



Planning and Resource Management for Our Communities and the Environment

25 November 2002

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Richard Floch
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Subject: **Preliminary Draft**
Technical Memorandum Number 16 –Visual Resources Study

Dear Dr. Shewbridge and Mr. Floch:

In order to help evaluate the potential to affect visual resources associated with Project No. 184 facilities and operations, EIP prepared the attached study. This is a preliminary draft. The primary preparers of the Technical Memorandum are listed below:

EIP Associates

Rick Hanson
Francisca Mar
Mark Genaris
Josh Schramm
Kristine Olsen
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Should you have any questions or wish to discuss this report please contact me.

Sincerely,

A handwritten signature in black ink that reads 'Rick Hanson'. The signature is written in a cursive, flowing style.

Rick Hanson
Senior Project Manager
Director, Water and Wastewater Infrastructure

Attachments

PRELIMINARY DRAFT

**EL DORADO IRRIGATION DISTRICT
FEDERAL ENERGY REGULATORY COMMISSION
PROJECT NUMBER 184**

VISUAL RESOURCES STUDY

INTRODUCTION

This visual resources analysis was prepared in support of El Dorado Irrigation District's (EID) application to the Federal Energy Regulatory Commission to relicense Project No. 184. This analysis describes the existing visual character of Project No. 184 facilities and evaluates the visual effect of continued power generation and water delivery operations for Project No. 184. No facility modifications are proposed as part of EID's application for relicensing.

The majority of facilities associated with Project No. 184 are located within El Dorado National Forest. Several Federal laws stipulate that scenic resources are to be managed and given equal consideration with other resources of the National Forests. Direction for management of visual resources is outlined in the U.S. Forest Service Visual Resources Management System (VMS), which is used to determine the appropriate level of protection for visual resources in any given area and to monitor visual changes in the landscape. Visual resources are inventoried based upon variety classes, sensitivity levels, distance zones, and visual quality objectives.

PURPOSE

The purpose of this study is to determine the existing visual conditions of the Project No. 184 facilities and to compare these conditions to the U.S. Forest Service management goals and objectives for the long-term condition of the landscape character, as established by the U.S. Forest Service Visual Resources Management System and the Lake Tahoe Basin Management Unit (LTBMU) Land and Resource Management Plan (LRMP). This study also addresses potential changes to visual conditions due to operation of Project No. 184 facilities by EID: potential changes that might occur as a result of possible variations in reservoir drawdown and changes in stream flows compared to historical conditions. This study was prepared as part of EID's Application for License and will be used to determine the project facilities' consistency with established Forest Service visual objectives.

METHODOLOGY

This report incorporates existing visual and Project No. 184 facility information from Section 7.4 of the El Dorado Irrigation District's February 2000 Application for License, Volume 3, Exhibit

E, and from additional research, including site visits, review of maps, and consultation with the U.S. Forest Service. Site visits included facilities on Aloha, Echo, Caples and Silver Lakes, as well as the El Dorado Forebay, the El Dorado Powerhouse, and portions of the 23-mile long El Dorado Canal.

Consultation with the U.S. Forest Service included two meetings at the Eldorado National Forest, Forest Supervisor's office in Placerville on July 1 and July 10, 2002. Forest Service staff offered direction on the content and approach of this report, including instruction to describe facilities from public use areas. Forest Service staff also was consulted regarding the designated viewsheds for the Project No. 184 facilities, and the existing Forest Service Visual Quality Objectives for each managed viewshed.

Each of the project subareas (Lake Aloha, Echo Lake, Caples Lake, Silver Lake, and the South Fork of the American River) is assessed in terms of the VMS designations for variety class, sensitivity levels, distance zones, and visual quality objectives. The VMS designations are described below. This is followed by a description of the visual conditions for each of the project subareas. Because approval of the relicensing application would not result in the construction of new facilities or modification of existing facilities, the visual conditions at these facilities would not be altered by the proposed relicensing. Therefore, the visual conditions following relicensing would be the same as the existing conditions. Each subarea discussion includes a description of the existing views of the facilities from public-use areas, the VMS designations for the area, and the visual character of the Project No 184 facilities.

The discussion also includes a description of potential visual changes to the area due to Project No. 184 operations (i.e., potential variations in historical drawdown of project reservoirs and project area stream flows). Some of the lakes are managed for water storage in the spring and early summer and for water releases in the fall through winter or spring. This can result in seasonal drawdown of the lakes, which in turn can result in changes to the visual character of the lake. Visual changes to the shorelines can be seen by viewers from the adjacent freeways and by recreational users on trails and the lakes. Project No. 184 operations can also result in changes in instream flows for several creeks and tributaries. Changes to instream flows can result in visual changes associated with low, moderate and high flows.

Key Observation Points

Views of the Project No. 184 facilities were observed and photographed from several public-use areas. For Lake Aloha facilities, the Key Observation Point (KOP) was the adjacent portion of the Pacific Crest Trail. For Echo Lake facilities, the KOPs were the Pacific Crest Trail, the Echo Lake Chalet, and the parking areas. For Caples Lake facilities, the KOPs were the Emigrant Lake Trail, Highway 88, the Caples Lake Resort, Caples Lake Campground and the Wood's Creek lake access. For Silver Lake facilities, the KOPs were Highway 88, Kay's Resort, and the Ferguson Point picnic area. For the El Dorado Canal, the KOPs were several points along Highway 50 and Ice House Road. For the El Dorado Forebay, the KOP was Forebay Road. The El Dorado Powerhouse is not visible from public-use area and was photographed from the private maintenance road.

Forest Service Visual Management System Designations

Viewsheds

The project facilities are located within portions of the Highway 88, Highway 50, Ice House Road, and South Fork American River viewsheds. The Highway 88 and Highway 50 viewsheds are managed for foreground-retention and middleground-retention. The South Fork American River and Icehouse Road viewsheds are managed for foreground-retention and middleground-partial retention.

Variety Classes

Variety class is a measure of the inherent scenic attractiveness of a landscape: its unique combination of form, line, color, and texture. Variety classes are obtained by classifying the landscape into different degrees of variety. This determines those landscapes that are most important and those that are of lesser value from the standpoint of scenic quality. The classification is based on the premise that all landscapes have some value, but those with the most variety or diversity have the greatest potential for high scenic value. There are three variety classes that identify the scenic quality of the natural landscape: Class A - Distinctive; Class B - Common; and Class C - Minimal.

In determining variety class, a frame of reference must be developed by which to judge the physical features of an area as distinctive, common, or minimal. This is derived from the character type or subtype. Features such as landforms, rockforms, waterforms, and vegetative patterns are compared singularly or in combination with those commonly found in the character type. Through this comparison, an area's overall degree of scenic quality and resultant variety class rating may be determined. Class A variety classes refer to those areas where features of landform, vegetative patterns, water forms and rock formations are of unusual or outstanding visual quality. They are usually not common in the character type. Class B variety classes refer to those areas where features contain variety in form, line, color, and texture or combinations thereof, but which tend to be common throughout the character type and are not outstanding in visual quality. Class C variety classes refer to those areas whose features have little change in form, line, color, or texture. It includes all areas not found under Classes A and B.¹

Sensitivity Levels

Sensitivity levels are a measure of people's concern for the scenic quality of the National Forests. Sensitivity levels are determined for land areas viewed by those who: are traveling through the Forest on developed roads and trails; are using areas such as campgrounds and visitor centers; or are recreating at lakes, streams, and other water bodies. It is recognized that all National Forest land is seen at least by aircraft users. Therefore, some degree of visitor sensitivity will be established for the entire land base.

¹ Forest Service, U.S. Department of Agriculture, Agriculture Handbook Number 462, *National Forest Landscape Management, Volume 2*, Chapter 1, The Visual Management System, April 1974, page 12.

The following three sensitivity levels are employed, each identifying a different level of user concern for the visual environment: Level 1 - highest sensitivity; Level 2 - average sensitivity; and Level 3 - lowest sensitivity.

Distance Zones

Distance zones are divisions of a particular landscape being viewed. They are used to describe the part of a characteristic landscape that is being inventoried or evaluated. The VMS defined three distance zones for scenery management: foreground, middleground, and background. Foreground is the distance from which details can be perceived and is usually limited to areas within one-fourth to one-half mile of the observer, but must be determined on a case-by-case basis. Normally, in foreground views, the individual boughs of trees form texture. The middleground zone extends from the foreground zone to three to five miles from the observer. Texture normally is characterized by the masses of trees in stands of uniform tree cover. Individual tree forms are usually only discernible in very open or spare stands. The background zone extends from middleground to infinity. Textures in stands of uniform tree cover is generally very weak or non-existent. In very open or sparse timber stands, texture is seen as groups or patterns of trees.²

Visual Quality Objectives

Visual Quality Objectives (VQOs) are established by the Forest Plan for each management area within the Forest. Lands are identified as to the public's concern for scenic quality (sensitivity levels) as well as diversity of natural features (variety classes). The Visual Quality Objectives are designed to be measurable standards or objectives for the visual management of these lands. The VQOs are represented by the following five terms that can be defined as visual resource management goals: preservation, retention, partial retention, modification, and maximum modification. These terms are described below.

