

### 1.0 EXECUTIVE SUMMARY

In 2003, mitigation measures for the Balsam Meadows (Eastwood Power Station) Project and Mammoth Pool Reservoir were evaluated, and potential effects on migrating deer from controlled flow releases were assessed.

Existing deer mitigation measures that were implemented for the construction of the Balsam Meadows (Eastwood Power Station) Project on SCE-owned lands around Shaver Lake were assessed to determine current status and effectiveness. These measures were developed to mitigate for impacts to deer, as well as other species. SCE has completed all of the mitigation measures to the satisfaction of the agencies, and all mitigation measures were signed off by the Habitat Area Planning (HAP) Team. There are only two mitigation measures that have not been maintained by SCE. The first involves the closure of the ¼-mile access road from the crest of Balsam Forebay Dam to the toe of the dam. This road currently remains open for hydrographer use (Joe Tanski, Personal Communication). This does not appear to be a major concern because the main access road to the Balsam Forebay Dam is locked at all times, barring public access to the road. The second mitigation measure involves taking photographs from permanent photograph stations along Balsam Creek to monitor restoration efforts. Photographs were not taken in 1998 and 2003 as stipulated, but were taken in 1999 (Joe Tanski, Personal Communication).

Existing SCE and CDFG mitigation measures for deer at Mammoth Pool Reservoir were assessed to determine current status and effectiveness. Only two recommendations from CDFG (1967) have not been implemented. These include removing trash buildups in the areas of the reservoir where deer attempt to swim, and creating ramps, cut to the spillway elevation, in areas with rough terrain along the shore of the reservoir, to encourage deer to enter the reservoir at more advantageous locations. During the deer migration study in 2002 (refer to the 2002 TERR 14, Mule Deer, Technical Study Report) and site visits on April 14 and September 10, 2003, ENTRIX biologists did not detect significant trash debris in the reservoir (Appendix A), and no signs of difficulty were observed with mule deer entering or exiting the reservoir.

Single-flow whitewater boating studies were conducted as part of REC 3, Whitewater Recreation Assessment Study. SCE developed appropriate avoidance, protection, and mitigation measures for special-status species, including deer, in consultation with the Terrestrial Resources Working Group, including CDFG and USFWS. Whitewater studies were conducted during the spill releases to avoid potential adverse impacts to special-status species and deer. Potential adverse impacts to deer were reduced to a less than significant level through these measures.

## 2.0 STUDY OBJECTIVES

- Determine the location of deer holding areas, summer and winter habitat areas, and migration routes. Identify and characterize areas of deer mortality at Project facilities (i.e., Mammoth Pool) during migration.

## 3.0 STUDY IMPLEMENTATION

### 3.1 STUDY ELEMENTS COMPLETED

- Evaluated existing deer mitigation measures, implemented for the construction of the Balsam Meadows (Eastwood Power Station) Project, on SCE-owned lands around Shaver Lake.
- Assessed SCE's and CDFG's existing mitigation measures for deer at Mammoth Pool Reservoir to determine current status and effectiveness.
- Assessed the potential effect on migrating deer of any proposed controlled flow releases by SCE (i.e., whitewater boating releases) necessary to complete relicensing studies in the Big Creek study area.

### 3.2 OUTSTANDING STUDY ELEMENTS

- There are no outstanding study elements.

## 4.0 STUDY METHODOLOGY

### 4.1 EVALUATION OF DEER MITIGATION MEASURES FOR BALSAM MEADOWS PROJECT

#### 4.1.1 LITERATURE REVIEW

A literature review was performed to evaluate SCE's compliance with mitigation measures for the Balsam Meadows (Eastwood Power Station) Project on SCE-owned lands in the Shaver Lake area. The literature review consisted of two main plans:

- *Southern California Edison Land Management Plan - Shaver Lake and Dinkey Creek* (SCE 1981);
- *Fish and Wildlife Agreement Between Southern California Edison Company and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67* (SCE 1982);

