

**Placer County Water Agency
Middle Fork American River Project
(FERC No. 2079)**

FINAL

**REC 5 – VISUAL QUALITY ASSESSMENT
TECHNICAL STUDY REPORT – 2008**



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1.0 INTRODUCTION

This report describes visual quality assessment studies conducted by the Placer County Water Agency (PCWA) in accordance with the REC 5 – Visual Quality Assessment Technical Study Plan (REC 5 – TSP). The REC 5 – TSP was included in Supporting Document (SD) H of the Pre-Application Document (PAD) for the Middle Fork American River Project (MFP or Project) (PCWA 2007).

This report provides a detailed description of the methods and results of visual quality assessment studies completed in 2007 and 2008. Specifically, this report identifies the management direction for visual resources in the vicinity of the Project as inventoried by the U.S. Department of Agriculture - Forest Service (USDA-FS or Forest Service) and as established in the current Land and Resource Management Plan (LRMP or Forest Plan) for each Forest. In addition this report documents the existing visual condition of the Project facilities, and visual conditions at Hell Hole and French Meadows reservoirs, and at Ralston Afterbay at low and high water surface elevations (WSEs). This report also includes photo renditions (simulations) of facilities associated with potential Project betterments as viewed from Key Observation Points (KOPs).

Note that this study is based on the USDA-FS Visual Management System (VMS), which is a methodology used by the USDA-FS to inventory and manage scenic resources with the National Forest. An overview of the VMS and associated terms and definitions is provided in Appendix A.

2.0 STUDY OBJECTIVES

The REC 5 – TSP included two study objectives, as follows:

- Identify, map, and describe USDA-FS inventories associated with existing Project facilities features and potential Project betterments; and
- Document the existing visual condition (EVC) of all Project facilities and features from associated viewsheds.

Figure REC 5-1 shows the REC 5 – TSP study objectives and the study elements and activities that relate to each objective.

3.0 STUDY IMPLEMENTATION

The REC 5 – Visual Quality Assessment Study was initiated in 2007 and completed in 2008. Study elements that have been completed, outstanding study elements, and any deviations or proposed modifications to the REC 5 – TSP are discussed in the following subsections.

3.1 STUDY ELEMENTS COMPLETED

The REC 5 – TSP included two primary study elements. The following summarizes the work completed to date, organized by study element.

USDA-FS Visual Management System (VMS) Inventory

- Identified and mapped all Sensitivity Level 1 and 2 viewsheds in the study area, including those associated with existing Project facilities, features, and potential Project betterments, in coordination with the USDA-FS.
- Summarized and mapped Eldorado National Forest (ENF) and Tahoe National Forest (TNF) Forest Plan Visual Quality Objectives (VQOs) in the study area.
- Identified and summarized the USDA-FS land management direction associated with the VMS inventories relative to the existing Project facilities, features, and potential Project betterments.
- Mapped the location of existing Project facilities, features, and proposed Project betterments with respect to their associated viewsheds and VMS inventories including VQOs, variety classes, sensitivity levels, and distance zones.

Existing Visual Condition

- Documented the EVC of all existing Project facilities and features from associated viewsheds.
- In consultation with the USDA-FS, identified, mapped, and described KOPs and photographed the existing Project facilities and features as viewed from the KOPs.
- At Project reservoirs that undergo seasonal WSE fluctuations (i.e., French Meadows and Hell Hole reservoirs), photographed the reservoirs from KOPs at high and low WSEs.
- Compiled and summarized WSE data at Ralston Afterbay to describe both daily and seasonal changes, and during maintenance outages.
- Photo-documented Ralston Afterbay at low, intermediate, and high WSEs from KOPs identified in coordination with the USDA-FS.
- Developed photo renditions of facilities associated with Project betterments from agreed upon KOPs for comparison to existing conditions.

3.2 DEVIATIONS FROM REC 5 – TSP

In general, all of the study elements were completed as outlined in the REC 5 – TSP with one minor deviation, as follows.

- The REC 5 – TSP specified that the reservoirs should be photographed at full pool (maximum normal operating level); however, neither reservoir reached full pool during the study period due to low runoff conditions. Therefore, the high water photographs depict conditions near the highest elevations reached during the study period.

3.3 OUTSTANDING STUDY ELEMENTS

There are no outstanding study elements.

3.4 PROPOSED MODIFICATIONS TO THE REC 5 – TSP

There are no proposed modifications to the REC 5 – TSP.

4.0 EXTENT OF STUDY AREA

The study area includes the Project facilities and features identified in Table REC 5-1 and their associated viewsheds. The viewsheds are defined by the USDA-FS and include primary travel routes (Forest Routes), other forest roads, recreation areas, and water bodies from which the existing Project facilities and features are visible to the public.

The study area also includes potential Project betterments, including new facilities, roads and trails, staging and construction work sites, as identified in Table REC 5-2, and new inundation areas associated with the Hell Hole Reservoir Seasonal Storage Betterment.

5.0 STUDY APPROACH

The first study element focuses on collecting, compiling and documenting USDA-FS VMS Inventory information. This effort was primarily completed by acquiring and summarizing existing information contained in the ENF and TNF Forest Plans, augmented with information developed in consultation with USDA-FS Landscape Architects. This information was then used to: (1) develop maps showing the location of existing Project facilities and potential Project betterments with respect to the Forest Plan VQOs; and (2) produce tables documenting other VMS Inventory information relative to each of the existing Project facilities and potential Project betterments facilities and features.

The second study element focused on: (1) documenting the EVC of Project facilities that can be seen from USDA-FS managed viewsheds; (2) documenting visual conditions at Hell Hole and French Meadows reservoirs and at Ralston Afterbay at high and low WSEs from KOPs; and, (3) simulating potential Project betterments from selected KOPs, with respect to existing visual conditions. The EVC assessment of Project facilities was completed in coordination with USDA-FS Landscape Architects. In addition, the KOPs were selected in consultation with the USDA-FS Landscape Architects.

The following section describes the specific methods used to complete each of these study elements.

5.1 USDA-FS VMS INVENTORY

The USDA-FS currently uses the Visual Management System (VMS) to address visual resources. A brief explanation of the VMS and associated definitions is included in Appendix A for reference. Compiling the USDA-FS VMS information involved five basic steps, as follows:

1. Identifying Sensitivity Level 1 and 2 viewsheds in consultation with the USDA-FS Landscape Architects;
2. Summarizing and mapping the Forest Plan VQOs for each forest;
3. Compiling and summarizing USDA-FS Inventory information, including viewer sensitivity levels, distance zones, landscape variety classes, and resulting Inventory VQOs;
4. Identifying and summarizing USDA-FS land management direction associated with Project facilities and features, and potential Project betterments; and
5. Mapping Project facilities and features, and potential Project betterments with respect to managed viewsheds and the Forest Plan VQOs.

The following describes the study methods associated with these five steps.

5.1.1 USDA-FS Managed Viewsheds

The first step in the VMS Inventory was to identify and map the Sensitivity Level 1 and 2 viewsheds in the MFP. The Sensitivity Level 1 and 2 viewsheds were initially identified in consultation with USDA-FS Landscape Architects from the ENF and TNF during two office meetings, which occurred on August 21 and September 26, 2008, respectively. The information provided by the USDA-FS was then used to create a table and maps showing the Sensitivity Level 1 and 2 viewsheds.

During a meeting conducted on June 15, 2009, and during follow up telephone conversations conducted on June 16, 2009, the ENF Landscape Architect identified two additional managed viewsheds, as follows: (1) Blacksmith Flat Road (14N25) from its intersection with the Middle Fork American River at Ralston Afterbay to its junction with FR 2 (Eleven Pines Road); and (2) Old Icehouse Road (17N02) from FR 24 (Chipmunk Ridge Road) to the southern terminus of the road above Hell Hole Boat Ramp General Parking Area. Accordingly, these road segments were added to the list of managed viewsheds and are discussed in this report.

5.1.2 USDA-FS Visual Management Information

The second step in VMS Inventory focused on collecting, compiling and documenting Forest Service VMS Inventory information. This effort was primarily completed by acquiring and summarizing existing information contained in the USDA-FS LRMPs for the ENF and TNF, augmented with information developed in consultation with USDA-FS Landscape Architects during office and field meetings conducted on the following dates: August 21-22, 2008 (ENF); September 24-26, 2008 (TNF); and June 15, 2009 (TNF and

ENF). Two types of information were compiled: (1) Inventory VQO information; and (2) Forest Plan VQO information. The distinctions between these two types of information are explained in Appendix A. Specific methods used to collect and compile this information are summarized below.

USDA-FS VQO Inventory Information

Inventory information including sensitivity levels, distance zones, landscape variety classes, and VQOs were obtained from each Forest in the form of paper copy 7.5 minute USGS quadrangles. This information was then reviewed with respect to the location of existing Project facilities and potential Project betterments in consultation with the USDA-FS Landscape Architects during office and field meetings conducted on August 21–22, 2008 and September 24–26, 2008. Any discrepancies or questions about the inventory were resolved during follow-up telephone conversations and e-mail correspondence.

The information provided by the USDA-FS was then used to create a table, which documents the inventory ratings (distance zone, sensitivity level, and variety class) for the area surrounding each Project facility. Similar tables were produced for the potential Project betterments.

Forest Plan VQO Information

Forest Plan VQOs reflect the visual management objectives (management direction) adopted by the respective Forest for implementation through the Forest Plan.

Forest Plan VQO information was obtained from the TNF Forest Plan (USDA-FS, 1990) and the ENF Forest Plan (USDA-FS, 1988), and electronically from the Region 5 website (<http://www.fs.fed.us/r5/rsl/clearinghouse/gis-download.shtml>). Conflicts between data sources regarding Forest Plan VQOs were resolved through research and coordination with the respective Landscape Architect from each Forest (pers. comm. ENF 2008a through 2008e, ENF 2009a, ENF 2009b, and TNF 2008a through 2008c).

The Forest Plan VQO information was used to develop maps showing the location of each existing Project facility with respect to the Forest Plan VQOs. In addition, the information was documented in tabular format, by Project facility. Similar maps and tables were produced for the potential Project betterments.

5.2 EXISTING VISUAL CONDITION ASSESSMENTS

This study element focused on: (1) documenting the Existing Visual Condition (EVC) of Project facilities and features; (2) documenting conditions at Hell Hole and French Meadows reservoirs and at Ralston Afterbay at high and low WSEs from KOPs; and (3) simulating potential Project betterments from selected KOPs, with respect to their existing visual conditions. Methods used to complete each of these tasks are described in the following.

5.2.1 EVC of Existing Project Facilities

EVC is another component of the USDA-FS VMS that is independent of VQOs. A brief explanation of EVC and associated definitions is included in Appendix A for reference. In general, the EVC methodology uses a five point system to rate the existing visual conditions of a Forest. EVC ratings range from EVC Type I (ecological changes only), to EVC Type V (landscape changes are strong and obvious). During a meeting conducted on June 15, 2009 the ENF and TNF indicated that none of the Project facilities should be classified as EVC Type V. As a result of this clarification, facilities that had been rated EVC Type V were changed to EVC Type IV.

The EVC assessment establishes the existing visual condition of Project facilities as seen in the landscape from USDA-FS managed viewsheds. The first step in the EVC assessment was to determine whether Project facilities or features could be seen from USDA-FS managed viewsheds in the study area. This was accomplished by traveling through most of the managed viewsheds. If a Project facility could be seen, the assessment described the degree of visual contrast created by Project facilities or feature when seen from a managed viewshed in terms of form, line, color and texture, and duration and aspect of viewing. If a facility was not seen, the facility was not assessed. If the facility was not noticeable, it was documented as such and considered to meet the EVC Type II (not visually evident). This assessment resulted in an EVC rating for each seen or not noticeable Project facility, which was tabulated by viewshed.

Since Project facilities may be seen from more than one location within a managed viewshed, or from more than one managed viewshed, the EVC assessment considers the visibility of Project features as seen from a particular managed viewshed (travel route, recreation area, water body), with consideration to factors such as frequency of views, duration of views, and viewing distance. KOPs were not used for the EVC assessment since the visibility of Project facilities could vary depending on the managed viewshed it was being viewed from.

The EVC field visits were done in tandem with the VMS Inventory. Field visits to Project facilities located within the ENF were conducted on August 20–21, 2008 and Project facilities located with the TNF were visited on September 24–25, 2008. Office analysis consisted of reviewing VMS maps, USGS 7.5 minute quad maps, 3-dimensional terrain models, photographs, and field notes.

All of the USDA-FS managed viewsheds were visited during the August and September 2008 field visits with the three exceptions: (1) Little Crater and Big Crater viewshed; (2) portions of the Western States Trail viewshed - segment above Duncan Creek Diversion and the segment along French Meadows Reservoir west of Poppy Campground; and (3) Tevis Cup Trail viewshed. Information on the visibility of Project facilities from these viewsheds was obtained from personal communications with PCWA staff, PCWA consultants conducting other MFP relicensing studies, and USDA-FS personally familiar with the areas.

In addition to observing the Project facilities and features from managed viewsheds, each Project facility was visited to understand the specific components and configuration of each facility and to verify the facilities seen from viewsheds. During these visits, facility features and surrounding visual conditions were recorded and photo-documented.

5.2.2 Reservoir Water Levels

French Meadows and Hell Hole reservoirs and Ralston Afterbay were photographed at low and high WSEs from KOPs selected in consultation with the ENF and TNF Landscape Architects during a field trip conducted on October 15, 2007. The goal of this study element was to photograph the reservoirs at representative high and low WSEs levels from the same vantage points to facilitate comparisons of the range of visual conditions presents under existing operations. Accordingly, the KOPs were marked in the field using rebar and/or flagging tape and GPS coordinates were documented for future reference. The locations of each of the KOPs were plotted on GIS-based maps. KOPs in the vicinity of Hell Hole Reservoir are shown on Map REC 4-1. KOPs in the vicinity of French Meadows Reservoir are shown on Map REC 4-2. KOPs in the vicinity of Ralston Afterbay are shown on Map REC 4-3.

Photo-documenting Water Levels at French Meadows and Hell Hole Reservoirs

The low WSE photographs of Hell Hole and French Meadows reservoirs were taken in October 2007 and October 2008, respectively. The photographs of Hell Hole Reservoir were taken near the lowest WSE that occurred during the study period. Water levels at French Meadows declined to slightly lower WSE than those that were present when the photographs were taken. However, the lowest WSE occurred in March when the area was inaccessible due to snow.

The high WSE photographs of Hell Hole and French Meadows reservoirs were taken June 17, 2008. The REC 5 – TSP specified that the reservoirs should be photographed at full pool (maximum normal operating level); however, neither reservoir reached full pool during the study period due to low runoff conditions. Therefore, the high WSE photographs depict conditions near the highest elevations reached during the study period.

The photograph dates and corresponding WSEs at Hell Hole and French Meadows reservoirs are summarized below. Storage data for each reservoir was obtained from the California Data Exchange Center (CDEC) website. The storage data was then converted to WSE using storage capacity curves.

Reservoir Photograph Dates and Corresponding WSEs

Date	Condition	Storage (acre-feet)	Elevation (MSL)	Elevation Difference between Photographs
Hell Hole Reservoir				
<i>Gross Storage = 207,590 ac ft / Max. Normal Operating Elevation = 4,630 msl</i>				
Jun 17, 2008	High Water	182,175	4610	98 feet
Oct 16, 2007	Low Water	94,247	4512	
French Meadows Reservoir				
<i>Gross Storage = 134,993 ac ft / Max. Normal Operating Elevation = 5,262 msl</i>				
Jun 17, 2008	High Water	93,381	5228	38 feet
Oct 24, 2008	Low Water	54,079	5190	

Photo-documenting WSEs at Ralston Afterbay

This effort included two tasks: (1) compiling WSE data at Ralston Afterbay to describe daily and seasonal WSE changes, and (2) photographing Ralston Afterbay at low and high WSE.

As required in the REC 5 – TSP, WSEs at Ralston Afterbay were compiled to describe daily and seasonal changes and conditions during the annual maintenance outage. To depict daily fluctuations, 15 minute and hourly WSE information recorded and maintained by PCWA was used to develop hydrographs showing the daily and weekly fluctuation patterns during the winter, spring, summer and fall periods. This information was plotted to illustrate daily and seasonal WSE fluctuations at Ralston Afterbay.

Ralston Afterbay was photographed at different WSEs from specific KOPs selected in consultation with the TNF Landscape Architect. The photograph dates and corresponding WSEs at Ralston Afterbay are summarized below. As indicated, three WSEs were photographed, one at high WSE, one at an intermediate WSE, and one at low WSE. The low WSE photographs were taken in November 2008 during the annual maintenance outage.

Ralston Afterbay Photograph Dates and Corresponding Water Level Elevations (Max. Normal Operating Elevation = 1,178 MSL)

Date	Condition	Elevation (MSL)	Elevation Difference Relative to Highest WSE (in feet)
Jun 17, 2008	High WSE	1173	–
Oct 24, 2008	Intermediate WSE	1171	2
Nov 12, 2008	Low WSE	1155	18

5.2.3 Photo-renditions of Facilities and Features associated with Project Betterments

This effort involved simulating facilities and features associated potential Project betterments to show how future visual conditions may change relative to existing visual conditions. The three proposed Project betterments are referred to as:

- Hell Hole Reservoir Seasonal Storage Increase Betterment;
- French Meadows Powerhouse Capacity Upgrade Betterment; and
- Ralston Powerhouse Capacity Upgrade Betterment.

SD C of the PAD (PCWA 2007) includes a detailed description of these three proposed Project betterments/improvements, including a detailed facility list for each betterment and maps showing inundation areas and the locations of all proposed facilities, potential construction, staging, and disposal areas necessary for construction of each of the betterments. An overview of the potential Project betterments is provided in Appendix B of this report for reference. Note that this overview has been modified since it was originally distributed to reflect the status of the proposed Project betterments as of July 15, 2009. Specifically, features or facilities that are no longer under consideration have been deleted. These modifications are shown in track changes. In addition, an updated list of proposed betterment facilities and features (including potential construction, staging and disposal areas) is provided in Table REC 5-2.

The most substantial change in proposed betterment facilities and features since issuance of the PAD is associated with the Hell Hole Reservoir Seasonal Storage Increase Betterment. The original concept of the betterment included installation of up to 10 foot-high crest gates on the existing dam spillway. Installation of 10 foot-high crest gates required that several parapet walls were needed around Hell Hole Reservoir to protect existing Project facilities. Installation of 3 foot-high crest gates or check value at South Fork Long Canyon Diversion Dam was also needed to prevent water from freely flowing from Hell Hole Reservoir into the diversion through the water conveyance system. PCWA's current refinement of the proposed betterment includes installation of only a 6 foot-high crest gate at Hell Hole Dam to ensure the new inundation areas does not extend beyond the current FERC Project boundary. As such, the parapet walls at Hell Hole Reservoir and crest gates at South Fork Long Canyon Diversion Dam have been removed from the list of potential betterment facilities and features. These changes are reflected on the tables and maps included in this report.

Simulations

Photo-renditions (simulations) showing the primary facilities associated with the potential Project betterments and larger inundation area at Hell Hole Reservoir were created using photographs taken from the KOPs described above. Simulations were only prepared for those features that are visible from the KOPs or USDA-FS designated viewsheds. The Ralston Powerhouse Capacity Upgrade Betterment only requires upgrades to electrical and mechanical equipment within the existing Ralston

Powerhouse. Since it does not involve any exterior modifications, no simulations were prepared for this betterment.

The visual simulations were created in Adobe Photoshop version 9 using photographs taken on June 17, 2008. Weather conditions were sunny and clear. Focal length was generally set at the default except for KOPs 1a, 1b, and 2, which were taken using a telephoto setting to simulate the view one might experience from a boat on the reservoir, which would represent a “worst case scenario.”

Maximum WSE (full pool) was not reached at Hell Hole Reservoir during the study period. Therefore, photographs showing the existing maximum pool condition were not available. To establish the “existing” condition photographs, all photos were first manipulated to simulate Hell Hole Reservoir at maximum normal operating elevation.

PCWA is continuing to assess the engineering and economic feasibility of each potential Project betterment. The simulations and analysis included in this report are based on the best information available at the time this report was prepared. Additional analysis may be required as the Project betterments evolve and construction specifications are developed.

6.0 STUDY RESULTS

The following sections describe the results of the Visual Quality Assessment, organized by study element.

6.1 USDA-FS VMS INVENTORY

Compiling the USDA-FS VMS information involved: (1) identifying USDA-FS managed viewsheds; and (2) compiling USDA-FS visual management information. The results of these efforts are described in the following.

6.1.1 USDA-FS Managed Viewsheds

The USDA-FS Landscape Architects identified 37 Forest Service managed viewsheds (Sensitivity Level 1 and 2 areas) in the vicinity of the MFP, of which 18 are within the TNF and 19 within the ENF. The managed viewsheds include primary travel routes (Forest Routes), other forest roads, trails, waterbodies, rivers, and developed recreation sites. All of the managed viewsheds that were identified by the ENF and TNF are shown on Table REC 5-3, organized by viewshed type. The Forest Routes (FRs) and forest roads that are designated as USDA-FS managed viewsheds are highlighted on Map REC 5-4 for reference, along with their common names and USDA-FS identification numbers. In addition, all Sensitivity Level 1 and 2 viewsheds are shown on Map REC 5-5 (5 sheets), with respect to Project facilities, recreation facilities, waterbodies, and potential Project betterments. Map REC 5-6 shows Sensitivity Level 1 and 2 viewsheds with respect to potential Project betterments.

6.1.2 USDA-FS Visual Management Information

Two types of visual management information were compiled: (1) Inventory VQO information, which includes distance zones, viewer sensitivity levels, and landscape variety classes; and (2) Forest Plan VQO information. Table REC 5-1 summarizes the Forest Plan VQOs and Inventory information for each existing Project facility. Table REC 5-2 summarizes this information for facilities and features associated with potential Project betterments. Map REC 5-5 (5 sheets) shows the location of each existing Project facility with respect to the Forest Plan VQOs. Map REC 5-6 shows the Forest Plan VQOs with respect to the proposed Project betterments.

The following discussion summarizes the VMS Inventory results by Project facility area, starting east and moving west. The visual management direction for the area as set forth in the Forest Plan is described including the Forest Plan VQO and any other specific information regarding the visual resource (USDA-FS 1988 and 1990). Additional information about each area, including the landscape character, major Project facilities, and typical use patterns associated with the area is included in Appendix C for reference. Note that tunnels and recreation facility water lines associated with the Project are underground and therefore are not seen. These features are not discussed in this report.

Duncan Creek Diversion Area

The Duncan Creek Diversion lies in the TNF, within a Management Area (MA) identified in the LRMP as “Sunflower” (MA 91). According to the LRMP this MA is to be managed for the Modification VQO.

French Meadows Reservoir Area

Project facilities associated with French Meadows Reservoir lie within the TNF management area “French” (MA 89) which is to be managed for the Retention VQO. Developed recreation facilities surrounding French Meadows Reservoir are to be managed for Partial Retention VQO within the site, and when the site can be viewed in the middleground from other managed viewsheds. Forest Plan VQOs are shown on Map REC 5-5 (Sheet 1 of 5), but do not depict the Partial Retention VQO within the developed recreation sites due to the small scale of the developed recreation areas.

Hell Hole Reservoir Area

Project facilities associated with Hell Hole Reservoir lie in the ENF, in an area defined as “Semiprimitive Motorized” (MA 7). This area is to be managed for the Retention VQO. The ENF Semiprimitive Motorized MA is essentially undisturbed, and land altering practices are to be limited in scope and duration. Developed recreation facilities surrounding Hell Hole Reservoir are to be managed to meet a VQO of Partial Retention, in accordance with Management Area 8 in the ENF Forest Plan (pers. comm. ENF 2009a). Forest Plan VQOs in the vicinity of Hell Hole Reservoir are shown on Map REC 5-5 (Sheet 2 of 5), but do not depict the Partial Retention VQO within the developed recreation sites due to the small scale of the developed recreation areas.

Long Canyon Diversion Areas

The Long Canyon area encompasses the North Fork Long Canyon and South Fork Long Canyon diversions, each on their respective stream. These Project facilities lie within the ENF MA “Spotted Owl” (MA18) where specific management direction is to eliminate disturbance to wildlife and protect old growth forests. All the above-ground Project facilities associated with the North Fork and South Fork Long Canyon diversions are to be managed for the Partial Retention VQO.

Middle Fork Interbay Area

The Middle Fork Interbay area spans the Middle Fork American River Canyon with the river forming the boundary between the ENF and TNF. Project facilities on the north side of the river are within the TNF and those on the south side are within the ENF. Project facilities that span the river (such as the dam and diversion pool) are considered to have both a TNF and ENF VQO designation.

Middle Fork Interbay Dam and Powerhouse Road and the Passive Microwave Reflector Station above Middle Fork Interbay are the only Project facilities on the north side of the canyon and lie within the TNF MA “End of the World” (MA 102) where the major resource emphasis is regulated intensive even-aged timber management. The Project road traverses an area that is managed predominantly for the Modification VQO and the Passive Microwave Reflector Station above Middle Fork Interbay is in an area managed for Partial Retention.

