of the case study surveys would be approximately \$133,345.
- All case studies factor in potentially present Decision Species.
- The total cost for surveys for all bodies of water in California would exceed \$3 billion.

² California Department of Fish and Game. Accessed 13 December 2011. *California Fishing Passport Program*. Available at: <http://www.dfg.ca.gov/fishingpassport/program.asp>

³ American Association of Fishing. Accessed 13 December 2011. *Sport Fishing in America*. Available at: <http://www.asafishing.org/images/statistics/resources/Sportfishing%20in%20America%20Rev.%207%2008.pdf>

SECTION 1.0 METHODS

Four lakes of varying sizes located throughout California were evaluated (Figure 1-1, *Lake Locations Map*; and Section 2.0, *Lake Descriptions*): (1) Irvine Lake is located in Orange County and is approximately 579 acres (Figure 1-2, *Irvine Lake*); (2) Dixon Lake is located in San Diego County and is approximately 63 acres (Figure 1-3, *Dixon Lake*); Knickerbocker Lake is located in Placer County and is approximately 8 acres (Figure 1-4, *Knickerbocker Lake*); and Cakebread Lake is located in Napa County and is approximately 2 acres (Figure 1-5, *Cakebread Lake*). Data gathered from the California Natural Diversity Database indicate that the respective water bodies would require surveys for 3 to 13 special-status species. Data indicate that the number of species for which surveys are required is not directly proportional to the size of the lake.

The following data were gathered for each of the case study lakes:

- Size of lake
- Perimeter (length in feet)
- Depth
- Private or public
- Associated amenities

The estimated cost for the fish surveys was prepared by San Marino Environmental Associates, who contributed comparable surveys for state agencies, including the California Department of Fish and Game (CDFG) and California Department of Transportation (Appendix A, *Resumes*). The estimated cost for avian and herpetological surveys was prepared by Sapphos Environmental, Inc., whose staff has over 20 years of experience performing comparable surveys on habitats throughout California (Appendix A).

1.1 SURVEY PROTOCOLS

Survey protocols and cost justification were prepared for the arroyo toad,¹ California red-legged frog,² and California tiger salamander³ based on the U.S. Fish and Wildlife Service (USFWS) survey protocols; for the giant garter snake based on USFWS programmatic formal consultation;⁴ for the

¹ U.S. Fish and Wildlife Service. 19 May 1999. *Survey Protocol for the Arroyo Toad*. Available at: http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/arroyotoad/arroyotoad_surveyprotocol.pdf

² U.S. Fish and Wildlife Service. August 2005. *Survey Protocol for the Red-Legged Frog*. Available at: http://www.fws.gov/sacramento/es/documents/crf_survey_guidance_aug2005.pdf

³ U.S. Fish and Wildlife Service. October 2003. *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander*. Available at: http://www.fws.gov/sacramento/es/documents/cts_survey_protocol.PDF

⁴ U.S. Fish and Wildlife Service. 13 November 1997. *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake*. Available at: http://www.water.ca.gov/fishpassage/docs/butte/butte_app_K.pdf<http://relicensing.pcwa.net/documents/Library/PCWA-L-270.pdf>



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FIGURE 1-1
Lake Locations Map