The second main plan, *Fish and Wildlife Agreement Between Southern California Edison Company and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities*, is comprised of 17 subplans. These are listed below:

- *Sensitive Area Requirements Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983);*
- *Construction Workers Management Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983);*
- *Security Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983);*
- *Habitat Management Plan, Meadow and Timber Shrub Enhancement Program Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983);*
- *Road Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983);*
- *Stevenson Meadow Development Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983);*
- *Domestic Animal Impact Control for Big Creek Project facilities for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984);*
- *Tunnel Muck Site Development and Rehabilitation Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984);*
- *Wildlife Compensation Plan for Balsam Meadow Tunnel Muck Site Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984);*
- *Ely Meadow, East Balsam Meadow, and Miscellaneous Small Meadows Plan for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984);*
- *Livestock Grazing Plan for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985);*

- *Balsam Meadow-Big Creek No. 1 220 kV Transmission Line right-of-way Clearing Plan and Amendment to Exhibit C Visual Resource Plan Between Southern California Edison, U.S. Forest Service, and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985);*
- *Stevenson Meadow Development Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985);*
- *Stevenson Meadow Rehabilitation Plan for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985);*
- *Rehabilitation Plan for Disturbed Areas For Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1988);*
- *Plan for Monitoring the Effectiveness of Fish and Wildlife Mitigative Measures (SCE 1988); and*
- *Balsam Basin and Disturbance Management Plan for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1989).*

Personal communications consisted of a meeting with Mark Newquist (SCE) and Joe Tanski (SCE) on August 11, 2003. Information regarding the mitigation measures for the Balsam Meadows (Eastwood Power Station) Project, including copies of the mitigation agreements with CDFG, was provided at this time. Follow-up phone conversations with Joe Tanski were held on August 14, August 18, and September 29, 2003.

#### **4.1.2 SITE VISIT**

ENTRIX biologists conducted a site visit at a representative subset of accessible meadow and timber-shrub enhancement areas on September 9, 2003. Site visits were conducted on foot. Vegetation of these sites was assessed for value to wildlife, including deer.

#### **4.2 EVALUATION OF DEER MITIGATION MEASURES FOR THE MAMMOTH POOL RESERVOIR**

A literature review was performed to evaluate SCE's compliance with mitigation measures for the Mammoth Pool Reservoir. The literature review consisted of: (1) *Spring Inspection of Mammoth Pool Reservoir Deer Migration Facilities (CDFG 1964);* (2) *Letter from C. Hart (CDFG) to J. T. Head (SCE) Regarding Deer Losses at Mammoth Pool Reservoir (CDFG 1967);* (3) *Deer Migration at Mammoth Pool Reservoir (1958-1976) (CDFG 1976);* (4) *Review of Mammoth Pool Reservoir Recreation Usage*

*as It Relates to the Vitality of the San Joaquin Deer Herd* (SCE 1976); and (5) *Deer Migration and the Mammoth Pool Reservoir in Fresno and Madera Counties*. California Department of Fish and Game, Region 4 (Peabody et al. 1978).

Personal communications consisted of a meeting with Mark Newquist (SCE) and Joe Tanski (SCE) on August 11, 2003. Information regarding the mitigation measures for the Mammoth Pool Reservoir was provided.

### **4.3 POTENTIAL EFFECT OF CONTROLLED FLOW RELEASES BY SCE**

When single-flow whitewater boating studies were proposed in the study area, potential impacts to special-status species and deer were discussed in the Terrestrial Resources Working Group, including USFWS and CDFG. In consultation with the Terrestrial Resources Working Group, SCE developed appropriate avoidance, protection, and mitigation measures for potential adverse impacts to special-status species, including deer. These measures were included in a letter to USFWS dated March 15, 2002 (SCE 2002).