Most of the Project facilities are located on the south side of the canyon where there are two ENF management areas: “Visual Foreground Partial Retention” (MA 21) which applies from the river to midway up slope (approximately one half-mile from the river), and ENF management area “High Site Timber” (MA 24) which extends up slope from MA 21. Project facilities between the river and the Middle Fork Powerhouse Penstock and butterfly valve house are within MA 21 where a Partial Retention VQO applies. Project facilities at and above the Butterfly Valve House are within MA 24 where a Modification VQO applies.

Ralston Afterbay Area

The Ralston Afterbay (also referred to by the USDA-FS as Oxbow Reservoir) spans the Middle Fork American River and Rubicon River canyons. The Middle Fork American River forms the boundary between the TNF and ENF. Accordingly, Project facilities are located in both the ENF and the TNF.

Project facilities on the north side of the river are within the TNF management area “Little Oak” (MA 108) where the management emphasis is on wildlife with special emphasis on recreation adjacent to Ralston Afterbay. Project facilities within this area are managed for the Partial Retention VQO since they are within the foreground view of the Ralston Picnic Area and Ralston Afterbay.

To the south of the Middle Fork American River, which includes the confluence with the Rubicon River, Project facilities are within the ENF management area “Wild and Scenic River” (MA 2) which is to receive “interim protection of its Wild, Scenic, or Recreational values until Congress makes a formal designation by law or disposes of the proposal”. Areas within MA 2 are to be managed for the Retention VQO (USDA-FS 1988, p.4-130).

The Brushy Canyon Adit and Brush Canyon Adit Access Road lie within the ENF “High Site Timber” MA (MA 24) where the Modification VQO applies.

Project Snow Courses

There are four snow courses associated with the Project. These are referred to as Wabena Meadows, Talbot Camp, Miranda Cabin, and Diamond Crossing. The Wabena Meadows snow course is located seven miles north of French Meadows Reservoir in an area managed for Partial Retention. Talbot Camp Snow Course is about 5 miles upstream of French Meadows Reservoir in an area managed for Retention. Miranda Cabin Snow Course is about 1.5 miles north of Hell Hole Reservoir in an area managed for Retention. The Diamond Crossing Snow Course is the only snow course within the Granite Chief Wilderness Area, and is located about 3 miles northwest of Hell Hole Reservoir in an area managed for Preservation. Note that the snow courses are not situated near any of the managed viewsheds identified on Table REC 5-3. As such, they are not discussed further in this report.

Potential Project Betterments

The primary facilities associated with the potential Project betterments are shown on Map REC 5-6 with respect to the Forest Plan VQOs. In addition, Inventory VQOs and Forest Plan VQOs for all of the facilities and features associated with potential Project betterments are summarized in Table REC 5-2.

As indicated, all of the facilities associated with the Hell Hole Reservoir Seasonal Storage Increase Betterment lie within areas managed for the Forest Plan VQO of Retention. The new penstock and associated features associated with the French Meadows Powerhouse Capacity Upgrade Betterment lie adjacent to the Hell Hole Reservoir. Accordingly, these new features also lie within an area managed for Retention. Betterments associated with Ralston Powerhouse will not result in visible changes to the structure; however construction activities will be visible. Ralston Powerhouse is in an area managed for Retention.

6.2 EXISTING VISUAL CONDITION ASSESSMENTS

This study element focused on: (1) documenting the EVC of Project facilities; (2) documenting conditions at Hell Hole and French Meadows reservoirs and at Ralston Afterbay at high and low WSEs from KOPs; and (3) simulating potential Project betterments from selected KOPs, with respect to existing conditions. The results of these efforts are described below.

6.2.1 EVC of Existing Project Facilities and Features

Results of the EVC assessment of Project facility and features are presented in Table REC 5-4 and summarized below. The results are organized by viewshed, as requested by the ENF Landscape Architects (Eldorado National Forest, 2008d). Viewshed types include: primary travel routes (Forest Routes), other forest roads, trails, water bodies, rivers and streams, and developed recreation sites. Photographs of select Project facility areas as seen from specific TNF and ENF managed viewsheds are included in Appendix D.

TNF Managed Viewsheds

Mosquito Ridge Road Viewshed (FR 96)

Mosquito Ridge Road (FR 96) is a primary access route through the Middle Fork American River watershed. This route begins in Foresthill at the junction of Foresthill Road, descends into the Middle Fork American River Canyon, then climbs back out of the canyon to follow Mosquito Ridge, first on the north side, then the south, up through the Duncan Creek watershed, before descending into the French Meadows Reservoir area. Along the route there are a few locations where there are brief views of Project facilities. Longer duration views of Project facilities are experienced near French Meadows Reservoir.

Rounding bends in the road while traveling east on Mosquito Ridge Road from Forest Hill, middleground views of Ralston Ridge are seen from a few locations. The ridge is forested, and cleared areas associated with the Ralston Powerhouse Butterfly Valve House Road and the Ralston Afterbay Ridge Sediment Disposal Area, attract the eye due to contrasts in color with the surrounding dark green vegetation, meeting the EVC Type IV. Other Project facilities on the ridge are either not noticed or not seen. (Appendix D, Photo 1).

Further along Mosquito Ridge Road, there is a short section of road where there is a brief, foreground view of the Ralston Afterbay Area near the Oxbow Powerhouse. Facilities seen include the dam, generator building, powerhouse and roads. The light colors of the roads dominate and the facilities contrast with the darker colors of the reservoir water and trees. However, the visual contrast is confined to a relatively small area, resulting in the appearance of minor disturbances with EVC ratings generally ranging from Type II-III (Appendix D, Photo 2).

Continuing east, Mosquito Ridge Road crosses to the south side of Mosquito Ridge at Dutch Flat, beyond which there is a short duration, middleground view of the Middle Fork Interbay area. From this location, the exposed soil associated with the Middle Fork Powerhouse Penstock is highly noticeable due to contrasts in line and color. The exposed soil around the penstock creates a long linear light colored line down the canyon slope. In addition, an exposed slope associated with an access road above the penstock also creates visual contrasts and attracts the viewer's attention. The Project

facilities as seen from this location meet the EVC Type IV rating since the landscapes changes are easily noticed and attract some attention (Appendix D, Photo 3).

After crossing the Duncan Creek drainage, French Meadows Reservoir and associated Project facilities become evident from Mosquito Ridge Road starting about one mile west of French Meadows Dam. Specifically, the following facilities are visible, although occasionally obscured by intervening trees or topography:

- French Meadows Dam and Outlet Works;
- French Meadows Generator Building; and
- French Meadows Dam Staging Area.

The landscape to the northwest of French Meadows Dam is relatively barren due to the Star Fire. As such, the following Project features may be seen from Mosquito Ridge but are not readily noticeable while driving:

- French Meadows Dam Staging Area Road;
- French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline;
- Duncan Creek-Middle Fork Tunnel Portal Road;
- French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline;
- Duncan Creek – Middle Fork Tunnel Portal;
- Middle Fork American River Gage and Weir below French Meadows Dam Road; and
- French Meadows Dam Outlet Works and Leakage Weirs Road.

At French Meadows Dam, Mosquito Ridge Road crosses the dam and then continues eastward, paralleling the south shore of French Meadows Reservoir, and continuing upstream along the Middle Fork American River. From about ½ mile east of the dam, none of the Project facilities are visible from Mosquito Ridge Road due to the presence of relatively dense coniferous forest.

As seen from Mosquito Ridge Road, visible Project facilities are concentrated at the north end of French Meadows dam. An EVC Type IV rating generalizes the overall developed character of the dam area, beyond which an EVC Type II rating generally exists.

Soda Springs-Riverton Road Viewshed (FR 22)

FR 22 is the primary access route between French Meadows Reservoir and Hell Hole Reservoir. This road extends from FR 2 near Long Canyon and intersects FR 96 at French Meadows Dam. There are no views of Project facilities from the road, except at

the intersection with Mosquito Ridge Road where the French Meadows Reservoir, dam, and access roads below the dam can be seen in the foreground. Facilities such as the generator building, spillway area and spoil disposal area are not readily noticeable from this location. French Meadows Dam and French Meadows Reservoir and Shoreline dominates foreground views in the immediate vicinity of the intersection of FR 22 with Mosquito Ridge Road resulting in an EVC Type IV rating for the dam, and an EVC range of II-IV for the reservoir depending on water surface elevation. Other Project facilities that can be seen from the intersection generally meet EVC ratings ranging from Type II-III. (Appendix D, Photo 4).

Western States Trail and Tevis Cup Viewsheds

The Western States Trail (WST) traverses the Middle Fork American River Watershed (Watershed) in the vicinity of the Project. The discussion below relies on the information shown on USDA-FS maps because this information is consistent with the USDA-FS managed viewshed designations.

The Western States Trail begins at a point just east of the upper Truckee River, near Lake Tahoe. At Watson Monument, the trail diverges into two segments. The northern segment is referred to on the TNF map as the Tevis Cup Trail, which heads westward towards Red Star Ridge and then southwestward along Red Star Ridge, above French Meadows Reservoir. The other segment heads south from Watson Monument, following the Middle Fork American River to French Meadows Reservoir, where it parallels the north shore of the reservoir. The WST and Tevis Cup Trail converge into the WST at a point located about ½ mile northwest of French Meadows Dam, just east of FR 96. From there the WST heads north, crossing Duncan Creek upstream of the Duncan Creek Diversion Dam and emerging at Robinson Flat. Trail segments in the vicinity of French Meadows Reservoir are shown on Map REC 5-2 and on Map REC 5-5 (Sheet 1 of 5) for reference.

French Meadows Reservoir can be seen from the WST. A representative view of French Meadows Reservoir from the WST can be seen from KOP FM-1, which is shown on Map REC 5-2. French Meadows Reservoir and French Meadows Dam are the only Project facilities that can be seen from this location. The downstream dam face is seen in the middleground distance zone. The dam is a dominant feature in the view due to its large size and engineered form. The colors of the dam create weak contrasts with the surrounding landscape, but are somewhat similar with other open areas in the landscape. As seen from the WST, the dam meets the EVC Type III (Appendix A, Photo 5). Other Project facilities seen from this location meet an EVC that ranges between Type II and III.

French Meadows Reservoir facilities can also be seen from the portion of the WST that parallels the north shore of the reservoir. The WST segment from Poppy Campground to the intersection with the Tevis Cup Trail was not visited. Based on interviews, views of Project facilities are limited due to the dense vegetation between the trail and the reservoir. However, it is likely that there are glimpses of many, if not all the Project facilities through the trees, including those near the French Meadows-Hell Hole Tunnel

Gatehouse, French Meadows Dam and Spillway, and facilities below the dam due to close proximity of the trail to the north side of the reservoir. Since views of Project facilities are assumed to be brief, and partially screened, an EVC Type IV rating for French Meadows Dam, and an EVC Type III rating for the French Meadows-Hell Hole Tunnel Gatehouse would be met. Most other facilities within the viewshed of the trail would meet an EVC of Type II and/or III.

From FR-96, the WST heads northeastward, crossing Duncan Creek upstream of the Duncan Creek Diversion Dam. None of the Project facilities in the vicinity of Duncan Creek Diversion can be seen from the WST due to the steepness of the Duncan Creek drainage and dense vegetation.

The Tevis Cup Trail follows Red Star Ridge, which forms the boundary between the Middle Fork American River and Duncan Creek. Much of this area was burned during the Star Fire, which consumed approximately 17,500 acres of forest on ENF, TNF, and private lands during the late summer of 2001. The trail was not visited. However, based on interviews and office analysis, it is unlikely that most Project facilities at French Meadows Reservoir would be discernable due to the distance between the trail and facilities, and the presence of intervening vegetation. French Meadows Dam and reservoir would be exceptions due to their large scale, thus meeting EVC Type IV with the remainder of the area meeting EVC Types II and/or III.

French Meadows Reservoir Viewshed

French Meadows Reservoir is an elongated water body, about four miles in length and about a half-mile in width. From on-water locations there are expansive views in all directions. Foreground views are of shoreline and forested hillsides with small openings associated with boat ramps. Campgrounds and day use areas are not readily noticeable. There are few Project facilities at the reservoir, resulting in a near natural appearing landscape throughout much of the reservoir viewshed. Exceptions, as seen from the reservoir are: French Meadows Dam, French Meadows Dam Generator Building, and French Meadows-Hell Hole Tunnel Gatehouse.

The visual exposure of French Meadows Dam fluctuates with WSEs. At near full-pool conditions, visual contrasts are low (EVC Type II rating) since most of the dam is not visually evident. As WSEs decline, more of the dam is exposed and contrast increases. At the lower WSEs, an EVC Type IV rating would be met due primarily to its large scale and engineered form of the dam face that is in contrast to the surrounding characteristic landscape (Appendix A, Photo 6).

The French Meadows Dam Generator Building sits on the north end of the dam and is surrounded by chain link fencing. From foreground dam locations, only the upper portion of the building may be seen due to a steep view angle. The rectangular form of the building is similar in form to the dam, but not to the characteristic landscape. Contrasts in color are weak, appearing lighter than the dam, but similar to the granite rock of the spillway. From middleground, more of the building may be seen, but

contrasts in form and color weaken due to the relatively small scale of the structure. Overall, the building meets EVC Type III rating, appearing as a minor disturbance.

The French Meadows-Hell Hole Tunnel Gatehouse is located just west of the French Meadows Picnic Area and Boat Ramp. The relatively small gatehouse building is painted a near-white color and sits back from the shoreline. Several evergreen trees surround the site providing partial screening of the area from the reservoir. The area is not noticeable from developed recreation areas or travel routes. Filtered views of the building are available from foreground reservoir locations, where it appears as a noticeable disturbance (EVC Type IV rating) due to contrasts in building form and color with the characteristic landscape. From more distant locations on the reservoir, the area appears as a minor disturbance (EVC Type III rating) due to its partial screening and relatively small scale appearance within the characteristic landscape (Appendix D, Photo 7).

Middle Fork American River Viewshed

Within the TNF, there is an approximately 1.5 mile stretch of the Middle Fork American River below French Meadows Dam that is part of the French Meadows Reservoir viewshed (Appendix D, Photo 8). Recreational use of the area below the dam is very low and there are no developed recreation facilities or public access points below the dam. The dam and other facilities below the dam (transmission lines, poles, roads, spoil pile and spillway) dominate the view from the river immediately below the dam. The duration of viewing could be long term for shoreline activities such as fishing. Due to the large size of the dam, French Meadows Dam in combination with other associated features would meet an EVC Type IV rating as seen from the Middle Fork American River immediately below the dam. The visual contrast and EVC rating diminishes farther downstream as views are obscured by topography and vegetation. Beyond about .25 mile downstream of the dam, intervening terrain and vegetation screen views of the dam and associated features. Other Project facilities within the viewshed of the river meet EVC Type II and/or III.

French Meadows Reservoir Developed Recreation Sites Viewsheds

There are ten managed recreation site viewsheds in the French Meadows Reservoir area. Of these, only five are affected by Project facilities. These include the viewsheds from Poppy Campground, McGuire Boat Ramp, McGuire Picnic Area, French Meadows Campground, and French Meadows Boat Ramp. All other viewsheds in the area are unaffected by Project facilities (no Project facilities are visible). The following describes the affected viewsheds.

On the north side of the reservoir, Poppy Campground provides filtered views across the reservoir of the French Meadows - Hell Hole Tunnel Gatehouse (Appendix D, Photo 9). As seen from the campground, the gatehouse meets an EVC Type III rating since intervening trees screen most views of the gatehouse area. No other Project facilities are visible from any of the campsites in Poppy Campground.

Also on the north side of the reservoir, nearly the entire reservoir is visible from McGuire Boat Ramp, including French Meadows Dam. Similar views are available from the McGuire Picnic Area beach. The dam would meet an EVC Type III rating depending on the WSE and the degree of exposure of the dam face. (Appendix D, Photo 10) Intervening trees screen most views of the reservoir from the McGuire Picnic Area and no Project facilities are visible from any of the individual picnic sites.

On the south side of the reservoir, French Meadows Boat Ramp provides views of the north side of the reservoir. This area offers the most open and expansive views of the reservoir viewshed due to the extent to which the boat ramp extends into the reservoir, especially at low WSEs. French Meadows Dam can be seen from this location to varying degrees. The dam would meet an EVC Type III-IV rating depending on the WSE and the degree of exposure of the dam face. Portions of French Meadows Reservoir and French Meadows Dam are visible from a few of the campsites within French Meadows Campground, although intervening trees screen most views (Appendix D, Photo 12). As seen from these sites, the dam meets an EVC Type III rating since intervening trees screen most of the views. No other Project facilities are visible from any of the campsites in French Meadows Campground.

Ralston Afterbay Developed Recreation Sites Viewsheds

Two developed recreation sites near Ralston Afterbay are considered USDA-FS managed viewsheds. These are the Ralston Afterbay Picnic Area and Car Top Boat Launch, and the Indian Bar Rafter Put-in and General Parking Area. Other than the afterbay, no Project facilities can be seen from the Ralston Afterbay Picnic Area and Car Top Boat Launch.

At Indian Bar, the most visually apparent facilities are the Oxbow Powerhouse and Switchyard and Oxbow Powerhouse Slope Fence. These facilities are seen in the immediate foreground and dominate the view as rafters enter the tailrace to start their river trips. While the moderate scale of the powerhouse, and somewhat similar colors to the surrounding rock hillside reduce visual contrasts with the surrounding characteristic landscape, the white cranes and other structures on top of the dam intensify visual contrasts, as does the partial skylining (when objects are seen against the sky) of the Ralston-Tunnel Intake to Ralston Powerhouse Communication Line. As seen from the rafter put-in, these facilities appear as a disturbance, with some resemblance to natural patterns, meeting the EVC Type IV rating. Other facilities that can be seen from Indian Bar meet EVC Types II and/or III (Appendix D, Photo 13).

ENF Managed Viewsheds

There are 19 managed viewsheds within the ENF in the vicinity of the MFP. Project facilities are not readily visible from most of the ENF managed viewsheds except Hell Hole Reservoir, the developed recreation sites located near Hell Hole Reservoir, and Project facilities associated with the Ralston Afterbay Area.

Eleven Pines Road Viewshed (Forest Road 14N08)

Eleven Pines Road is the primary travel route when accessing the MFP vicinity from Georgetown. According to the ENF Landscape Architect (pers. comm. ENF 2009a), Eleven Pines Road extends from Wentworth Springs Road to the intersection of 17N02 (Old Icehouse Road), described below. None of the Project facilities are visible from this viewshed.

Old Icehouse Road Viewshed (Forest Road 17N02)

Old Icehouse Road extends from Hell Hole Dam to French Meadows Dam, in a horseshoe shape around Chipmunk Ridge. According to the ENF Landscape Architect (pers. comm. ENF 2009a), this road is divided into two viewsheds, as follows:

One viewshed extends from the intersection of 14N08 (Eleven Pines Road described above) north to FR 96 (Mosquito Ridge Road). The ENF refers to this road as 17N02 but the TNF refers to this road as FR 22. In the ENF, none of the Project facilities or features are visible from this viewshed.

The other viewshed extends from the intersection of 14N08 (Eleven Pines Road described above) northeast to Hell Hole Boat Ramp Parking Area which is near Hell Hole Dam. This segment of 17N02 travels near Project facilities associated with the North Fork and South Fork Long Canyon diversions, and Hell Hole Dam and Reservoir.

None of the facilities associated with the North Fork Long Canyon Creek Diversion are visible from 17N02. In addition, there is only one location where there is a brief side view of the South Fork Long Canyon Diversion from this segment of 17N02. Specifically, the opening created by the access road to the South Fork Long Canyon Diversion provides a brief view from 17N02 towards the South Fork Long Canyon Creek where the yellow railings leading down to the diversion can be seen briefly while traveling past the road. As seen from the road, the access road and stair railings create a minor visual disturbance due to the yellow color of the railings resulting in an EVC Type III rating. Forest road 17N02 continues east along South Fork Long Canyon Creek for about two miles, then veers southeast, entering the Hell Hole Reservoir viewshed, descending about two miles and terminating at the Hell Hole Boat Ramp Parking Area. The road traverses forest terrain with no views of Project facilities until the last mile of road.

In the last mile, there is a brief, open view of the Dormitory and Cottages Water Supply Tank in the immediate foreground of the road. The dark brown color of the tank blends well with the surrounding forested setting, but the light reflective roof attracts attention, resulting in an EVC Type II-III rating. Further down the road, poles and lines associated with the French Meadows Powerhouse and Switchyard to Hell Hole-Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages and Hell Hole Powerhouse Communication Line/Powerline can be seen briefly in the immediate foreground of the road near the Operator's Cottage entrance. The powerlines, in combination with the entrance roads and other features in the area contribute to an appearance of a minor

visual disturbance, meeting ECV Type II-III. There are glimpses of the Operator's Cottage and Shop which is set back in the forest. The light color of the structures contrasts with the forested setting and attracts attention, although most of the area is well screened by trees, and meets EVC Type II-III. There is a brief view of the entrance for Dormitory Facility Road that is across from the Operator's Cottage and Shop that is noticed briefly while passing. The entrance road in combination with the other facilities in this area (cottage, shop, powerlines) contributes to an appearance of a minor visual disturbance, meeting EVC Type II-III.

The southern terminus of 17N02 rounds the reservoir shoreline above Hell Hole Boat Ramp and Hell Hole Boat Ramp General Parking Area providing longer duration views of the reservoir and the Project facilities. Hell Hole Dam dominates foreground views to the south due to contrasts in scale and form resulting in an EVC Type IV rating. Hell Hole-Middle Fork Tunnel Gatehouse is seen in the foreground to the north, and attracts attention due to contrasts in color and form, but is relatively small in scale and therefore meets EVC Type III-IV. French Meadows Powerhouse can be seen in the middleground with contrasts in form, meeting an EVC Type III-IV, and French Meadows Powerhouse Road is somewhat noticeable, meeting the EVC Type II-III. Other Project facilities are either not noticed or meet EVC Type II and/or III.

Blacksmith Flat Road Viewshed (FR 23, 14N25)

Blacksmith Flat Road begins at FR 96 (Mosquito Ridge Road) in the TNF, crosses over to the ENF at the Middle Fork American River, and ends at 14N08 (Eleven Pines Road described above) in the ENF. Only the 14N25 road segment within the ENF (Middle Fork American River to 14N08) is a managed viewshed.

Starting at Mosquito Ridge Road (FR 96), Blacksmith Flat Road descends southward into the Middle Fork American River canyon, turning east at Ralston Afterbay. The road continues along the north shore of Ralston Afterbay, crossing the Middle Fork American River (and crossing into the ENF where the road becomes a managed viewshed) near the Ralston Picnic Area. The road veers south, following the west bank of the Rubicon River, passing near Project facilities associated with Ralston Powerhouse. Continuing south, the road diverges away from the river and climbs out of the canyon past a few Project facilities. At the top of the canyon, Blacksmith Flat Road switchbacks across the nose of Ralston Ridge, passing the last of the Project facilities associated with the Ralston Afterbay Area. As Blacksmith Flat Road continues east along Ralston Ridge to its terminus at 14N08, there are no other Project facilities visible from the road.

From the Middle Fork American River to the top of Ralston Ridge, Blacksmith Flat Road passes by several Project facilities that are adjacent to or near the road and therefore are seen in the immediate foreground. These include the Ralston Powerhouse and Switchyard and the Ralston Sediment Disposal Area, both of which are large scale features that dominate the view from the road and contrast strongly with the surrounding landscape. As such, they meet EVC Type IV. Project facilities that are moderate in scale, attract attention, but do not dominate the view, include the Ralston-Oxbow Tunnel Intake to Ralston Powerhouse Communication Line and the Middle Fork-Ralston Tunnel

Surge Shaft and Tank, which meet EVC Type IV. Project facilities that appear as minor disturbances, meeting EVC Type III, include Ralston Afterbay and Shoreline, Ralston Powerhouse Penstock and Butterfly Valve House, Ralston Powerhouse to Ralston Powerhouse Butterfly Valve House Communication Line/Powerline and Ralston Powerhouse Penstock and Butterfly Valve House Slope Fences. The remaining Project facilities that are within the Blacksmith Flat Road viewshed but are not noticeable, meeting EVC Type II, include Ralston Afterbay Sediment Removal Access Point, Passive Microwave Reflector Station above Ralston Afterbay, Ralston Butterfly Valve House Road, and the Ralston Powerhouse Slope Fence.

Chipmunk Ridge Road Viewshed (FR 24)

Chipmunk Ridge Road (FR 24) is an alternate route to French Meadows Reservoir from Hell Hole Reservoir. FR 24 begins near Big Meadows Campground and climbs the north-slope above Hell Hole Reservoir into the upper reaches of the South Fork Long Canyon Creek. The route is heavily wooded, and there are no views of Project facilities.

Hunters Trail Viewshed

Hunters Trail (USDA-FS Trail No. 14E09) parallels the Rubicon River from Hell Hole Reservoir to Ellicott Bridge, where Eleven Pines Road (FR 2) crosses the Rubicon River. The trail begins near Hell Hole Dam, behind a caretaker's cottage. The trail descends to the southwest, behind a knoll that separates the trail from views of Hell Hole Dam and the other Project facilities below it. The trail reaches the river more than a mile downstream of Hell Hole Dam. From the trail there are no views of Project facilities.