Preservation

The VQO of preservation allows ecological changes only. Management activities, except for very low visual-impact recreation facilities, are prohibited. This objective applies to Wilderness areas, primitive areas, other special classified areas, areas awaiting classification, and some unique management units that do not justify special classification.

Retention

The VQO of retention provides for management activities that are not visually evident. Under retention, activities may only repeat form, line, color, an texture that are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc. should not be evident.

² Forest Service, U.S. Department of Agriculture, Agriculture Handbook Number 462, *National Forest Landscape Management, Volume 2*, Chapter 1, The Visual Management System, April 1974, page 7.

Partial Retention

Under the VQO of partial retention, management activities remain visually subordinate to the characteristic landscape. Activities may repeat form, line, color, or texture common to the characteristic landscape, but changes in their qualities of size, amount, intensity, direction, and pattern remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or texture that are found infrequently or not at all in the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape.

Modification

Under the modification VQO, management activities may visually dominate the original characteristic landscape. However, activities of vegetative and land form alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type. Additional parts of these activities, such as structures, road, or slash, must remain visually subordinate to the proposed composition. Activities that are predominately introduction of facilities such as buildings, signs, and roads should borrow naturally established form, line, color and texture so completely and at such scale that its visual characteristics are compatible with the natural surroundings.

Maximum Modification

Under the maximum modification VQO, management activities of vegetative and landform alterations may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character type. When viewed as foreground or middleground, they may not appear to completely borrow from naturally established form, line, color or texture. Alterations may also be out of scale or contain detail that is incongruent with natural occurrences as seen in foreground or middleground. Introduction of additional parts of these activities, such as structures and roads, must remain visually subordinate to the proposed composition as viewed in background.

VISUAL CONDITIONS

Introduction

The Project No. 184 (project) vicinity encompasses a broad range of landscapes in Alpine, Amador, and El Dorado Counties, from the Tahoe Basin and the alpine regions of the Sierra Nevada in the east, to the rolling foothills of the lower elevations in the west. Aesthetic resources in the vicinity of the project include alpine lakes, rivers, streams, general forested areas, wilderness areas, and scenic trails and roadways.

Visual Character of the Upper Lakes and Facility Sites

The following discussions describe the existing visual conditions in the vicinity of Project No 184's four upper lakes (Lake Aloha, Echo Lake, Caples Lake, and Silver Lake), and the project's facility sites, including the El Dorado Diversion Dam Powerhouse, and the El Dorado Canal.

Lake Aloha

Lake Aloha, previously known as Medley Lakes, is located five miles southwest of Lake Tahoe within the Desolation Wilderness. The lake occupies the upper end of Desolation Valley at the base of Pyramid Peak and Mt. Price, and falls under the management jurisdiction of the El Dorado National Forest. Features that contribute to the area's character include: the predominance of vast expanses of rock interrupted by sparsely scattered trees and shrubs; a large water body with numerous granite islets and dead trees protruding from it; the concentration of vegetation, primarily along the southeastern and eastern sides of the lake; and few man-made elements.

The Desolation Wilderness is used exclusively by recreational hikers and campers, who have a high level of user sensitivity. Users expect undeveloped, pristine surroundings. Most of the users in this area hike along the Pacific Crest National Scenic Trail (PCT), which follows the gentle terrain of the eastern shore of Lake Aloha for about one and a half miles before continuing on. It is a popular trail during much of the spring, summer, and fall months. A smaller number of users hike cross-country on the level terrain at the southern shore of Lake Aloha, which extends about a half mile along the shore. The western and northern shores of Lake Aloha are characterized by steep, rocky areas that are not as easily accessible to hikers. The only public-use area associated with Lake Aloha is the PCT on the eastern shore.

VMS Designations

Lake Aloha meets the variety class A and a sensitivity level 1. From the PCT and southern shoreline, foreground view includes the southern and eastern shorelines. Middleground views include Lake Aloha and the western and northern shorelines with their surrounding landscape. Along the western shore, the gray granite slopes of Pyramid Peak (9,983 feet) and neighboring Mt. Price (9,976 feet) rise abruptly almost 1,900 feet above the water surface of the lake. North of Lake Aloha, Jacks Peak (9,856 feet) dominates the views, rising above a steep wall of reddish rock.

As stated above, Lake Aloha is located within the Desolation Wilderness. The El Dorado National Forest's LRMP applies a VQO of preservation to the Desolation Wilderness. In accordance with the area's wilderness qualities, this VQO is preservation and allows only ecological changes to the landscape. Management activities that modify the natural character of the landscape are prohibited; however, the project facilities are allowed as a special use with certain management conditions.³ The project facilities were built prior to the designation of the

³ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-8.

area as a Wilderness Area. In designating the Desolation Wilderness Area, the 1969 House Report stated the following:⁴

“Lake Aloha is a shallow reservoir, constructed originally in 1865 and enlarged in 1876. It is constructed of native rock that, due to age, blends well with the surrounding country. Although originally used as a source of water for mining, it is now operated by the Pacific Gas & Electric Co. for generation of power at a site outside the present primitive area.”

It was determined that the areas containing the two low dams should be eliminated from the proposed wilderness area. However, while wishing to maintain the usual high quality standards in the proposed Desolation Valley Wilderness Area, the committee did not wish to permit the areas recommended for exclusion to be commercialized or further developed. Accordingly, although the 2,000 acres within Federal Power Commission Project No. 184, containing Lake Aloha Dam and Reservoir and the adjoining access corridor, were excluded from the wilderness designation, the excluded lands continue to be managed in a manner that is consistent with the adjacent wilderness. The only exception to this was a provision for reasonable access by the utility companies for necessary maintenance and operation of the hydroelectric facilities without prior approval from Forest Service officials.⁵ This would prevent commercialization but would permit reasonable access by the operating companies for maintenance and for other necessary operations in connection with the dam.

Project No. 184 Facilities

Facilities on Lake Aloha include one main dam and 11 auxiliary dams. The PCT runs along the eastern shore of Lake Aloha. Most of the dams are not readily visible from the trail. The main dam and auxiliary dams #8 and #9 are located west of the PCT along the southern shore of Lake Aloha and are not visible from any designated public-use area.

Views from the PCT and southern shore are affected by Project No. 184 facilities, including the eleven auxiliary dams built of native masonry. The dams vary in size and shape, ranging from 16 inches to 8.5 feet in height and nine to 140 feet in length. Auxiliary dams 1 through 7 are clustered near the southern shore, which is adjacent to the PCT. The use of native building materials creates the same color and form as the natural landscape (see Figures 1 and 2). As a result, these dams blend into the landscape and are not readily visible to the casual recreational user. These facilities do not meet a VQO of preservation, but do meet a VQO of retention. Retention involves facilities or management activities that are not evident to the casual forest user.

The main dam, located at the southwest end of Lake Aloha above Pyramid Creek, consists of a 113-foot-long rubble masonry structure rising to a maximum height of 33 feet above the Pyramid Creek streambed (see Figures 3 and 4). Because of the rocky terrain, the main dam and auxiliary dams 8 and 9 are not visible in any middleground or background views from public-use areas to

⁴ Congressional Record, Volume 115 (1969), House Report (Interior and Insular Affairs Committee) No. 91-473, September 4, 1969, page 1155.

⁵ Congressional Record, Volume 115 (1969), House Report (Interior and Insular Affairs Committee) No. 91-473, September 4, 1969, page 1155.









the east and west. Views along this half-mile stretch on the southern shore are affected by the presence of the main dam and by the views of the southern end of the lake after water levels are drawn down in July and August. The view of the main dam from this stretch of shoreline meets a VQO of partial retention. Partial retention allows changes to the area that may be noticeable, but remain subordinate to the natural character of the landscape.

Project No. 184 Operations

During July and August, Lake Aloha water levels are typically drawn down by about 15 feet. The reduced water levels result in changes in landscape views affecting the line, form, color and texture of the shoreline, both in the foreground and middleground views. Staining on the granite rocks lining the shore is exposed as the water level in the reservoir decreases. The degree to which this is visible depends on the lighting at different times of the day and the familiarity of the user with the area. In addition, views may be affected by sediment deposition at the shallow southern end of the lake. The sediment is most visible to users along the first half-mile of the PCT (at the southeast shore). When water levels are low, dead tree snags and large boulders in the lake are also more visible. The operation of Lake Aloha for water storage and release meets a VQO of partial retention.

Echo Lake

Echo Lake lies immediately southeast of Desolation Wilderness in the Echo Lakes Management Unit of the Lake Tahoe Basin Management Unit (LTBMU) and consists of two lakes, Upper and Lower Echo Lakes, connected by a small channel. The 8,363-foot high Flagpole Peak and 8,824-foot-high Talking Mountain flank the lake on the north and south, respectively. The PCT crosses the Project No. 184 dam at the eastern outlet of Lower Echo Lake and parallels the northern shores of Lower and Upper Echo Lakes for about two miles, affording foreground views of the lakes, before entering Desolation Wilderness just northwest of the lakes. The PCT is a designated National Scenic Trail under the National Trails System Act (16 U.S. Code 1231 et seq.). This section of the PCT also comprises part of the Tahoe Rim Trail that encircles the Lake Tahoe Basin.