## **5.0 STUDY RESULTS AND ANALYSIS**

### **5.1 EVALUATION OF DEER MITIGATION MEASURES FOR BALSAM MEADOWS PROJECT**

#### **5.1.1 LITERATURE REVIEW**

Mitigation measures for the Balsam Meadows (Eastwood Power Station) Project are contained in 18 documents (including 17 subplans). These documents were prepared by SCE and approved by CDFG. Activities involving USFS land required USFS approval as well. A series of sign-off sheets were developed that required SCE and CDFG signatures upon successful completion of particular measures. Success of rehabilitation projects was determined by the Habitat Area Planning (HAP) Team, which was comprised of representatives from SCE and CDFG. Successful implementation of these measures was determined by the agencies to reduce impacts to plant and wildlife species and improve habitat for deer.

SCE has completed all of the mitigation measures (with two exceptions, which are described below) to the satisfaction of the agencies, and all mitigation measures were signed off by the HAP Team. A summary of the reviewed documents is provided below.

#### ***Southern California Edison Land Management Plan - Shaver Lake and Dinkey Creek (SCE 1981)***

This plan was developed to serve as a comprehensive description of resources in the Shaver Lake and Dinkey Creek areas, including recreation, water supply, wildlife, and timber. This plan states that the lands will be managed in accordance with the provisions of FERC Project No. 67. This document precedes the Balsam Meadows (Eastwood Power Station) Project, and does not list mitigation measures. It states that

all activities in the Shaver Lake and Dinkey Creek areas will be in accordance with the license for FERC Project No. 67.

***Fish and Wildlife Agreement Between Southern California Edison Company and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1982).***

This plan was developed to minimize the impacts from the construction and operation of the Balsam Meadows (Eastwood Power Station) Project on fish and wildlife through implementation of mitigation measures. It was the goal of these mitigation measures to reduce disturbances to wildlife, minimize impacts to wildlife habitat during construction, and to maintain and enhance alternative habitat to mitigate for temporary and permanent wildlife habitat losses. This plan is comprised of 17 sub-plans, which are summarized below.

1. *Sensitive Area Requirements Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983).*

This sub-plan was developed to identify the areas of ecological sensitivity that would be affected by project construction and to identify methods to be used to minimize project impacts. Areas of highest sensitivity are: (1) wildlife production centers; (2) meadow habitat; (3) stream and riparian habitat areas; and (4) key wildlife use areas. To protect these sensitive habitats, limitations were imposed on construction, including timing of construction activities to reduce disturbance to wildlife, and road closures. There are no outstanding mitigation measures associated with this sub-plan.

2. *Construction Workers Management Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983).*

This sub-plan was developed to outline rules and regulations to ensure that worker-induced impacts to fish and wildlife resources would be held to a minimum. All workers involved with the Balsam Meadows (Eastwood Power Station) Project were given a brochure that outlined rules and regulations to minimize impacts to wildlife from their activities. All workers were required to attend an orientation program that included presentations on environmental protection. Other requirements included using designated parking areas, and the prohibition of pets or firearms at the job site. There are no outstanding mitigation measures associated with this sub-plan.

3. *Security Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983).*

This sub-plan was developed to control vehicular and foot traffic in construction areas, and conforms to regulatory agency requirements with respect to wildlife impacts. There are no outstanding mitigation measures associated with this sub-plan.

4. *Habitat Management Plan, Meadow and Timber Shrub Enhancement Program Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983).*

This sub-plan was developed to identify areas where meadow habitat and timber-shrub habitat enhancement would be performed, per the Fish and Wildlife Agreement (SCE 1982). Areas originally chosen for enhancement included 14 sites, totaling 200 acres. Work completed in these meadows included, but was not limited to, selective placement of rockfill, soil, fertilizer, and cull logs, selective removal of trees and shrubs, and plantings of native vegetation.

As part of the post-construction monitoring for this plan, SCE submitted an annual report from 1989 to 1993 to CDFG, summarizing mitigation work completed, in progress, and objectives accomplished. The habitat improvement sites were monitored for five years to the satisfaction of the HAP Team. There are no outstanding mitigation measures associated with this sub-plan.