Hell Hole Reservoir Viewshed

Hell Hole Reservoir is a crescent-shaped water body, nearly five miles in length and about a half-mile in width. From on-water locations there are expansive views in all directions. Hell Hole Dam and Spillway, the French Meadows Powerhouse and Switchyard, and the Hell Hole-Middle Fork Tunnel Gatehouse are the most visually evident facilities and can be seen from most locations on the reservoir.

Hell Hole Dam and Spillway result in large cut slopes and angular rock forms. The dam can be seen from much of the reservoir, but the spillway and adjacent cut slopes are only seen from the southwest end of the reservoir. Due to the large landscape disturbance associated with the dam and spillway area, the EVC Type IV rating is met (Appendix A, Photo 14).

The French Meadows Powerhouse and Switchyard sit on the north shore, near the middle of the reservoir. As seen from the immediate foreground, an EVC Type IV rating is met due to the large scale of the structures, but mostly due to the large area of spoil muck on the hill side adjacent to it (Appendix A, Photo 15). From more distant middleground locations the tunnel muck continues to appear as a major disturbance but the powerhouse recedes into the landscape due to the similar coloring of the structure to the surrounding shoreline. The white color of the Hell Hole-Middle Fork Tunnel

Gatehouse attracts attention due to contrasts in color and meets EVC Type III-IV (Appendix A, Photo 16). EVC ratings associated with other Project facilities are Type II and/or III.

Middle Fork American River Viewshed

The Middle Fork American River traverses the entire length of the study area. Within the ENF, the river below Ralston Afterbay is a managed viewshed. Recreational use of the area below the dam is associated primarily with whitewater boating and angling. The Ralston Afterbay Dam and Oxbow Powerhouse and Switchyard are visible in the immediate foreground of the river, beyond which facilities would not be readily noticeable. There are immediate foreground views of the dam, powerhouse and switchyard which are moderate in scale and would meet the EVC Type IV rating.

Rubicon River Viewshed

The Rubicon River corridor downstream of Hell Hole Dam is managed to maintain its eligibility as a Wild and Scenic River. The Rubicon River traverses the entire length of the study area, starting in Desolation Wilderness, continuing downstream below Hell Hole Reservoir, and ending at Ralston Afterbay near its confluence with the Middle Fork American River.

Below Hell Hole Reservoir, there are several Project facilities that can be seen from the river immediately downstream of Hell Hole Dam, although this area does not appear to have any recreational use. The dam, outlet works, spillway channel, access roads, and power/communication line would be visible in the immediate foreground of the river. Large scale facilities such as Hell Hole Dam and Outlet Works, and roads (Hell Hole Dam and Powerhouse Road and Spillway Southern Access Point, and Hell Hole Dam Spillway Discharge Channel Road) meet the EVC Type IV whereas other facilities below the dam would meet EVC Type II and/or III (Appendix A, Photo 17)

Near the confluence of the Rubicon River with the Middle Fork American River, at the Ralston Afterbay Area, most Project facilities associated with the Ralston Powerhouse and Switchyard area can be seen in the immediate foreground from the river. Due to large size and industrial character of the powerhouse and switchyard, these features would be visually dominant. Other associated features add to the industrial character, although color contrasts associated with the penstock and river gage crossing structure have been reduced due to the dark green and black colors they have been painted, respectively. While the Ralston Powerhouse Penstock and Butterfly Valve House, Ralston Powerhouse would only be seen for a short distance due to bends in the river, they would appear as disturbances and EVC Type IV ratings would be met. Other facilities seen in the Ralston Afterbay Area would meet an EVC Type II and/or III (Appendix A, Photo 18).

South Fork Long Canyon Creek Viewshed

South Fork Long Canyon Creek area is a managed viewshed. The South Fork Long Canyon Diversion and the North Fork Long Canyon Diversion Drop Inlet facilities may

be seen from recreationists in the immediate vicinity of the facilities. Due to the confined character of the stream corridor, and the concentration of diversion facilities, most of the Project facilities at the South Fork Long Canyon Diversion, as seen from the creek would appear as minor disturbances, meeting an EVC Type III, except for South Fork Long Canyon Diversion Dam and Pool which would be a noticeable disturbance that would attract some attention, meeting an EVC Type IV rating. The drop inlet facilities associated with the North Fork Long Canyon Creek Diversion would appear as a minor disturbances, meeting EVC Type III ratings (Appendix A, Photo 19).

Hell Hole Reservoir Developed Recreation Site Viewsheds

There are six managed viewsheds associated with developed recreation sites near Hell Hole Reservoir. Most of the developed recreation site viewsheds at Hell Hole Reservoir are located at the southwest end of reservoir where views of Project facilities vary. There are no views of Project facilities from two of the six managed viewsheds: Big Meadows Campground and Upper Hell Hole Campground. Big Meadows Campground is outside the reservoir viewshed, and the Upper Hell Hole Campground is in the upper reaches of the reservoir where topography blocks views to the west where Project facilities are located.

Hell Hole Boat Ramp, Hell Hole Boat Ramp Parking Area, and Hell Hole General Parking Area are located at the southwest end of the reservoir, northwest of the dam and spillway. From the Hell Hole Boat Ramp and Hell Hole Boat Ramp Parking Area, there are expansive views of the reservoir viewshed to the east. Several Project facilities are visually evident from the boat ramp and parking area in the foreground distance zone, most notably the Hell Hole-Middle Fork Tunnel Gatehouse and the French Meadows Powerhouse and Switchyard. The Hell Hole-Middle Fork Tunnel Gatehouse is in the immediate foreground of the boat ramp. The white color and angular form of the structure makes it highly visible and the IV Type III rating is met. The French Meadows Powerhouse is further away, closer to the water, and of a similar color as the reservoir soil. From the boat ramp, the powerhouse appears as a minor disturbance (EVC Type III rating). Other facilities seen from these sites meet EVC Type II and/or III (Appendix A, Photo 20).

Hell Hole Vista and Hell Hole Campground are located on the northwest slope above the reservoir shoreline. From Hell Hole Vista there are panoramic vistas of the reservoir and surrounding viewshed. To the west, Hell Hole Dam, Hell Hole Spillway and Project facility roads can be seen in the foreground distance zone. These features create a visual disturbance, meeting EVC Type IV rating. Looking east from Hell Hole Vista, no Project structures are visually evident, although the tunnel muck next to the French Meadows Powerhouse appears as a disturbance that is readily seen. The EVC of the French Meadows Powerhouse area creates a minor visual disturbance, meeting EVC Type III (Appendix A, Photo 21).

Similar views as Hell Hole Vista are available from some camp sites at Hell Hole Campground, which is located at a similar elevation and location. Most of the campsites are in the woods setback from the open reservoir slope, and due the wooded

character of the campground, Project facilities are not seen. Views of the dam are available from a few sites nearest the reservoir. Depending on the reservoir level, the EVC of the dam can range from a minor disturbance, EVC Type II, to a noticeable disturbance (EVC Type IV as seen from the campsites close to the reservoir (Appendix A, Photo 22).

Middle Meadows Group Campground Viewshed

One developed recreation site viewshed is located near South Fork Long Canyon Diversion. Middle Meadows Group Campground is located about 1,000 feet upstream of the South Fork Long Canyon Diversion Dam. The campground area is wooded and views are limited to the immediate foreground. There are no views of the diversion facilities or any other Project facilities from the campground or the streambed adjacent to it.

Big and Little Crater Special Interest Area Viewsheds

Big Crater and Little Crater are Special Interest Areas designated by the ENF for their geologic interest. Both are located in a remote area of the Forest, on the edge of the south slope of the Middle Fork American River Canyon. Little Crater is a heavily wooded area that lies about a mile east of the upper Middle Fork Interbay facilities. The area was not visited, but according to USDA-FS staff, there are no views of Project facilities (Eldorado National Forest, 2008c and 2008d).

Big Crater lies about a mile west of the upper Middle Fork Interbay facilities. Big Crater is a bowl-shaped crater, with open views across the canyon to the northeast. This area was not visited. Based on aerial photographs, it is unlikely that Project facilities at the river could be seen due to the steepness of the canyon. Some portion of Project facilities higher up on the slope may be seen, however these are likely screened by intervening vegetation. The most likely visual feature would be the Passive Microwave Reflector Station above Middle Fork Interbay since these facilities are located directly across the canyon. The EVC of these facilities as seen from Big Crater is assumed to be that of a minor disturbance, with an EVC Type III rating.

6.2.2 Reservoir Water Levels

French Meadows and Hell Hole reservoirs and at Ralston Afterbay were photographed at low and high WSEs from KOPs selected in consultation with the ENF and TNF Landscape Architects. The locations of the KOPs at Hell Hole and French Meadows reservoirs are shown on Maps REC 5-1 and 5-2, respectively. The locations of the KOPs at Ralston Afterbay are shown on Map REC 5-3.

Hell Hole and French Meadows Reservoirs

Typical reservoir annual operation results in the capture or diversion of water into Hell Hole and French Meadows reservoirs during the winter and spring (filling period), and drawdown of the reservoirs during the summer, fall, and early winter (release period). Operation of the MFP varies from year-to-year based on the timing and magnitude of

spring runoff, which is influenced by the amount of the winter snow pack and ambient temperature conditions, as well as precipitation. Despite the year-to-year variation, both reservoirs typically reach their maximum storage for the year in late spring or early summer. Reservoir levels begin to decline in the summer and continue to decline until the late fall or winter. Reservoir levels are typically at their lowest in January.

Photographs of Hell Hole and French Meadows reservoirs at high and low WSEs are included in Appendices E and F, respectively. As indicated in the photographs, more shoreline is exposed when the WSE in the reservoirs recede. However, this effect is diminished from farther distances where other factors such as lighting, cloud cover, air quality, and vegetation growth influence the view. Note that some of the photos have been “zoomed” to simulate conditions as they would appear from a boat on the water.

Ralston Afterbay

The Middle Fork American River and the Rubicon River converge at Ralston Afterbay, which captures flows from these two rivers as well as water conveyed from the Middle Fork Interbay and released to Ralston Afterbay via the Ralston Powerhouse. From Ralston Afterbay, water is transported to the Oxbow Powerhouse via the Ralston-Oxbow Tunnel and released downstream to the Middle Fork American River.

Oxbow Powerhouse frequently runs in tandem with Middle Fork and Ralston powerhouses. The capacity of Oxbow Powerhouse (1,025 cfs) is slightly higher than the present capacity of Ralston Powerhouse (924 cfs), which allows Oxbow Powerhouse to utilize water supplied by Ralston Powerhouse as well as inflow from the Middle Fork American and Rubicon rivers. Ralston Afterbay also has sufficient operational storage capacity (about 1,200 ac-ft out of 2,782 ac-ft gross) to allow Oxbow Powerhouse to operate independently of Middle Fork and Ralston powerhouses for several hours at a time, depending on generation level. This independent operational flexibility is used, for example, to meet the ramping rate requirement downstream of Oxbow Powerhouse and to make releases for whitewater rafting without requiring operation of the Middle Fork and Ralston powerhouses. Because Ralston Afterbay is used primarily as a regulating facility, WSEs may fluctuate on a day-to-day or hour-to-hour basis. Ralston Afterbay does not follow a seasonal fill and release pattern like Hell Hole or French Meadows reservoirs.

Fluctuations at Ralston Afterbay occur daily throughout the year but the daily pattern varies depending upon season. To illustrate this point, hourly and daily WSE plots for representative winter, spring, summer, and fall week days were generated (Figures REC 5-2, 5-3, 5-4, and 5-5). The Ralston Afterbay WSE fluctuation patterns vary with water year type, electrical demand, and MFP (and other neighboring hydropower projects) scheduled and emergency maintenance activities. The following is a general description to illustrate typical WSE fluctuation patterns at Ralston Afterbay.

As indicated in the figures, the biggest fluctuations in WSE typically occur during the summer and fall periods when the source of inflow is predominately due to Ralston Powerhouse generation. During a 24-hour period in the summer, WSEs in Ralston

Afterbay are typically at their highest from midnight to about 7:00 AM. This occurs because Oxbow Powerhouse would have been generating at a low level for several hours and Ralston Powerhouse would have been generating at or near capacity for several hours, allowing the reservoir to fill. Around 7:00 AM, energy production releases through Oxbow Powerhouse begin to ramp up, while Ralston Powerhouse would not begin generating for several hours. Water levels in Ralston Afterbay decline as energy production continues and releases through Oxbow Powerhouse increase and Ralston Powerhouse remains offline. During the summer, WSEs in Ralston Afterbay are at their lowest levels in the day at about 2:00 PM when Oxbow Powerhouse would have been generating at its capacity for several hours and Ralston Powerhouse would have just begun to generate. At this point WSEs begin to rise in Ralston Afterbay as releases through Oxbow Powerhouse recede and Ralston Powerhouse is generating at full capacity. Water levels in Ralston Afterbay continue to rise through the remainder of the day until they peak at about 9:00 PM. The pattern is similar during the fall, except that the lowest WSE in Ralston occurs about 2 hours earlier, at about 12:00 PM. This is because releases during the summer are made about 2 hours later than would normally occur to accommodate commercial whitewater boating activities downstream of Oxbow Powerhouse. Commercial whitewater boating activities generally end during the last week of September.

Water levels in Ralston Afterbay also fluctuate during the spring, but fluctuations typically are not as regular or as large. During a 24-hour period in the spring, WSE in Ralston Afterbay were highest during the late afternoon, usually at about 6 PM. WSE then recedes through the evening and are at their lowest at about midnight at which point WSE begins to increase. During the spring, accretion flows (run-off from the Middle Fork and Rubicon watersheds) contribute substantially more water to Ralston Afterbay than during the summer, which tends to attenuate fluctuations in Ralston Afterbay. Also, the Ralston and Oxbow powerhouses are run more synchronously because there is no whitewater rafting.

During the winter, regular daily fluctuations are generally minimal (Figure REC 5-2) but fluctuations may occur over the course of days or weeks (Figure REC 5-2) to allow for management of run-off resulting from winter storms. In general, WSEs in Ralston remain relatively stable during the winter, although not at full pool to allow the capture of run-off from winter storm events and to minimize reservoir spilling. If a large storm event is projected, Ralston Afterbay may be drawn down substantially in advance in preparation for high flows. Similar to the spring, the Ralston and Oxbow powerhouses are run more synchronously because there is no whitewater rafting.

To maintain Afterbay and protect system reliability, PCWA conducts annual inspection, testing and maintenance of Project facilities. Annual maintenance in the Ralston Afterbay area occurs in the fall. During the fall maintenance period (3-6 weeks), Ralston Afterbay WSEs is lowered considerably to allow access to the Project facilities.

Photographs of Ralston Afterbay taken from KOPs at a range of WSE are included in Appendix G. As indicated, there is very little difference between the photographs taken at high and intermediate WSE. The low WSE photographs were taken during the

annual maintenance outage. These conditions would not be experienced during the rest of the year.

6.2.3 Photo Renditions of Proposed Project Betterment Facilities and Features

Photo renditions (simulations) of the primary facilities associated with potential Project betterments as viewed from the appropriate KOPs are included in Appendix H. For the purposes of understanding the photo simulations, the primary modifications or new facilities associated with each of these betterments are briefly summarized below, along with an explanation of the photo simulations that were produced. Note that some of the photos and comparative simulations have been “zoomed” to simulate conditions as they would appear from a boat on the water.

Simulations were only prepared for potential Project betterment facilities or features that would be visible from select KOPs. The simulations included in this report were created using the best available information about each potential betterment that was available at the time this report was prepared. Additional simulations will be produced to support a thorough visual assessment if new or additional features related to any betterment are identified.

Ralston Powerhouse Capacity

The Ralston Powerhouse Capacity Upgrade Betterment requires only upgrades to electrical and mechanical equipment within the existing Ralston Powerhouse. Since it does not involve any exterior modifications, no simulations were prepared for this betterment.

Hell Hole Reservoir Seasonal Storage Increase Betterment

This betterment involves seasonally increasing the storage capacity of Hell Hole Reservoir by installing crest gates in the existing spillway. This betterment would seasonally raise the maximum operating WSE of the reservoir by 6 feet. Accordingly, the reservoir would appear slightly larger due to the larger surface area. Over time, the higher WSE would result in a higher “bath tub” ring. Accordingly, the bath tub ring would be larger than the current ring when WSEs recede.

In addition to installing new spillway gates, this betterment would require the modification of several existing structures and the construction of new structures, as described in the following. For comparison, views of the existing Project facilities at Hell Hole Reservoir as viewed from select KOPs are included in Appendix H, along with simulated views from the same vantage points showing the existing Project facilities with a six foot raise in the maximum operating WSE (Appendix H, Sims 1-6).

Hell Hole Dam Spillway Crest Gates

This betterment involves installing crest gates in the existing Hell Hole spillway. In general, the gates would not be visible from Hell Hole Reservoir when in operation because they would be covered or nearly covered by water. The gates would be lowered when the reservoir level recedes and would lay flat (horizontal) on the spillway when not in use. Therefore, the new gates would not be visible when not in use.

The existing Hell Hole Dam and spillway area as viewed from the Hell Hole Vista (KOP HH-4a) are shown on Sim 1 (Appendix H), with the current maximum operating WSE. The new crest gates as viewed from Hell Hole Vista (KOP HH-4a) are shown on Sim 2 (Appendix H) although they are hardly noticeable because the reservoir water covers the gates. The gates would not be visible from any of the other selected KOPs. This simulation also includes additional associated structures described below.

Hell Hole Dam Spillway Crest Gates Control Building and Powerline

This betterment would require the construction of a small control building adjacent to the spillway to provide power to operate the spillway crest gates. In addition, a short spur line (approximately 525 feet) from the control building to an existing powerline would be erected to provide power for spillway crest gate operations.

These features as viewed from the Hell Hole Vista (KOP HH 4a) are shown on Sim 2 (Appendix H). However, the control building is not very noticeable because it is obscured by the south facing bedrock wall on the north side of the spillway, and by shadows. Similarly, the powerline is not visible because it is obscured by bedrock outcrops, by shadows, and by vegetation. It should be noted that even the existing powerline is not noticeable in the photo simulations.

French Meadows Powerhouse Capacity Upgrade Betterment

The primary purpose of this betterment would be to increase the generating capacity of the existing French Meadows Powerhouse. This would be achieved by constructing a second powerhouse and penstock adjacent to the existing powerhouse and penstock. This betterment would require several new facilities and several modifications to existing Project facilities including: a second powerhouse, penstock and switchyard, and; additional surge capacity facility. In addition, a portion of Forest Road 14N09A (Hell Hole OHV Trail) would be improved (e.g. graded) to facilitate access the French Meadows – Hell Hole Tunnel Surge Shaft or Pipeline Road. Of these, only the powerhouse, penstock and switchyard would be visible from the selected KOPs, as described in the following.

French Meadows Powerhouse, Penstock, and Switchyard

This betterment would involve the construction of a second powerhouse and penstock adjacent to the existing powerhouse and penstock. In addition, the existing switchyard

would be expanded to include additional buswork, transformers and electrical switching equipment necessary to convey the additional power generated at the new powerhouse.

These features would be visible from the Hell Hole Trail (KOP HH-2) and the Hell Hole Boat Ramp Parking (KOP - HH 1c). Photo simulations from each of these KOPs were produced and are included in Appendix H. For comparison purposes, Sim 7 (Appendix H) shows the existing structures with the current maximum operating water surface as viewed from the KOP HH-2. Sim 8 (Appendix H) shows the existing structures plus the new powerhouse, penstock, and an upgraded switchyard with the existing maximum operating water surface from the same vantage point. Sim 9 (Appendix H) shows the existing structures with the current maximum operating water surface as viewed from the KOP HH-1c. Sim 10 (Appendix H) shows the existing structures plus the new structures with the current maximum operating water surface from the same vantage point.

Combined Betterment Scenario

It is possible that PCWA would proceed with both the French Meadows Powerhouse Capacity Upgrade Betterment and the Hell Hole Reservoir Seasonal Storage Increase Betterment.

For comparison, Sim 11 (Appendix H) shows the existing Project facilities with the current maximum operating water surface as viewed from the Hell Hole Trail (KOP HH-2). Sim 12 (Appendix H) shows the existing facilities plus the second powerhouse and penstock *and* a 6-foot raise in the maximum operating water surface from the same vantage point. Sim 13 (Appendix H) shows the existing Project facilities with the current maximum operating water surface as viewed from the Hell Hole Trail (KOP HH-1c). Sim 14 (Appendix H) shows the existing facilities plus the second powerhouse and penstock *and* a 6-foot raise in the maximum operating water surface from the same vantage point.

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Personal Communication

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TABLES

Table REC 5-1. Existing Project Facilities and Features and Associated VQOs.

Middle Fork Project Facilities	Forest Plan VQOs	Inventory VQO Information
Dams, Reservoirs, and Diversion Pools		
Large Dams		
French Meadows Dam and Outlet Works	R	F1B
Hell Hole Dam and Outlet Works	R	F1A
Medium Dams		
Middle Fork Interbay Dam	PR/M	F2A
Ralston Afterbay Dam	R/PR	FIB/MIA
Small Dams		
Duncan Creek Diversion Dam	M	M2A
North Fork Long Canyon Diversion Dam	PR	F2B
South Fork Long Canyon Diversion Dam	PR	F2B
Large Reservoirs		
French Meadows Reservoir (and Shoreline)	R	F1B
Hell Hole Reservoir (and Shoreline)	R	F1A
Medium Reservoirs		
Middle Fork Interbay	PR/M	F2A
Ralston Afterbay	R/PR	FIB/MIA
Small Diversion Pools		
Duncan Creek Diversion Pool	M	M2A
North Fork Long Canyon Diversion Pool	PR	F2B
South Fork Long Canyon Diversion Pool	PR	F2B
Water Conveyance Systems		
Tunnels		
Duncan Creek-Middle Fork Tunnel	NA - Subsurface Features	
French Meadows-Hell Hole Tunnel		
Hell Hole-Middle Fork Tunnel		
Middle Fork-Ralston Tunnel		
Ralston-Oxbow Tunnel		
Diversion Pipes and Drop Inlets		
North Fork Long Canyon Diversion Pipe and Drop Inlet	PR	F2B
South Fork Long Canyon Diversion Pipe and Drop Inlet	PR	F2B
Surge Shafts and Adits		
Brushy Canyon Adit	M	M2A
Hell Hole-Middle Fork Tunnel Surge Shaft and Tank	M	F2A
Middle Fork – Ralston Tunnel Surge Shaft and Tank	R	FIA
Removable Sections and Portals		
Duncan Creek – Middle Fork Tunnel Portal	R	F1B
French Meadows – Hell Hole Tunnel Removable Section	R	F1A
Hell Hole – Middle Fork Tunnel Removable Section	M	F2A
Middle Fork – Ralston Tunnel Removable Section	R	FIA
North Fork Long Canyon Crossing Removable Section	PR	F2B
Intakes and Gatehouses		
Duncan Creek – Middle Fork Tunnel Intake	M	M2A
French Meadows-Hell Hole Tunnel Gatehouse	R	F1B
French Meadows – Hell Hole Tunnel Intake	R	F1B
Hell Hole – Middle Fork Tunnel Gatehouse	R	F1A
Hell Hole – Middle Fork Tunnel Intake	R	F1A
Middle Fork-Ralston Tunnel Intake and Gatehouse	PR	F2A
Ralston-Oxbow Tunnel Intake	PR	MIA

Table REC 5-1. Existing Project Facilities and Features and Associated VQOs.

Middle Fork Project Facilities	Forest Plan VQOs	Inventory VQO Information
Water Conveyance Systems (continued)		
Penstocks and Valve Houses		
French Meadows Powerhouse Penstock and Butterfly Valve House	R	F1A
Middle Fork Powerhouse Penstock and Butterfly Valve House	PR	M2A
Ralston Powerhouse Penstock and Butterfly Valve House	R	F1A
Powerhouses, Switchyards, and Substations		
French Meadows Powerhouse and Switchyard	R	F1A
Hell Hole Powerhouse	R	F1A
Middle Fork Powerhouse and Upper and Lower Switchyards	PR	F2A
Ralston Powerhouse and Switchyard	R	F1A
Oxbow Powerhouse and Switchyard	PR	M1A
Hell Hole Substation	R	F1A
Gaging Stations and Weirs		
Stream Gages and Weirs		
Duncan Creek Gage and Weir above Diversion Dam (USGS Gage and Weir No. 11427700)	M	M2A
Duncan Creek Gage and Weir below Diversion Dam (USGS Gage and Weir No. 11427750)	M	M2A
Middle Fork American River Gage and Weir below French Meadows Dam (USGS Gage and Weir No. 11427500)	R	F1B
Middle Fork American River Gage at Interbay Dam (USGS Gage No. 11427770)	PR	F2A
Middle Fork American River Gage above Middle Fork Powerhouse (USGS Gage No. 11427760)	PR	F2A
Middle Fork American River Gage below Oxbow Powerhouse (USGS Gage No. 11433300)	PR	M1A
North Fork Long Canyon Gage and Weir at Diversion Dam (USGS Gage and Weir No. 11433085)	PR	F2B
South Fork Long Canyon Gage and Weir at Diversion Dam (USGS Gage and Weir No. 11433065)	PR	F2B
Rubicon River Gage and Weir below Hell Hole Dam (USGS Gage and Weir No. 11428800)	R	F1A
Diversion Gages		
North Fork Long Canyon Gage at Diversion Dam (USGS Gage No. 11433080)	PR	F2B
South Fork Long Canyon Gage at Diversion Dam (USGS Gage No. 11433060)	PR	F2B
Reservoir Gages		
French Meadows Reservoir Gage (USGS Gage No. 11427400)	R	F1B
French Meadows Reservoir Staff Gage	R	F1B
Hell Hole Reservoir Gage (USGS Gage No. 11428700)	R	F1A
Hell Hole Reservoir Staff Gage	R	F1A
Middle Fork Interbay Reservoir Gage	PR	F2A
Ralston Afterbay Reservoir Gage	PR	M1A

Table REC 5-1. Existing Project Facilities and Features and Associated VQOs.