Public use areas on Echo Lake include the Echo Lake Chalet, marina and associated facilities on the eastern shore, and the PCT. In addition, various private cabins are located along the shoreline. Visitors to the Echo Lakes area are primarily recreational users and cabin owners, who hike, fish, camp, boat, or enjoy the local scenery or hikers who use the PCT trailhead at Lower Echo Lake to access Desolation Wilderness.

LTMBU Designations

Echo Lake is not located in the Eldorado National Forest. The LTMBU's Land and Resources Management Plan (LMRP) guides management of the immediate area along most of the northern and southern shore of Upper and Lower Echo Lakes for developed recreation. A long, narrow strip of land adjacent to, and south of, the eastern tip of Lower Echo Lake is also managed for developed recreation. This designation has a VQO of partial retention. A half mile stretch of the northern and southern shores at the eastern end of Lower Echo Lake, as well as the western end of Upper Echo Lake, are managed for dispersed recreation. The larger surrounding landscape of

Echo Lakes is managed for roadless recreation. These two management designations have a VQO of retention.

The foreground view from the eastern shore entrance includes: the lake; Project No. 184 facilities; Echo Lake Chalet; a marina, boat launch, and ticket booth; a concrete block restroom facility; Echo Creek; and the Echo Lake Trailhead to the PCT. The middleground view of the area immediately surrounding Echo Lake is rugged, with steep slopes rising 900 feet above the north shore and over 1,300 feet above the south shore of the lake. The visual character of the north and south shores differ dramatically, with the north side consisting primarily of gray granite slopes with scattered clumps of trees and shrubs. The area south of the lake is more heavily forested, with some rocky outcrops.

Project No. 184 Facilities

A number of developed facilities contribute to the visual character of Echo Lake, including Project No. 184 facilities and public and private recreational developments. The road leading into Echo Lakes ends at a parking lot at the eastern top of Lower Echo Lake. There are no developed roads around the lake and the only way to access the lake shoreline is by boat or hiking along the PCT.

Project No. 184 facilities at Lower Echo Lake include a dam and spillway, a metal bridge across Echo Creek, a small operations building near the dam, a conduit south of the lakes and a sign in the upper parking lot. The dam consists of a curved, 320-foot-long and 14-foot-high-roller compacted concrete structure on Echo Creek at the eastern end of Lower Echo Lake, with a two-foot-high wave coping wall (see Figure 5). There is a small, rustic building used for Project operations located between the dam and the nearby parking lot, and near the Echo Lake Chalet. A 30-foot wide spillway adjoins the northern end of the dam and directs water into Echo Creek (see Figure 6). Water released from Echo Lakes into Echo Creek is redirected into a 30-cubic feet per second (cfs) capacity, 1.16-mile-long conduit (consisting of a canal, tunnel and steel pipe) from the lake area to the South Fork of the American River. The top of the dam and a metal bridge over the spillway provide pedestrian access to the PCT and the north side of the lake.

The Project No. 184 facilities, along with the developed recreational facilities described above, are visible from the upper parking lot and Echo Lake (see Figure 7). The Project No. 184 developed facilities at Lower Echo Lake meet the designated partial retention VQO along the end of the eastern shore. The facilities are only partially visible through existing vegetation from the beginning of the PCT (see Figure 8). The facilities are not visible once users hike up the PCT or boat out onto the lake, where the VQO changes to retention for a half mile. After the half mile, the VQO changes back to partial retention due to the 139 cabins and individual boat docks clustered around Upper Echo Lake and the western half of Lower Echo Lake. The Project No. 184 facilities are not visible from the cabins located adjacent to the PCT on the northern or eastern shores. No Project No. 184 facilities are visible on the PCT between Lower and Upper Echo Lakes and between Upper Echo Lake and Lake Aloha. The project facilities are not visible from Highway 50 and, therefore, meet the Highway 50 VQO of foreground retention and middleground-retention.









Project No. 184 Operations

Project No. 184 operations involve the storage of water beginning in the spring and the drawdown of the lakes from September (after Labor Day) through November. The maximum drawdown is six feet at Echo Lake. Because the water is drawn down in the fall after the primary recreation season has ended, the change is not readily visible to a large number of forest users. In addition, the steep rocky shoreline at Echo Lake does not lend itself to a visible change in color and line. The management of water storage and releases meets a VQO of retention for all of the shoreline.

Caples Lake

Caples Lake, previously known as Twin Lakes, lies immediately south of State Highway 88 about 0.5 mile east of the Amador-Alpine County line and north of the Mokelumne Wilderness. With an elevation of 9,031 feet, Black Butte rises over 1,200 feet above the southeast end of the lake, dominating views from scenic Highway 88. Highway 88, a Federal Scenic Byway and State- and County-designated scenic highway, follows the northern shore of the lake. The foreground views are of Caples Lake and the developed facilities along the north shore, while forest and rugged snow-capped mountains make up the middleground views. The mountains south of the lake are forested. The Emigrant Lake Trail begins at the Caples Dam Trailhead and parallels the southwestern shore of Caples Lake to enter the Mokelumne Wilderness. The Mokelumne Wilderness borders Caples Lake along the entire three and a half miles of the southern shore.

There are several public-use areas located around Caples Lake. Public areas include the following: Highway 88, which borders the northern and eastern shores of the Lake; parking and restroom facilities near the auxiliary dam; the Emigrant Lake Trail; and recreation facilities on the eastern shore, including the Caples Lake Resort, the Caples Lake Campground, thirteen summer recreation cabins, a picnic area, and a parking lot and lake access near Woods Creek at the lake's east end.

VMS Designations

Caples Lake meets the variety class A and Sensitivity Level 1. Caples Lake is within the boundaries of the ENF, in an area classified as Roded Natural High Country. The Forest Service management emphasis in areas designated as Roded Natural High Country is to “maintain a roded natural type forest setting that provides a range of recreation opportunities and experiences.”⁶ The ENF LRMP applies VQOs of retention, for the landscape surrounding the lake, and partial retention for areas where developed facilities are located. The Mokelumne Wilderness has a VQO of preservation. Caples Lake is located in the Highway 88 viewshed, which is managed by the Forest Service for foreground-retention and middleground-retention.

⁶ USFS 1988a, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, _____, page 7-12.

Project No. 184 Facilities

The main dam, located at the northern end of the lake above Caples Creek, consists of a 1,200-foot-long earthfill structure rising to a maximum height of 63 feet above the Caples Creek streambed (see Figures 9 and 10). The auxiliary dam consists of a 237-foot-long, 33-foot high earthfill section and a 300-foot-long, 19-foot-high concrete section (see Figure 11). Water released from Caples Lake flows through Caples Creek into the Silver Fork of the American River, which eventually converges with the South Fork. Caples Lake Resort, located between Highway 88 and the lake, consists of several rustic buildings and a boat launch. In addition, 13 summer use cabins are located near the lake. Most of the other developed recreation facilities are located near, and are visible from, Highway 88.

From Highway 88 and the north shore, the main dam is clearly visible for approximately one mile before the road enters a forested area (see Figure 12). The highway emerges again to an open area for another mile, where the Highway 88 crosses the top of the auxiliary dam (see Figure 13). Only the top of the auxiliary dam is visible from this point. The Project No. 184 facilities do not meet the Highway 88 viewshed VQO of retention. The facilities meet a VQO of partial retention along Highway 88 on the northern shore, along with the other developed facilities for recreational use.

The main dam is not visible from the Emigrant Lake Trail on the southern shore of Caples Lake. The auxiliary dam is visible from the trailhead located adjacent to the dam and parking lot (see Figure 14). However, once on the trail, the dam is barely distinguishable from the shoreline (see Figure 15). The auxiliary dam is not visible from Highway 88 as it crosses the main dam, or any of the recreational facilities on Caples Lake. Because of the natural shoreline, the main dam is not visible from the Caples Lake Resort or the Caples Lake campground. Because of distance, the main dam is barely visible from the lake access at Woods Creek, and is not distinguishable from the natural shoreline (see Figure 16).

Project No. 184 Operations

Caples Lakes is managed for water storage in the spring and early summer and for water releases from August through March. The maximum drawdown is 44.4 feet. Lower water levels result in some changes in the line and color along the shore; however, steep terrain and rocky outcrops make these changes difficult to distinguish. The southern tip of Caples Lake is relatively shallow and the lake bottom is exposed as the water level decreases. As such, the visual change associated with reservoir drawdown are most apparent here. The Emigrant Lake Trail follows the southwestern shore to the Mokelumne Wilderness. Therefore, trail users would be most sensitive to draw down effects. Since Highway 88 is just slightly higher than the lake, the effects of draw down on the southern end of the lake are not visible from Highway 88.