5. *Road Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983).*

This sub-plan was developed to delineate facility roads, map and define project uses, and identify roads to be closed, reseeded, and have erosion control structures in place after construction. There are no outstanding mitigation measures associated with this sub-plan.

6. *Stevenson Meadow Development Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983).*

This sub-plan was developed to define the enhancement measures required to finalize the meadow improvement plan. The objectives of this plan included improving the area for a variety of wildlife species, and minimizing short and long-term impacts caused by project construction. This plan has been superseded by the *Stevenson Meadow Rehabilitation Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985).*

7. *Domestic Animal Impact Control for Big Creek Project Facilities for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984).*

This sub-plan was developed to prevent adverse impacts to wildlife caused by domestic pets in the Big Creek area. General provisions state that all dogs must be on a leash or under control of a responsible person at all times, unless the dog is confined within the owner's home premises. Dogs that are not in compliance will be impounded. There are no outstanding mitigation measures associated with this sub-plan.

8. *Tunnel Muck Site Development and Rehabilitation Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984).*

This sub-plan was developed to provide mitigation measures for potential adverse environmental impacts resulting from hauling and storage of tunnel muck stockpiled during powerhouse chamber and tunnel excavation. This plan stipulates that an adjacent area of nine acres will be set aside and managed primarily for wildlife. Native vegetation and trees were to be planted along the North Perimeter Road prior to hauling of the tunnel muck away from the storage site. There are no outstanding mitigation measures associated with this sub-plan.

9. *Wildlife Compensation Plan for Balsam Meadow Tunnel Muck Site Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984).*

This sub-plan was developed to set aside and manage on a continuous basis nine acres of habitat primarily for wildlife until the spoil storage area was rehabilitated and revegetated, as stipulated in the *Tunnel Muck Site Development and Rehabilitation Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984)*. These nine acres are located in Sulfur Meadow. Work included: (1) reduction of 30 percent of the timber for overstory modification and increases in vegetation diversity; (2) shrub clearing; (3) snag tree development; (4) prescribed burning; (5) revegetation; and (6) control of cattle grazing. There are no outstanding mitigation measures associated with this sub-plan.

10. *Ely Meadow, East Balsam Meadow, and Miscellaneous Small Meadows Plan for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1984).*

This sub-plan was developed to enhance and enlarge the size of wet and dry meadow habitat within the designated five small meadows, Ely Meadow, and East Balsam Meadow. East Balsam Meadow is located 0.5 mile east of the Balsam



Dam. Ely meadow is located approximately 1.5 miles north of Shaver Lake Dam, just east of Big Creek Road. Locations for the five small meadows are as follows: (1) Meadow 1 is located on East Balsam Creek downstream about 0.25 mile from the East Balsam Meadow site; (2) Meadows 2, 2a, and 2b are located northwest of Balsam Meadow between Balsam Meadow and Meadow 3; (3) Meadow 3 is located about 0.75 mile northwest of Balsam Meadow; (4) Meadow 4 is located approximately one mile west of the Balsam Meadow dam site; and (5) Meadow 5 is located 0.5 mile west of Balsam Meadow, near the top of the drainage to Stevenson Meadow. Work completed in these meadows included selective placement of rockfill, soil, fertilizer, and cull logs, selective removal of trees and shrubs, and plantings of native vegetation.

In April 1989, the Balsam Forebay spilled, causing damage to Meadow 2. SCE restored the meadow in 1990. The Balsam Forebay spilled again in 1999 and CDFG decided that the meadow was revegetating naturally, and did not require SCE to restore the meadow (Joe Tanksi, Personal Communication). The meadow will be revisited from time to time by the HAP Team to check on continued success.

As part of the post-construction monitoring for this plan, SCE submitted an annual report from 1989 to 1993 to CDFG, summarizing mitigation work completed, in progress, and objectives accomplished. All sites were monitored for five years to the satisfaction of the HAP Team.