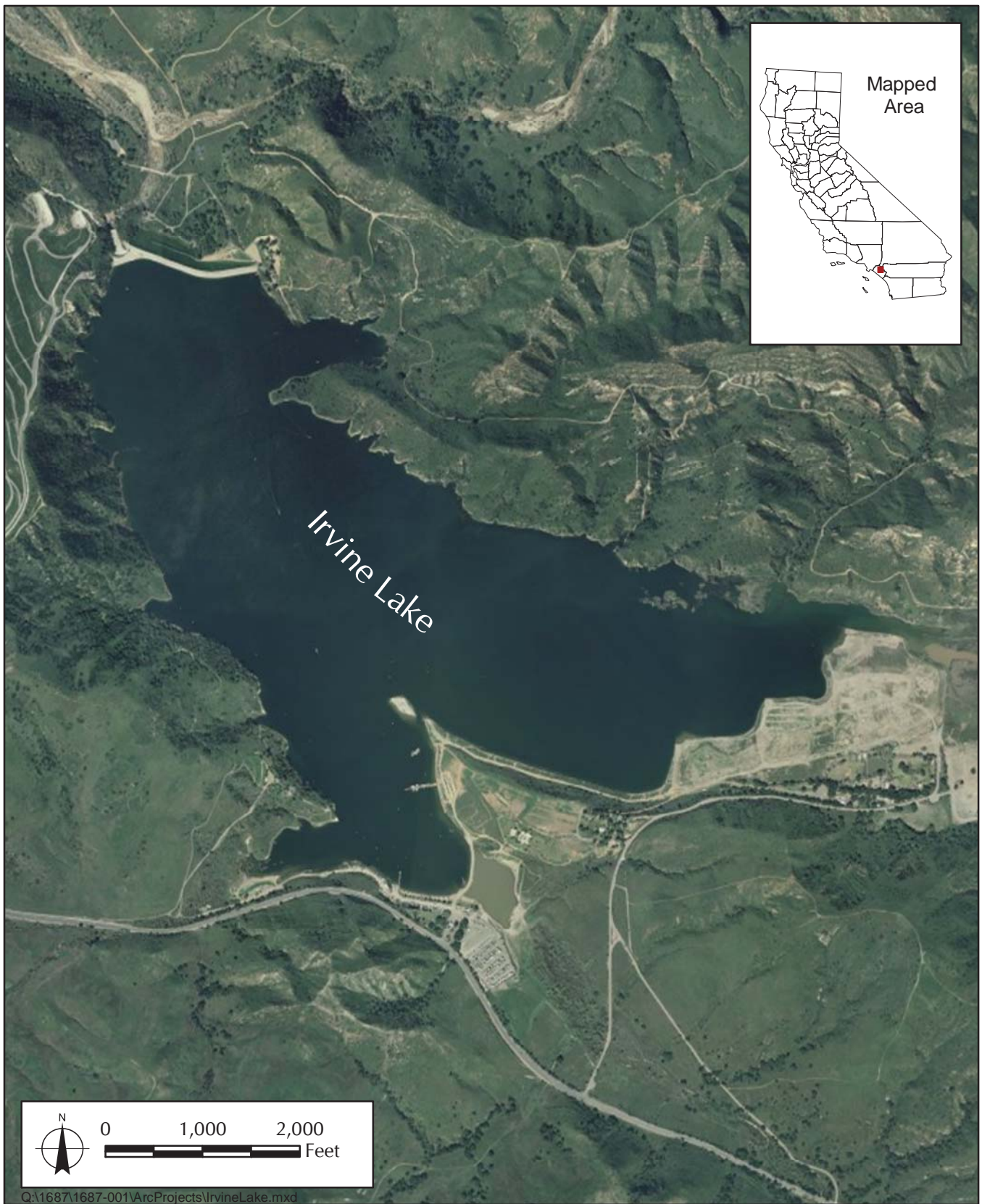


FIGURE 1-2
Irvine Lake

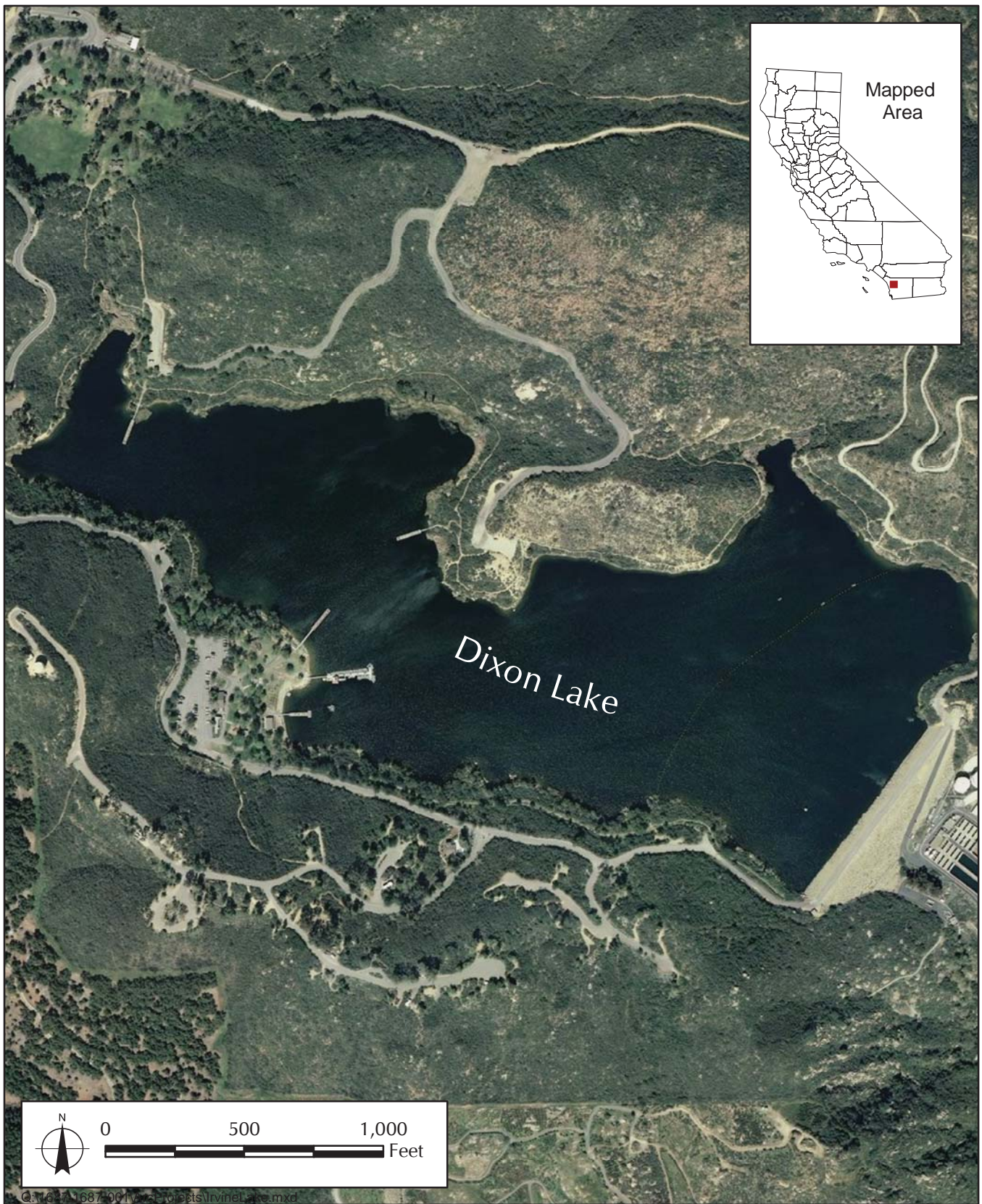


FIGURE 1-3
Dixon Lake

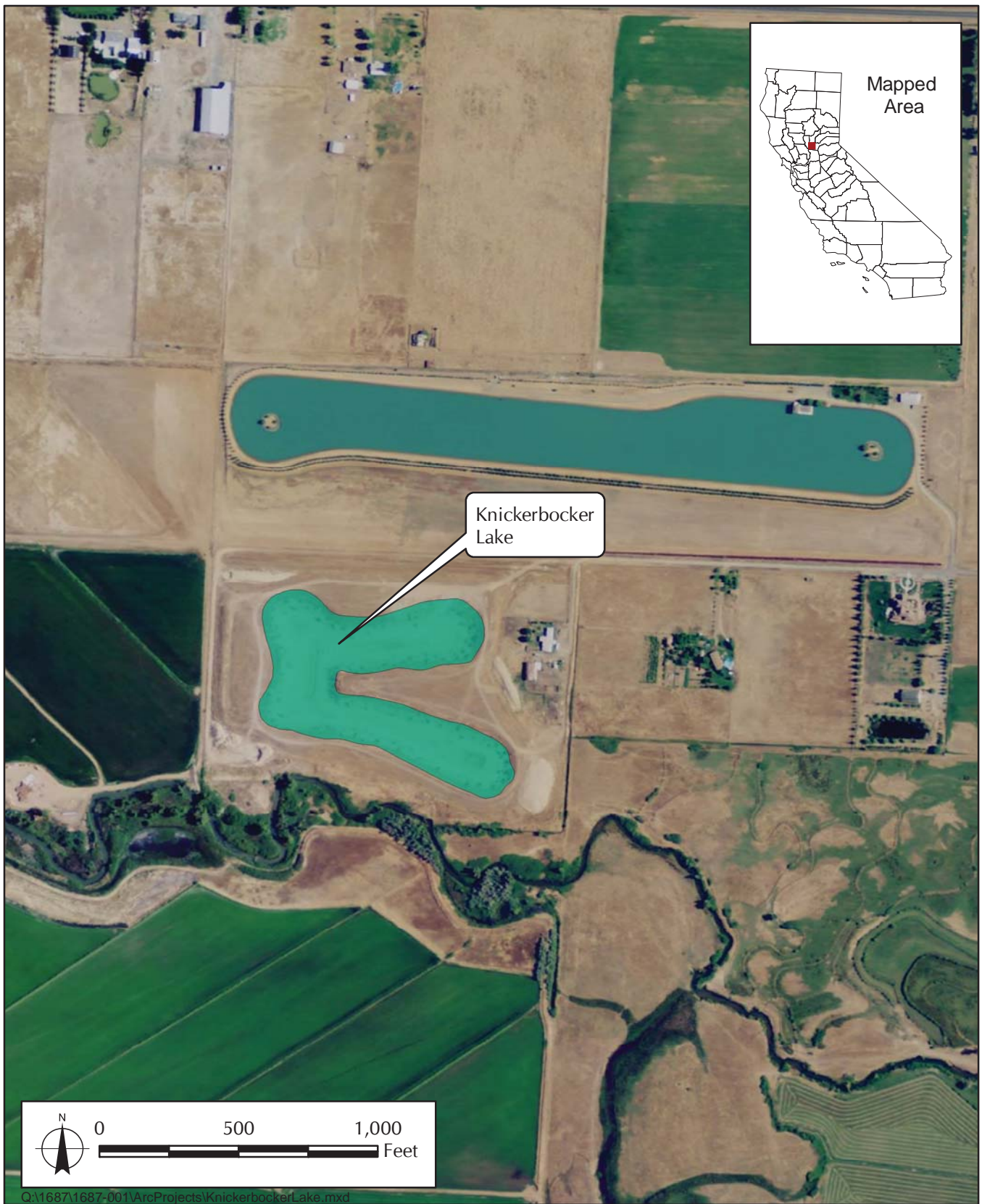


FIGURE 1-4
Knickerbocker Lake

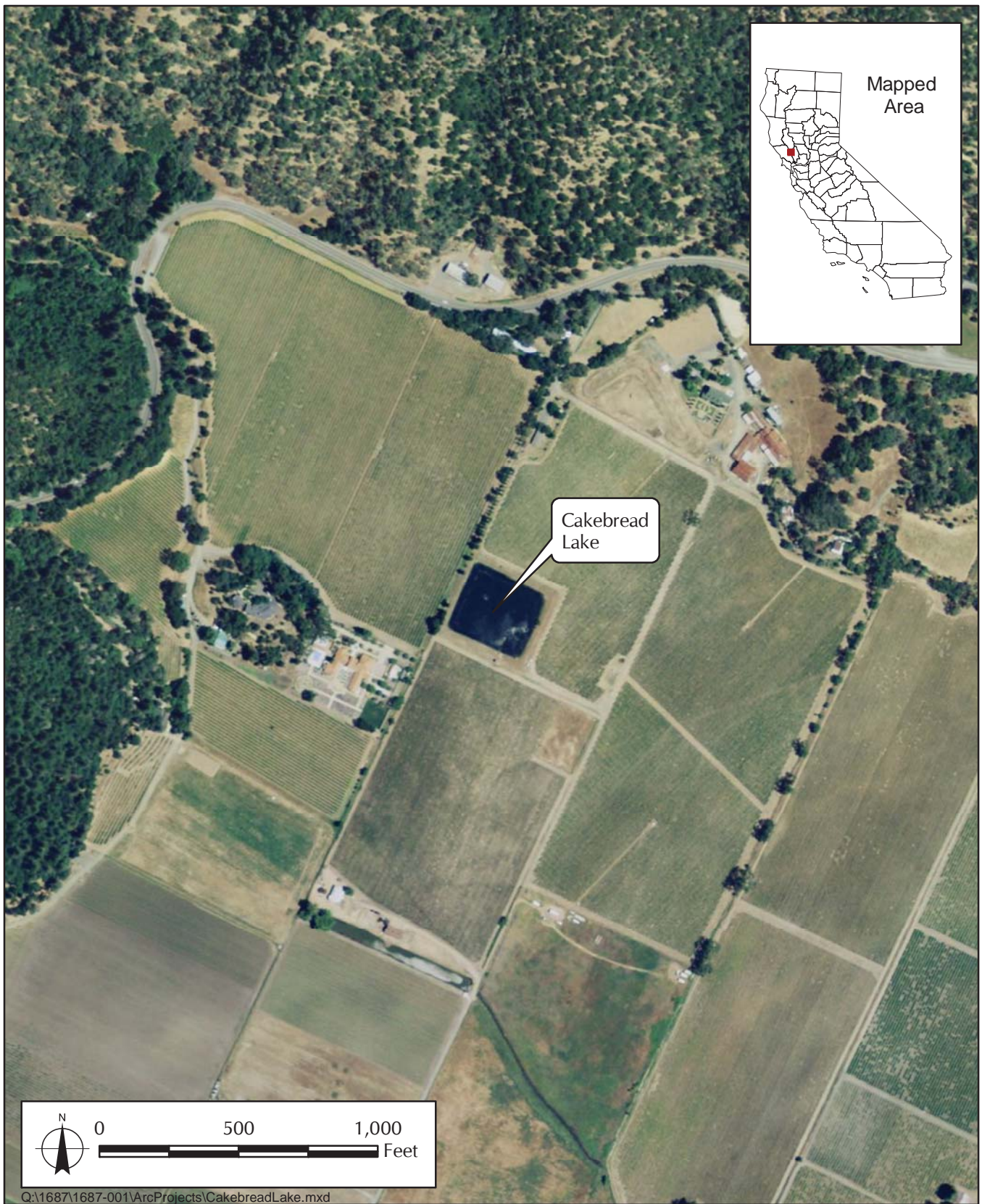


FIGURE 1-5
Cakebread Lake

western pond turtle based on USGS survey protocols;⁵ and for the foothill yellow-legged frog based on Pacific Gas and Electric Company Technical and Ecological Services Survey Protocols.⁶

⁵ U.S. Fish and Wildlife Service. 2006. *USGS Western Pond Turtle Visual Survey Protocol for the Southcoast Ecoregion*. Available at: <http://www.ycwa-relicensing.com/Technical%20References/02%20-%20Aquatic%20Resources/Amphibians%20and%20Reptiles/USGS%202006%20WPT%20Visual%20Survey%20Protocols.pdf>

⁶ Pacific Gas and Electric, Technical and Ecological Services (PGE, TES). May 2002. *A Standardized Approach for Habitat Assessments and Visual Encounter Surveys for the Foothill Yellow-legged Frog*. Available at: <http://relicensing.pcwa.net/documents/Library/PCWA-L-270.pdf>

SECTION 2.0 LAKE DESCRIPTIONS

2.1 IRVINE LAKE

Irvine Lake is located at 4621 Santiago Canyon Road, Silverado, California 92676. The lake encompasses 579.4 acres and is approximately 70 feet deep (Figure 1-2).

Irvine Lake is stocked with trout, largemouth bass, catfish, crappie, bluegill, redear sunfish, sturgeon, wiper, and carp. Irvine Lake also has camping areas, launch ramps, a café, picnic and barbeque areas, private boat and recreational vehicle storage, and a kids lagoon.

Avians

Southwestern Willow Flycatcher