Silver Lake

Located near Kirkwood in Amador County, Silver Lake is a natural occurring lake that was enlarged in the early 1920s by constructing an earth and rockfill dam on the Silver Fork of the American River. The lake is within the Silver Fork of the American River drainage and is fed by



EIP
ASSOCIATES

Source:
EIP November 2002

Project Number: 10540-01

Figure 9
Caples Lake Main Dam West Side











Source:
EIP November 2002

Figure 14
Caples Lake Auxillary Dam from
Emigrant Lake Trail Start

Project Number: 10540-01





several unnamed perennial creeks. Silver Lake and Thunder Mountain, which rises 2,147 feet over Silver Lake, dominate the views from Highway 88. The landscape surrounding the lake is primarily red fir forest and barren granite slopes with a wet meadow habitat at the south end of the lake.

The first view of Silver Lake occurs on Highway 88 from the top of a high ridge, where a vast view of the southern end of the lake and the surrounding mountain appears. The details of the lake shoreline and developed facilities are not visible from this viewpoint. Traveling northward, Highway 88 descends through forested land and emerges at the northwestern shore of Silver Lake near Kay's Resort. This is the most open area on the north shore with foreground views of the lake, mountains, and the top of the Silver Lake Dam. The southern shore is not visible from this viewpoint.

A road circles the north shore of the lake, with intermittent views of forest and rocky coves. This leads to the Kit Carson Lodge and the East Silver Lake Tract, which has private residences. The southern portion of Silver Lake has a number of developed recreational facilities, including Plasse's Resort, Plasse's Homestead, and the South Silver Lake Tract. There are additional homes located on EID land. Hiking trails extend along both the west and eastern shores from the southern shore. The Silver Lake Dam and facilities are not visible from these views, but homes and developed recreation facilities are evident.

Public-use areas around Silver Lake include: Kay's Resort; Kit Carson Lodge; Plasse's Resort; Silver Lake East and West Family Campgrounds; Sandy Cove picnic and parking areas; Ferguson Point picnic and parking areas; Oyster Creek roadside rest; Martin Meadows overflow area; recreational residences; three organizational camps; and five trailheads.

VSM Designations

Silver Lake meets the Variety Class A and a sensitivity level 1. The ENF LRMP has classified the areas surrounding Silver Lake as: 1) Semi primitive Motorized and Roded Natural, both with a retention VQO; and 2) Existing Recreation and Private Sector Recreation, both with a partial retention VQO. Silver Lake is located in the Highway 88 viewshed, which is managed by the Forest Service for a VQO of foreground-retention and middleground-retention.

Project No. 184 Facilities

The dam on Silver Lake is 280 feet long and up to 30 feet high and is composed of a concrete and wet masonry structure that is rock- and earth-filled (see Figure 17). A concrete and steel fish ladder is located on the west side of the dam (see Figure 18).

Traveling northward, Highway 88 descends through forested land and emerges at the northwestern shore of Silver Lake near Kay's Resort. This is the most open area on the north shore with foreground views of the lake, mountains, and the top of the Silver Lake Dam. The southern shore is not visible from this viewpoint. Highway 88 continues along the north shore for another quarter of a mile where it crosses the Silver Lake Dam at Silver Fork, and then continues north away from the lake. There are parking areas near the dam, and visitors fish from the top of the dam.





The Project No. 184 dam on Silver Lake is only visible in the immediate vicinity of the dam. The west side of the dam is not visible from any public use areas. Because of the shoreline around Kay's Resort on the western shore and the picnic area on the northern shore, the east side of the dam is not visible from most public use areas. The views from Highway 88, along the northwestern shore meet a VQO of retention because the dam is indistinguishable from the Highway until it is directly underneath. The Ferguson Point Picnic area is located on the north shore of Silver Lake. Kay's resort is visible from the picnic area, but the dam is not visible from the picnic area shore because of the shoreline (see Figure 19).

Project No. 184 Operations

Silver Lake is managed by Project No. 184 for water storage in the spring and early summer and for water releases from August through November. The maximum drawdown of the lake is 22.7 feet. Due to recreation interests at the lake, the water is left as high as possible until after Labor Day, depending on the type of water year. The draw down of water can be visible to visitors in September through early October. The reservoir at the northern part of the lake is deeper, so the draw down effects at the northern end of the lake are not as apparent as those at the southern end. In addition, the rocky coves of the north shore, interspersed with forested areas, tend to reduce the visibility of changes in color or line. However, the draw down is clearly visible along the southern shore near the South Silver Lake Tract and Plasse's Resort. The southern tip of the Silver Lake is a narrow, shallow peninsula; as the water is drawn down grassy areas become visible and, then, large areas of mudflat. The mudflat can extend up to a mile north (around Treasure Island) by October 15. This represents a change in the color, form, texture, and line of the shoreline. This change occurs for a short period of time after the traditional recreation season has ended. The management of water levels at Silver Lake meets a partial retention VQO.

South Fork of the American River

Water released from the four Sierra lakes travels down the Silver Fork of the American River, Caples Creek, Pyramid Creek and into the South Fork. Development in the immediate vicinity of Project No. 184 facilities along the South Fork of the American River include private summer homes in the Alder Creek, Bull Creek, and Whitehall Tracts located within the same stretch of the South Fork near Highway 50. Recreational users and communities whose populations are not directly associated with Forest land management activities are typically considered highly sensitive.

VMS Designations

The South Fork has been proposed for consideration as a Recreation Classification river under the Wild and Scenic Rivers Act (from its headwaters to Blair Bridge). In addition, the vicinity of the Project No. 184 South Fork diverted reach encompasses landscapes divided by the ENF into two variety classes: variety class A and variety class B. The South Fork corridor is classified as a variety class A landscape due to its distinctive landform, vegetative patterns, water forms, and rock formation features. Surrounding areas are classified as variety class B landscapes, as they



Source:
EIP November 2002

Project Number: 10540-01

Figure 19
Silver Lake Dam and Kays Resort from
Ferguson Point Picnic Area

exhibit relatively common landscape characteristics.⁷ Although the 1992 Cleveland Fire destroyed much of the vegetative features that determine variety classes, the underlying features, and therefore the variety classes, remain unaltered. The ENF LRMP has designated the foreground view of the South Fork corridor for a retention VQO, with smaller areas of development as a partial retention VQO. The middleground views from the South Fork corridor vary between partial retention and modified VQO's.

Project No. 184 Facilities

With the exception of the Echo Lake Conduit outlet, there are no Project No. 184 facilities along the South Fork, upstream of Kyburz. Project No. 184 facilities located along, or near, the South Fork between Kyburz and Slab Creek Reservoir (north of Pollack Pines) include: the El Dorado Diversion Dam, the El Dorado Canal, Alder Creek Diversion Dam and Feeder, the El Dorado Forebay, Pipeline and Penstock, and the El Dorado Powerhouse.

El Dorado Diversion Dam

The El Dorado Diversion Dam and intake structure are located on private property along the south Fork, about 1.5 miles south of Kyburz off Highway 50. Access to the Dam is on a private, gated, and locked road off Highway 50. The former timber crib dam was a historic structure that was damaged in the January 1997 storms. At present, all that remains is a small portion of the original dam. The Diversion Dam was rebuilt with a design that matches the proportions of the former dam, but uses modern materials and construction techniques to provide greater structural integrity. This facility can only be viewed from a small area surrounding the dam, including the private road, and just upstream and downstream of the dam on the South Fork. Recreational uses in the area include fishing, hiking, and whitewater boating. Whitewater boaters must portage their boats around the dam or start their run below the dam. Foreground views from the river and riverbank of the current dam, or the proposed reconstructed dam, would meet a partial retention VQO.

El Dorado Canal

The 22.3-mile long El Dorado Canal (Canal) carries diverted water from the El Dorado Diversion Dam to the El Dorado Forebay. The Canal runs along the steep slopes immediately south of the South Fork to the Forebay. The Canal consists of several different types of features including: lined and unlined ditch (17.2 miles), line and unlined tunnel (0.4 miles), pre-cast wood and concrete flume (4 miles), and steel pipe (.6 miles) (see Figures 20 and 21). Portions of the Canal are visible from Highway 50 and Ice House Road. These viewsheds are discussed separately below.

The Canal is not readily visible from the South Fork because of the steep terrain, vegetation, and distance. There may be a few locations where someone looking up the slope might be able to detect the presence of the Canal, but it would be difficult. It may be possible to see the Canal

⁷ El Dorado Irrigation District, El Dorado Project (FERC Project No. 184) Application for License, February 2000, Volume _____, page 7-14.





from some of the summer homes along the South Fork, but it would require looking up the steep slopes a considerable distance. Some recreational visitors hike to the Canal and walk or bike along sections where the terrain is not as steep, such as viewed from Forebay Road near Sand Flat Campground. The middleground views of the Canal from the South Fork and summer homes would meet a retention VQO. The foreground view for visitors hiking to the Canal would meet a partial retention VQO.

An approximately 2-mile long tunnel is now under construction to replace the section of canal running between Mill and Bull creeks. The Mill-to-Bull Creek tunnel is due to be completed in early 2003.