Middle Fork Project Facilities	Forest Plan VQOs	Inventory VQO Information
Gaging Stations and Weirs (continued)		
Powerhouse Gages		
French Meadows Powerhouse Gage (USGS Gage No. 11427200)	R	F1A
Middle Fork Powerhouse Gage (USGS Gage No. 11428600)	PR	F2A
Oxbow Powerhouse Gage (USGS Gage No. 11433212)	PR	MIA
Ralston Powerhouse Gage (USGS Gage No. 11427765)	R	FIA
Leakage Weirs		
French Meadows Dam Leakage Weir Nos. 1-6	R	F1B
Hell Hole Dam Leakage Weir	R	F1A
Project Communication Lines and Powerlines		
French Meadows Area		
French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	R	F1B
French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline	R	F1B
Hell Hole Area		
French Meadows Powerhouse to French Meadows Powerhouse Penstock and Butterfly Valve House Communication Line/Powerline	R	F1A
French Meadows Powerhouse and Switchyard to Hell Hole — Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages, and Hell Hole Powerhouse Communication Line/Powerline	R	F1A
Dormitory and Cottages Water Supply Tank Powerline	R	F1A
Hell Hole Powerhouse to Rubicon River Gage and Weir below Hell Hole Dam Communication Line/Powerline	R	F1A
Middle Fork Interbay Area		
Middle Fork Powerhouse to Middle Fork Powerhouse Butterfly Valve House Communication Line/Powerline	PR/M	F2A
Middle Fork Powerhouse Butterfly Valve House to Radio Repeater near Hell Hole – Middle Fork Tunnel Surge Tank (underground) Communication Line/Powerline	PR/M	F2A
Middle Fork Powerhouse to Middle Fork – Ralston Tunnel Intake and Gatehouse Communication Line/Powerline	PR	F2A
Middle Fork Powerhouse to Middle Fork American River Gage above Middle Fork Powerhouse Communication Line/Powerline	PR/M	F2A
Ralston-Oxbow Area		
Ralston-Oxbow Tunnel Intake to Ralston Powerhouse Communication Line	R/PR	FIA/MIA
Ralston Powerhouse to Ralston Powerhouse Butterfly Valve House Communication Line/Powerline	R	FIA
Ralston Afterbay Dam Generator Building to Ralston-Oxbow Tunnel Intake Communication Line/Powerline	PR	MIA
Oxbow Powerhouse to Ralston Afterbay Dam Generator Building Communication Line/Powerline	PR	MIA

Table REC 5-1. Existing Project Facilities and Features and Associated VQOs.

Middle Fork Project Facilities	Forest Plan VQOs	Inventory VQO Information
Photovoltaic Poles and Powerlines		
Photovoltaic Poles and Powerline to Duncan Creek Gage above Diversion Dam	M	M2A
Photovoltaic Pole and Powerline at Duncan Creek Gage below Diversion Dam	M	M2A
Photovoltaic Pole and Powerline at Middle Fork American River Gage below French Meadows Dam	R	F1B
Photovoltaic Pole and Powerline at Middle Fork American River Gage above Middle Fork Powerhouse	PR	F2A
Photovoltaic Pole and Powerline at North Fork Long Canyon Gage at Diversion Dam	PR	F2B
Photovoltaic Pole and Powerline at South Fork Long Canyon Gage at Diversion Dam	PR	F2B
Photovoltaic Pole at Middle Fork American River Gage below Oxbow Powerhouse	PR	MIA
Microwave Reflectors and Radio Towers		
Passive Microwave Reflector Station above Middle Fork Interbay	PR	F2A
Radio Communications Tower near French Meadows – Hell Hole Tunnel Gatehouse	R	F1B
Radio Communications Tower and Repeater near Hell Hole – Middle Fork Tunnel Surge Shaft and Tank	M	M2A
Passive Microwave Reflector Station above Ralston Afterbay	R	FIA
Disposal Sites		
Duncan Diversion Dam Sediment Disposal Area	M	M2A
North Fork Long Canyon Crossing Sediment Disposal Area	PR	F2B
Middle Fork Interbay Sediment Disposal Area	M	M1A
Ralston Ridge Sediment Disposal Area	R	FIA
Indian Bar Sediment Disposal Area	PR	MIA
Ancillary Facilities		
French Meadows Dam Generator Building	R	F1B
French Meadows Dam Staging Area	R	F1B
Dormitory Facility	R	F1A
Dormitory and Cottages Water Supply Tank	R	F1A
Hell Hole Staging Areas	R	F1A
Operator Cottages and Shop	R	F1A
Ralston Afterbay Dam Generator Building	PR	MIA
Storage Building at Middle Fork – Ralston Tunnel Surge Shaft and Tank	R	FIA
Wabena Meadows Snow Course	PR	F2B
Miranda Cabin Snow Course	R	M1A
Diamond Crossing Snow Course	P	FIA
Talbot Camp Snow Course	R	F1B
Project Fences		
Slope Fences		
French Meadows Powerhouse Penstock Rock Fence	R	F1A
French Meadows Powerhouse Slope Fence	R	F1A
Long Canyon Crossing Slope Fence	PR	F2B
Middle Fork Powerhouse Upper Switchyard Slope Fence	PR	F2A

Table REC 5-1. Existing Project Facilities and Features and Associated VQOs.

Middle Fork Project Facilities	Forest Plan VQOs	Inventory VQO Information
Project Fences (continued)		
Slope Fences (continued)		
Middle Fork Interbay Dam Slope Fence	PR	F2A
Oxbow Powerhouse Slope Fence	PR	MIA
Ralston Powerhouse Penstock and Butterfly Valve House Slope Fences	R	FIA
Ralston Powerhouse Slope Fence	R	FIA
Public Safety Fences		
Dormitory Facility Barrier Fence	R	F1A
Hell Hole Dam General Parking Area Barrier Fence	R	F1A
North Fork Long Canyon Crossing Removable Section Barrier Fence	PR	F2B
Project Roads and Access Points		
Duncan Creek Area		
Duncan Creek Diversion Intake Road and Diversion Pool Access Point	M	M2A
Duncan Creek Diversion Dam Road	M	M2A
Duncan Creek Diversion Pool Road and Access Point	M	M2A
French Meadows Area		
Duncan Creek – Middle Fork Tunnel Portal Road and Spillway Access Point	R	F1B
French Meadows – Hell Hole Tunnel Gatehouse Road	R	F1B
French Meadows Dam Outlet Works and Leakage Weirs Road	R	F1B
French Meadows Dam Staging Area Road	R	F1B
Middle Fork American River Gage and Weir below French Meadows Dam Road	R	F1B
Hell Hole Area		
Hell Hole Dam and Powerhouse Road and Spillway Southern Access Point	R	F1A
Rubicon River Gage and Weir below Hell Hole Dam Road	R	F1A
Hell Hole Dam Leakage Weir Road	R	F1A
Hell Hole Dam Spillway Northern Access Point	R	F1A
French Meadows-Hell Hole Tunnel Portal Road	R	F1A
French Meadows Powerhouse Road	R	F1A
Hell Hole-Middle Fork Tunnel Gatehouse Road	R	F1A
Dormitory Facility Road	R	F1A
Hell Hole Dam Spillway Discharge Channel Road	R	F1A
Long Canyon Area		
North Fork Long Canyon Diversion North Road	PR	F2B
North Fork Long Canyon Diversion South Road	PR	F2B
North Fork Long Canyon Diversion Drop Inlet Road	PR	F2B
South Fork Long Canyon Diversion and Drop Inlet Road	PR	F2B
North Fork Long Canyon Crossing Removable Section North Road and Parking Area	PR	F2B
North Fork Long Canyon Crossing Removable Section South Road	PR	F2B
Middle Fork Interbay Area		
Middle Fork Powerhouse Butterfly Valve House Road	M	3A
Middle Fork Powerhouse Penstock and Butterfly Valve House Road	PR	M2A

Table REC 5-1. Existing Project Facilities and Features and Associated VQOs.

Middle Fork Project Facilities	Forest Plan VQOs	Inventory VQO Information
Project Roads and Access Points (continued)		
Middle Fork Interbay Area (continued)		
Middle Fork Interbay Dam and Powerhouse Road and Interbay Access Points	R/PR/M	F1C/F2A/F2C/M1A/M1C
Middle Fork Powerhouse Upper Switchyard Road	PR	F2A
Ralston-Oxbow Area		
Brushy Canyon Adit Road	M	M2B/3A/3B
Oxbow Powerhouse Road	PR	MIA
Ralston Powerhouse Butterfly Valve House Road	R	FIA
Ralston-Oxbow Tunnel Intake Road	PR	MIA
Ralston Afterbay Road and Boat Ramp	PR	MIA
Ralston Afterbay Dam Road and Afterbay Access Point	R	FIA
Ralston Afterbay Sediment Removal Access Point	R	FIA
Project Trails		
Duncan Creek Area		
Duncan Creek Diversion Dam North Trail	M	M2A
Duncan Creek Diversion Dam South Trail	M	M2A
Photovoltaic Poles and Powerline to Duncan Creek Gage above Diversion Dam Trail	M	M2A
Duncan Creek Gage and Weir above Diversion Trail	M	M2A
Duncan Creek Gage and Weir below Diversion Trail	M	M2A
French Meadows Area		
Middle Fork American River Gage and Weir below French Meadows Dam Trail	R	F1B
Middle Fork Interbay Area		
Middle Fork American River Gage above Middle Fork Powerhouse Trail	PR	F2A
Passive Microwave Reflector Station above Middle Fork Interbay Trail	PR/M	M2A/F2C
Ralston Afterbay Area		
Passive Microwave Reflector Station above Ralston Afterbay Trail	R	FIA
Middle Fork American River Gage below Oxbow Powerhouse Trail	PR	MIA

Table REC 5-2. Potential Project Betterment Facilities and Features and Associated VQOs.

Project Facility	Forest Plan VQOs	Inventory VQO Information
Hell Hole Reservoir Seasonal Storage Increase Betterment		
Hell Hole Dam		
Modified Facilities		
Hell Hole Dam Spillway Crest Gates	R	F1A
New Facilities		
Hell Hole Dam Spillway Crest Gates Control Building	R	F1A
Hell Hole Dam Spillway Crest Gates Control Building Powerline	R	F1A
Temporary Construction and Staging Areas		
Hell Hole Dam Spillway Crest Gates Construction Road	R	F1A
Hell Hole Dam Spillway Crest Gates Construction Work Area	R	F1A
Hell Hole Dam Spillway Crest Gates and Control Building Construction Staging Area	R	F1A
Hell Hole Dam Spillway Crest Gates Control Building Construction Work Area	R	F1A
Hell Hole Dam Spillway Crest Gates Control Building Powerline Construction Work Area	R	F1A
Hell Hole Dam Spillway Crest Gates Control Building Powerline Construction Staging Area	R	F1A
French Meadows Powerhouse Capacity Upgrade Betterment		
French Meadows Powerhouse		
Modified Facilities		
French Meadows Powerhouse Switchyard	R	F1A
New Facilities		
French Meadows Powerhouse	R	F1A
French Meadows Powerhouse Penstock	R	F1A
French Meadows - Hell Hole Tunnel Surge Shaft/Tank	R	F1A
French Meadows - Hell Hole Tunnel Surge Pipeline	R	F1A
French Meadows - Hell Hole Tunnel Surge Shaft or Pipeline Road	R	F1A
Temporary Construction and Staging Areas		
French Meadows Powerhouse/Switchyard Construction Work Area	R	F1A
French Meadows Powerhouse/Switchyard Construction Staging Area	R	F1A
French Meadows Powerhouse Penstock Construction Work Area	R	F1A
French Meadows Powerhouse Penstock Construction Staging Areas	R	F1A
French Meadows - Hell Hole Tunnel Surge Shaft/Tank or Pipeline Construction Staging Areas	R	F1A
French Meadows - Hell Hole Tunnel Surge Shaft/Tank Construction Work Area	R	F1A
French Meadows - Hell Hole Tunnel Surge Pipeline Construction Work Area	R	F1A
French Meadows - Hell Hole Tunnel Surge Shaft or Pipeline Road Construction Staging and Work Area	R	F1A
Non-Project Facilities Modified During Construction		
Forest Road 14N09A	R	F1A
Forest Road 14N09A Construction Staging and Work Area	R	F1A
Middle Fork Powerhouse		
Modified Facilities		
Middle Fork Powerhouse Upper Switchyard	R	F1A
Ralston Powerhouse Capacity Upgrade Betterment		
Ralston Powerhouse		
Modified Facilities		
Ralston Powerhouse	R/PR	F1B/M1A
Temporary Construction and Staging Areas		
Ralston Powerhouse Construction Staging Areas	R/PR	F1B/M1A

Table REC 5-3. USDA-FS Managed Viewsheds in the Vicinity of the MFP.

Viewshed Type	TNF Managed Viewsheds	Common Name	Description	Sensitivity Level
Forest Routes and/or Roads	FR-96	Mosquito Ridge Road	Extends from Foresthill Road in Foresthill to Ahart Campground (and beyond)	1
	FR-22	Soda Springs Riverton Road	Extends from FR 2 to FR 96.	2
Trails	Western States Trail	-	-	1
	Tevis Cup Trail	-	-	1
Water Bodies	French Meadows Reservoir	-	-	1
Rivers & Streams	Middle Fork American River	-	From French Meadows Dam to 1.5 miles downstream.	1
Developed Recreation Sites	French Meadows Reservoir Recreation Areas <ul style="list-style-type: none"> Ahart Campground Coyote Group Campground French Meadows Campground French Meadows Picnic Area French Meadows Boat Ramp Gates Group Campground Lewis Campground McGuire Boat Ramp McGuire Picnic Area Poppy Campground 	-	-	1*
	Ralston Afterbay Reservoir Recreation Areas <ul style="list-style-type: none"> Ralston Picnic Area and Ralston Picnic Area Cartop Boat Ramp 	-	-	1*
	Indian Bar Rafting Access and General Parking	-	-	1*

*Developed recreation sites in the TNF are managed to meet a visual quality objective of partial retention (PR) within the developed recreation site, in accordance with direction contained in the TNF Land and Resource Management Plan. A VQO of PR allows for the development of recreation facilities and features that are visually subordinate to the characteristic landscape. (Personal Communication. William Davis, Tahoe National Forest Landscape Architect, June 18, 2009)

Table REC 5-3. USDA-FS Managed Viewsheds in the Vicinity of the MFP (Continued).

Viewshed Type	ENF Managed Viewsheds	Common Name	Description	Sensitivity Level
Forest Routes and/or Roads	Forest Road 14N08 (Part of FR 2)	Eleven Pines Road	Extends from Wentworth Springs Road to 17N02.	2
	Forest Road 17N02 (FR 22)	Old Icehouse Road	Extends from FR 2 to FR 96.	2
	Forest Road 17N02 (Part of FR 2)	Old Icehouse Road	Extends from 14N08 (Eleven Pines Road) to Hell Hole Dam (Used to be 17N12.1)	Level 2 to eastern edge of Section 18. Level 1 east of Section 18 to HH Reservoir.
	Forest Road 14N25 (FR 23)	Blacksmith Flat Road	Extends from FR 96 to 14N08 (FR 2).	2
	Forest Road 14N09 (FR 24)	Chipmunk Ridge Road	Extends from 17N02 to Forest Road 48 located at ENF/TNF boundary	2
Trails	Hunters Trail	-	-	1
Water Bodies	Hell Hole Reservoir	-	-	1
Rivers & Streams	Rubicon River (from base of Hell Hole Dam to confluence with Middle Fork American River)	-	-	1
	Middle Fork American River (downstream of confluence with Rubicon River)	-	-	1
	South Fork Long Canyon Creek	-	-	2
Developed Recreation Sites	Hell Hole Reservoir Recreation Areas <ul style="list-style-type: none"> • Big Meadows Campground • Hell Hole Campground • Hell Hole Boat Ramp and Hell Hole Boat Ramp Parking Area • Hell Hole General Parking Area • Hell Hole Vista • Upper Hell Hole Campground 	-	-	Not applicable**
	Middle Meadows Group Campground	-	-	Not applicable**
Special Interest Areas	Big Crater Special Interest Area	-	-	1
	Little Crater Special Interest Area	-	-	1

**Not applicable. There are no sensitivity levels associated with developed recreation sites in the ENF. Developed recreation areas in the ENF are managed to meet a visual quality objective of partial retention (PR), in accordance with Management Area 8 of the ENF Land and Resource Management Plan (LRMP). Personal Communication. Vicky Jowice, Eldorado National Forest Landscape Architect. June 15, 2009.

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
TNF Managed Viewsheds						
Mosquito Ridge Road Viewshed (FR 96)						
French Meadows Reservoir Area	French Meadows Dam and Outlet Works	Large Dam	Seen	R	IV	FR 96 crosses top of dam. Travelers experience immediate foreground views of downstream dam face for a short distance (less than 0.5 mi) when approaching dam from the west. Outlet works are not seen due to view angle and intervening terrain. Dam appears as major disturbance seen in foreground distance zone.
	French Meadows Reservoir & Shoreline	Large Reservoir	Seen	R	II-IV	Reservoir and shoreline are not seen until FR 96 nears the spillway structure. Views are of short duration while crossing the spillway area and dam. Expansive panoramic views of the reservoir and shoreline are experienced when crossing the dam. There are limited filtered views of the reservoir and shoreline through trees when traveling east along the reservoir. Reservoir appears near-natural at full pool, and visual quality declines with reservoir surface elevation and increased exposure of shoreline. Very low pool elevations dominate visual experience.
	French Meadows Reservoir Staff Gage	Reservoir Gage	Not noticed	R	II	Not noticed from FR 96 due to small scale of gage, speed of travel on road and location of gage near north shoreline.
	French Meadows Reservoir Gage (USGS Gage No. 11427400)	Reservoir Gage	Not noticed	R	II	
	French Meadows Dam Leakage Weir Nos. 1-6	Leakage Weir	Not noticed	R	II	
	French Meadows Dam Generator Building	Ancillary Facility	Seen	R	IV	Seen in immediate foreground, foreground and middleground from FR 96. Industrial appearance of structure in combination with spillway facilities and chain link fencing dominate view when seen in immediate foreground. Small scale and light color of building result in facilities being not readily noticed when seen in the middleground distance zone.
	French Meadows Dam Staging Area	Ancillary Facility	Seen	R	III-IV	Seen in immediate foreground, foreground and middleground from FR 96. The moderate scale, and spoil-pile-character of staging area is seen in the immediate foreground when entering the reservoir viewshed. The staging area contrasts in form and texture with the surrounding characteristic landscape.
	French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline	Powerline	Seen	R	III	Poles seen in immediate foreground from segment of FR 96 near spillway area. Small scale features add incrementally to industrial character of area.
	French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	Powerline	Seen	R	III	Poles seen in immediate foreground from segment of FR 96 near spillway area. Small scale features add incrementally to industrial character of area.
	Duncan Creek – Middle Fork Tunnel Portal Road and Spillway Access Point	Project Road/Access Point	Seen	R	II-III	Horizontal line created by road alignment visible from Westbound FR 96 when crossing dam. Bed of road not seen.
	French Meadows – Hell Hole Tunnel Gatehouse Road	Project Road	Seen	R	II-III	Entrance to road and gate seen from FR 96. Brief view while traveling road eastbound.
	French Meadows Dam Outlet Works and Leakage Weirs Road	Project Road	Seen	R	II-III	Road is seen in the foreground distance zone. Road is not readily noticeable due to low color contrasts and partial screening from vegetation.
	French Meadows Dam Staging Area Access Road	Project Road	Not noticed	R	II	Entrance seen from road. Not readily noticed.
	Middle Fork Powerhouse Penstock and Butterfly Valve House	Water Conveyance	Seen	PR	IV	Exposed soil associated with penstock is noticeable in background from FR 96. Butterfly valve house not seen.
Middle Fork Powerhouse to Middle Fork Powerhouse Butterfly Valve House Communication Line/Powerline	Communication and Powerline	Seen/Not noticed	PR/M	II-III	Exposed soil associated with ROW creates contrasts in color with surrounding landscape. Exposed soil seen from Mosquito Ridge Road near Dutch Flat. Visibility of actual powerline from FR 96 is not readily noticed.	
Middle Fork Interbay Area	Middle Fork Powerhouse Penstock and Butterfly Valve House Road	Project Road	Not noticed	R	II	
	Middle Fork Powerhouse and Butterfly Valve House Road	Project Road	Seen	R	IV	Road alignment not readily seen due to vegetative screening. However exposed soils associated with road cut can be seen from FR 96 (in background distance zone of road).
Ralston Afterbay Area	Ralston Afterbay Dam	Medium Dam	Seen	R/PR	III	Views of the dam are limited from the road due to rugged terrain and vegetative screening. Angular form and light color of dam contrasts with surrounding vegetation and water.
	Ralston Afterbay	Medium Reservoir	Seen	R/PR	II-III	Views of the reservoir are limited due to rugged terrain and vegetative screening. Reservoir is moderate in scale and blends with the surrounding characteristic landscape.
	Middle Fork – Ralston Tunnel Surge Shaft and Tank	Water Conveyance	Not noticed	R	II	Middleground views from above Ralston Afterbay and near intersection with 14N25. Tank is not noticeable due earth color, nearby vegetation, and viewing distance from road (in background distance zone of road).
	Ralston Afterbay Dam Generator Building	Ancillary Facility	Seen	PR	III	Limited views of area from road due to terrain and vegetative screening. Small scale of building minimizes visual effects. Light color of building blends with exposed soil of roads and dam. Angular form of building blends with form of dam.
	Storage Building at Middle Fork – Ralston Tunnel Surge Shaft and Tank	Ancillary Facility	Not noticed	R	II	Middleground views from above Ralston Afterbay and near intersection with 14N25. Due to small scale of building and distance it is not readily noticeable. Light white color of building does increase visibility since it contrasts with surrounding vegetation.
	Oxbow Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	PR	III	Opening in vegetation above powerhouse and dam area provides a near view of Ralston Afterbay Area. Exposed soil areas associated with roads is and the dam dominate the view. The powerhouse and switchyard are tucked into the hillside and partially screened by vegetation. The small scale of the powerhouse and neutral to dark colors reduce the contrasts of the building with the surrounding landscape.
	Ralston Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	R	II-III	Brief view rounding bend at junction with Blacksmith Flat Road (14N25). Facilities not readily noticed due to distance (0.5mi) and relatively small scale of facilities as seen in context of Rubicon River corridor.
	Passive Microwave Reflector Station above Ralston Afterbay	Microwave Reflector	Not noticed	R	II	Brief view up Rubicon canyon near intersection with 14N25. Due to distance and small scale of facility relative to view of canyon, the reflector would not be noticed to most travelers on FR 96. May be more noticeable at certain times of day due to reflection. Contrast in color with surrounding vegetation enhances visibility.
	Ralston Afterbay Ridge Sediment Disposal Area	Disposal Site	Seen	R	IV	Limited middleground views across river canyons to Ralston Ridge. Exposed soils and moderately large spoil area combine with exposed soil from roads and cleared transmission line corridor to create a disturbed appearance not characteristic to the surrounding landscape. Spoil pile creates contrasts primarily in color with surrounding landscape.
	Indian Bar Sediment Disposal Area	Disposal Site	Seen	PR	II-III	Partial views of sediment disposal area from road above Ralston Afterbay. The disposal area appears characteristic of riverside conditions from this location.