11. *Livestock Grazing Plan for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985).*

This sub-plan was developed to evaluate the compatibility of livestock grazing with early stages of the meadow revegetation efforts within the Balsam Meadows (Eastwood Power Station) Project. Grazing was prohibited in all areas within the Balsam Meadows (Eastwood Power Station) Project until 1997. A final evaluation was made in 1997 to determine if the rehabilitated meadows could sustain livestock grazing, at which time it was decided not to allow cattle grazing in Stevenson Meadow. There are no outstanding mitigation measures associated with this sub-plan.

12. *Balsam Meadow-Big Creek No. 1 220 kV Transmission Line Right-of-way Clearing Plan and Amendment to Exhibit C Visual Resource Plan Between Southern California Edison, U.S. Forest Service, and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985).*

This sub-plan was developed to provide guidelines for clearing the right-of-way for a 4.5-mile long 220 kV transmission line from the Balsam Meadow Switchyard to the Big Creek No. 1 Substation. Objectives of this plan included minimizing impacts to wildlife resources and analyzing impacts to visual resources. Additional erosion control and rehabilitation work was requested by CDFG in 1986. SCE

completed this work in 1987, as requested. There are no outstanding mitigation measures associated with this sub-plan.

13. *Stevenson Meadow Development Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985).*

This document superseded the *Stevenson Meadow Development Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983)*. The purpose of this document was to identify the primary responses to finalize completion of the Stevenson Meadow expansion program for the Balsam Meadow facilities, and to clarify the specific areas of constraints and define the enhancement measures required to finalize the meadow improvement plan. The objectives were to improve the area for a variety of fauna species, bring to resolution an efficient and effective meadow enhancement program, and minimize short and long range impact caused by project disturbance. This subplan included measures for meadow clearing and enhancement work, soils, construction controls, grazing, seeding, habitat enhancement, and water quality control. There are no outstanding mitigation measures associated with this subplan.

14. *Stevenson Meadow Rehabilitation Plan Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1985).*

This sub-plan was developed to mitigate the loss of Balsam Meadow by rehabilitating Stevenson Meadow. This plan superseded the *Stevenson Meadow Development Plan Between Southern California Edison and California Department of Fish Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983)*. It was the goal of this plan for Stevenson Meadow to: (1) possess a permanent water source; (2) support productivity and plant species diversity comparable to other mid-elevation meadows in the central Sierra Nevada; (3) reduce the potential of erosion through a combination of engineering design and vegetation establishment; and (4) be self-sustaining to the extent possible, so that a minimum of maintenance and intervention is required to sustain an acceptable level of productivity.

Post-construction monitoring for this plan occurred from 1988 to 1993, and included biological, geomorphological, hydrological, and meteorological components. Post-construction monitoring of biological activities included measuring vegetative cover, density, productivity, and wildlife diversity through quantitative field sampling. In addition, annual photographs were taken to determine revegetation success. As part of the post-construction monitoring for this plan, SCE submitted an annual report from 1989 to 1993 to CDFG, summarizing mitigation work completed, in progress, and objectives accomplished. There are no outstanding mitigation measures associated with this sub-plan.

15. *Rehabilitation Plan for Disturbed Areas For Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1988).*

This sub-plan was developed to facilitate the rehabilitation of the construction, laydown, and spillway areas used during construction of the Balsam Meadows (Eastwood Power Station) facilities. The objectives of this plan were to create favorable conditions to wildlife by: (1) removal of support facilities (temporary electrical facilities, trailers, concrete pads, etc.); (2) grading of areas for drainage and erosion control, as necessary; (3) restoration of disturbed sites through a combination of engineering design and vegetative establishment; (4) establishment of trees and shrubs by planting; and (5) establishment of herbaceous vegetation by seeding. There are no outstanding mitigation measures associated with this sub-plan.