Alder Creek Diversion Dam and Feeder

The Alder Creek Diversion Dam and Feeder are located in a steep relatively inaccessible area. Foreground view of the Alder Creek facilities from the surrounding landscape would meet a partial retention VQO.

El Dorado Forebay, Pipeline and Penstock

The El Dorado Forebay is about a quarter mile south of the South Fork, outside the ENF in a rural area of El Dorado County (see Figure 22). The Forebay is not visible from the South Fork. The Forebay appears as a small lake and is visible from Forebay road. Parking, restrooms, and picnic tables are available for day use. A steel pipe carries the water from the Forebay to a surge tank and, then, two pipes (penstocks) transport the water to the El Dorado Powerhouse. The penstocks run down a deep canyon and are only visible from the Forebay or the Powerhouse. The penstocks are not visible from Forebay Road.

El Dorado Powerhouse

The El Dorado Powerhouse is located on land within the ENF in a steep, rugged canyon along the South Fork (see Figure 23). The Powerhouse is a distinct structure on the South Fork, but it is only accessible via a gated road.

Scenic Routes

Within the Project area, scenic routes have been identified under federal jurisdiction by the Forest Service, under State jurisdiction by the California Department of Transportation (Caltrans), and under county jurisdiction by El Dorado County. Federal scenic designations are determined by the Federal Highway Administration and the Forest Service National Scenic Byway. Section 261 of the California Streets and Highways Code provides for the management of scenic resources along State-designated routes. To protect the appearance of the scenic corridor, Caltrans and local agencies: 1) regulate land use and intensity (density) of development; 2) conduct detailed land and site planning; 3) control outdoor advertising; 4) monitor earthmoving and landscaping; and 5) mandate the design and appearance of structures and equipment. State-designated routes in the Project area are managed jointly by Caltrans and Alpine, Amador and El Dorado Counties. Finally, the El Dorado County General Plan





designates scenic routes not identified by the federal or State government. Travelers on these designated scenic roadways are considered sensitive to changes in the Project area's visual conditions.⁸

Highway 50

U.S. Highway 50 is a heavily traveled east-west route across the Sierra Nevada and is one of two Officially Designated State Scenic Highways in the Project vicinity. The 1996 Caltrans Guidelines for the Official Designation of Scenic Highways designates U.S. Highway 50 as a State Scenic Highway through El Dorado County from the eastern limits of the Government Center interchange in Placerville to South Lake Tahoe. Highway 50 runs parallel to the South Fork between Kyburz and Ditch Camp (about three miles east of Pollack Pines).

VMS Designations

The ENF manages the Forest lands along the Highway 50 corridor for a VQO of foreground retention. Middleground views from portions of Highway 50 are managed for a VQO of partial retention. Foreground and middleground views from Highway 50 include forested inclines, glimpses of the South Fork, and rock cliffs, ridges and peaks.

Project No. 184 Facilities

Echo Lake Conduit outlet near Highway 50 looks like a small stream and is not noticeable from the Highway. None of the Project No. 184 reservoirs are visible from Highway 50. None of the other Project No. 184 facilities along the diverted reach of the South Fork are visible from Highway 50 with the exception of the Canal. The Canal is not readily visible from Highway 50 because of the steep terrain, vegetation, and distance. Under normal vegetative conditions, there may be a few locations where someone looking up slope might be able to detect the presence of the Canal, but it would be difficult. Because of the existing lack of vegetation along the area of the Cleaveland fire, portions of the Canal are currently visible from Highway 50. In this area, the canal itself is usually not distinguishable but its location can be identified by a ridge along the Highway. The canal structure itself is only visible in a couple of locations when a viewer is consciously watching the adjacent hill for a sign of it. The middleground views of the Canal from the Highway 50 would meet a retention VQO.

State Highway 88

State Highway 88 is also an Officially Designated State Scenic Highway. The State designation applies to 59 miles of Highway 88, from Dew Drop Fire Station to the Nevada State Line. A Federal Highway Administration and Forest Service National Scenic Byway designation also applies to Highway 88 for the same stretch of road. This route is noted for natural resource, recreation, and scenic qualities. According to the Alpine County Draft General Plan (1997), the designation as a Federal Scenic Byway followed a 1985 planning agreement between Amador, Alpine, and El Dorado Counties, the Federal Highway Administration, Caltrans and the ENF.

⁸ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-15.

Under this agreement, these agencies manage this section of Highway 88 for scenic values in keeping with the ENF Highway 88 Scenic Byway Management Guidelines and the aesthetic resources policies contained in local general plans.⁹ Highway 88 is managed for a VQO of foreground retention and middleground retention.

Highway 88 passes near and along the banks of Silver and Caples Lakes, and includes views of forested ridges, rock outcroppings, and tributaries of the South Fork. Some of the more dramatic scenery starts at Silver Lake and continues past Caples Lake and over Carson Pass into Hope Valley.

Project No. 184 Facilities

The visual character of the Project No. 184 facilities along Highway 88 are discussed in the section above describing the upper Sierra Lakes. Facilities located on Highway 88 include the dam on Silver Lake, and the auxiliary and main dam on Caples Lake.

Ice House Road

Ice House Road joins Highway 50 at Riverton to provide access to Crystal Basin to the northeast of Highway 50 and the South Fork. While not included by Caltrans on the list of State-designated scenic highways, El Dorado County manages the section of roadway between Highway 50 and Loon Lake as a Scenic County Road under the guidelines of Section 261 of the California Streets and Highways Code.

VMS Designations

The Icehouse Road viewshed is managed for foreground-retention and middleground-partial retention.

Project No. 184 Facilities

The only Project No. 184 facilities visible from Ice House Road are portions of the El Dorado Canal (see Figures 24 and 25). The Forest Service has an overlook at Cleveland Corral, about a mile up Ice House Road off Highway 50. There is an interpretive center here with information on the surrounding landscape and the 1992 Cleveland Fire. Over 22,000 acres of forest were lost in the fire, leaving the area barren and scarred. The El Dorado Canal is evident in the middleground view from Cleveland Corral and along nearby stretches of Ice House Road. Looking across the South Fork Canyon, the Canal creates an obvious linear feature along the steep slopes. While the linear feature is distinguishable, the canal structure itself is only visible in a couple of locations. The facility is particularly apparent since the Cleveland Fire. The Canal slopes are now planted with tree seedlings and low brush is growing. The middleground Canal view from the Ice House Road and Cleveland Corral meets a partial retention VQO.

⁹ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-16.



Source:
EIP November 2002

Figure 24
El Dorado Canal from Ice House Road

Project Number: 10540-01



Aesthetic Impacts

EID's relicensing of Project No. 184 would require the continued presence of the hydroelectric and water supply facilities, including the Powerhouse, Forebay, Canal, Diversion Dam, and the dams on the high elevation reservoirs. It also involves operation of these facilities and related seasonal changes in water storage levels of the reservoirs and water flow levels in South Fork American River and its tributaries. The evaluation of the effects of EID's relicensing of Project No. 184 on aesthetic resources identified several areas of potential concern, including light and glare, the effects of flows in the South Fork and tributaries, the effects of flows going over Horsetail Falls, and the effects of reservoir filling and draw down. Each of these potential areas of effect is discussed in the following. In addition, a discussion of potential effects on Echo Creek is provided.

Light and Glare

The lighting associated with Project No. 184 facilities are not sources of substantial light to public use areas. The lighting occurs within the Project boundaries, is well away from residences and roads, and is shielded by vegetation. Many sites are infrequently used and illuminated.

The existing Project No. 184 facilities include incidental interior and exterior lighting in the powerhouse, the operation and maintenance buildings and yards, the remote controlled canal spillways, and the diversion dam. The purpose of the lighting is to allow nighttime operation, to assure safety, and to contribute to security. No new sources of light are proposed as part of EID's relicensing of the Project.¹⁰

Lighting for dam facilities is visible at the Echo, Caples and Silver Lakes from nearby recreational developments. Lights at Caples and Silver Lakes is also visible from Highway 88 when cars drive through the area. Lights from the canal spillways are potentially visible from Ice House Road and from the summer homes along the South Fork.

The El Dorado Canal is the only facility where a glare might be noticed by the casual forest visitor on Ice House Road. The metal pipes and fittings could reflect light at certain times of the day; however, these materials have been painted or covered to minimize the effects.