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
Mosquito Ridge Road Viewshed (FR 96) (continued)						
Ralston Afterbay Area	Ralston Powerhouse Butterfly Valve House Road	Project Road	Seen	R	IV	Brief view of exposed soil associated with road alignment when rounding bend near road intersection with 14N25. Exposed light soil contrasts with surrounding dark green vegetation.
	Oxbow Powerhouse Road	Project Road	Seen	PR	III	Exposed soil associated with road surface and nearby features (parking areas) attracts attention and is in contrast to the dark color of the surrounding vegetation.
	Ralston Afterbay Dam Road and Afterbay Access Point	Project Road	Seen	R	II-III	Brief, near view of Ralston Area from above. Road is not readily noticed since it is well integrated into the dam structure, and there are no expansive areas of exposed soil associated with it.
Soda Springs-Riverton Road Viewshed (FR 22)						
French Meadows Reservoir Area	French Meadows Dam and Outlet Works	Large Dam	Seen	R	IV	FR 22 intersects with FR 96 on south side of dam. Travelers experience immediate foreground views of dam near intersection with FR 96. Outlet works are not seen from FR 22.
	French Meadows Reservoir & Shoreline	Large Reservoir	Seen	R	II-IV	Reservoir and shoreline are not seen until near the intersection of FR 22 with FR 96. Immediate foreground views are of the access road to the dam base, downstream dam face, FR 96 road across dam and reservoir and shoreline. More distant foreground views (about 1 mile) are of the spillway, staging area and gatehouse structures which are not readily noticed due to the moderate scale of the features, similar colors to the surrounding characteristic landscape, and the partial screening provided by trees. Reservoir appears near-natural at full pool, and visual quality declines with reservoir surface elevation and increased exposure of shoreline. Very low pool elevations dominate visual experience.
	French Meadows Dam Leakage Weir Nos. 1-6	Leakage Weir	Not noticed	R	II	
	French Meadows Dam Generator Building	Ancillary Facility	Not noticed	R	II	Building is generally not noticeable due to small scale and low height of building, and because light color of building is similar to surrounding exposed rock.
	French Meadows Dam Staging Area	Ancillary Facility	Not noticed	R	II	Seen in middleground from FR 22 at the intersection with FR 96. Due to viewing distance and relatively small size of staging area, it appears integrated into the characteristic landscape due to the similar colors as the surrounding granite rock.
	Duncan Creek – Middle Fork Tunnel Portal Road and Spillway Access Point	Project Road/Access Point	Seen	R	II-III	Horizontal line created by road alignment not readily noticed due to middleground viewing distance and trees near rock outcropping breaking up horizontal line.
	French Meadows Dam Outlet Works and Leakage Weirs Road	Project Road	Seen	R	III	Road is seen in vicinity of intersection with FR 96. Road is not highly noticed due to low contrasts in color and partial screening from vegetation.
Western States Trail Viewshed						
French Meadows Reservoir Area	French Meadows Dam and Outlet Works	Large Dam	Seen	R	IV	Most likely filtered views periodically. Dam ranges from immediate foreground to foreground.
	French Meadows Reservoir & Shoreline	Large Reservoir	Seen	R	II-IV	Reservoir appears near-natural at full pool and visual quality declines with reservoir surface elevation and increased exposure of shoreline. Very low pool elevations dominate visual experience.
	French Meadows-Hell Hole Tunnel Gatehouse	Water Conveyance	Seen	R	III	Gatehouse may be seen in middleground, across reservoir depending on screening from vegetation between trail and reservoir and screening from trees at gatehouse area.
	Middle Fork American River Gage and Weir below French Meadows Dam (USGS Gage and Weir No. 11427500)	Stream Gage and Weir	Not noticed	R	II	
	French Meadows Reservoir Staff Gage	Reservoir Gage	Not noticed	R	II	
	French Meadows Reservoir Gage (USGS Gage No. 11427400)	Reservoir Gage	Not noticed	R	II	
	French Meadows Dam Leakage Weir Nos. 1-6	Leakage Weir	Not noticed	R	II	
	French Meadows Dam Generator Building	Ancillary Facility	Seen	R	III	May be seen in immediate foreground of trail, although most views from trail appear partially screened by vegetation.
	French Meadows Dam Staging Area	Ancillary Facility	Seen	R	II-III	May be seen in immediate foreground of trail, although most views from trail appear to be partially screened by vegetation.
	French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline	Powerline	Seen	R	III	May be seen in immediate foreground of trail, although most views from trail appear to be partially screened by vegetation.
	French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	Powerline	Seen	R	III	May be seen in foreground of trail, although most views from trail appear to be partially screened by vegetation.
	Radio Communications Tower near French Meadows – Hell Hole Tunnel Gatehouse	Radio Tower	Not noticed	R	II	Seen in middleground, across reservoir. Screening between trail and shoreline and near radio tower may result in tower being not noticed.
	Duncan Creek – Middle Fork Tunnel Portal Road and Spillway Access Point	Project Road/Access Point	Seen	R	III	May be seen in immediate foreground of trail due to close proximity of road to trail.
	French Meadows Dam Outlet Works and Leakage Weirs Road	Project Road	Seen	R	III	May be seen in foreground of trail, although most views from trail appear to be partially screened by vegetation.
	French Meadows Dam Staging Area Access Road	Project Road	Seen	R	III	May be seen in immediate foreground of trail, although most views from trail appear to be partially screened by vegetation.

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
Tevis Cup Trail Viewshed						
French Meadows Reservoir Area	French Meadows Dam and Outlet Works	Large Dam	Seen	R	IV	Assume dam is seen in middleground from Red Star Ridge above north side of reservoir. From middleground dam is visually evident, but does not dominate due to similarity to exposed shoreline.
	French Meadows Reservoir & Shoreline	Large Reservoir	Seen	R	II-III	Assume reservoir appears near-natural from middleground views of trail. Reservoir would appear near-natural at full pool. Visual quality would decline with reservoir surface elevation and increased exposure of shoreline. Very low pool elevations would be visually evident but not dominate the visual experience from the middleground distance zone.
	French Meadows-Hell Hole Tunnel Gatehouse	Water Conveyance	Seen	R	III	Assume gatehouse can be seen in middleground. Due to small scale of feature, assume area appears as a minor disturbance.
	French Meadows Dam Staging Area	Ancillary Facility	Not noticed	R	II	Assume feature blends in with characteristic landscape as seen from middleground.
	French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	Powerline	Not noticed	R	II	
	French Meadows Dam Generator Building to French Meadows Dam Spillway Gates Powerline	Powerline	Not noticed	R	II	
	Photovoltaic Pole and Powerline at Middle Fork American River Gage below French Meadows Dam	Photovoltaic Pole and Powerline	Not noticed	R	II	
	Radio Communications Tower near French Meadows – Hell Hole Tunnel Gatehouse	Radio Tower	Not noticed	R	II	
	French Meadows Dam Outlet Works and Leakage Weirs Road	Project Road	Seen	R	II-III	Assume exposed soil associated with road could be noticeable from middleground.
	Middle Fork American River Gage and Weir below French Meadows Dam Road	Project Road	Not noticed	R	II	
Middle Fork American River Gage and Weir below French Meadows Dam Trail	Project Trail	Not noticed	R	II		
French Meadows Reservoir Viewshed						
French Meadows Reservoir Area	French Meadows Dam and Outlet Works	Large Dam	Seen	R	III-IV	Long duration views of dam due to recreational activities. Views range from immediate foreground to middleground views for water-based recreation and middleground views for land-based recreation. The dam creates contrasts in form, line and texture that vary in strength depending on water surface elevation and the degree of exposure of the dam. Outlet works are not seen.
	French Meadows Reservoir & Shoreline	Large Reservoir	Seen	R	II-IV	
	French Meadows-Hell Hole Tunnel Gatehouse	Water Conveyance	Seen	R	III-IV	Area is set back from reservoir shoreline. Area seen primarily from nearby reservoir. Views include abandoned rusting equipment and other project related materials scattered about site.
	Duncan Creek – Middle Fork Tunnel Portal	Water Conveyance	Not noticed	R	II	
	French Meadows Dam Generator Building	Ancillary Facility	Seen	R	III	Seen in foreground and middleground from reservoir. Small scale and light color of building and fencing result in facilities not dominating the view especially when seen in context with the dam face.
	French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	Powerline	Not noticed	R	II	Not noticed or seen from most of the reservoir, except immediate foreground views.
	Radio Communications Tower near French Meadows – Hell Hole Tunnel Gatehouse	Radio Tower	Seen	R	III	Small scale feature seen from reservoir area near gate house area.
	French Meadows – Hell Hole Tunnel Gatehouse Road	Project Road	Not noticed	R	II	Views of road obscured by vegetation
Duncan Creek – Middle Fork Tunnel Portal Road and Spillway Access Point	Project Road/Access Point	Seen	R	II-III	Horizontal line created by road alignment is visible from reservoir locations within the immediate foreground of the dam, but is not readily noticeable from more distant locations.	

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
Middle Fork American River Viewshed						
French Meadows Reservoir Area	French Meadows Dam and Outlet Works	Large Dam	Seen	R	IV	Immediate foreground views of dam and outlet works due to location next to river. Dam dominates view due to large scale and engineered form.
	Middle Fork American River Gage and Weir below French Meadows Dam (USGS Gage and Weir No. 11427500)	Stream Gage and Weir	Seen	R	II-III	Immediate foreground view from the river. Small scale feature would not readily detract from the surrounding landscape character.
	French Meadows Dam Leakage Weir Nos. 1-6	Leakage Weir	Seen	R	II-III	
	French Meadows Dam Generator Building to French Meadows Dam Outlet Works Powerline	Powerline	Seen	R	III	Seen in immediate foreground. Multicolor line enhances visibility. Small scale feature seen against backdrop of dam adds visual clutter to area.
	Photovoltaic Pole and Powerline at Middle Fork American River Gage below French Meadows Dam	Photovoltaic Pole and Powerline	Seen	R	III	Small scale feature seen in immediate foreground of river.
	French Meadows Dam Outlet Works and Leakage Weirs Road	Project Road	Seen	R	III	Road seen in immediate vicinity of dam. Road is not highly noticed due to low contrasts in color and partial screening from vegetation.
	Middle Fork American River Gage and Weir below French Meadows Dam Road	Project Road	Seen	R	II-III	Road seen in immediate foreground of river.
Middle Fork American River Gage and Weir below French Meadows Dam Trail	Project Trail	Seen	R	II-III	Trail seen in immediate foreground of river.	
French Meadows Reservoir Developed Recreation Sites Viewsheds (Ahart CG, Coyote Group CG, French Meadows CG, French Meadows Picnic Area, French Meadows Boat Ramp, Gates Group CG, Lewis CG, McGuire Boat Ramp, McGuire						
French Meadows Reservoir Area	French Meadows Dam and Outlet Works	Large Dam	Seen	R	III-IV	Long duration, middleground views of the dam face are experienced by visitors to French Meadows Picnic Area, French Meadows Boat Ramp and French Meadows Campground. Outlet works are not seen. Dam blends well in color and texture with surrounding exposed shoreline and is not readily distinguishable from the shoreline as seen in middleground.
	French Meadows Reservoir & Shoreline	Large Reservoir	Seen	R	II-III	Reservoir and shoreline seen from French Meadows Picnic Area, Boat Ramp and Campground, McGuire Boat Ramp and Poppy Campground. Views from boat ramps are open and expansive. Views from campgrounds and picnic areas are partially to completely screened depending on the camp or picnic site.
	French Meadows-Hell Hole Tunnel Gatehouse	Water Conveyance	Seen	R	III	Not seen from developed recreation sites except Poppy Campground. Views from Poppy Campground are middleground and partially screened by vegetation. Area is not readily noticed from campground.
Ralston Afterbay Developed Recreation Sites Viewsheds (Ralston Picnic Area and Ralston Picnic Area Cartop Boat Ramp and Indian Bar Rafting Access and General Parking)						
Ralston Afterbay Area	Oxbow Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	PR	IV	Indian Bar Rafting Access and General Parking Recreation Site - near views of moderate duration during raft staging & loading activities. Powerhouse is of moderate scale and nestled into canyon wall. Switchyard, powerhouse and associated landform alterations introduce angular forms and textures in contrast to the characteristic landscape. Powerhouse colors are somewhat similar to surrounding landscape.
	Oxbow Powerhouse Gage (USGS Gage No. 11433212)	Powerhouse Gage	Seen	PR	II-III	Indian Bar Rafting Access and General Parking Recreation Site - minor structure not readily noticed compared to powerhouse and switchyard, but contributes to visual contrasts associated with the powerhouse.
	Indian Bar Sediment Disposal Area	Disposal Site	Seen	PR	III	Indian Bar Rafting Access and General Parking Recreation Site
	Oxbow Powerhouse Slope Fence	Fence	Seen	PR	III	Indian Bar Rafting Access and General Parking Recreation Site. Fencing is discernable on hillsides. Metallic color contrasts with native rock enhancing visibility of the fencing.
	Oxbow Powerhouse Road	Project Road	Seen	PR	III	Indian Bar Rafting Access and General Parking Recreation Site - immediate foreground views of road experienced by rafters to access the rafting access site.
Oxbow Powerhouse to Ralston Afterbay Dam Generator Building Communication Line/Powerline	Project Communication Line	Seen	PR	III	Indian Bar Rafting Access and General Parking Recreation Site. Line is discernable on hillsides. Metallic color contrasts with native rock enhancing visibility of the line.	

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
ENF Managed Viewsheds						
Eleven Pines Road Viewshed (Forest Road 14N08)						
No Project facilities or features are visible from this viewshed.						
Old Icehouse Road Viewshed (Forest Road 17N02) - Extends from Eleven Pines Road (14N08) Northwest to ENF/TNF Boundary						
No Project facilities or features are visible from this viewshed.						
Old Icehouse Road Viewshed (Forest Road 17N02) - Extends from Eleven Pines Road (14N08) East to Hell Hole Dam						
North Fork Long Canyon Diversion Area	North Fork Long Canyon Diversion Drop Inlet Road	Project Road	Not noticed	PR	II	Road crosses FR 2 nearly perpendicular to it. Not readily noticed due to road alignment and forested setting.
	North Fork Long Canyon Crossing Removable Section North Road and Parking Area	Project Road	Not noticed	PR	II	Road crosses FR 2 nearly perpendicular to it. Not readily noticed due to road alignment and forested setting.
South Fork Long Canyon Diversion Area	South Fork Long Canyon Diversion Dam and Pool	Small Diversion Dam and Pool	Seen	PR	III	Brief views of yellow railings when traveling on FR 2.
	South Fork Long Canyon Diversion and Drop Inlet Road	Project Road	Seen	PR	III	Brief view of road, entrance sign and cleared area. Road segment down to drop inlet not seen.
Hell Hole Reservoir Area	Hell Hole Dam and Outlet Works	Large Dam	Seen	R	IV	Foreground views of upstream end of dam seen from southern terminus of road. Large scale feature dominates the view and contrasts in form and texture with the surrounding landscape.
	Hell Hole Reservoir & Shoreline	Large Reservoir	Seen	R	II-III	Short term expansive views from above Hell Hole Boat Ramp, and brief view from along ¼ mile section of road that is north of the Dormitory and Cottage Water Supply Tank. EVC rating moves from II to III as water surface elevation lowers and more shoreline is exposed.
	Hell Hole-Middle Fork Tunnel Gatehouse	Water Conveyance	Seen	R	III-IV	Foreground views of gatehouse f. Moderately small, light colored structure is highly noticed due to color contrasts with surrounding cut slopes that are moderately dark in color.
	French Meadows Powerhouse Penstock and Butterfly Valve House	Water Conveyance	Not noticed	R	II	Penstock not noticed from road due to dark color that blends with surrounding landscape. Butterfly Valve House is not noticed due to the small scale and light color that blends in with the surrounding landscape.
	French Meadows Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	R	III-IV	Powerhouse seen from road segment above boat ramp. Not seen from other road locations. Powerhouse is in middle-ground distance zone from road. Exposed soil adjacent to the powerhouse and switchyard attracts attention to the powerhouse. Powerhouse contrasts in form and texture with surrounding landscape. Switchyard is not noticed.
	Dormitory and Cottages Water Supply Tank	Ancillary Facility	Seen	R	II-III	Minor facilities located adjacent to road. Seen in immediate foreground for a brief duration. Dark siding on tank blends well with surrounding landscape. Roof of structure contrasts due to light reflective color/material.
	French Meadows Powerhouse and Switchyard to Hell Hole — Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages, and Hell Hole Powerhouse Communication Line/Powerline	Communication and Powerline	Seen	R	II-III	Power lines and poles are in the immediate foreground of the road near the cottage and dormitory. In combination with the roads and other features they are somewhat noticed. The powerline is not seen from other road locations.
	Operator Cottages and Shop	Ancillary Facility	Seen	R	II-III	Brief foreground views of cottage and workshop from road above boat ramp. Light tan color of buildings contrasts with surrounding forested landscape. Road entrance and gate are more noticeable than structures.
	French Meadows-Hell Hole Tunnel Portal Road	Project Road	Not noticed	R	II	Seen in middle-ground. Blends well with surrounding landscape.
	French Meadows Powerhouse Road	Project Road	Seen	R	II-III	Road blends well with surrounding landscape due to narrow road width, minor road cuts, and highly textured landscape surrounding the road.
	Hell Hole-Middle Fork Tunnel Gatehouse Road	Project Road	Not noticed	R	II	Road blends well with surrounding landscape due to narrow road width, minor road cuts, and highly textured landscape surrounding the road.
	Dormitory Facility Road	Project Road	Seen	R	II-III	Road entrance seen. Narrow road bed with vegetation close to road bed reduces visual effect of road.
	Hell Hole Dam Spillway Northern Access Point	Project Road/Access Point	Not noticed	R	II	Blends in well with surrounding landscape.

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
Blacksmith Flat Road Viewshed (14N25, also referred to as FR 23)						
Ralston Afterbay Area	Ralston Afterbay and Shoreline	Medium Reservoir	Seen	R/PR	III	Open, near views Ralston Afterbay upper reaches on Middle Fork and Rubicon rivers. Reservoir fluctuations noticeable around shoreline.
	Ralston Afterbay Sediment Removal Access Point	Access Point	Not noticed	R	II	Small feature, not readily noticeable.
	Ralston-Oxbow Tunnel Intake to Ralston Powerhouse Communication Line	Project Communication Line	Seen	R/PR	III	Seen in immediate foreground of road for a moderate duration of time. Seen from Middle Fork American River to Ralston Powerhouse. Cleared area of ROW increases visual contrasts associated with the power line.
	Ralston Powerhouse and Switchyard	Powerhouse and Switchyard	Seen	R	IV	Facilities seen in foreground and immediate foreground where road parallels Rubicon River. Views are short to moderate in duration. Exposed views, no screening. Facilities dominate and contrast strongly with surrounding landscape due to large scale and angular forms.
	Passive Microwave Reflector Station above Ralston Afterbay	Microwave Reflector	Not noticed	R	II	Trail and microwave not noticeable from the road.
	Ralston Powerhouse Butterfly Valve House Road	Project Road	Not noticed	R	II	Road appears as part of Ralston Afterbay Ridge Sediment Disposal Area and is not readily noticeable from 14N25
	Ralston Powerhouse to Ralston Powerhouse Butterfly Valve House Communication Line/Powerline	Project Communication Line	Seen	R	III	Seen for a short duration from road along Rubicon River. Highly textured hillside reduces visual contrast of power line. Exposed soil of ROW increases visual contrasts associated with the power line.
	Ralston Powerhouse Slope Fence	Project Fence	Not noticed	R	II	Not noticeable from road.
	Ralston Powerhouse Penstock and Butterfly Valve House Slope Fences	Project Fence	Seen	R	III	Moderate scale feature noticeable due to immediate foreground views from the road and visual contrasts in color and texture.
	Ralston Powerhouse Penstock and Butterfly Valve House Storage Building at Middle Fork - Ralston Tunnel Surge Shaft and Tank	Water Conveyance	Seen	R	III	Open view of lower portion of penstock seen in immediate foreground of road along river near Ralston Powerhouse. Dark color of penstock reduces contrasts with surrounding landscape.
	Middle Fork - Ralston Tunnel Surge Shaft and Tank	Ancillary Facility	Seen	R	III	Small feature seen as part of Surge Shaft and Tank. Immediate foreground views of storage facility from road for a short duration of time.
	Ralston Ridge Sediment Disposal Area	Water Conveyance	Seen	R	IV	Immediate foreground view for short duration of large scale feature.
		Disposal Site	Seen	R	IV	Large scale feature dominates view from the road for a short duration. Foreground views of open, exposed soil areas with engineered land contours.
Chipmunk Ridge Road Viewshed (14N09, also referred to as FR 24)						
No Project facilities or features are visible from this viewshed.						
Hunters Trail Viewshed (trail near spur trail from FR 96 visited only)						
No Project facilities or features are visible from this viewshed.						

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
Hell Hole Reservoir Viewshed						
Hell Hole Reservoir Area	Hell Hole Dam and Outlet Works	Large Dam	Seen	R	IV	Foreground and middleground views of dam from most reservoir locations, except boat ramp area and upper reservoir area. Large scale feature creates contrasts in form, line and texture depending on the extent of exposure (water surface elevation). Outlet works not seen because they are located on downstream side of dam.
	Hell Hole Reservoir & Shoreline	Large Reservoir	Seen	R	II-IV	Meets retention at full pool/ partial retention at moderate drawdown. Modification at low reservoir elevations due to dominance of exposed shoreline and color contrasts with surrounding forested landscape.
	Hell Hole – Middle Fork Tunnel Gatehouse	Water Conveyance	Seen	R	III-IV	Foreground and middleground views of gatehouse from most reservoir locations, except upper reservoir area. Moderately small, light colored structure is highly noticed due to color contrasts with surrounding moderately dark rock walls.
	French Meadows Powerhouse Penstock and Butterfly Valve House	Water Conveyance	Seen	R	III	Penstock readily noticed from foreground distance zone of reservoir, but not readily noticed from middleground viewing locations. Dark colored penstock blends well with surrounding terrain. Butterfly house may be noticed in foreground but not readily noticed from middleground due to small scale and light color of building which blends well with surrounding rock walls. Tunnel muck next to the penstock and powerhouse dominates views of the area. Area seen from foreground and middleground reservoir locations. The large area covered by the muck, and form and texture of the material create a strong contrast to the surrounding characteristic landscape.
	French Meadows Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	R	IV	Powerhouse and switchyard noticed in the foreground and middleground distance zones. Color of powerhouse and switchyard similar to surrounding terrain, reducing color contrasts. Moderate contrasts in form and texture. Tunnel muck next to the powerhouse dominates views of the area. Area seen from foreground and middleground reservoir locations. The large area covered by the muck, and form and texture of the material create a strong contrast to the surrounding characteristic landscape.
	French Meadows Powerhouse Gage (USGS Gage No. 11427200)	Powerhouse Gage	Not noticed	R	II	Small scale feature not seen from the reservoir except in the immediate foreground of the gage.
	Hell Hole Reservoir Staff Gage	Reservoir Gage	Not noticed	R	II	Small scale feature not seen except in the immediate foreground of the gage.
	French Meadows Powerhouse to French Meadows Powerhouse Penstock and Butterfly Valve House Communication Line/Powerline	Communication and Powerline	Seen	R	II-III	Upper portion of poles and some line segments can be seen from foreground locations. However, feature is not readily noticeable from most locations due to small scale of feature and screening of the feature by topography and vegetation.
	French Meadows Powerhouse and Switchyard to Hell Hole — Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages, and Hell Hole Powerhouse Communication Line/Powerline	Communication and Powerline	Seen	R	II-III	Seen in foreground from western half of reservoir. Powerline is not readily noticeable in most locations due to vegetative screening.
	Hell Hole Substation	Substation	Not noticed	R	II-III	Substation is screened by vegetation and is not readily noticeable as seen from the south shore of the reservoir.
	Dormitory Facility	Ancillary Facility	Seen	R	II-III	Visible from some areas of reservoir but not readily noticeable.
	French Meadows Powerhouse Penstock Rock Fence	Fence	Not noticed	R	II	
	French Meadows Powerhouse Slope Fence	Fence	Seen	R	II-III	Small scale feature seen only from immediate foreground of powerhouse area. Not discernable from most other reservoir locations.
	French Meadows-Hell Hole Tunnel Portal Road	Project Road	Seen	R	II-III	Cut slope associated with road seen in foreground and middleground. Road cut is not visually evident because feature blends in with the surrounding rock reducing color contrasts.
	French Meadows Powerhouse Road	Project Road	Seen	R	II-III	Road seen in foreground, creates a line on hillside. Otherwise, is not visually evident due to a lack of road cuts, good vegetative screening and the highly textured character of the surrounding landscape.
Hell Hole-Middle Fork Tunnel Gatehouse Road	Project Road	Seen	R	II-III	Road seen in foreground from the west end of the reservoir. Minimal road cuts and partial vegetative screening results in road being not readily noticeable.	
Hell Hole Dam and Powerhouse Road and Spillway Southern Access Point	Project Road/Access Point	Seen	R	IV	Upper portion road can be seen from most reservoir locations. Road is integrated part of dam and spillway.	
Hell Hole Dam Spillway Northern Access Point	Project Road/Access Point	Seen	R	II-III	Upper portion road can be seen from most reservoir locations. Road is integrated part of dam and spillway.	
Middle Fork American River Viewshed						
Ralston Afterbay Area	Ralston Afterbay Dam	Medium Dam	Seen	R/PR	IV	Due to immediate foreground views from river, dam would dominate the characteristic landscape due to contrasts in form, and color.
	Oxbow Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	PR	IV	Short term viewing by whitewater boaters putting in at Indian Bar Rafters Put-in, and by other visitors using this access point.
	Middle Fork American River Gage below Oxbow Powerhouse (USGS Gage No. 11433300)	Stream Gage	Seen	PR	III	Short term viewing by rafters or anglers. Staff plate and pipe is adjacent to river and visible from river. Metal stairs are mounted on bedrock above the river. Small scale object, visually unobtrusive.
	Oxbow Powerhouse Gage (USGS Gage No. 11433212)	Powerhouse Gage	Not noticed	PR	II	
	Photovoltaic Pole at Middle Fork American River Gage below Oxbow Powerhouse	Photovoltaic Pole and Powerline	Not noticed	PR	II	Short term viewing of isolated gage in river by rafters. Due to the small scale of the object, it is visually unobtrusive.
	Oxbow Powerhouse Slope Fence	Fence	Not noticed	PR	II	
	Middle Fork American River Gage below Oxbow Powerhouse Trail	Project Trail	Seen	PR	III	Short duration view by rafters and anglers. The trail consists of a gangplank and metal stairs mounted on bedrock. Not visually intrusive.