A California Natural Diversity Database (CNDDDB) Rarefind4 search for Orange County identified four occurrences of southwestern willow flycatcher (*Empidonax traillii extimus*), with the closest observation approximately 6.5 miles north of Irvine Lake. Southwestern willow flycatcher requires dense riparian thickets, primarily composed of willow, for nesting habitat. Irvine Lake appears to contain little to no riparian habitat around its perimeter, but two small and one large riparian area leading off from the lake may contain suitable southwestern willow flycatcher habitat. It is proposed that these three riparian segments be surveyed according to federal protocol.

Osprey

Although osprey (*Pandion haliaetus*) was not found in a nine-quadrangle CNDDDB search, it is possible that they overwinter on Irvine Lake, especially if the lake is currently stocked. Therefore, it is proposed that a winter osprey survey be conducted along the perimeter of the lake between November 15 and March 15 to document presence/absence.

Amphibians and Reptiles

According to the CNDDDB, the following amphibians are of special concern within Irvine Lake:

- California red-legged frog (*Rana aurora draytonii*)
- California tiger salamander (*Ambystoma californiense*)
- Foothill yellow-legged frog (*Rana boylei*)
- Southwestern pond turtle (*Clemmys marmorata pallida*)

2.2 DIXON LAKE

Dixon Lake is located at 1700 North La Honda Drive, Escondido, California 92027. The lake encompasses approximately 63.2 acres and is approximately 160 feet deep (Figure 1-3).