Instream Flows

The past operation of Project No. 184 for power generation and water supply has resulted in changes in instream flows that vary according to the time of year and the location within the South Fork basin and Echo Creek. Although output varied, Project No. 184 has typically operated every month of the year, diverting up to about 165 cfs at the El Dorado Diversion Dam at Kyburz, and additional flows from tributaries along the El Dorado Canal. As such, the South Fork downstream of the Diversion Dam has been affected by Project No. 184 diversions year-round, although the amount of the diversion, and its proportion to existing stream flows

¹⁰ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-17.

varied considerably. Upstream of the El Dorado Diversion Dam, Project No. 184 affected South Fork instream flows by storing a portion of the spring runoff, and releasing it during the late summer and fall. The natural runoff was not removed from the South Fork watershed above the El Dorado Diversion Dam. In fact, a modest amount of flow was imported into the South Fork basin from the adjacent Echo Creek drainage.¹¹

Past operation has affected instream flows and South Fork flows downstream of the El Dorado Powerhouse. The effects have varied according to the type of water year, the time of year and the stream reach. Although most of the water managed by Project No. 184 was returned to the South Fork at the Powerhouse, the EID water supply diversion from the Forebay took up to 15.080 afy of water for consumptive uses. This diversion amounted to not more than 40 cfs at any time. This amount of water was removed from the Forebay, did not flow through the Powerhouse, and was not returned into the South Fork below the Powerhouse. However, up to 175 cfs was discharged from the Powerhouse into the South Fork, depending upon how much water was released from the El Dorado Forebay for power generation. Therefore, the effects on South Fork instream flows below the Powerhouse included a modest flow reduction along with seasonal and shorter-term changes in the timing of the instream flows. The shorter-term changes depended upon the weekly and daily operation of the Forebay and Powerhouse.

The description of the general pattern of flows, provided above, applies as well to the Project following relicensing. The reservoirs will continue to be filled during the same times of the year, with the effect of reducing flows in some river reaches. Similarly, the reservoirs will continue to be drawn upon during the late summer and early fall, resulting in increased flows compared with the natural hydrology during this time of year. This pattern is tied to the seasonal water demands in California. Some variability in the specific magnitudes of flows and the levels of the reservoirs from year to year will continue to be expected following relicensing.

The following points provide information that is relevant to determining whether changes in instream flows cause significant aesthetic impacts. First, it is very difficult for the casual observer to detect modest changes in flow levels as they occur day to day based on visual observation. Even highly experienced water industry professionals have difficulty visually estimating the quantities of instream flows in natural channels, and therefore in perceiving measurable difference in flow. Errors of more than 100 percent are common, particularly when the flows are less than about 50 cfs to 100 cfs. At moderately high flows, in the range of about 200 cfs to 1,000 cfs, errors in visual estimates of more than 100 cfs to 200 cfs are common. Visual estimates of flows above 1,000 cfs can be even more subjective and unreliable.

Many people in California are familiar with the dynamics of California's water delivery systems and hydroelectric power generation facilities that operate throughout the State. These facilities involve the diversion and storage of water in reservoirs during the spring runoff, and the release of water for consumptive water use and power generation throughout the late summer and fall. These historic operations generally result in instream flows being lower than normal during the spring, and higher than normal during the late summer and fall. While moderate discontinuities

¹¹ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-17.

between water year expectations and observed runoff may not be immediately obvious, major discontinuities could be highly apparent.

The visual components associated with low, moderate, and high flows are different from each other, but none is intrinsically more visually appealing than the other. Whitewater is generally absent during low flow, while water flowing within braided channels and boulders is generally absent during high flows. Both whitewater and braided channels are visually appealing. Arguably, some observers might be surprised to see braided channels rather than whitewater conditions during a particular season and water year, but this would not make it aesthetically unpleasing. Third, there are no adopted objective standards contained in the El Dorado Forest Plan, the LTBMU LRMP, or the General Plans of El Dorado, Amador, or Alpine Counties that apply to the kinds of aesthetic effects associated with the changes in instream flows produced by operating Project No. 184. Among other reasons, objective standards for aesthetic effects of this nature are extremely difficult to develop because personal preference plays such a large part in determining what type of water levels that are most pleasing or what water levels detract from a positive experience. Objective standards are more easily developed for aesthetics where there are also obvious visual and land use conflicts, such as the siting of a shopping center within a regional park.

Project No. 184 Operations

EID's Application for License discussed the effects of EID relicensing Project No. 184 on the nine affected stream reaches in the South Fork basin and the adjacent Echo Creek drainage. The following discussions summarize the previous effects of Project No. 184 on these stream reaches. There is no substantial evidence to suggest that future operation of Project No. 184 facilities would result in significant changes from past operation. Table 1 includes the 25-year historic daily mean flows, as well as the mean spring and summer/fall flows under Project No. 184 for the nine stream reaches.

Past operation of Project No. 184 generally reduces natural flows during the spring and increases natural flows during the late summer and fall in the following stream reaches: Caples Creek below Caples Lake; Silver Fork below Silver Lake; and the South Fork above Kyburz. These flow ranges do not create negative aesthetic conditions.

Pyramid Creek below Lake Aloha: As shown in Table 1, the past operation of Project No. 184 generally reduced natural flows in Pyramid Creek during the spring and increased natural flows during the late summer and fall. These flow ranges do not create negative aesthetic conditions. In fact, the augmented late summer flows are considered to be aesthetic enhancements to Horsetail Falls.¹²

South Fork Below Echo Conduit: Past releases of up to about 33 cfs from the Echo Conduit usually after Labor Day have increased September flows in this reach of the South Fork from about 5 cfs above the confluence with Echo Conduit, to as much as about 38 cfs downstream of

¹² Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-20.

TABLE 1**INSTREAM FLOWS**

Creek	25-year Daily Mean Flows	Typical Flows under Project No. 184	
		Spring	Late Summer/Fall
Pyramid Creek below Lake Aloha	1.0 cfs - 605 cfs	15 cfs - 50 cfs	10cfs - 75 cfs
Caples Creek below Caples Lake	1.0 cfs - 445 cfs	7.0 cfs - 32 cfs	10 cfs - 125 cfs
Silver Fork below Silver Lake	1.0 cfs - 469 cfs	7.0 cfs - 23 cfs	10 cfs - 75 cfs
Echo Creek below Echo Lake	N/A	N/A	N/A
South Fork below Echo Conduit	N/A	N/A	N/A
South Fork above Kyburz	12 cfs - 6,850 cfs	550 cfs - 1,600 cfs	70 cfs - 200 cfs
South Fork below Kyburz	12 cfs - 6,850 cfs	400 cfs - 1,450 cfs	10 cfs to 18 cfs (dry years) 38 cfs - 50 cfs (wet years)
South Fork Tributaries along Canal Alder Creek	5.6 cfs - 85 cfs	N/A	N/A
South Fork below El Dorado Powerhouse	N/A	N/A	N/A

Source: El Dorado Irrigation District, El Dorado Project (FERC Project No. 184) Application for License, February 2000, Volume 3, Exhibit E, pages 7-20 through 7-23.

the confluence. These releases usually have occurred over about a six to eight week period. The highest flows occur early in the release schedule, for the first few weeks, and then the flows diminish to around five to ten cfs. Instream flows much greater than 38 cfs occur naturally in this portion of the South Fork during April, May and June, but are uncommon during late August and September. These conditions are expected to continue following relicensing.¹³

South Fork Below Kyburz: The 25-year hydrologic record (1970 through 1996) for the South Fork immediately above Kyburz diversion structure shows a range in the daily mean flows from about 12 cfs to 6,850 cfs, although flows in the range of approximately 25.0 cfs to 3,500 cfs appear to be more typical. In the past, the Project No. 184 diversion structure has diverted up to about 165 cfs of flow from the South Fork when it was available, and bypassed 10 cfs to 50 cfs as a minimum flow release. During the spring, flows below the Project No. 184 facilities have been in the range of about 400 cfs to 1,450 cfs. This accounts both for the water that has been put into storage by Project No. 184, and the water diverted into the El Dorado Canal.¹⁴

During the late summer and fall, Project No. 184 has traditionally released 10 cfs to 18 cfs into the South Fork below Kyburz during dry years, and 38 cfs to 50 cfs during normal years. These minimum flow releases were established in 1984 by the FERC, in consultation with the Forest Service and DFG, to protect aquatic resources in the 39-mile reach of the South Fork between the Diversion Dam and the Powerhouse. These amounts were believed by the agencies to approximate the natural flows that would occur in the reach during dry and normal years if Project No. 184 had not been constructed. EID's relicensing of Project No. 184 would comply

¹³ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-21.

¹⁴ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-22.

with FERC-required minimum flow releases, and therefore would release water in amounts that approximate the natural flow.