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
Rubicon River Wild and Scenic River Viewshed						
Hell Hole Reservoir Area	Hell Hole Dam and Outlet Works	Large Dam	Seen	R	IV	Foreground views of dam from river downstream of dam. Views of the dam dominate. Dam contrasts in scale, form, and texture with the characteristic landscape.
	Hell Hole Powerhouse	Powerhouse	Seen	R	III	Seen in immediate foreground at base of dam. Small scale structure blends in color with surrounding characteristic landscape, low contrasts in form, line and texture.
	Rubicon River Gage and Weir below Hell Hole Dam (USGS Gage and Weir No. 11428800)	Stream Gage and Weir	Seen	R	II-III	
	Hell Hole Dam Leakage Weir	Leakage Weir	Seen	R	II-III	
	French Meadows Powerhouse and Switchyard to Hell Hole — Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages, and Hell Hole Powerhouse Communication Line/Powerline	Communication and Powerline	Seen	R	III	Poles and lines seen in immediate foreground of the river, and ascending the north slope of the canyon. Features contribute to existing visual disturbance.
	Hell Hole Powerhouse to Rubicon River Gage and Weir below Hell Hole Dam Communication Line/Powerline	Communication and Powerline	Seen	R	III	Foreground views of line and poles at river and ascending open rock slope. Poles and line are visually evident due to no vegetative screening and contribute to visually cluttered appearance of area below dam.
	Hell Hole Dam Leakage Weir Road	Project Road	Seen	R	III	In foreground of river, in immediate vicinity of dam.
	Hell Hole Dam and Powerhouse Road and Spillway Southern Access Point	Project Road/Access Point	Seen	R	IV	Road seen in immediate foreground from river below dam. Road contributes to the disturbed character of the area.
	Rubicon River Gage and Weir below Hell Hole Dam Road	Project Road	Seen	R	III	Road seen in immediate foreground from river below dam. Lack of road cuts minimizes visual effects but contributes to disturbed character of the area.
	Hell Hole Dam Spillway Discharge Channel Road	Project Road	Seen	R	IV	Road seen in immediate foreground from river below dam. Road contributes to the disturbed character of the area.
Ralston Reservoir Area	Ralston Afterbay	Medium Reservoir	Seen	R/PR	II-III	Upper end of reservoir is visible from Rubicon River
	Ralston Powerhouse Penstock and Butterfly Valve House	Water Conveyance	Seen	R	IV	Penstock creates solid line on hillside in contrast to highly textured hillside. Appurtenant facilities at base add visual clutter. Penstock color blends well with surrounding characteristic landscape.
	Ralston Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	R	IV	Near views of moderate duration while traveling along Rubicon river. Facilities dominate and contrast strongly with surrounding landscape character due to large scale, angular forms and smooth man-made textures created by building and switchyard facilities.
	Ralston Powerhouse Gage (USGS Gage No. 11427765)	Powerhouse Gage	Seen	R	III	Minor structure not readily noticed compared to powerhouse and switchyard, but contributing to visual contrasts associated with the powerhouse.
	Ralston Powerhouse to Ralston Powerhouse Butterfly Valve House Communication Line/Powerline	Communication and Powerline	Seen	R	III	Powerline is not readily discernable. Visibility of exposed soils associated with the penstock dominates.
	Ralston-Oxbow Tunnel Intake to Ralston Powerhouse Communication Line	Communication Line	Seen	R/PR	III	Powerline seen from Rubicon River along 14N25.
	Passive Microwave Reflector Station above Ralston Afterbay	Microwave Reflector	Seen	R	II-III	This feature could be seen by river users, although it may not be readily noticeable depending upon the viewing angle and time of day.
	Ralston Powerhouse Penstock and Butterfly Valve House Slope Fences	Fence	Not noticed	R	II	
	Ralston Powerhouse Slope Fence	Fence	Seen	R	III	Fencing is discernable on hillsides. Metallic color contrasts with native rock enhancing visibility of the fencing.
Ralston Afterbay Sediment Removal Access Point	Project Road/Access Point	Seen	R	II-III	Area can be seen from the river when entering the upstream tail of Ralston Afterbay. Access point appears as a put-in or ramp area and is not visually obtrusive.	

Table REC 5-4. EVC Assessment of MFP Facilities or Features that are Visible from USDA-FS Managed Viewsheds.

Project Area	Middle Fork Project Facilities	Project Facility Type	Visibility from Viewshed	Forest Plan VQO	EVC Rating	Discussion/Explanation
South Fork Long Canyon Creek Viewshed						
South Fork Long Canyon Diversion Area	South Fork Long Canyon Diversion Dam and Pool	Small Diversion Dam and Pool	Seen	PR	IV	Project features dominate immediate foreground views from stream locations immediately upstream and downstream of the diversion. Built features contrast in form, line, colors and textures with the characteristic landscape. Due to the relatively small scale of the features they are not readily seen beyond the immediate foreground.
	South Fork Long Canyon Diversion Pipe and Drop Inlet	Water Conveyance	Seen	PR	III	Project feature seen in immediate foreground view of stream. Due to the relatively small scale of the features they are not readily seen beyond the immediate foreground.
	South Fork Long Canyon Gage and Weir at Diversion Dam (USGS Gage and Weir No. 11433065)	Stream Gage/Weir	Seen	PR	III	Gage and weir seen in immediate foreground of stream below diversion.
	South Fork Long Canyon Gage at Diversion Dam (USGS Gage No. 11433060)	Diversion Gage	Seen	PR	III	Gage seen in immediate foreground of stream upstream of the diversion.
	Photovoltaic Pole and Powerline at South Fork Long Canyon Gage at Diversion Dam	Photovoltaic Pole and Powerline	Seen	PR	III	Seen from immediate foreground of stream upstream of the diversion.
	South Fork Long Canyon Diversion and Drop Inlet Road	Project Road	Seen	PR	III	Features seen in immediate foreground of stream downstream of the diversion only.
North Fork Long Canyon	North Fork Long Canyon Diversion Pipe and Drop Inlet	Water Conveyance	Seen	PR	III	Seen in immediate foreground of stream bed, otherwise not seen.
	North Fork Long Canyon Diversion Drop Inlet Road	Project Road	Seen	PR	III	May be seen, area not visited.
Hell Hole Reservoir Developed Recreation Sites Viewsheds (Big Meadows CG, Hell Hole CG, Hell Hole Boat Ramp and Hell Hole Boat Ramp Parking Area, Hell Hole General Parking Area, Hell Hole Vista, Upper Hell Hole CG)						
Hell Hole Reservoir Area	Hell Hole Dam and Outlet Works	Large Dam	Seen	R	III-IV	A portion of the dam is seen in foreground from the Hell Hole General Parking area and in middleground from Hell Hole Vista and some sites from Hell Hole Campground.
	Hell Hole Reservoir & Shoreline	Large Reservoir	Seen	R	II-III	Reservoir seen from Hell Hole Boat Ramp, parking area, general parking area, Hell Hole Vista, and campsites nearest the reservoir at Hell Hole Campground and from Upper Hell Hole Campground.
	Hell Hole – Middle Fork Tunnel Gatehouse	Water Conveyance	Seen	R	III	Foreground views of gatehouse from Hell Hole Boat Ramp, parking area and general parking area. Moderately small, light colored structure is highly noticed due to color contrasts with surrounding moderately dark rock walls.
	French Meadows Powerhouse Penstock and Butterfly Valve House	Water Conveyance	Seen	R	II-III	Seen in foreground, at an oblique angle from Hell Hole Vista. Seen in middleground from Hell Hole Boat Ramp, parking area and general parking area. Penstock and butterfly valve house are not readily noticed due to visual dominance of tunnel muck from all locations.
	French Meadows Powerhouse and Switchyard	Powerhouse/ Switchyard	Seen	R	III	Seen in foreground, at an oblique angle from Hell Hole Vista. Seen in middleground from Hell Hole Boat Ramp, parking area and general parking area. Powerhouse and switchyard are visually evident, but do not dominate the view as does the tunnel muck.
	French Meadows Powerhouse to French Meadows Powerhouse Penstock and Butterfly Valve House Communication Line/Powerline	Communication and Powerline	Seen	R	II-III	Seen in foreground from Hell Hole Vista and foreground and middleground from Hell Hole Boat Ramp area. Poles and line are not readily noticeable.
	French Meadows Powerhouse and Switchyard to Hell Hole — Middle Fork Tunnel Gatehouse, Dormitory Facility, Operator's Cottages, and Hell Hole Powerhouse Communication Line/Powerline	Communication and Powerline	Seen	R	II-III	Foreground views from above of some of the line from Hell Hole Vista. Foreground and middleground views from Hell Hole Boat Ramp, Parking Area, and General Parking Area of the powerline are not readily noticeable due to vegetative screening.
Hell Hole Substation	Substation	Seen	R	II-III		
Hell Hole Reservoir Developed Recreation Sites Viewsheds (Big Meadows CG, Hell Hole CG, Hell Hole Boat Ramp and Hell Hole Boat Ramp Parking Area, Hell Hole General Parking Area, Hell Hole Vista, Upper Hell Hole CG) (continued)						
Hell Hole Reservoir Area	French Meadows Powerhouse Penstock Rock Fence	Fence	Not noticed	R	II	
	French Meadows Powerhouse Slope Fence	Fence	Not noticed	R	II	
	French Meadows-Hell Hole Tunnel Portal Road	Project Road	Seen	R	II-III	Road cut in hillside seen, but not readily noticeable. Road blends well in color and texture with surrounding characteristic landscape. Road not noticeable from Boat Ramp, Parking, and General Parking areas, and not seen from other recreation sites.
	French Meadows Powerhouse Road	Project Road	Seen	R	II-III	Road seen in foreground, creates a line on hillside. Otherwise, is not visually evident due to a lack of road cuts, good vegetative screening and the highly textured character of the surrounding landscape.
	Hell Hole-Middle Fork Tunnel Gatehouse Road	Project Road	Seen	R	II-III	Road seen in foreground from the Boat Ramp, Parking Area, and General Parking Area. Minimal road cuts and partial vegetative screening results in road being not readily noticeable.
	Hell Hole Dam and Powerhouse Road and Spillway Southern Access Point	Project Road/Access Point	Seen	R	IV	Southern access road is visible in background from Hell Hole Vista
	Hell Hole Dam Spillway Northern Access Point	Project Road/Access Point	Seen	R	II-III	Northern access road is visible in background from Hell Hole Vista
Middle Meadows Group Campground Viewshed						
No Project facilities or features are visible from this viewshed.						
Big Crater Special Interest Area Viewshed (area not visited, information based on USFS communication)						
Middle Fork Interbay Area	Passive Microwave Reflector Station above Middle Fork Interbay	Microwave Reflector	Seen	PR	III	Likely view across canyon from rim of Big Crater. Small scale object, light color contrasts with surrounding vegetation.
	Middle Fork Powerhouse Penstock and Butterfly Valve House Road	Project Road	Seen	PR	III	Possible views of exposed slopes and road bed due to viewing angle and foreground viewing distance.
	Middle Fork Powerhouse Butterfly Valve House Road	Project Road	Seen	M	III	Possible views of exposed slopes and road bed due to viewing angle and foreground viewing distance.
	Middle Fork Interbay Dam and Powerhouse Road and Interbay Access Points	Project Road/Access Point	Seen	R/PR/M	III	Most likely road is fairly well screened due to heavily vegetated slope, middleground distance, and viewing angle.
Little Crater Interest Area Viewshed (area not visited, information based on USFS communication)						
No Project facilities or features are visible from this viewshed.						

FIGURES

Figure REC 5-1. REC 5 – Visual Quality Study Objectives and Related Study Elements.

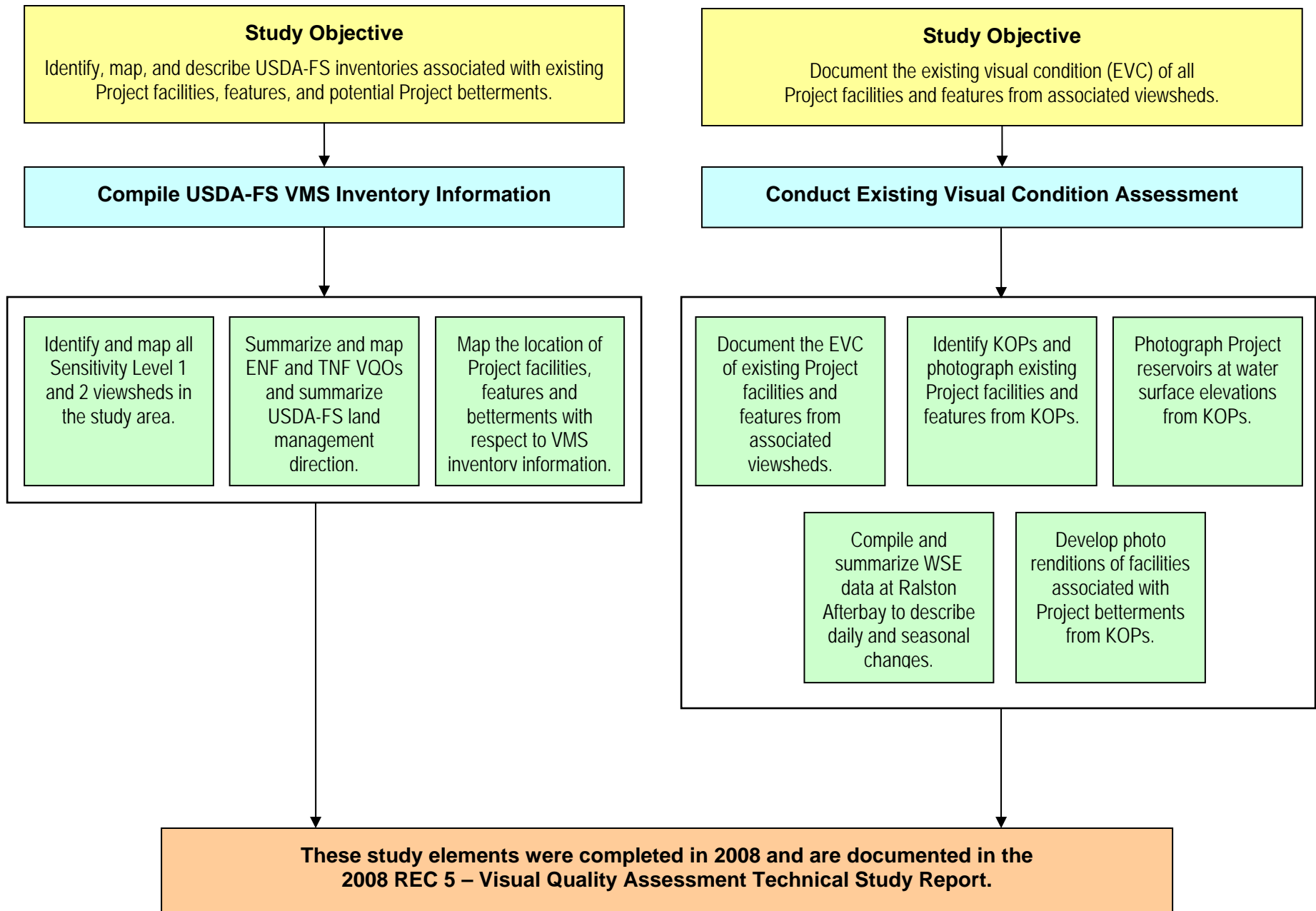


Figure REC 5-2. Water Surface Elevations at Ralston Afterbay – Winter.

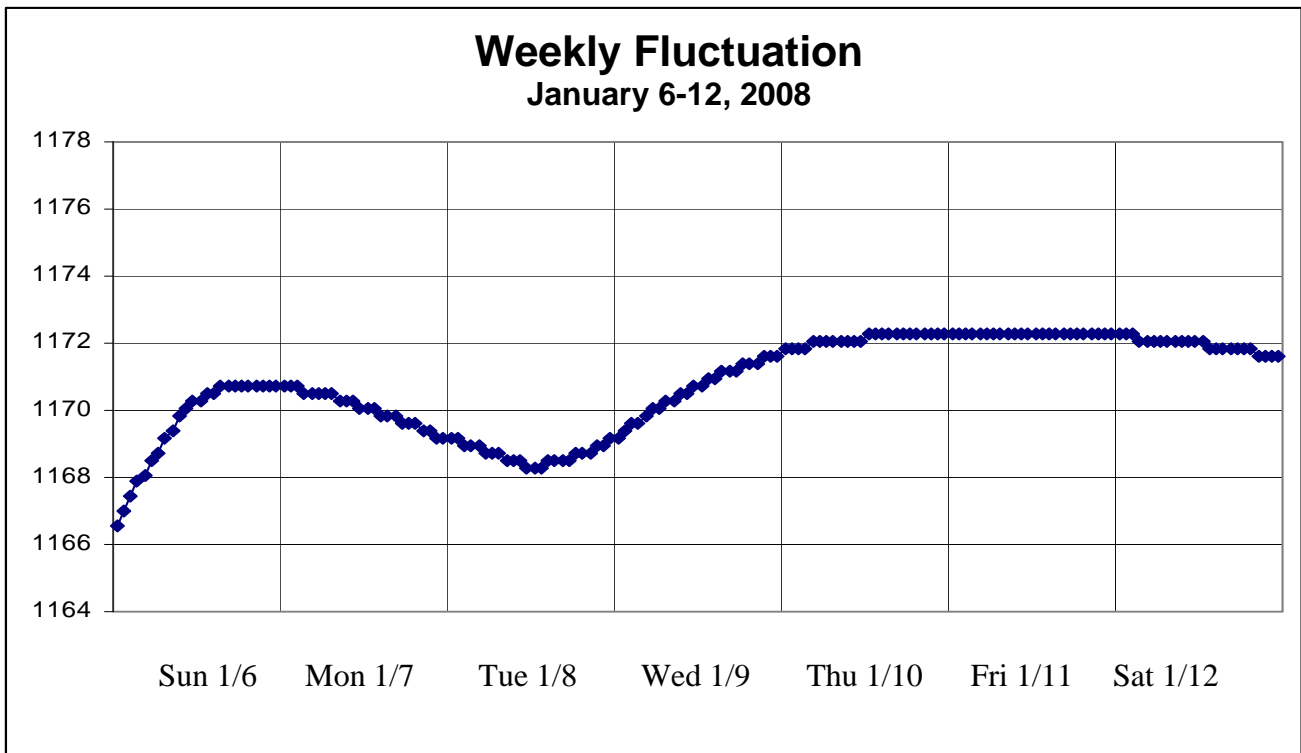
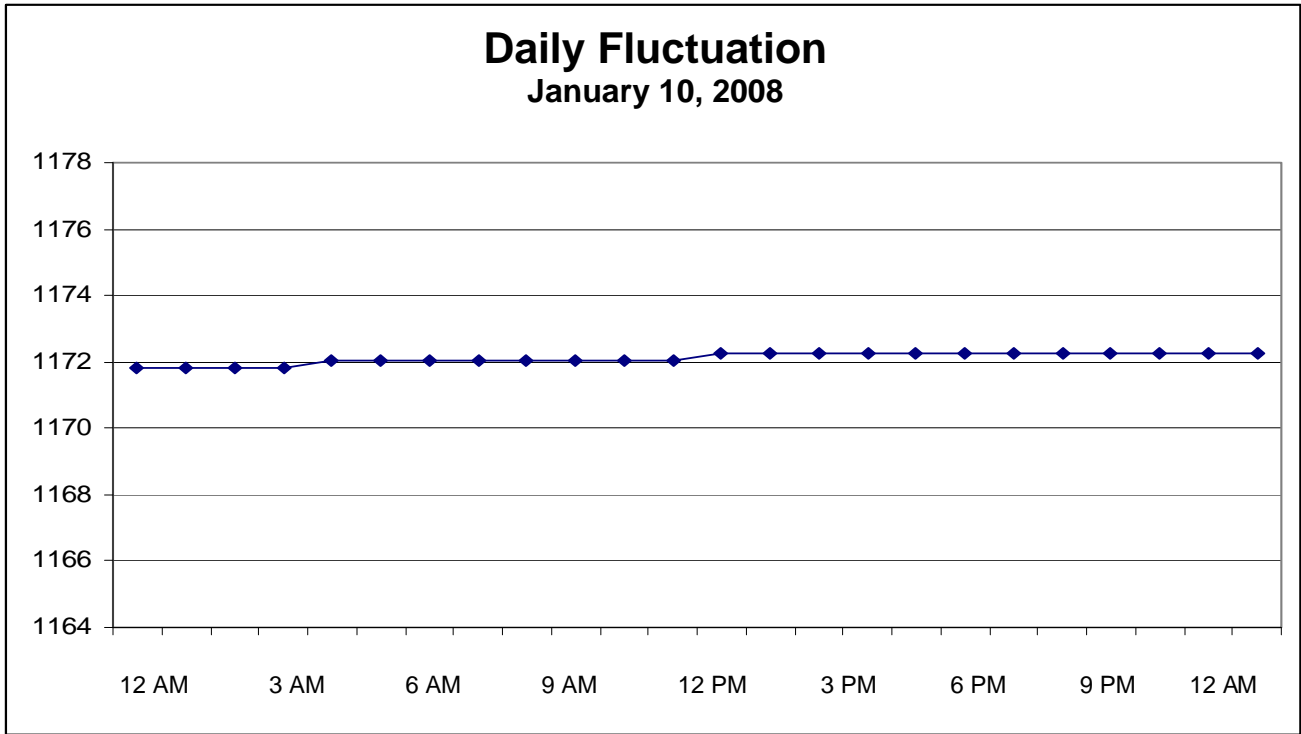


Figure REC 5-3. Water Surface Elevations at Ralston Afterbay – Spring.