Dixon Lake is open year-round, with open access to the public. The lake is often stocked with catfish and trout. Dixon Lake facilities include camping areas, barbeques, boating, hiking, and picnics.

Avians

Southwestern Willow Flycatcher

A CNDDDB Rarefind4 search for San Diego County contains 21 occurrences of southwestern willow flycatcher, with the closest observation approximately 7 miles south of Dixon Lake. Southwestern willow flycatcher requires dense riparian thickets, primarily composed of willow, for nesting habitat. Dixon Lake appears to contain little to no riparian habitat around its perimeter, but three small riparian areas leading off from the lake may contain suitable southwestern willow flycatcher habitat. It is proposed that these three small riparian segments, each less than 400 meters in length, be surveyed according to federal protocol.

Osprey

Although osprey was not found in a nine-quadrangle CNDDDB search, it is possible that they overwinter on Dixon Lake, especially if the lake is currently stocked. Therefore, it is proposed that a winter osprey survey be conducted along the perimeter of the lake between November 15 and March 15 to document presence/absence.

Amphibians and Reptiles

According to the CNDDDB, the following amphibians are of special concern in Dixon Lake:

Upland

- Coast horned lizard (*Phrynosoma coronatum*)
- Coast patch-nosed snake (*Salvadora hexalepis virgultea*)
- Coastal whiptail (*Aspidoscellis tigris stejnegeri*)
- Coronado island skink (*Plestiodon skiltonianus interparietalis*)
- Large-blotched salamander (*Ensatina klauberi*)
- Orangethroat whiptail (*Cnemidophorus hyperythrus*)
- Red-diamond rattlesnake (*Crotalus ruber*)
- Rosy boa (*Lichanura trivirgata roseofusca*)

Riparian

- Arroyo toad (*Bufo californicus*)
- Sierra Madre yellow legged frog (*Rana muscosa*)
- Southwestern pond turtle (*Clemmys marmorata pallida*)
- Two-striped garter snake (*Thamnophis hammondi*)
- Western spadefoot (*Spea hammondi*)

2.3 KNICKERBOCKER LAKE

Knickerbocker Lake is located at 8505 Knickerbocker Place, Lincoln, California 95648. Knickerbocker Lake encompasses approximately 8.2 acres and is approximately 12.9 feet deep (Figure 1-4).

Knickerbocker Lake is located within the boundary of a private residence and is not easily accessible to the public. Known uses for the lake are private leisure activities, such as fishing, camping, and swimming.

Avians

No decision species are listed on CNDDDB results. Knickerbocker Lake is located in a residential complex surrounded by agricultural fields. There are no shrubs or vegetation surrounding the immediate site. There is a small stream south of the property, but it is unlikely to support willow flycatcher, as the stream is outside of its breeding range, which is the Sierra Nevada and Cascade ranges and riparian areas along coast. No surveys are needed.

Amphibians and Reptiles

According to the CNDDDB Database, the following amphibians are of special concern in Knickerbocker Lake:

- Giant garter snake (*Thamnophis gigas*)
- Southwestern pond turtle
- Western spadefoot

2.4 CAKEBREAD LAKE

Cakebread Lake is located at 4394 Silverado Trail, Napa, California 94558. Cakebread Lake encompasses approximately 2.1 acres (Figure 1-5).

Cakebread Lake is located within the boundary of a private residence and is not easily accessible to the public. Known uses for the lake include private leisure activities, such as fishing, camping, and swimming.

Avians

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) was listed by CNDDDB for the adjacent nine-quadrangle area, but it is unlikely that this species would use Cakebread Lake for breeding, wintering, or foraging activities due to the lake's small size and its proximity to human development. Cakebread Lake is a small, private, approximately 2.1-acre pond located in a residential/agricultural area east of Calistoga, California, in Napa County. Bald eagles typically use large reservoirs with forested edges in the breeding season. For wintering habitat, bald eagles typically require adequate open water sites for foraging, prominent roost trees, and absence of human disturbance. Given this lake's small size, lack of adjacent trees, and proximity to human habitation, it does not seem necessary to survey for bald eagle presence at this site. The closest occurrence results in Rarefind4 were located at larger lakes/reservoirs in Napa County, including Lake Hennessey (approximately 9 miles southeast of Cakebread Lake and covering approximately 850 acres), Lake Berryessa (approximately 15 miles east of Cakebread Lake and covering approximately 20,700 acres), and McCreary Lake (approximately 13 miles north of Cakebread Lake and covering approximately 186 acres).

Amphibians and Reptiles

According to the CNDDDB, the following amphibians are of special concern within Cakebread Lake:

- California red-legged frog (*Rana aurora draytonii*)
- California tiger salamander
- Foothill yellow-legged frog
- Southwestern pond turtle

SECTION 3.0 COST ESTIMATES

Each table in this section presents the total estimated cost for given surveys at each designated lake.

3.1 FISH SURVEYS

The estimated cost for fish surveys ranges from \$21,694 to \$31,546 for the four lakes in the case study (Table 3.1-1, *Estimated Cost for Fish Surveys*).

**TABLE 3.1-1
ESTIMATED COST FOR FISH SURVEYS**

Lake	Acres	Perimeter (Feet)	Total Cost
Cakebread Lake	2.1	1,200	\$21,694
Knickerbocker Lake	8.2	3,771	\$22,281
Dixon Lake	63.2	10,109	\$25,919
Irvine Lake	579.4	43,124	\$31,546

Assumptions

- Subscription to the California Natural Diversity Database (CNDDDB) is \$600 per year and is replicated for each lake, so it would be a nonrecurring cost of \$600 for all four lakes.
- Budget assumes sampling will be done using gillnets and fyke/hoop nets.
- Budget assumes net deployment at 3:00 p.m. and collection by 11:00 a.m.
- Work would be 3:00 p.m. to 10 p.m. and 6:00 a.m. to 11:00 a.m., or 12 hours.
- Work schedule would allow gillnets to be checked twice before they are finally pulled, thus reducing mortality rates.

3.2 AVIAN SURVEYS

Cost Justification

Estimated costs for osprey winter surveys (*Pandion haliaetus*) were based on Hawk Migration Association of North America protocols (Table 3.2-1, *Estimated Cost for Osprey Winter Surveys*).¹ This protocol suggests four visits to the site between November and March to assess raptor presence. Surveys should be conducted between midmorning and midafternoon in 4 hours between 10 a.m. and 2 p.m. Costs for osprey winter surveys assume 6 hours per visit, for four total visits, requiring one biologist. The cost estimate includes travel time to the site from Sapphos Environmental, Inc.'s office in Pasadena, travel costs, and optical equipment.