South Fork Tributaries Along Canal: Flows from several small tributaries to the South Fork have been diverted into the El Dorado Canal as part of past Project No. 184 operations. These include: Alder Creek; Carpenter Creek; Mill Creek; Bull Creek; Ogilby Creek; Esmeralda Creek; and No Name Creek. Alder Creek is the largest of these tributaries, with annual mean flows ranging from 5.6 cfs in 1924 to 85 cfs in 1950. These tributaries occur in steep areas overgrown by vegetation, and are difficult to access. Small tributary streams like these are common in the Sierra Nevada, and it is common to find them relatively dry during the summer.¹⁵

South Fork Below El Dorado Powerhouse: Water that has been used by past Project No. 184 operations for power generation has been discharged from the El Dorado Powerhouse into the South Fork about 0.75 mile upstream of Slab Creek Reservoir. EID's operation of Project No. 184 would remain the same and, as a result, any impacts to the aesthetics of instream flow would be limited to this reach. A review of the conditions in this location reveal little potential for Project No. 184 operations to affect aesthetics for the following reasons: 1) the reach occurs within an extremely steep canyon with limited public access; 2) the releases from the Powerhouse include all but up to 40 cfs of the amount of water diverted for water supply and power generation at Kyburz; and 3) this reach of the South Fork receives substantial flow from Silver Creek, about 1.5 miles upstream of the powerhouse, and from Camino Powerhouse located about 0.25 mile downstream of the El Dorado Powerhouse. Silver Creek and Camino Powerhouse flows include the return water from Sacramento Municipal Utility District's Upper American River Project, which manages much greater flows than are managed by Project No. 184.¹⁶

Echo Creek: Echo Lake has been used to store spring runoff in the Echo Creek watershed of the Upper Truckee River basin, for diversion into the South Fork during the late summer and early fall. A total of 1,943 acre feet of useable storage has been provided by Echo Lake, and this amount of water has been withheld each year from release into Echo Creek. There have been small releases from Echo Lake into Echo Creek through a drain system estimated in the range of 0.1 cfs to 0.25 cfs below Echo Lake dam. The releases provided minimum flows in Echo Creek that created moving water, aquatic habitat and riparian vegetation. These flows have combined with minor amounts of natural seepage from the dam. Echo Creek is visible from U.S. 50 just north of the town of Meyers.

Long term stream gaging records for the 1.6 mile-long creek below the Echo Lake dam are not available. Up to 33 cfs has been released from Echo Lake into the South Fork for past Project No. 184 operations that would otherwise have flowed into Echo Creek, and then into the much larger Upper Truckee River, which is 1.6 miles downstream of the dam and empties into Lake Tahoe. Past operation of Project No. 184 has substantially reduced flows during the spring and

¹⁵ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-22.

¹⁶ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-23.

increased flows during the late summer and fall. Seepage from Echo Lake dam represents a small augmentation of water to flows.¹⁷

Instream Flows Conclusion

EID's relicensing of Project No. 184 will result in the same range of instream flows that have occurred under past operations. The past operational range of flows is within the range of variability of natural flows for any given stream reach within the Project. Low flows from the Project do not produce offensive aesthetic conditions to public view (e.g. exposing man made structures or debris left floating in the water) nor demonstrable negative aesthetic effects. Changes in instream flows related to the Project do not conflict with Forest Service VQOs or with any other State and local policies or plans. This is equally true for moderate and high flows in natural channels.

Horsetail Falls

Horsetail Falls is located on Pyramid Creek, below Lake Aloha. The falls are located in Desolation Wilderness on the north side of Highway 50, in an area that is characterized by steep and rugged terrain. Horsetail Falls are accessible from Highway 50 from a trail that begins at the Twin Bridges Forest Service parking area and trailhead. The falls are visible from the trailhead and various locations along Highway 50 between Twin Bridges and Camp Sacramento.

Operation of Lake Aloha affects flows in Pyramid Creek, which in turn affects the appearance of Horsetail Falls. When flows are high, the falls are well defined and briefly visible from the westbound traffic lanes of Highway 50. The falls are not visible from the eastbound traffic lanes (unless pulled out at a turnout) because the highway turns south abruptly in the vicinity of Pyramid Creek.

The U.S. Forest Service believes that Horsetail Falls attracts visitors to the area who might not otherwise be there, namely motorists who stop to hike when they see the falls from the Highway. According to the Forest Service, these visitors create impacts along Pyramid Creek and in the Desolation Wilderness. Because flows from Lake Aloha affect the appearance of Horsetail Falls, the Eldorado National Forest believes that Project No. 184 operations may influence the amount of visitation in the area, and associated impacts.¹⁸

At the request of the Forest Service, EID examined Horsetail Falls under different flow conditions. EID took a series of photographs of Horsetail Falls from two vantage points along Highway 50; a large paved turnout located adjacent to the eastbound Highway 50 traffic lanes south of Horsetail Falls, and a large unpaved turnout located adjacent to the westbound traffic lanes, southeast of the Falls. EID recorded the flows in Pyramid Creek that corresponded to the photographs. EID concluded that flows greater than 34.9 cfs create a waterfall that is clearly visible from Highway 50. A waterfall was present on September 15, 1999 when flow in Pyramid

¹⁷ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-21.

¹⁸ El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 5, Exhibit E: Appendices P through Y, February 2000, Appendix T, Horsetail Falls, page 1.

Creek was measured to be 13.0 cfs. However, this flow did not appear to create a waterfall that would be obvious to highway travelers.¹⁹

The EID photographs were used, along with statistical flow information, to determine whether Project No. 184 operations have the potential to influence visitation along Pyramid Creek. Specifically, 12 years of hydrologic data were examined to determine how often Project operations affect whether a visible waterfall is present at Horsetail Falls, with 10.0 cfs being the threshold flow that creates a visible waterfall. The analysis concluded that, over the 12-year period of record, Project No. 184 operations created 560 waterfall days by releasing water from Lake Aloha. Conversely, 160 waterfall days were lost because Lake Aloha stored water that would have otherwise flowed down Pyramid Creek. The data analysis also indicated that Project No. 184 operations resulted in creating about 19 percent more waterfall days than would have otherwise occurred during the summer and fall recreation season. The data suggest that Project operations create more waterfall days than would otherwise occur. However, the number of waterfall days created is not considered substantial given a waterfall would be present at least 60-percent of the time annually and 47-percent of the time during summer and fall recreation season, even without the Project operating.²⁰

Horsetail Falls currently meets a VQO of retention. As discussed above, the operation of Project No. 184 facilities could affect the appearance of Horsetail Falls by affecting the flow of water. Project No. 184 operations will not change the physical characteristics of the Horsetail Falls and will not change the natural appearance of the terrain surrounding the Falls. Regardless of the continued operation of the Project No. 184 facilities, Horsetail Falls will continue to meet a VQO of retention.²¹

Reservoir Levels

The operation of Project No. 184 has relied upon the reservoirs being filled during the spring so that water may be stored for use later in the year. The operation typically has required the reservoirs to be drawn down during the late summer and fall to augment diminished natural flows during California's long dry season.

These reservoirs are four of the 1,395 reservoirs in California that are currently under the jurisdiction of the Department of Water Resources, Division of the Safety of Dams, and of the 1,200 reservoirs that are sited within lands administered by the Forest Service in California. Reportedly, there are 101 reservoirs within the Counties of El Dorado (53), Amador (22), and Alpine (26). The need for reservoirs, their presence, and their operation are familiar to most residents of California.

Reservoirs are essential to California's water delivery systems due to the State's geography, climate and patterns of development. The large numbers of reservoirs in California, their

¹⁹ El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 5, Exhibit E: Appendices P through Y, February 2000, Appendix T, Horsetail Falls, page 2.

²⁰ El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 5, Exhibit E: Appendices P through Y, February 2000, Appendix T, Horsetail Falls, page 3.

²¹ Personal communication, U.S. Forest Service, Vickie Jowise, Eldorado National Forest Service, July 10, 2002.

distribution across the State and pattern of reservoir operation are the result of State and local water planning and policy. The late summer routine of preparing for declining reservoir levels, securing swimming platforms and floating docks, and putting boats and equipment away for the winter is common experience to the long-time residents and users of California's reservoirs. This late summer and fall routine is common experience not only in the Sierra Nevada, but in the Coast Range, the Tehachapi Mountains, the San Bernardino Mountains, in other mountainous areas, in the heavily used regional parks, and even in the neighborhoods of California cities like Oakland and Palo Alto.

Determining whether operation of reservoirs results in attractive or unattractive aesthetic impacts is based on the subjective expectations of the viewer. Many people, however, probably view the exposed shoreline resulting from reservoir draw down as aesthetically unattractive, but different people can disagree sharply on the subject.

There are no adopted objective standards contained in the Eldorado Forest Plan or the General Plans of El Dorado, Amador, or Alpine Counties that apply to the kinds of aesthetic effects associated with the seasonal filling and draw down of the four reservoirs. The Forest Service VQOs provide no specific criteria or objective standards to apply to reservoir operations. None of these adopted plans or regulatory frameworks or systems contains criteria or standards that would constrain reservoir operation in consideration of aesthetic effects.²²

The following information on aesthetic effects first considers the physical presence of the reservoirs as man-made structures, and then discusses fluctuations in reservoir water levels.

Reservoirs as Man-Made Structures

All four high elevation reservoirs were created by or enlarged in size by man-made dams, and these dams are highly visible to residents and users. There are some people who would find the dams to be aesthetically offensive, and to have substantial negative effects. These observers may contrast the reservoirs, even when full, with the smaller natural lakes that would occur in these locations if the reservoirs had not been created. At Silver Lake and Caples Lake, the dams support Highway 88, which is designated under both State and federal guidelines as a scenic highway. The fact that the dams occur under the roadway tends to reduce their visual contrast with the surroundings. The asphalt surface and shoulders of Highway 88 tend to be the immediate, dominating man-made features. At Lake Aloha, the dam can be seen by visitors to the Desolation Wilderness. The dam at Echo Lake is also highly visible by boaters, hikers, and visitors to the Echo Lake Chalet. In some cases, the dams are concrete and rock structures that are highly visible and contrast sharply with their natural-appearing surroundings. It should be noted, however, that the dam at Lake Aloha is considered to be a historic resource by the Eldorado National Forest.