16. *Plan for Monitoring the Effectiveness of Fish and Wildlife Mitigative Measures (SCE 1988).*

This sub-plan was developed to identify criteria to be used to determine if rehabilitation for each of the above listed sub-plans was successful. Success of rehabilitation projects was determined by the HAP Team. A series of sign-off schedules were developed that required SCE and CDFG signatures upon completion of particular measures for each sub-plan. Each sub-plan was monitored to the satisfaction of the HAP Team, and all sign-off sheets were completed.

This sub-plan also stipulates that permanent photograph stations be established in consultation with CDFG at Balsam Creek to monitor any changes that may take place from high flow events. Photographs were to be taken every five years, starting in 1988, and continue for the duration of the project license period. Photographs taken from the permanent photograph stations were last taken in 1993. Photographs should have been taken in 1998 and 2003, but this was not done. Photographs were taken in 1999 after the second spill event at Balsam Creek, but not from the permanent photographic stations (Joe Tanski, Personal Communication).

17. *Balsam Basin and Disturbance Management Plan for Fish and Wildlife Agreement Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1989).*

This plan was developed to identify and manage human disturbance factors that could impact sensitive wildlife areas as identified in the *Sensitive Area Requirements Between Southern California Edison and California Department of Fish and Game for Balsam Meadow Powerhouse Facilities. FERC Project No. 67 (SCE 1983)*. This plan discusses road closures, timber management activities, off-road vehicle control measures, and methods of enforcement.

This plan stipulates that eleven public use roads are to be closed either seasonally or year round. SCE continues to follow these closures at this time, with the exception of the access road from the crest of Balsam Dam to the toe of the dam, which is approximately 0.25 mile long. This road was identified as a road that would be closed all year, but is now open all year (Joe Tanski, SCE, Personal Communication). This road was originally locked at all times, but SCE hydrographers needed access to gages at the toe of the dam. The HAP Team gave approval for the hydrographers to use the road, under the condition that they leave it locked when the road was not in use. Over time, the hydrographers began to leave the gate unlocked at all times (Joe Tanski, SCE, Personal Communication). This change in road closure status has not been approved by the HAP Team. This does not appear to be a major concern because the main access road to the Balsam Forebay Dam is locked at all times, barring public access to the road. This road is inaccessible during winter due to snow accumulation. This is the only mitigation measure associated with this sub-plan that has not been implemented by SCE.

### **5.1.2 SITE VISIT**

All of the meadows visited by ENTRIX biologists appear to be adequately vegetated and have adequate vegetation for deer browsing. The mitigation measures for these meadows were completed to the satisfaction of the HAP Team, which completed sign-off sheets for all of the mitigation measures.

## **5.2 EVALUATION OF DEER MITIGATION MEASURES FOR THE MAMMOTH POOL RESERVOIR**

Deer mitigation measures for the Mammoth Pool Reservoir were developed through a cooperative effort between SCE, USFS, and CDFG, which included meetings, field surveys, and correspondence through record memorandums and letters. This cooperative effort has been ongoing since deer losses were first documented during construction of the dam, in 1958 (Joe Tanski, SCE, Personal Communication). The most recent task involving this cooperative effort involved the reconstruction of the bridge over Daulton Creek in 2001, to assist migrating deer over the creek. A document that outlines the recommended mitigation measures for Mammoth Pool Dam was drafted, but never finalized. The majority of mitigation measures included in this document have been implemented by SCE, and the recreation closure has been implemented by the Sierra National Forest.

During construction, significant losses to deer occurred at the diversion tunnel. After construction, significant losses to deer occurred at the spillway during the spring when deer were migrating through the area. Deer mortality was also determined to be caused by the Daulton Creek diversion, trash buildup at points where deer were trying to swim the reservoir, and harassment from recreational activities on the reservoir. CDFG (1967) made several recommendations to increase the survival rates of deer crossing at Mammoth Pool Reservoir during spring migration. These included the installation of fences to guide deer around the spillway, sand placement on the dam to encourage

deer to cross on the dam, installation of a barrel line across the spillway to discourage deer from crossing the reservoir close to the spillway, construction of a bridge across Daulton Creek to allow deer to safely cross the creek during high flows, and reducing impacts from recreation by closing the reservoir to boating and by closing the road to the dam during the peak migration period, from May 1 to June 15. Appendix A contains photographs of some of these mitigative measures. SCE continues to follow these recommendations (Joe Tanski, SCE, Personal Communication).