Estimated costs for southwestern willow flycatcher (*Empidonax traillii extimus*) surveys were based on the U.S. Geological Survey's *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher* (Table 3.2-2, *Estimated Cost for Southwestern Willow Flycatcher*

¹ Hawk Migration Association of North America (HMANA). 2007. *North American Winter Raptor Surveys*. Available at: <http://www.hmana.org/wrs.php>

Surveys).² The southwestern willow flycatcher is listed as endangered pursuant to both the federal and California Endangered Species Acts; therefore, survey protocols are relatively rigid and must be closely followed to satisfy the survey requirements. A review of aerial imagery of the site determined that three small riparian areas (approximately 28 call playback points) would need full survey coverage. Because the decision to stock the lake would be considered a change in site management that might result in a potential or foreseeable impact to the southwestern willow flycatcher's habitat, the more stringent survey requirements for project-related surveys were followed. Instead of the three survey visits required for general surveys, five survey visits will be conducted. Therefore, the estimated cost for surveys assumes three riparian areas visited five times over three survey periods (between May 15 and July 17) at 5 hours per day for 1 day per survey period, requiring two biologists. The cost estimate includes travel time to the site from Pasadena, travel costs, optical equipment and song playback equipment.

**TABLE 3.2-1
ESTIMATED COST FOR OSPREY WINTER SURVEYS**

Lake	Acres	Perimeter (Feet)	Total Cost
Cakebread Lake	2.1	1,200	N/A
Knickerbocker Lake	8.2	3,771	N/A
Dixon Lake	63.2	10,109	\$6,302.24
Irvine Lake	579.4	43,124	\$8,177.12

**TABLE 3.2-2
ESTIMATED COST FOR SOUTHWESTERN WILLOW FLYCATCHER SURVEYS**

Lake	Acres	Perimeter (Feet)	Total Cost
Cakebread Lake	2.1	1,200	N/A
Knickerbocker Lake	8.2	3,771	N/A
Dixon Lake	63.2	10,109	\$9,188.48
Irvine Lake	579.4	43,124	\$23,119.04

Assumptions

- Cost estimates for avian surveys were based on a combination of protocols highlighted below.
- Avian surveys would not be required for Cakebread Lake and Knickerbocker Lake based on CNDDDB occurrence records and habitat present on-site.

Irvine Lake

Estimated costs for osprey winter surveys (*Pandion haliaetus*) were based on Hawk Migration Association of North America protocols (Table 3.2-1).³ This protocol suggests four visits to the site between November and March to assess raptor presence. Surveys should be conducted between midmorning and midafternoon over 4 hours between 10 a.m. and 2 p.m. Costs for osprey winter

² U.S. Geological Survey. 2010. *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher*. Available at: <http://www.fws.gov/mountain-prairie/endspp/protocols/SWWFReport.pdf>

³ Hawk Migration Association of North America (HMANA). 2007. *North American Winter Raptor Surveys*. Available at: <http://www.hmana.org/wrs.php>

surveys assume 10 hours per visit, for four total visits, requiring one biologist. The cost estimate includes travel time to site from Pasadena, travel costs, and optical equipment.

Estimated costs for southwestern willow flycatcher (*Empidonax traillii extimus*) surveys were based on the U.S. Geological Survey's *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher* (Table 3.2-2).⁴ The southwestern willow flycatcher is listed as endangered pursuant to both the federal and California Endangered Species Acts; therefore, survey protocols are relatively rigid and must be closely followed to satisfy the survey requirements. A review of aerial imagery of the site determined that four large riparian areas (approximately 129 call playback points) would need full survey coverage. Because the decision to stock the lake would be considered a change in site management that might result in a potential or foreseeable impact to the southwestern willow flycatcher's habitat, the more stringent survey requirements for project-related surveys were followed. Instead of the three survey visits required for general surveys, five survey visits will be conducted. Therefore, the estimated cost assumes four riparian areas visited five times over three survey periods (between May 15 and July 17) at 5 hours per day for 3.5 days per survey period, requiring two biologists. Surveys must be completed between sunrise and 10:30 a.m., necessitating multiple survey days per visit to completely survey the area. The estimated cost includes travel time to the site from Pasadena, travel costs, optical equipment, and song playback equipment.

3.3 HERPETOLOGICAL SURVEYS

Cost Justification

A variety of sensitive reptile and amphibian species occur in proximity to the four lakes addressed in this cost estimate (Table 3.3-1, *Estimated Cost for Herpetological Surveys*). Many of the identified species have specific protocols published by various agencies, including the U.S. Fish and Wildlife Service. These protocols contain guidelines that help determine the presence/absence of a specific species. This cost estimate includes the costs needed to conduct each species-specific protocol. If no species specific protocol was found, a combination of various protocols for taxonomically similar species was used. The estimated cost for surveys each species is based on an entire protocol survey. However, the species-specific survey shall cease if the species is observed prior to finishing the protocol survey.

**TABLE 3.3-1
ESTIMATED COST FOR HERPETOLOGICAL SURVEYS**

Lake	Acres	Perimeter (Feet)	Total Cost
Cakebread Lake	2.1	1,200	\$122,692.22
Knickerbocker Lake	8.2	3,771	\$24,234.78
Dixon Lake	63.2	10,109	\$139,677.06
Irvine Lake	579.4	43,124	\$115,458.14

⁴ U.S. Geological Survey. 2010. *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher*. Available at: <http://www.fws.gov/mountain-prairie/endspp/protocols/SWWFReport.pdf>

Assumptions

- Cost estimates for herp surveys were based on a combination of protocols highlighted below in the “notes” section.
- Herp surveys would be required for all four lakes based on CNDDDB occurrence records and habitat presence on site.
- Two biologists would conduct all herp surveys.

Cakebread Lake

- Foothill yellow-legged frog (*Rana boylei*) surveys assume 12 hours a day, 8 days, two biologists.
- California red-legged frog (*Rana aurora draytonii*) surveys assume 12 hours a day, 8 days, two biologists.
- California tiger salamander (*Ambystoma californiense*) surveys assume larval surveys for 10 hours a day, 3 days, two biologists; includes Upland surveys for 8 hours a day, 20 days, two biologists.
- Western pond turtle (*Actinemys marmorata* or *Emys marmorata*) surveys assume 12 hours a day, 1 day, two biologists.

Knickerbocker Lake

- Southwestern pond turtle (*Clemmys marmorata pallida*) surveys assume 12 hours a day, 1 day, two biologists.
- Giant garter snake (*Thamnophis gigas*) surveys assume 12 hours a day, 1 day, two biologists.
- Western spadefoot (*Spea hammondi*) surveys assume 12 hours a day, 3 days, two biologists.

Irvine Lake

- Coast range newt (*Taricha torosa torosa*) surveys assume 12 hours a day, 5 days, two biologists.
- Arroyo toad (*Bufo californicus*) day surveys assume 12 hours a day, 6 days, two biologists; night surveys assume 8 hours a day, 6 nights, two biologists.
- Western spadefoot surveys assume 12 hours a day, 5 days, two biologists.
- Western pond turtle surveys assume 12 hours a day, 5 days, two biologists.
- Two-striped garter snake (*Thamnophis hammondi*) surveys assume 12 hours a day, 5 days, two biologists.
- Northern leopard frog (*Rana pipiens*) surveys assume 12 hours a day, 5 days, two biologists.

Dixon Lake

- Sierra Madre yellow legged frog (*Rana muscosa*) surveys assume 12 hours a day, 8 days, two biologists.
- Arroyo toad day surveys assume 12 hours a day, 6 days, two biologists; night surveys assume 8 hours a day, 6 nights, two biologists.