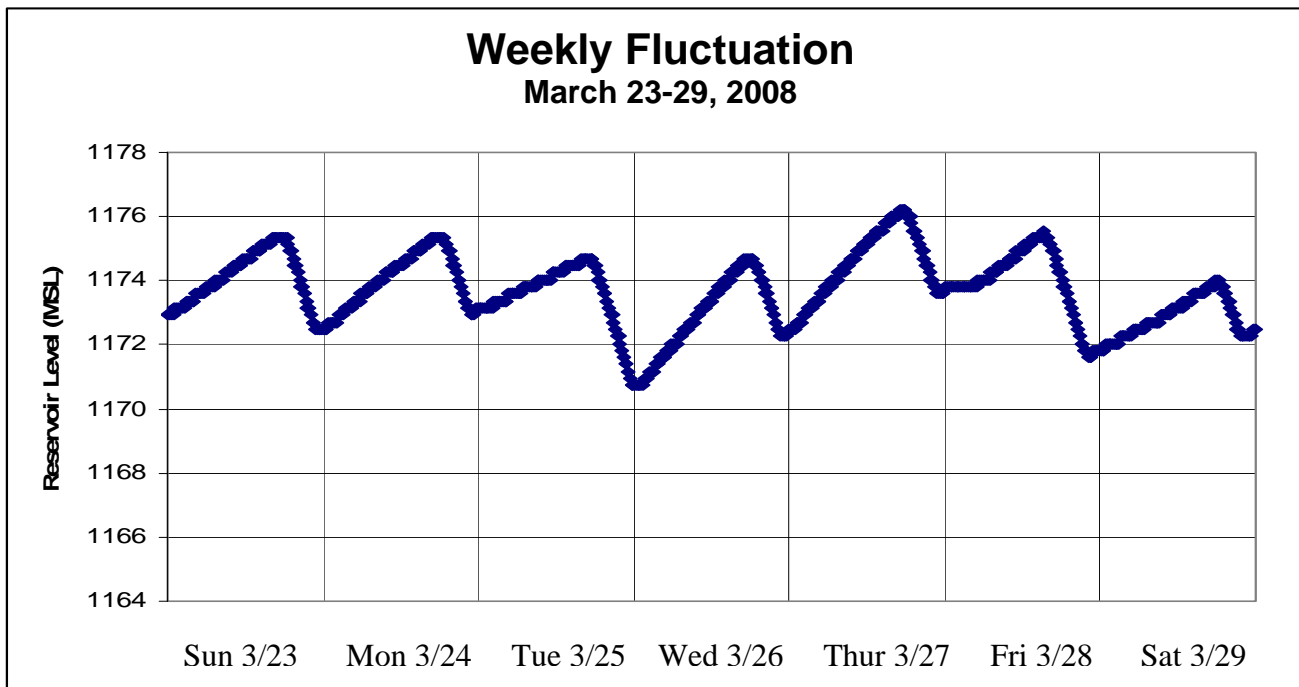
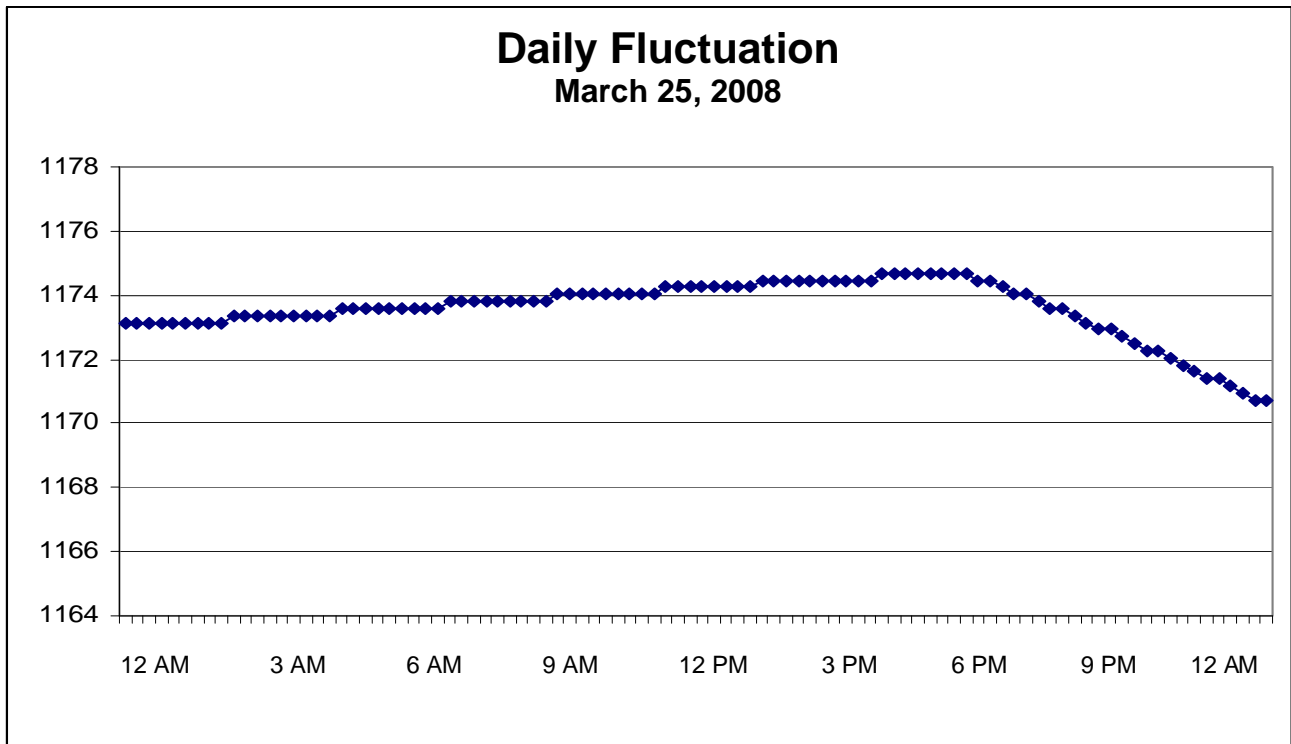


Figure REC 5-4. Water Surface Elevations at Ralston Afterbay – Summer.

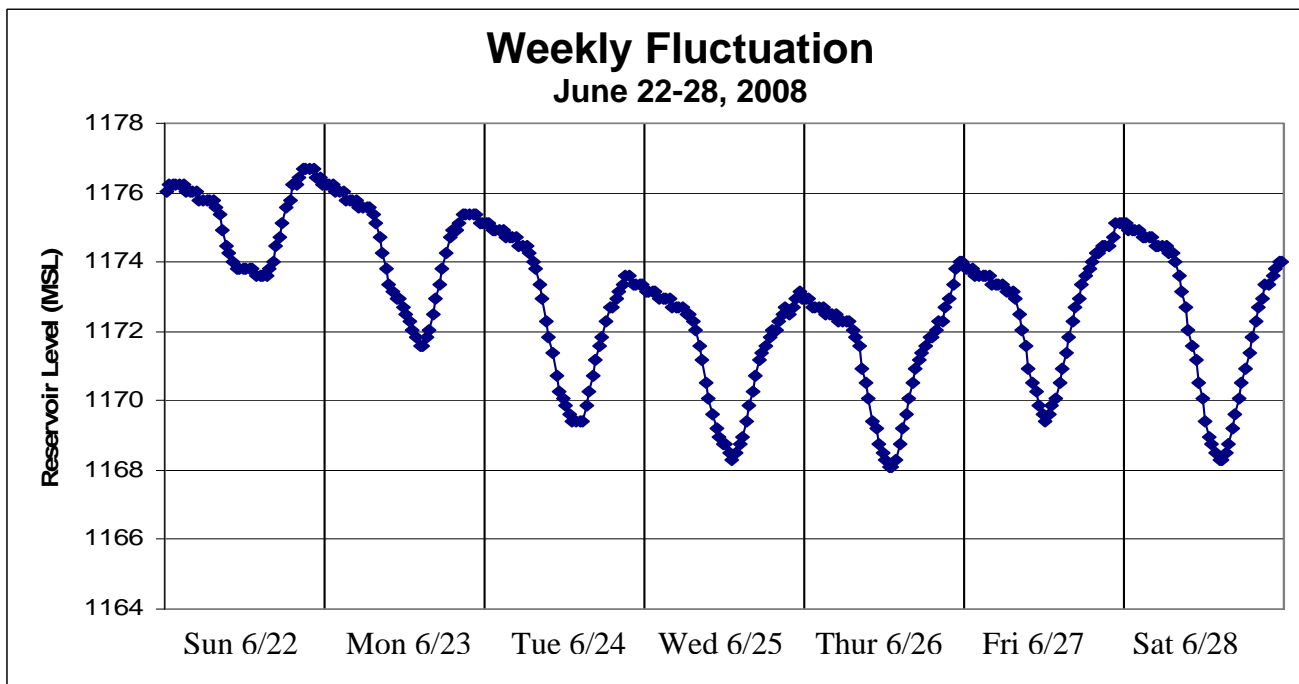
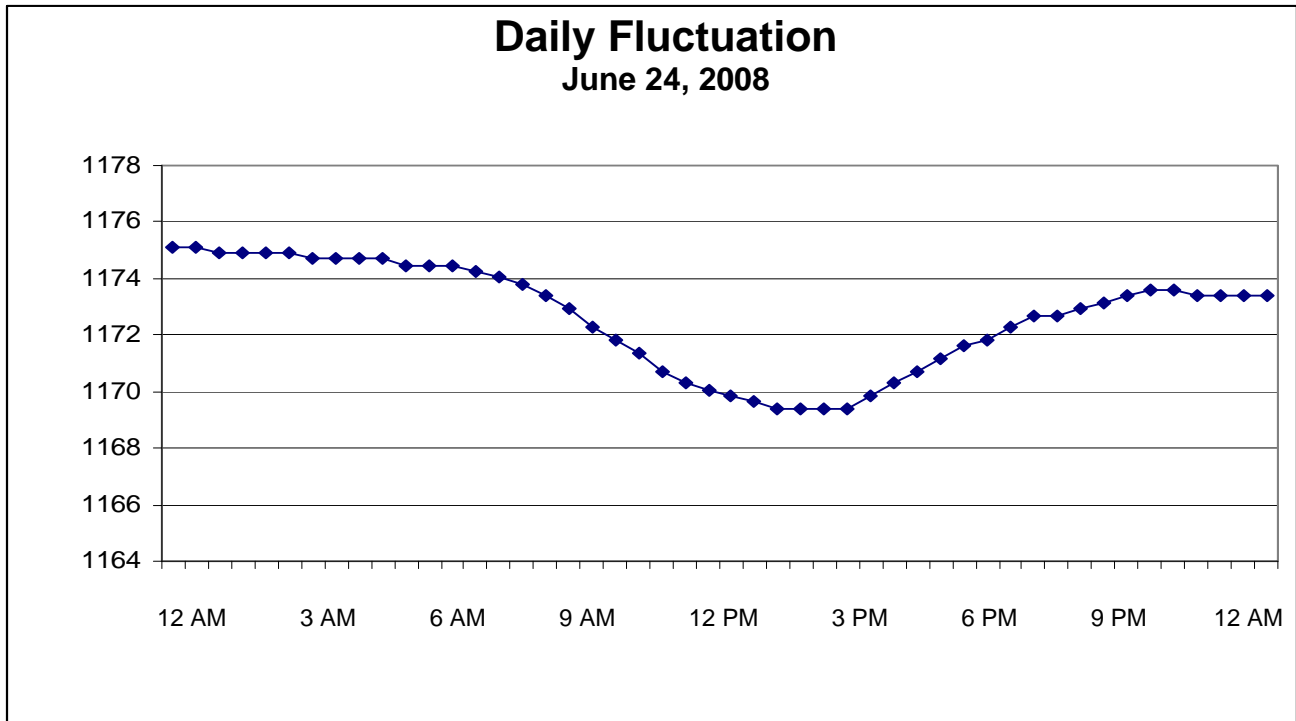
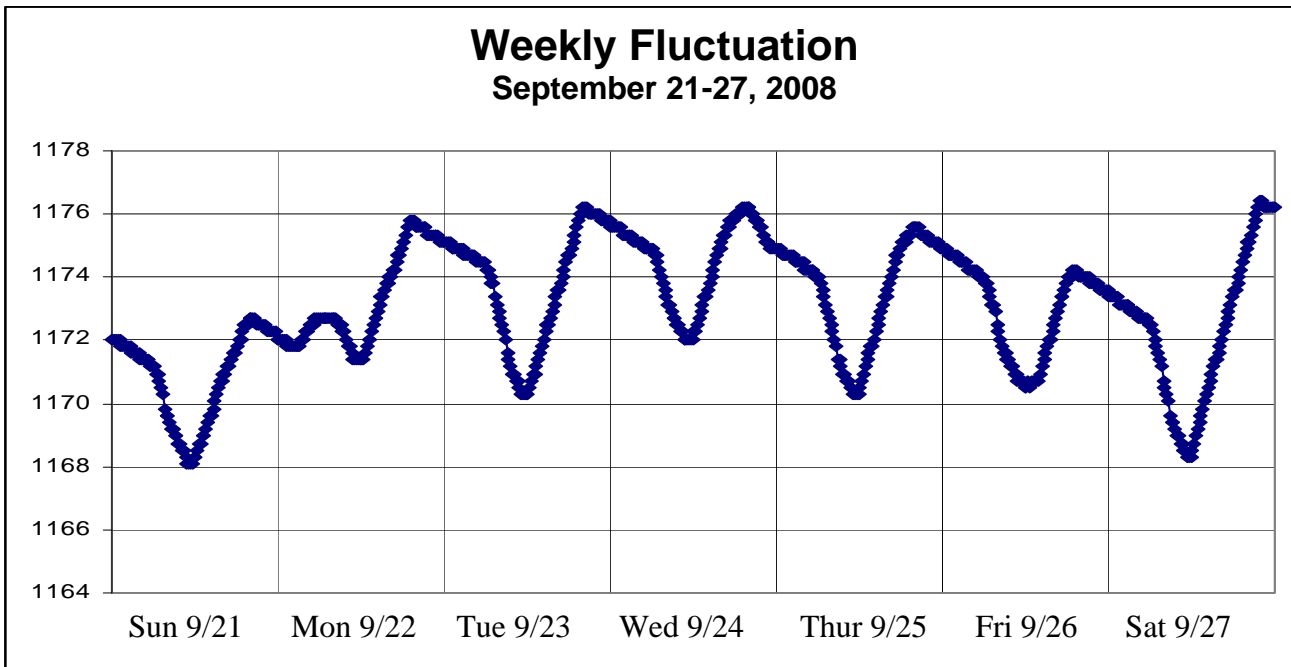
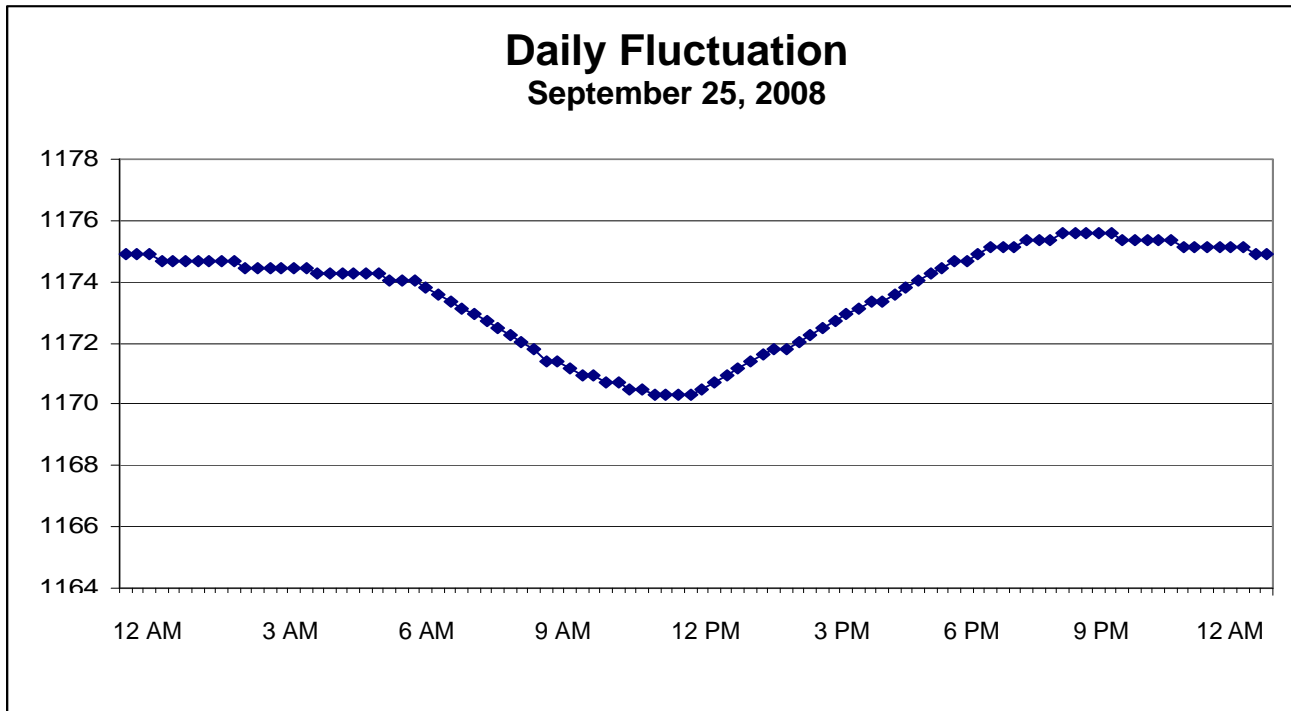


Figure REC 5-5. Water Surface Elevations at Ralston Afterbay – Fall.



MAPS

APPENDIX A
Overview of the USDA-FS Visual Management System

Overview of the USDA-FS Visual Management System

The U.S. Department of Agriculture Forest Service (USDA-FS) Visual Management System (VMS) is a methodology for: (1) inventorying the visual resource, referred to as “Inventory VQOs”; (2) establishing management objectives for the visual resource, referred to as “Forest Plan VQOs”; and (3) assessing visual impacts associated with proposed actions. Two important assumptions inherent to this methodology are:

- A landscape viewed by many people is more visually sensitive than a landscape viewed by a few.
- A unique or aesthetically high-quality landscape is more sensitive than a regionally common landscape, whether or not it is viewed by many people.

The VMS is used in two separate, but connected ways to manage a Forest’s visual resources. The VMS is first used to inventory the visual landscape based on the character of the landscape, the sensitivity of the viewers that most commonly view the landscape, and the distance from which the landscape is most commonly viewed. The results of the inventory are summarized by one of the four visual quality objective (VQO) designations (preservation, retention, partial retention, and modification) used by the Forest Service. These are referred to in this report as “Inventory VQOs”.

The VMS, through the Inventory VQOs is then used in the development of the Forest Plan. The Inventory VQOs provide the starting point or baseline, for visual management in the Forest planning effort. Since Forest Plans must balance competing resource objectives, the Inventory VQOs can be modified or “traded off” during the Forest Plan development process. Therefore, an area that may have an Inventory VQO of retention may have a Forest Plan VQO of partial retention, or vice versa. As a result, the VQOs in the Forest Plan may or may not be different from Inventory VQOs. However, Forest Plan VQOs represent the management direction for the visual resource through the designation of “**objectives**” for the visual resource. In this report, these are referred to as “Forest Plan VQOs”.

Both the Inventory VQOs and Forest Plan VQOs provide visual resource management information necessary to evaluate the existing visual condition of the Project and the visual effect of proposed Project betterments. The primary difference between the two is that Inventory VQOs reflect actual landscape conditions on the ground, where as Forest Plan VQOs are the adopted management direction for visual resources throughout the life of the Forest Plan and are used to evaluate the consistency of proposed management actions with Forest Plan direction. The visual terminology used in establishing Inventory VQOs, and the definitions for Forest Plan VQOs used on the ENF and TNF are discussed below.

Inventory VQOs

Inventory VQOs are established by each respective Forest using GIS information and field verification. Inventory VQOs represent composite rating of three separate visual resource components: (1) landscape variety, (2) viewer sensitivity, and (3) distance zone. Landscape variety is a classification of the inherent scenic integrity or visual

interest of the landscape. Viewer sensitivity levels reflect the number and relative concern of viewers for the scenic qualities of the landscape. Distance zones reflect the typical distance from which the landscape is viewed. Each of these VQO components is described below.

Landscape Variety Classes

Landscape variety classes are a relative classification of the landscape into areas of importance from a scenic quality perspective. 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. The USDA-FS has established three variety classes:

- Class A – Distinctive
- Class B – Common
- Class C – Minimal

Sensitivity Levels

Sensitivity levels are an indication of people's concern for the scenic quality of the landscape. The levels are based on the amount of use an area receives and the type of user. The USDA-FS has established three levels of sensitivity: Level 1 – for primary travel routes and recreation use areas, where visitors are anticipated to have a high concern for the visual quality; Levels 2 and 3 – for areas that are not heavily used, and where users have a moderate or low concern for the visual quality due to a commodity orientation to the landscape.

Distance Zones

The USDA-FS has established three distance zones used in a VQO designation:

- Foreground (Fg) is defined as the landscape within 0.5 miles of the observer
- Middle ground (Mg) is defined as the distance between 0.5 miles and 3 miles
- Background (Bg) is defined as the distance beyond the middle ground

Inventory VQO Designations

The matrix below depicts the resultant Inventory VQOs based on consideration of the combined results of the VQO components (landscape variety, sensitivity level and distance). The Inventory VQOs include:

- P = preservation VQO
- R = retention VQO
- PR = partial retention VQO
- M = modification VQO

**USDA-FS Inventory VQOs
Resulting from Combinations of
Distance Zone, Sensitivity Level and Variety Class**

Landscape Variety Classes		Distance Zone and Sensitivity Level						
		Fg1	Mg1	Bg1	Fg2	Mg2	Bg2	3*
A	Distinctive	<i>R</i>	<i>R</i>	<i>R</i>	<i>PR</i>	<i>PR</i>	<i>PR</i>	<i>PR</i>
B	Common	<i>R</i>	<i>PR</i>	<i>PR</i>	<i>PR</i>	<i>M</i>	<i>M</i>	<i>M</i>
C	Minimal	<i>PR</i>	<i>PR</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>

*There are no distance zone designations associated with Sensitivity Level 3. Source: USDA Forest Service 1974.

Forest Plan VQOs

Forest Plan VQOs represent Forest management direction throughout the life of the Forest Plan. Forest Plan VQOs are used in Forest decision making to evaluate consistency of proposed actions with Forest management direction. VQOs are established to assure that visitors are afforded views of natural looking landscapes when seen from Sensitivity Level 1 and 2 roads, trails, water bodies (streams, lakes and reservoirs) and developed recreational use areas where public use is concentrated.

Forest Plan VQOs are one of many Forest resources that are inventoried and then weighed and balanced in combination with multiple resources to develop a Forest Plan. Forest Plans can differ in their structure and organization, but most dissect a forest into some type of management area for which a specific management direction is defined. The ENF Forest Plan identifies 6 emphasis zones within each are several management areas. Whereas the TNF Forest Plan identified over 100 geographically defined management areas (MAs). Both types of Forest Plan structures identify management areas for which there are varying combinations of practices, standards, and guidelines which make up a management area prescription that is the Forest Plan direction for that unit of land. VQOs are one of the guidelines established within each management area and are referred to in this report as Forest Plan VQO.

Forest Plan VQO Definitions

Four different VQOs are used on the TNF and ENF: Preservation (P), Retention (R), Partial Retention (PR), and Modification (M). Each of these is defined below.

Preservation (P) – The Preservation VQO designation allows for ecological changes only. Management activities, except for very low visual impact recreation facilities are prohibited. The 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 (USDA-FS1974).

Retention (R) – The Retention (R) VQO provides for management activities that are not visually evident. Under Retention, activities may only repeat form, line, color and texture which are frequently found in the characteristic landscape. Changes in their

qualities of size, amount, intensity, direction, pattern, etc., should not be evident (USDA-FS 1974).

Partial Retention (PR) – Under the Partial Retention (PR) VQO, management activities are to 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, pattern, etc., remain visually subordinate to the characteristic landscape. Activities may also introduce form, line, color, or texture, which are found infrequently or not at all in the characteristic landscape, but they should remain visually subordinate to the visual strength of the characteristic landscape (USDA-FS 1974).

Modification (M) – Under the modification (M) VQO, management activities may visually dominate the original characteristic landscape. However, activities of vegetative and land form alterations 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, roads, slash, root wads, etc., must remain visually subordinate to the proposed composition. Activities which are predominantly introduction of facilities such as buildings, signs, roads, etc., should borrow naturally established form, line, color, and texture so completely and at such a scale that its visual characteristics are compatible with the natural surroundings (USDA-FS 1974).

Existing Visual Condition (EVC)

EVC is another component of the VMS that is independent of the VMS methodologies for establishing Inventory VQOs and Forest Plan VQOs. EVC is an analysis tool for evaluating the visual effect of existing and/or proposed management activities. It is used primarily to determine the degree to which a management activity is consistent with Forest Plan VQOs.

For the PCWA Project, the EVC assessment identifies the EVC Type attributed to Project facilities as seen from specific managed viewsheds identified by each of the respective Forests. Some Project facilities are seen from more than one viewshed. Therefore, the appearance of the facility may have more than one EVC Type rating depending upon how it appears from each viewshed it is seen from.

The EVC assessment uses terminology and thresholds that are parallel to VQO definitions in that EVC Types I, II, III, and IV correspond to VQO definitions for preservation, retention, partial retention, and modification, respectively. In addition, EVC Type V corresponds to the VQO definition for maximum modification which can occur in an EVC assessment, but is not an acceptable objective for Forest Planning and is not used by either the TNF or ENF as a Forest Plan VQO in their Forest Plan. EVC Types are defined by the USDA-FS as follows (USDA Forest Service 1974):

Type I – Areas where only ecological change has taken place except for trails needed for access, and areas are visually untouched by man’s activities.

Type II – Areas in which change in the landscape are not visually evident to the average person unless pointed out. These areas are unnoticed.

Type III – Areas where changes in the landscape are noticed by the average Forest visitor, but they do not attract attention. The natural appearance of the landscape still remains dominant. These areas appear to be minor disturbances.

Type IV – Areas in which changes in the landscape are easily noticed by the average Forest visitor and may attract some attention. These areas visually appear as disturbances but resemble natural patterns.

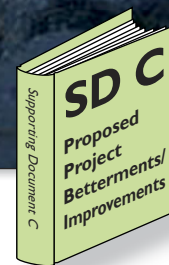
Type V – Areas in which changes in the landscape are strong and would be obvious to the average Forest visitor. These changes stand out as a dominating impression of the landscape, yet they are shaped so that they might resemble natural patterns when viewed from 3-5 miles or more distance. These areas visually appear to be major disturbances.

APPENDIX B

Overview of Potential Project Betterments/Improvements



HELL HOLE RESERVOIR SPILLWAY



Project Betterments/ Improvements

IN PREPARATION FOR THE RELICENSING OF THE MFP, PCWA conducted an assessment to identify potential modifications or additions (betterments) to existing Project facilities that would improve operations or maintenance of the Project, and result in an increase in net or peaking generation. As a result of this assessment, PCWA is including the following three potential Project betterments in the PAD:

- Hell Hole Reservoir Seasonal Storage Increase
- French Meadows Powerhouse Capacity Upgrade
- Ralston Powerhouse Capacity Upgrade

PCWA intends to further evaluate these potential betterments during relicensing with respect to their engineering and economic feasibility and the potential protection, mitigation, or enhancement measures that may be necessary to address potential effects on environmental and cultural resources. The specific Project betterments to be included in the License Application will be determined after reviewing the results of on-going engineering, economic, cultural, and environmental studies in relation to potential future license conditions.