At this time, only two recommendations have not been implemented. CDFG (1967) recommended removal of trash debris in the reservoir to lower the potential for deer to drown as a result of being trapped in the debris. SCE does not regularly remove large debris from Mammoth Pool. Historically, trash debris were sometimes observed at both the entry and exit points along the deer migration routes, and could create hazards to migrating deer (Peabody 1978). During the deer migration study in 2002 (refer to the 2002 TERR 14, Mule Deer, Technical Study Report) and site visits on April 14 and September 10, 2003, ENTRIX biologists did not detect any trash debris in the reservoir (Appendix A). CDFG (1967) also recommended that ramps should be cut to the spillway elevation through areas with rough terrain in the reservoir upstream from the barrel line to encourage the deer to enter the reservoir at more advantageous locations. According to Peabody (1978), the problem of poor terrain is present to some extent west of the spillway, and providing a trail with a dirt entrance may encourage the deer to enter the reservoir in a less hazardous area. During the deer migration study in 2002 (refer to the 2003 TERR 14, Mule Deer, Technical Study Report) no signs of difficulty were observed with mule deer entering or exiting the reservoir.

### **5.3 POTENTIAL EFFECTS OF CONTROLLED FLOW RELEASES BY SCE**

Single-flow whitewater boating studies were conducted as part of REC 3, Whitewater Recreation Assessment Study. Studies were conducted in Mono Creek upstream of the diversion in August 2002, and in the San Joaquin River Mammoth Reach (Mammoth Pool Dam to Dam 6) and Stevenson Reach (Dam 6 to Redinger Lake) and the South Fork San Joaquin River downstream of Florence Lake in May and June 2003. SCE developed appropriate avoidance, protection, and mitigation measures for special-status species and deer in consultation with the Terrestrial Resources Working Group, including CDFG, USFS, and USFWS. These measures were included in a letter to USFWS dated March 15, 2002 (SCE 2002). Whitewater boating studies were conducted during pre-spill events to minimize adverse impacts to special-status species and deer. Participants in the study spent the minimum amount of time necessary outside of their boats, remained on established trails and roads to the extent possible, and avoided excessive noise at all times. Staging areas were limited to developed areas, and a minimum number of vehicles were used to transport people and watercraft to the study site. Access areas were limited to existing trails to the extent possible. The Terrestrial Resources Working Group, CDFG, and USFWS approved this study methodology, including implementation of these avoidance measures.

Potential impacts to deer were minimized because studies were conducted in May, June, and August which is during the end of, or after the deer migration season

(typically April and May); whitewater boating studies were conducted during pre-spill events to the extent possible; and appropriate avoidance, protection, and mitigation measures were developed. These mitigation measures were developed to mitigate for impacts to deer, as well as other species, and were successfully completed.

## 6.0 LITERATURE CITED

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## **APPENDIX A**

### **Photographs**

### Appendix A. Photographs



Fencing to spillway elevation along Mammoth Pool Reservoir and buoys across spillway.



Fencing along road at Mammoth Pool Reservoir.



Buoys across spillway.



Sand placement on the dam to aid in deer crossing.



Existing deer bridge over Daulton Creek.



South Entrance to Daulton Creek Bridge.

## Appendix A. Photographs (continued)



View of Mammoth Pool from Mammoth Pool Dam on April 14, 2003. This is an area of concern for debris build-up. No debris was detected.



View of Mammoth Pool from Mammoth Pool Dam on September 10, 2003. This is an area of concern for debris build-up. No debris was detected.