- Western spadefoot surveys assume 12 hours a day, 3 days, two biologists.
- Western pond turtle surveys assume 12 hours, 1 day, two biologists.

3.4 NOTES

For each of the respective sensitive herp species, surveys shall cease immediately upon determination of presence in the survey area (includes all stages of life cycle).

SECTION 4.0 REFERENCES

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- U.S. Fish and Wildlife Service. 13 November 1997. *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake*. Available at: http://www.water.ca.gov/fishpassage/docs/butte/butte_app_K.pdf<http://relicensing.pcwa.net/documents/Library/PCWA-L-270.pdf>
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Marie C. Campbell, MA

Master of Arts, Geography,
Geomorphology/
Biogeography, University of
California, Los Angeles, 1988

Principal/President

- *Ensure technical and procedural adequacy pursuant to the National Environmental Policy Act, California Environmental Quality Act (CEQA), and other federal, state, and local statutes and regulations*
- *Provide strategy for regulatory permit compliance*
- *Agency coordination*
- *Coordination with special interests*
- *Identify opportunities for issue resolution*
- *Public outreach*
- *Quality assurance / quality control*
- *Milestone compliance*

Years of Experience: 25 +

Relevant Experience/Speaking Engagements:

- *Board Member, California Wind Energy Association*
- *Past Chapter Director, Los Angeles Association of Environmental Professionals*
- *Lecturer on CEQA before the Association of Environmental Professionals and the County of Los Angeles Chief Executive Office staff*
- *Lecturer at Cal Poly Pomona*
- *Quality assurance manager for Long Beach Memorial Medical Center*
- *Project manager for Los Angeles Grand Avenue and Environs EIR*
- *Technical expert to successfully support clients in 12 CEQA lawsuits*

Ms. Marie Campbell, principal of Sapphos Environmental, Inc, is an environmental compliance specialist with more than 25 years of experience in managing public- and private-sector projects that require strategic planning, environmental compliance documentation, and resource management planning. In particular, Ms. Campbell has extensive experience with complex and controversial alternative energy projects, including the 300-megawatt PdV Wind Energy Project, which was unanimously approved by the Kern County Board of Supervisors in July 2008, and the Lompoc Wind Energy Project, which was unanimously approved by the Santa Barbara County Board of Supervisors in May 2009. Success of these projects was reinforced by the strong working relationships Ms. Campbell built among the many diverse parties who had an interest in the projects. Ms. Campbell managed the coordination among agencies, special interests, and the public to resolve issues and meet project goals and milestones. Ms. Campbell serves on the board of the California Wind Energy Association, and is currently overseeing the preparation of a white paper in support of wind energy siting within the Desert Renewable Energy Conservation Area in California.

Ms. Campbell has served as project manager or senior technical advisor for numerous challenging and high-profile projects, including the Hollywood Bowl Shell Rehabilitation and Acoustical Improvements Environmental Impact Report (EIR), Addendum No. 2 to the First Street Properties (Walt Disney Concert Hall) EIR, the LA Plaza de Cultura y Artes EIR, Grand Avenue and Environs EIR, Bonelli Regional County Park Master Plan EIR, and Deane Dana Friendship Community Regional County Park EIR. Many of these projects involved the preparation of joint environmental documents with multiple agencies. Ms. Campbell has developed strong working relationships with numerous regulatory oversight agencies, including the South Coast Air Quality Management District, Regional Water Quality Control Board, Department of Toxic Substances Control, U.S. Fish and Wildlife Service, and California Department of Fish and Game.

Although the majority of projects for which environmental compliance documentation has been prepared have not involved litigation, the strategic planning and compliance advice provided by Ms. Campbell has been critical to the success of Sapphos Environmental, Inc.'s clients in each of the 12 cases (on 10 projects) that were subject to litigation. In each case, Sapphos Environmental, Inc.'s client prevailed and the project was able to proceed as analyzed.

Throughout her career, Ms. Campbell has been actively engaged in community service. Ms. Campbell established the Sapphos Foundation through the California Community Foundation as a means of supporting community service efforts that are meaningful to her clients, employees, and family. She serves on the board of the Pasadena Mothers' Club Family Learning Center and is honored to be the recipient of their 2009 Corporate Responsibility Award.

Pauline K. Roberts, PhD

PhD, Ecology and Evolutionary
Biology, Dartmouth
College, 2006

Resource Specialist

- Project management, staff management, and budgeting
- Study design and statistical analysis
- Endangered species surveys
- Avian surveys
- Capture and handling of endangered birds
- Aerial raptor surveys
- Radio telemetry
- Plant community mapping and habitat assessments
- Small mammal trapping
- Reptile and amphibian capture with drift fences, pitfall traps, and hand capture
- Arthropod identification and sampling using pitfall traps, leaf litter collection, and branch clipping

Years of Experience: 17

Relevant Experience:

- Coordination with federal and state agencies and local stakeholders in endangered species management and recovery efforts
- Reintroduction of captive-bred birds and mammals
- Surveys of western U.S. bird and plant communities
- Geographic information system and remote sensing

Dr. Pauline Roberts, resources specialist for Sapphos Environmental, Inc., manages and coordinates multiple projects, coordinates and schedules budgets and deliverables, designs and conducts field studies, and prepares technical reports. She is responsible for acting as project manager, task manager, or team leader for environmental projects that involve Environmental Impact Statements (EISs), Environmental Assessments (EAs), and other technical documents in support of the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), or other state and federal agency requirements.

Dr. Roberts has 17 years of experience in the field of wildlife biology, including the design and implementation biological studies encompassing a wide array of avian species and other flora and fauna, project management, endangered species recovery program coordination, wildlife-habitat relationships, and avian surveys. A highly qualified specialist in avian ecology, she has a strong combination of research skills and practical management skills and has worked with birds in a wide range of habitats across the United States and internationally.

Prior to joining Sapphos Environmental, Dr. Roberts directed the Kauai Forest Bird Recovery Project on behalf of the Hawaii Division of Forestry and Wildlife, coordinating recovery efforts with U.S. Fish and Wildlife Service, the State of Hawaii, and other stakeholders. In that position, she was responsible for managing research and recovery actions for Kauai's federally endangered songbirds, including the Puaiohi (*Myadestes palmeri*), 'Akikiki (*Oreomystis bairdi*), and 'Akeke'e (*Loxops caeruleirostris*). She oversaw the reintroduction of 75 captive-bred Puaiohi, documenting the postrelease survival of this critically endangered thrush. Additional projects completed under her supervision include (1) evaluating disease prevalence (a major threat) in native birds of Kauai, (2) nesting and survival studies of native Kauai birds, and (3) a nest box experiment to bolster reproductive success.

Dr. Roberts has in-depth experience handling and surveying a wide range of avian species, including aerial raptor surveys; aerial radio telemetry; and capture using mist-nets, treadle traps, and hand nets. She has marked, measured, and collected blood samples from hundreds of birds. She has experience designing and implementing bird surveys of many types, including point counts, strip transects, and resights of color-banded birds, and has extensive experience analyzing the resulting data to assess population size, density, and bird-habitat relationships. She has worked with numerous endangered birds and has a special interest in working with endangered plants and animals.