The continued presence and operation of the existing dams is consistent with the Eldorado Forest Plan and the General Plans of El Dorado, Amador, and Alpine Counties. There are no aesthetic

²² Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-24.

criteria or standards that conflict with the continued presence and operation of these existing structures.

Reservoir Water Levels

The seasonal drawdown of the four high-elevation reservoirs has exposed barren, unnatural-appearing shores, depending upon the location, from mid-July through mid-November. The shores range from several feet in width on steep edges to as much as 0.5 mile in width on the southern side of Silver Lake. Typically the shores can be muddy or gravelly upon exposure during the late summer and early fall, and thereafter can then become sparsely covered by grasses. The muddy shores can be relatively sensitive to disturbance. The uncontrolled use of portions of the muddy shores, including off-road-vehicle use at Silver Lake, can increase the unnatural appearance of the exposed shores.

The visual effects of the drawdown are usually diminished by about mid-November as the shores are generally covered by snow in late November or early December. At that time, the effects become less noticeable to the casual observer, although the lack of trees close to the edge of the water remains a somewhat discordant element to the observer familiar with the landscape. Later in the winter, when the reservoirs freeze, the snow-covered shores and the ice- and snow-covered lakes form a single, unbroken expanse. At that point, even a knowledgeable observer has difficulty distinguishing the reservoir from the shores. The shores remain snow-covered into the spring, and are typically submerged by the rising reservoirs soon after the snow-melt period begins in March and April. The four high elevation reservoirs typically tend to be full by about June.

Several resort and cabin owners in the Silver Lake and Caples Lake areas have described the barren shores of the drawn down reservoirs as unattractive or ugly. Some of the users of the Desolation Wilderness, who visit the Aloha Lake area for its natural values, consider the barren shores there as unattractive. Storage reservoirs are clearly not natural, not simply because of the presence of the dams, but because of the unnatural appearance of the water margins even at full pool. The reservoir side slopes are typically overly steep and the water/land contact tends to be too abrupt when compared with natural lakes. The substrates on the reservoir shores tend to be overly coarse and uniform in appearance. The typical absence of shoreline vegetation creates an unnatural appearance.²³

Project No. 184 Recreation-Use Studies

Recreation studies were conducted for the Project No. 184 relicensing project, including a contingent use analysis to determine the impacts of varying water levels on recreation use around the four lakes (Aloha, Echo, Caples and Silver). The study's focus was to determine how much user demand changes for recreational activities in Project No. 184 facility areas when water levels change. The recreation study report included results from face-to face surveys conducted around the four lakes between July 4 and September 2, 2002 and a telephone survey conducted by Regional and Economic Sciences between August 30 and September 19, 2002. Respondents

²³ Desolation Wilderness Management Guidelines, 1998, pages 43-44, as cited in: El Dorado Irrigation District, *FERC Project No. 184 Application for License*, Volume 3, Exhibit E, page 7-25.

were asked about 14 recreational activities at Lake Aloha and 20 activities at the other lakes.²⁴ To complete the interview by telephone, respondents referred to a brochure showing each of the four lakes at three different water levels (low, medium and high). For Lake Aloha, the lake drops 7.5 feet from high to medium, and it drops another 7.5 feet from medium to low. Echo Lake drops three feet from high to medium, and it drops another three feet from medium to low. For Caples Lake, the lake drops 28 feet from high to medium, and it drops another 28 feet from medium to low. Silver Lake drops 11 feet from high to medium, and it drops another 11 feet from medium to low. The overall conclusions of the contingent use analysis stated that total activities at all four lakes increase as the water level increases from low to medium to high water levels. The change in water levels had the least impact at Echo Lake, possibly because it experiences the lowest change in water level; it increases only six feet from low to high water level. The change in water levels has the greatest impact for Aloha and Caples Lakes. Although the absolute increase at Aloha is only 15 feet, it is a large relative effect that hides rocks and mud. Hikers who look at the low water level with exposed rocks and mud may hike on to other lakes in the Desolation Wilderness Area. When the water level at Lake Aloha drops from high to medium, approximately 20-percent of respondents said they would go to another location in the Desolation Wilderness Area. When it drops from medium to low, almost one-third of respondents said they would go to another location in the Desolation Wilderness Area. However, some hikers may see beauty at Lake Aloha when the water level is low because landscape photography shows up in the five most frequently mentioned activities only when the water level is low at Lake Aloha.²⁵

Caples Lakes rises 56 feet from low to high water level. The contingent use analysis results indicated that the number of activities increases sharply with the rise in water level. For all four lakes, the impact of a change in water level on activities is greater from low to medium than from medium to high. When activities were divided into water-based and land-based, both types of activities decline as water levels drop. For both types of activities, the rate of increase is greater from low to medium than from medium to high. However, the rate of increase for water-based activities is greater than the rate of increase for land-based activities. Hiking was the most popular activity at each of the four lakes, regardless of the water level, with the following exception. Fishing is the most popular activity at Silver Lake when the water level is low²⁶.

The recreation contingent use study indicates that changes in water levels at the four lakes influence recreation use. In general, total uses such as hiking and swimming, increases as water levels increase, with the exception of uses such as landscape photography.

The continued filling and draw down of the four high elevation reservoirs appears to be consistent with the Eldorado Forest Plan and the LTMBU LRMP. The relicensing of Project No. 184 facilities would not substantially change the operations of the existing facilities and would not change the existing visual conditions. There are no aesthetic criteria or standards that conflict with the continued operation of these existing reservoirs.

²⁴ Regional and Economic Sciences, *Contingent Use Analysis of Four Lakes in the El Dorado Irrigation District*, prepared for the El Dorado Irrigation District, October 21, 2002, page 3.

²⁵ Regional and Economic Sciences, *Contingent Use Analysis of Four Lakes in the El Dorado Irrigation District*, prepared for the El Dorado Irrigation District, October 21, 2002, page 35.

²⁶ Regional and Economic Sciences, *Contingent Use Analysis of Four Lakes in the El Dorado Irrigation District*, prepared for the El Dorado Irrigation District, October 21, 2002, page 36.

Measures Recommended by the Agencies

The EID's draft Report on Land Management and Aesthetics contained in their Application for Relicensing was circulated to local, State, and federal land management agencies potentially having authority over Project No. 184 lands, including El Dorado, Amador, and Alpine Counties. No mitigation or enhancement recommendations were provided by the commenting parties.

PROPOSED AESTHETIC IMPROVEMENTS

No new aesthetic improvement measures are proposed by the applicant for the existing Project No. 184 Facilities.

IMPACTS/CONCLUSION

The proposed project consists of the relicensing of Project No. 184 and would not include the alteration of existing facilities or the construction of new facilities. Therefore, the scenic quality impacts for the project would include only those caused by continuation of current uses.

The facilities located on Lake Aloha do not now meet the VQO of preservation. Auxiliary dams 1 through 7 and 10 and 11 are located near the PCT and several of these dams are visible from the vicinity of the trail. These dams meet a VQO of retention. The main dam and Auxiliary dams 8 and 9 are not visible from designated public-use areas and meet a VQO of partial retention. The area containing Lake Aloha Dam and reservoir was excluded from the Desolation Wilderness designation, but is managed in a manner that is consistent with the adjacent wilderness.

The dam and spillway on Echo Lake meet the LTMPU VQO of partial retention that is designated for the strip of land adjacent to and south of the eastern tip of Lower Echo Lake. The facilities meet the VQO of retention for the half mile stretch of the southern and northern shores at the eastern end because the dam is only visible at the start of the public-use Pacific Crest Trail on the northern shore. The dam and spillway are not visible from Highway 50 and, therefore, meet the foreground retention and middleground-retention VMS designations.

The main and auxiliary dams on Caples Lake do not meet the Highway 88 viewshed VQO of retention, but the facilities do meet a VQO of partial retention along Highway 88 on the northern shore, along with other developed facilities for recreational use.

The Silver Lake dam does not meet the Highway 88 VQO of retention, but it does meet a VQO of partial retention because it is not visible from the majority of Highway 88 surrounding Silver Lake, and is mostly indistinguishable from the Highway.

Project No. 184 facilities that are visible on Highway 50 meet a VQO of retention. Project facilities that are visible from Highway 88 mostly do not meet a VQO of foreground retention and middleground retention. Facilities on Caples and Silver Lake meet a VQO of partial retention. Project No. 184 facilities that are visible from Ice House Road meet the designated VQO of middleground partial retention.

Continued operation of the Project No. 184 facilities would not result in changes to the existing seasonal fluctuations in instream flows for creeks and tributaries located downstream of Project facilities, including Echo Creek. In addition, under continued operations of Project facilities, Horsetail Falls would continue to meet a VQO of retention.