HELL HOLE RESERVOIR SEASONAL STORAGE INCREASE

The purpose of this betterment would be to seasonally increase the storage capacity of Hell Hole Reservoir. The betterment would utilize a portion of the existing flood control pool, above the present normal maximum operating water level, to store additional water during the spring and summer after the peak of the runoff period. An approximate ~~9,750 ac-ft to 12,000 ac-ft~~ increase in seasonal storage in the reservoir would be achieved by installing ~~8-10~~ foot high crest gates on the existing dam spillway. The crest gates would be raised when needed to increase reservoir storage. Operation of the crest gates would also seasonally increase the reservoir's inundation area within the existing flood pool by approximately 37 acres.

7,600

6

6



Installation of spillway gates on Hell Hole Reservoir will increase seasonal storage and power generation.

In years when either French Meadows or Hell Hole reservoirs would have spilled, this betterment would allow the MFP to capture additional water in storage in Hell Hole Reservoir which can later be used to increase net annual energy generation. In all but the driest years, the betterment would also allow the MFP to shift the timing of some generation from the spring run-off period to the summer peak energy demand period. While the shift in the timing of the generation will not increase total annual MFP generation, it will increase the benefit of the Project by increasing generation during the peak energy demand period. This betterment would require a new water right to allow for additional storage at Hell Hole Reservoir.

This betterment would require the following modifications to existing Project facilities:

- Hell Hole Dam Spillway - install ~~8-10~~ foot-high crest gates on the existing concrete spillway
- Hell Hole Dam - ~~install 2 foot high parapet walls on each end of the existing dam to maintain minimum freeboard requirements, if 10 foot high crest gates are installed~~
- French Meadow Powerhouse - ~~install 4 foot-high parapet wall at the powerhouse to avoid inundation from wave action when the reservoir is at its maximum water surface elevation~~
- Hell Hole - Middle Fork Tunnel Gatehouse - ~~install 4 foot high parapet wall around the gatehouse to avoid inundation from wave action~~
- South Fork Long Canyon Diversion Dam - ~~install 3 foot-high crest gates on the diversion dam or a check valve at the drop inlet to avoid the backflow of water from the Hell Hole - Middle Fork Tunnel into South Fork Long Canyon Creek when Middle Fork Powerhouse is not operating~~

The betterment would also require construction of ~~three~~ **two** new Project facilities including:

- Hell Hole Dam Spillway Crest Gates Control Building - construct a small control building adjacent to the spillway to provide power to operate the spillway crest gates
- Hell Hole Dam Spillway Crest Gates Control Building Powerline - construct a short spur line (approximately 525 feet) from the control building to an existing powerline to provide power for spillway crest gate operations
- ~~South Fork Long Canyon Diversion Dam Generator Building - construct a control building with a generator to provide power to operate the crest gate~~

FRENCH MEADOWS POWERHOUSE CAPACITY UPGRADE

The purpose of this betterment would be to increase the generating capacity of the existing French Meadows Powerhouse from 15.3 MW to approximately 30 MW. Generating capacity would be increased by adding a second powerhouse immediately adjacent to the existing powerhouse. The existing French Meadows Powerhouse is only able to utilize approximately one-half of the maximum hydraulic capacity of the French Meadows - Hell Hole Tunnel. The addition



FRENCH MEADOWS POWERHOUSE

The addition of a second French Meadows Powerhouse will allow PCWA to increase peaking generation.

of a second unit would allow the maximum hydraulic capacity of the tunnel to be used to transport more water over a shorter period of time from French Meadows Reservoir to Hell Hole Reservoir, thereby increasing the MFP's peaking generation capabilities. This betterment would require a new water right to allow for an increase in the permitted direct diversion rate from French Meadows Reservoir to Hell Hole Reservoir.

The new powerhouse would also increase the capability of the MFP to supply electrical grid support services. The new generating unit could be operated simultaneously or independently of the existing generating unit. The existing PG&E 60-kV French Meadows - Middle Fork Transmission Line will be used to interconnect the new powerhouse with the PG&E transmission system.

This betterment would require the following modifications to existing Project facilities:

- French Meadows - Hell Hole Tunnel Intake Trash Rack - possible replacement of the existing cylindrical trash rack with a larger trash rack to reduce head losses and allow greater volume of water to flow into the tunnel
- French Meadows Powerhouse Switchyard - expand the existing switchyard to include additional buswork, transformers, and electrical switching equipment necessary to convey the additional power generated at the new powerhouse
- Middle Fork Powerhouse Upper Switchyard - upgrade the transformers and switchgear at the existing 60kV substation at Middle Fork Interbay to handle the additional power transfer

This betterment would also require construction of the following new Project facilities:

- French Meadows Powerhouse - construct a second powerhouse with installed generating capacity of approximately 15 MW immediately adjacent to existing powerhouse
- French Meadows Powerhouse Penstock - construct a second penstock, parallel to the existing penstock, to provide water to the new powerhouse
- Additional Surge Capacity Facility - develop additional surge capacity through construction of a surge shaft, surge shaft and tank, or surge pipeline located above the French Meadows - Hell Hole Tunnel Portal, or installation of a bypass valve in the new powerhouse
- French Meadows - Hell Hole Tunnel Surge Shaft or Pipeline Access Road - construct a new Project road from an existing Forest Service road to the surge shaft or pipeline and temporarily improve the existing Forest Service road

RALSTON POWERHOUSE CAPACITY UPGRADE

The purpose of this betterment is to improve the operating efficiency of the Middle Fork - Ralston system by increasing the hydraulic capacity of Ralston Powerhouse to match Middle Fork Powerhouse throughput, plus accretions at Middle Fork Interbay. This betterment would allow the MFP to maximize peaking generation during periods of high energy demand, thereby increasing the overall benefit of the MFP. This betterment would only require upgrades to electrical and mechanical equipment within the Ralston Powerhouse. This betterment may result in the ability of Ralston Powerhouse to utilize more than 1,000 cfs, in which case a new water right will be needed.



RALSTON POWERHOUSE

The Ralston Powerhouse upgrade will increase peaking generation opportunities.

APPENDIX C

Overview of Project Facility Areas and Landscape Character

Project Landscape Character

The Project is situated in the foothills and mountainous uplands of the western slope of the central Sierra Nevada, within the TNF and ENF. Bypass streams downstream of the Project reservoirs flow from elevations ranging from a high of approximately 5,300 feet (ft) above mean sea level (msl) to approximately 1,100 ft msl at Ralston Afterbay. Surrounding ridgelines reach elevations of 7,000 ft msl.

The Middle Fork American River landscape is characterized by steep canyons and rugged terrain with dense forests and woodlands. Aesthetic resources include alpine lakes, rivers, streams, general forested areas, Wilderness areas, rivers, scenic forest routes, hiking trails, and developed campgrounds, vista points, picnic areas, boat ramps and special interest areas. This landscape is managed for timber, grazing, fish and wildlife habitat, recreation, and hydropower generation.

The land encompassing the Project facilities and bypass streams is considered rural in nature. There are no residential or commercial developments in the immediate vicinity of the Project. The nearest population center is Foresthill (population 1,791), located approximately four miles west-northwest of Ralston Afterbay. Several paved roads provide the primary access to the MFP vicinity. These include: Mosquito Ridge Road, Ralston Ridge Road, Blacksmith Flat Road, Soda Springs Riverton Road and Eleven Pines Road. Access to more remote Project locations is possible using ancillary roads and trails associated with the Forest Service Transportation System.

Duncan Creek Diversion Dam Area

The primary Project facilities in the Duncan Creek area are the Duncan Creek Diversion Dam and Duncan Creek Diversion Pool. These facilities are located on Duncan Creek, a tributary to the Middle Fork American River. The Duncan Creek Diversion Dam is a 32 foot-high, 165 foot-long, concrete gravity structure with a crest elevation of 5,275 ft msl. The dam impounds Duncan Creek and forms the Duncan Creek Diversion Pool, which has a gross storage capacity of approximately 20 acre-feet (ac-ft) and a maximum surface area of approximately 3 acres.

The topography in the Duncan Creek area is moderately steep. Predominant aspects are northwest and southeast. The Duncan Creek watershed is dominated by mixed conifer and pine species, including Douglas-fir and ponderosa pine, annual grasses and forbs, and California black oak, particularly near the confluence with the Middle Fork American River. Riparian species are found along the stream channel. The stream valley and side slopes are comprised of Paleozoic marine deposits and andesite, respectively. Rock outcrops can be seen along the immediate perimeter of the Duncan Creek Diversion Pool. In 2001, the Star Fire consumed 17,500 acres of forest on the ENF and TNF and private lands. This fire burned in the immediate vicinity of the Duncan Creek Diversion Dam destroying many of the trees and vegetation on the side slopes near the dam and altering the visual character of the landscape.

French Meadows Reservoir Area

The primary Project facilities in the French Meadows area are the French Meadows Dam and Reservoir, located on the Middle Fork American River. French Meadows Dam (also referred to as LL Anderson Dam) is a 231 foot-high, 2,700 foot-long rock and gravel filled structure with a crest elevation of 5,273 ft msl. The French Meadows Dam impounds the Middle Fork American River forming the French Meadows Reservoir, which provides 134,993 ac-ft of gross storage. The maximum surface area is about 5,262 ft and the minimum operating surface area is about 5,125 ft.

The landscape surrounding French Meadows Reservoir is characterized by moderately steep hillsides which are densely vegetated with mixed conifer forest, interspersed with small areas dominated by white fir and huckleberry oak. Upper montane chaparral species are also present on the surrounding side slopes. The reservoir and surrounding side slopes include intermittent exposure of granitic bedrock. Hundreds of forested acres west of the dam were consumed in the Star Fire in 2001, leaving the area burned and scarred. Most of the burned area consists of a few patches of forest with large areas of exposed bedrock and soil.

Hell Hole Reservoir Area

The primary Project facilities at Hell Hole Reservoir are the Hell Hole Dam and Reservoir located on the Rubicon River. The Hell Hole Dam is a 410 foot-high, 1,570 foot-long rock fill structure with a crest elevation of 4,650 ft msl. The dam impounds the Rubicon River and Five Lakes Creek to form Hell Hole Reservoir. Hell Hole Reservoir has a gross storage capacity of 207,590 ac-ft and a maximum surface area of 4,630 ft, and a minimum operating surface area of 4,340 ft.

The Hell Hole Reservoir is located in the rugged Rubicon River Canyon. The surrounding landscape is characterized by steep and rocky slopes, which are covered with brush and mixed-conifer forest. The vegetation is sparse compared to the French Meadows area, consisting of California black oak and various conifers, pines, and firs. Vegetation near Hell Hole Dam is comprised of upper montane chaparral species, huckleberry oak, and annual grasses and forbs. The upper hillsides are dominated by red fir and white fir, with upper montane mixed shrub species and huckleberry oaks interspersed. Willow species also occur along side drainages. The reservoir and surrounding side slopes are primarily composed of granite with areas of glacial deposits on the surrounding side slopes. The upper reaches of the reservoir transition into a river canyon environment.

Long Canyon Area

The North Fork Long Canyon Diversion Dam is a 10 foot-high, 120 foot-wide concrete gravity structure with a crest elevation of 4,720 ft msl. The dam impounds the North Fork Long Canyon Creek and forms a small diversion pool with less than one ac-ft of storage. The South Fork Long Canyon Dam is a 27 foot-high, 145 foot-long concrete gravity structure with a crest elevation of 4,650 ft msl. The dam impounds the South Fork Long Canyon Creek and forms a diversion pool with less than 1 ac-ft of storage.

The landscape in the vicinity of the two diversion dams is characterized by U-shaped valleys created by glaciers. Vegetation along the North and South forks of Long Canyon Creek is dominated by mixed conifer, fir, and pine species, interspersed with small areas dominated by red fir, white fir, Jeffrey pine, mixed Douglas-fir and ponderosa pine, and California black oak. Riparian species are found along the stream channel. The North and South Forks of Long Canyon Creek are composed primarily of andesite, with granite within the stream valley near their confluence. The side slopes are comprised of andesite to the divides.

Middle Fork Interbay Area

The primary Project facility in the Interbay area is the Interbay Dam, located on the Middle Fork American River. Interbay Dam is a 70.5 foot-high, 233 foot-long concrete gravity structure with a crest elevation of 2,536 ft msl. The dam impounds the Middle Fork American River forming the Middle Fork Interbay, where water is diverted into the Middle Fork-Ralston Tunnel. Middle Fork Interbay has a maximum operating surface area of about seven acres and a gross storage capacity of 175 ac-ft.

The landscape in the vicinity of Middle Fork Interbay is moderately steep, entrenched, and confined by narrow V-shaped valleys. The vegetation is comprised of communities dominated by mixed conifer and pine species, including Douglas-fir and ponderosa pine. Canyon live oak, lower montane chaparral species, and California black oak also occur on the surrounding hillsides. Riparian species occur along the stream channel. The valley and side slopes surrounding Middle Fork Interbay are underlain by Paleozoic marine deposits, with andesite rocks along the southern upper side slopes.

Ralston Afterbay Area

The primary Project facilities in the Ralston Area include the Ralston Afterbay and Ralston Afterbay Dam. Ralston Afterbay Dam is an 89 foot-high, 560 foot-long concrete gravity structure with a crest elevation of 1,189 ft msl. The dam is located on the Middle Fork American River, about three quarters of a mile downstream of the Rubicon River confluence. The dam impounds water from the Rubicon River and the Middle Fork American River to form Ralston Afterbay, which diverts water into the Middle Fork - Ralston Tunnel and re-regulates flows at the lower end of the MFP. Ralston Afterbay has a gross storage capacity of 2,782 ac-ft and a maximum surface area of approximately 68 acres.

The landscape in the Ralston Area is characterized by moderate to steep slopes with elevations ranging from 1,600 feet msl at the Middle Fork American River, to 4,000 feet msl on top of Mosquito Ridge. The vegetation consists of mixed conifer stands interspersed with large black oaks, and predominant black oak stands. Steeply sloping hillsides are characterized by mixed brush hardwood stands, and scattered conifers. The valley and side slopes surrounding Ralston Afterbay are underlain by Paleozoic marine deposits.

Project Snow Courses

Each snow course consists of a helicopter landing area and a signs marking snow course starting and ending points. Three of the four snow courses lie in natural meadows so very little clearing, if any, is necessary to maintain either the helicopter landing area or the snow course corridors. The Talbot Camp Snow Course area is more densely vegetated and therefore requires periodic maintenance. Signs are used to mark the end points of each of the snow courses. The signs are 12" by 18" aluminum, painted orange with black lettering. They are generally mounted about 20 feet high on trees so that are visible when the area is covered in snow. Some sites also have a smaller yellow sign lower down on the tree that explains the purpose of the snow course sign.

APPENDIX D

**Representative Views of Project Facilities
as seen from USDA-FS Managed Viewsheds**

Tahoe National Forest Managed Viewsheds



Photo 1. View of Project facilities above Ralston Powerhouse on Ralston Ridge as seen from Mosquito Ridge Road, looking southeast.



Photo 2. View of Ralston Afterbay Dam and associated features from Mosquito Ridge Road.



Photo 3. View of Middle Fork Powerhouse Penstock from Mosquito Ridge Road near Dutch Flat.



Photo 4. View of French Meadows Dam and below, from Mosquito Ridge Road (FR 96) near its intersection with Soda Springs - Riverton Road (FR 22).



Photo 5. View of French Meadows Dam and Reservoir as seen from near the junction of the Tevis Cup Trail and the Western States Trail.



Photo 6. View of upstream side of French Meadows Dam from French Meadows Reservoir viewshed (near Spillway), looking south.



Photo 7. View of French Meadows-Hell Hole Tunnel Gatehouse from French Meadows Reservoir viewshed.



Photo 8. View of Middle Fork American River viewshed immediately downstream of French Meadows Dam.



Photo 9. View from Poppy Campground, looking south across reservoir towards French Meadows Boat Ramp and French Meadows - Hell Hole Tunnel Gatehouse.



Photo 10. View of French Meadows Dam looking west from McGuire Boat Ramp.



Photo 11. View of French Meadows Dam looking west from French Meadows Boat Ramp.



Photo 12. View towards French Meadows Dam from French Meadows Campground.



Photo 13. View of Oxbow Powerhouse and Switchyard from near the Indian Bar Rafter Put-in.

Eldorado National Forest Managed Viewsheds



Photo 14. View of Hell Hole Dam and Spillway from Upper Hell Hole Trail (Hell Hole Reservoir viewshed).



Photo 15. View of French Meadows Powerhouse and Switchyard area from Upper Hell Hole Trail (Hell Hole Reservoir viewshed).



Photo 16. View of Hell-Hole - Middle Fork Tunnel Gatehouse from Upper Hell Hole Trail (Hell Hole Reservoir viewshed).



Photo 17. View of the Rubicon River viewshed immediately below Hell Hole Dam.



Photo 18. View of Ralston Powerhouse Area as viewed from the Rubicon arm of Ralston Afterbay.



Photo 19. View of South Fork Long Canyon Creek Diversion from above the creek.



Photo 20. View of Hell Hole Gatehouse (in foreground) and French Meadows Powerhouse (in background) taken from Hell Hole Boat Ramp Parking Area.



Photo 21. View of French Meadows Powerhouse and Penstock area from Hell Hole Vista.



Photo 22. View of Hell Hole Dam from edge of Hell Hole Campground looking south.

APPENDIX E

**Photographs of Hell Hole Reservoir at
High and Low Maximum Normal Operating WSE**

**Hell Hole - Middle Fork Tunnel Gatehouse and French Meadows
Powerhouse as seen from Hell Hole Boat Ramp Parking Area (KOP HH-1b)**



High WSE

Date: 6/17/08 Time: 1300



Low WSE

Date: 10/16/07 Time: 0830

**French Meadows Powerhouse and Penstock
from Hell Hole Boat Ramp Parking Area (KOP HH-1c)**

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



High WSE

Date: 6/17/08 Time: 1300



Low WSE

Date: 10/16/07 Time: 0830

**French Meadows Powerhouse Area
from Hell Hole Trail (KOP HH-2)**



High WSE

Date: 6/17/08 Time: 1345



Low WSE

Date: 10/16/07 Time: 0930

**French Meadows Powerhouse and
Penstock from Hell Hole Trail (KOP HH-2)**

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



High WSE

Date: 6/17/08 Time: 1345



Low WSE

Date: 10/16/07 Time: 0930

**French Meadows Powerhouse and Hell Hole Reservoir
as seen from the Hell Hole Vista (KOP HH-3)**



High WSE

Date: 6/17/08 Time: 1635



Low WSE

Date: 10/16/07 Time: 1045

**Hell Hole Dam and Spillway
as seen from the Hell Hole Vista (KOP HH-4a)**



High WSE

Date: 6/17/08 Time: 1640



Low WSE

Date: 10/16/07 Time: 1050

**Hell Hole Reservoir Shoreline
as seen from Hell Hole Vista (KOP HH-4b)**



High WSE

Date: 6/17/08 Time: 1640



Low WSE

Date: 10/16/07 Time: 1050

APPENDIX F

**Photographs of French Meadows Reservoir
at High and Low Maximum Normal Operating WSE**

**French Meadows Dam and Reservoir
from the Western States Trail (KOP FM-1)**



High WSE

Date: 6/17/08 Time: 0958



Low WSE

Date: 10/24/08 Time: 1228

**French Meadows Dam and Reservoir
from FR 96 (KOP FM-2)**



High WSE

Date: 6/17/08 Time:1015



Low WSE

Date: 10/24/08 Time:1217

**French Meadows Dam and Reservoir
from FR 96 (KOP FM-3)**



High WSE

Date: 6/17/08 Time:1028



Low WSE

Date: 10/24/08 Time:1213

**French Meadows Reservoir from Parking Area
at North end of French Meadows Dam (KOP FM-4a)**



High WSE

Date: 6/17/08 Time:1038



Low WSE

Date: 10/24/08 Time:1205

**French Meadows Reservoir from Parking Area
on North side of Dam (KOP FM-4b)**



High WSE

Date: 6/17/08 Time:1039



Low WSE

Date: 10/24/08 Time:1206

**French Meadows Dam and Reservoir looking West
from French Meadows Boat Ramp (KOP FM-5a)**



High WSE

Date: 6/17/08 Time:1053



Low WSE

Date: 10/24/08 Time:1151

**French Meadows Reservoir Shoreline looking Northwest
from French Meadows Boat Ramp (KOP FM-5b)**



High WSE

Date: 6/17/08 Time:1054



Low WSE

Date: 10/24/08 Time:1153

**French Meadows Reservoir Shoreline looking Northeast
from French Meadows Boat Ramp (KOP FM-5c)**



High WSE

Date: 6/17/08 Time:1056



Low WSE

Date: 10/15/07 Time:1154

**French Meadows Reservoir Shoreline looking West
from McGuire Boat Ramp (KOP FM-6a)**



High WSE

Date: 6/17/08 Time:1110



Low WSE

Date: 10/24/08 Time:1137

**French Meadows Reservoir Shoreline looking Southwest
from McGuire Boat Ramp (KOP FM-6b)**



High WSE

Date: 6/17/08 Time:1111



Low WSE

Date: 10/24/08 Time:1139

**French Meadows Reservoir Shoreline looking Southeast
from McGuire Boat Ramp (KOP FM-6c)**



High WSE

Date: 6/17/08 Time:1112



Low WSE

Date: 10/24/87 Time:1139

**French Meadows Reservoir Shoreline looking East
from McGuire Boat Ramp (KOP FM-6d)**



High WSE

Date: 6/17/08 Time:1114



Low WSE

Date: 10/24/08 Time:1141

APPENDIX G

**Photographs of Ralston Afterbay
at High, Intermediate, and Low Maximum Normal Operating WSE**

**Ralston Powerhouse and Reservoir
from Blacksmith Flat Road (KOP RA-1)**



Low WSE

Date: 11/12/08 Time: 1000



Intermediate WSE

Date: 10/24/08 Time: 1345

**Ralston Powerhouse and Reservoir
from Blacksmith Flat Road (KOP RA-1)**



High WSE

Date: 6/17/08 Time: 1803

**Ralston Powerhouse and Ralston Afterbay
from FR 23 (KOP RA-2)**



Low WSE

Date: 11/12/08 Time: 1030



Intermediate WSE

Date: 10/24/08 Time: 1351

**Ralston Powerhouse and Ralston Afterbay
from FR 23 (KOP RA-2)**



High WSE

Date: 6/17/08 Time: 1755

**Ralston Afterbay and Dam
from FR 23.2 (KOP RA-3)**



Low WSE

Date: 11/12/08 Time: 1022



Intermediate WSE

Date: 10/24/08 Time: 1500

**Ralston Afterbay and Dam
from FR 23.2 (KOP RA-3)**



High WSE

Date: 6/17/08 Time: 1745

APPENDIX H

Photo Simulations of Proposed Project Betterments Facilities

Hell Hole Seasonal Storage Increase Betterment

**Hell Hole Dam and Spillway
from Hell Hole Vista (KOP HH-4a)**



Sim 1 - Existing structures with current maximum normal operating WSE.



Sim 2 - Existing structures with 6-foot raise in current maximum normal operating WSE, Plus new spill way gates. (Note that neither the new or existing power lines are discernable from this KOP.)

French Meadows Powerhouse and Penstock from Hell Hole Trail (KOP HH-2)

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



Sim 3 - Existing structures with current maximum normal operating WSE.



Sim 4 - Existing structures with 6-foot raise in current maximum normal operating WSE.

**Hell Hole - Middle Fork Tunnel Gatehouse
from Hell Hole Boat Ramp Parking Area (KOP HH-1a)**

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



Sim 5 - Existing structures with current maximum normal operating WSE.



Sim 6 - Existing structures with 6-foot raise in current maximum normal operating WSE.

French Meadows Powerhouse Capacity Upgrade Betterment

French Meadows Powerhouse and Penstock from Hell Hole Trail (KOP HH-2)

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



Sim 7 - Existing structures with current maximum normal operating WSE.



Sim 8 - Existing structures plus new structures with current maximum normal operating WSE.

**French Meadows Powerhouse and Penstock
from Hell Hole Boat Ramp Parking Area (KOP HH-1c)**

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



Sim 9 - Existing structures with current maximum normal operating WSE.



Sim 10 - Existing and new structures, with current maximum normal operating WSE.

Combined Betterments Scenario

French Meadows Powerhouse and Penstock from Hell Hole Trail (KOP HH-2)

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



Sim 11 - Existing structures with current maximum normal operating WSE.



Sim 12 - Existing structures plus new structures with 6-foot raise in current maximum normal operating WSE.

French Meadows Powerhouse and Penstock from Hell Hole Boat Ramp Parking Area (KOP HH-2)

(Note: Zoomed to simulate conditions as they would appear from a boat on the water.)



Sim 13 - Existing structures with current maximum normal operating WSE.



Sim 14 - Existing structures plus new structures with 6-foot raise in current maximum normal operating WSE.