In addition to her extensive experience in avian ecology, Dr. Roberts has worked with plants, arthropods, mammals, and reptiles. She has designed plant community surveys, both for classifying vegetation type and for use in analyzing wildlife-habitat relationships. She has worked with mammals ranging from bats to wallabies and has experience trapping small mammals. She has experience with a variety of arthropod collection and sampling methods, including pitfall traps, sticky traps, malaise traps, and Berlese funnels.

Dr. Roberts has presented the results of her work at numerous professional conferences and has coauthored technical and peer-reviewed publications. Her professional affiliations include The Wildlife Society and the American Ornithologists' Union.

Mary W. Davis, MS

Master of Science,
Environmental Studies,
College of Charleston,
2007

Resource Coordinator

- Avian surveys
- Endangered species surveys
- Avian nest monitoring and productivity
- Small mammal trapping
- Reptile and amphibian capture with drift fences
- Habitat assessment / Vegetation classification
- Preparation of technical reports

Years of Experience: 7

Relevant Experience:

- Surveys and monitoring of endangered and threatened birds
- Surveys of western U.S. plant and bird communities
- Coordination with resource management agencies to meet research goals
- Western Yellow-billed Cuckoo surveys and vegetation classification along the Lower Colorado River in Arizona

Mary W. Davis, resource coordinator for Sapphos Environmental, Inc., has over seven years of experience in wildlife biology, particularly avian research and monitoring. She has surveyed for a wide variety of species, including birds, mammals, and reptiles in a range of habitats throughout the United States and internationally. In the past several years, Ms. Davis has monitored productivity of Common Murres (*Uria aalge*) in Big Sur, California, and western Snowy Plovers (*Charadrius alexandrinus nivosus*) in Monterey Bay, California, and has conducted western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) surveys in riparian corridors of the Lower Colorado River in Arizona. She has worked for a variety of agencies and research institutions including the U.S. Fish and Wildlife Service, U.S. Geological Survey, National Park Service, and PRBO Conservation Science. In many of these positions, Ms. Davis has been responsible for contributing to technical documents summarizing biological data.

Since starting at Sapphos Environmental, Inc., Ms. Davis has worked on several wind energy projects in both Northern and Southern California. She has performed bird use counts and small bird counts in desert and mountain environments. She has also taken the lead in assessing habitat and conducting presence/absence surveys for willow flycatcher (*Empidonax traillii*). In addition, Ms. Davis has supported management activities by developing biological resources templates and procedures and training other members of the Biological Resources group in avian identification and protocols in the field.

Ms. Davis holds a Master of Science in Environmental Studies from the College of Charleston. She conducted her master's research on the potential of habitat management to increase the productivity of terns on a remote nesting colony in Massachusetts. She received a Bachelor of Arts in Environmental Science and Policy from Duke University with a minor in Biological Anthropology and Anatomy. In addition to her biology training, Ms. Davis has extensive experience researching and interpreting wildlife law and policy.

Ryan P. Villanueva, BA, BS

Bachelor of Arts, Environmental Studies

*Bachelor of Science, Biology
University of California, Santa Cruz, 2005*

Biological Resource Coordinator

- *Construction/mitigation monitoring*
- *Endangered species surveys*
- *Plant community identification and mapping*
- *Wetland delineations*
- *Project management*
- *NEPA/CEQA compliance*
- *Habitat assessments*
- *Survey methodology*
- *Restoration*
- *CDFG collecting permit*

Years of Experience: 5+

Relevant Experience:

- *Agency coordination*
- *Protocol surveys for federally and state-listed, sensitive and locally important flora and fauna species*
- *Preparation of Jurisdictional Delineations, Habitat Assessments, Mitigation Monitoring, and Biological Resources Technical Reports*
- *Preparation of biological data in support of Environmental Impact Reports, Initial Studies, and Environmental Assessments*

Mr. Ryan Villanueva, resource coordinator at Sapphos Environmental, Inc., has more than five years of experience in wildlife biology field; specifically, agency coordination, construction monitoring, surveys, and habitat analyses. A specialist in desert tortoise (*Gopherus agassizii*), Mr. Villanueva has extensive experience conducting surveys for desert tortoise, for which he holds California Department of Fish and Game scientific collecting permit no. 009578. Mr. Villanueva has conducted endangered species surveys and monitoring for several energy and railway projects in the Mojave Desert.

Most recently before joining Sapphos Environmental, Inc., Mr. Villanueva was monitoring construction in support of the Sunrise Powerlink Project in Boulevard, California. As part of this project, Mr. Villanueva monitoring compliance with established guidelines and measures in daily logs and coordinated with construction crews and client project personnel. In 2010, Mr. Villanueva coordinated biological (desert tortoise) and archeological surveys for Burlington Northern Santa Fe, and surveys were successfully completed.

At Sapphos Environmental, Inc., Mr. Villanueva is responsible for the assessment of natural resources and acquisition of federal, state, and local permits. He conducts habitat assessments and biological resources surveys, delineation of wetlands and other jurisdictional waters, biological monitoring, and production of documents in support of federal, state, and local regulations, including the National Environmental Policy Act, Clean Water Act, Endangered Species Act, and the California Environmental Quality Act, among others.

Mr. Villanueva has extensive experience conducting work efforts in rugged terrain and under adverse weather conditions in coastal, desert, and mountainous environments. Mr. Villanueva attended the Desert Tortoise Council's Surveying, Monitoring, and Handling Techniques Workshop for the desert tortoise, which focused on protocol surveys for the endangered species.

San Marino Environmental Associates

**Name & Title: Jonathan N. Baskin, Ph.D.
Principal Senior Scientist**

Sole Proprietor and

Years Experience: 38 Years with this Firm: 22

Education: B.A./1961/Biology – Harvard College
M.S./1965/Marine Biology – University of Miami, Florida
Ph.D./1973/Biology – City University of New York

Permits:

California Department of Fish and Game, Scientific Collecting Permit
U.S. Fish and Wildlife Recovery Permit, including Santa Ana Sucker.

Background:

Dr. Baskin has 38 years experience as a biological consultant. He has been working on threatened/endangered species and their habitats in the southwest since 1971 and has considerable experience with impact analysis in freshwater, estuarine, and marine systems. He been on the faculty of the Biological Sciences Department at Cal Poly University Pomona since 1971 and now continues to supervise research students part-time as an Emeritus Professor. He is also active with several professional societies, including being on the Board of Directors of the Southern California Academy of Sciences, a member of the Conservation Committee of The American Society of Ichthyologists and Herpetologists, and the organizer of the Southern California Native Freshwater Fauna Working Group. He holds a Scientific Collecting Permit from the California Department of Fish and Game and a T and E Species Permit from the U.S. Fish and Wildlife Service.

Dr. Baskin, the founder of San Marino Environmental Associates, has degrees in marine biology and biology and has studied fishes on both the east and west coasts of the United States. Dr. Baskin is a broadly trained fisheries ecologist who has extensive experience with sensitive freshwater species of the southwestern United States. He has successfully completed focused surveys and protection activities for fishes and other aquatic species for the Los Angeles County Department of Public Works, U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the California Department of Fish and Game. As a result, he is well known to agency personnel and often assists private clients with regulatory coordination. Dr. Baskin's ecological studies include fishes of western North America, as well as Neotropical freshwater fishes. Consequently, he has experience with large seasonally fluctuating streams and with the more ephemeral riverine habitats of the southwestern United States. Due to his acknowledged expertise on the southern California fauna and his knowledge of issues concerning sensitive species, Dr. Baskin was made a member of Los Angeles County's Sensitive Ecological Areas Technical Advisory Committee (SEATAC) in 1991. Dr. Baskin's work with regulatory agencies has included work on streambed alteration agreements and advising clients on Section 7 (Endangered Species Act) Consultations.

In addition to his work with fishes, Dr. Baskin has been studying other elements of the riparian fauna, including macroinvertebrates and sensitive species such as the southwestern pond turtle (*Clemmys marmorata pallida*) and the two-striped garter snake (*Thamnophis hammondi*). Dr. Baskin has also directed and participated in large-scale sensitive animal species inventories in Los Angeles County.

Relevant Experience:

- Dr. Baskin is the Owner/Director of San Marino Environmental Associates. In this capacity, he has supervised projects on all aspects of the fauna and flora of southern

California. San Marino Environmental Associates is considered to be one of the firms with the greatest experience and technical expertise on native southern California freshwater fishes.

- Dr. Baskin has done extensive research on the life history of the federally endangered unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*), the federally threatened Santa Ana sucker (*Catostomus santaanae*) and the arroyo chub (*Gila orcutti*).
- Published several peer reviewed scientific papers and meeting abstracts, authored numerous scientific reports, presented research results at scientific society meetings each year for more than 20 years.
- Served as a member of the Unarmored Threespine Stickleback Recovery Team since its formation and assisted with the preparation of the first Recovery Plan for this endangered species.

Population Estimates of Santa Ana Suckers in the Santa Ana River, CA

Dr. Baskin directed the sampling of fishes using electrofishing with the multiple pass depletion method to estimate population size of suckers at several sites over a 10 year period for the Santa Ana Watershed Authority. This included habitat evaluation and fish condition analysis, as well as statistical analysis of multiple years of data.

Protection of Aquatic Resources and Stream Restoration in Conjunction with a Roadbed Stabilization, Ventura County, CA.

Dr. Baskin supervised the protection of aquatic resources during the stabilization of Highway 150. By working closely with the construction company he was able to remove sensitive resources (including trout), allow stream diversion, and minimize damage to the system. He also made recommendations for stream restoration following the project and analyzed the project impacts on the aquatic fauna.

Determination of Potential Translocation Sites for Endangered Southern California Sticklebacks.

Dr. Baskin surveyed various potential translocation sites for endangered Southern California sticklebacks. Based on analyses of habitat structure, water quality data, presence of other species, and macroinvertebrate data; he made recommendations to the Unarmored Threespine Stickleback Recovery Team.

Name & Title: Thomas R. Haglund, Ph.D.

Principal Senior Scientist

Years Experience: 33 Years with this Firm: 19

Education: B.S./1972/Geology – University of Washington
Graduate School/1972-1974/Geology-University of Washington
Ph.D./1981/Biology-Fish Population Biology – University of California, Los Angeles

Background

Dr. Haglund has 30 years experience as a consultant, with degrees in both geology and biology he is able to integrate geological information and hydrological modeling into biological/ecological analyses. He has extensive experience in endangered/sensitive species management, as well as, stream and wetland restoration. Dr. Haglund has excellent relationships with local, state and federal agencies.

Dr. Haglund is a broadly trained research biologist with specialized expertise in freshwater fish biology. He has been involved in the study of fishes throughout the southwestern United States. Dr. Haglund began his career in environmental assessment in 1980 when he began consulting for the U.S. Army Corps of Engineers. In addition, to being a broadly trained ecologist, he also has a degree in geology. Dr. Haglund has also worked in the Water Quality Unit of the California Department of Water Resources.

Although best known for his work with freshwater fishes, Dr. Haglund is also an expert on the riparian fauna of California. Recently, he has participated in seven projects on southwestern pond turtles, four on the two-striped garter snake, seven on amphibians and several general herpetological surveys. He also directs and participates in bird surveys and censuses. Because of his expertise in freshwater systems, Dr. Haglund has been analyzing aquatic macroinvertebrate data and recently designed and completed studies on the aquatic macroinvertebrates of the Santa Clara River, San Gabriel River and Owens Lake.

With degrees in geology and biology, Dr. Haglund brings a broad scientific perspective and extensive field and laboratory experience to his environmental work.

Dr. Haglund is Chairman of the Southern California Native Fishes Working Group; a member of the Shay Creek Stickleback Working Group and the Mohave Tui Chub Advisory Group; and an advisor to the Unarmored Threespine Stickleback Recovery Team.

Relevant Experience

- Environmental Consultant with 32 years experience consulting on issues concerning southern California freshwater fishes. He has worked with San Marino Environmental Associates on more than 50 projects concerning southern California freshwater fishes. In addition to fisheries studies, Dr. Haglund can provide expertise on almost all elements of the fauna of the southwestern United States.
- Research Biologist at UCLA, specializing in the population biology of minnows (Cyprinidae), suckers (Catostomidae) and sticklebacks (Gasterosteidae). Much of his work has focused on the population/conservation genetics of endangered species in the southwestern United States.
- Scientific Advisor to the Unarmored Threespine Stickleback Recovery Team. Consultant/Researcher on genetics of southern California ticklebacks, stickleback habitat enhancement and reintroduction of the endangered southern California sticklebacks.
- Dr. Haglund has published 25 professional papers, coauthored more than 150 environmental reports and gives presentations at professional meetings. The majority of

this work has focused on freshwater fishes of the southwestern United States.

Ballona Wetland Fisheries Restoration, Los Angeles County, CA.

Dr Haglund directed a large-scale fisheries investigation into the status of the fisheries resources of Ballona Wetlands and the surrounding area. Based on the results of his studies, historical work, and comparison with other southern California estuarine habitats; Dr. Haglund designed and proposed fisheries restoration goals for all NEPA alternatives for the Playa Vista project. Fisheries restoration goals included a detailed description of the habitats to be constructed and the expected benefits.

Biological Impacts of Sediment Management Alternatives on Sensitive Aquatic Resources, Los Angeles County, CA.

Dr. Haglund was responsible for evaluating the potential impacts/benefits to sensitive aquatic resources downstream of Cogswell Dam in the West Fork of the San Gabriel River, based upon temperature modeling and modeling using the U.S Army Corps of Engineers HEC-6 model. The study was designed to analyze alternative dam management scenarios in order to determine the efficacy of flow assisted sediment transport as a sediment management alternative.

Shay Creek Stickleback Management, Habitat Enhancement and Alternatives to Insure Long Term Survival.

Dr. Haglund is part of a multidisciplinary team working to protect an endangered species. His responsibilities include recommending/designing habitat enhancement, determining informational needs, interpreting groundwater hydrological studies to assess the impacts of water extraction on stickleback habitat, and to design alternative management options that will insure long term species survival.