

# Appendix N Visual Quality Technical Appendix

This appendix documents the visual quality technical analysis to support the impact analysis in the Environmental Impact Statement (EIS).

This section describes visual resources that could be potentially affected by the implementation of the action alternatives considered in the EIS. Effects on visual resources resulting from the continuation of operations and some proposed changes in Central Valley Project (CVP) and State Water Project (SWP) operations may occur in the Trinity River region, Sacramento River region, San Joaquin Valley, Bay-Delta region, and CVP and SWP Service Areas in the nearshore coastal regions.

Physical form and visual character are the result of the interaction of natural and engineered elements. Natural elements of topography, hydrology, vegetation, and climate create the physical context. Engineered elements, such as buildings, roads, infrastructure, and settlement patterns, are secondary elements that act on the natural physical context to establish a visual environment.

Both the natural and engineered landscape features contribute to perceived views and the aesthetic value of those views. In areas considered to have high resource value and scenic character, it is important to evaluate and protect the visual character and aesthetic value of landscapes that may undergo alteration.

## N.1 Background Information

### N.1.1 Trinity River Region

The Trinity River region includes Trinity Reservoir and Trinity River downstream of Lewiston Reservoir.

### N.1.2 Trinity River Watershed

The Trinity River drains an area of the Coast Ranges, northwest of the Sacramento Valley. Dams on the river form Trinity Lake and Lewiston Lake, both of which are in the Whiskeytown-Shasta-Trinity National Recreation Area. The Trinity River flows through lightly populated and heavily forested, mountainous terrain with jagged cliffs that are in view when people pursue recreational activities, such as fishing, hiking, rafting, kayaking, and canoeing. The forests offer visual resources that include snow-covered peaks, volcanoes, rock outcroppings, mountain creeks, lakes, meadows, and a wide variety of trees and vegetation. Downstream of Lewiston Dam, the Trinity River corridor is characterized by gravel bars, riparian vegetation, and human-built features (North Coast Regional Water Quality Control Board [NCRWQCB] et al. 2013). Artificial lights are present from passing vehicles, marinas and houseboats, campgrounds, and local residential and commercial buildings. Glare related to the water surfaces may occur at some view locations.

#### N.1.2.1 *Wild and Scenic Rivers and Scenic Highways in the Trinity River Watershed*

On January 19, 1981, the Secretary of the Interior designated portions of the Trinity River watershed as part of the National Wild and Scenic Rivers System, including the Trinity River downstream of Lewiston

Dam and portions of the South Fork, North Fork, and New River (U.S. Department of the Interior Bureau of Land Management [BLM] et al. 2018). The State of California identified similar reaches under Public Resources Code Sections 5093.54 and 5093.545 as components of the California Wild and Scenic River System.

The Trinity River region includes two highways in Trinity County and one highway in Humboldt County that are eligible for State Scenic Highway designation. The two eligible highways in Trinity County are Siskiyou-Trinity Scenic Byway (State Route [SR] 3, which extends from south of Hayfork to north of Trinity Lake to Interstate [I-] 5) and Trinity Scenic Byway (SR 299, which extends from the Pacific Ocean to Redding). In Humboldt County, SR 96 along the Trinity River from Willow Creek to the confluence with the Klamath River is eligible for State Scenic Highway designation (California Department of Transportation [Caltrans] 2019).

### **N.1.3 Sacramento Valley**

The Sacramento Valley is generally identified as the region extending upstream from the Delta to the Redding metropolitan area, and includes Shasta Lake, Keswick Reservoir, Whiskeytown Lake, Sacramento River between Keswick Dam and the Delta, Lake Oroville and the Thermalito Afterbay, the Yuba River from between New Bullards Bar and the Feather River, the Bear River between Camp Far West Reservoir and the Feather River, the Feather River between Thermalito Dam and the Sacramento River, Folsom Lake and Lake Natoma, the American River between Nimbus Dam and the Sacramento River, and refuges that use CVP water supplies. For the purposes of this analysis, the Sacramento Valley includes the Sacramento River, Clear Creek, American River, and Feather River regions.

The Sacramento Valley extends from the northern mountainous areas to the less dramatic landscapes of the Central Valley at the lower elevations. The mountainous areas are characterized by rugged and deep river canyons and valleys that extend from jagged peaks to forested areas with pine and deciduous trees. Large rivers flow from the mountain areas through the foothills into the agricultural areas and communities along the valley floor. Oak woodlands are located at middle and lower elevations of the foothills and along riparian corridors on the valley floor.

#### **N.1.3.1 *Shasta Lake and Whiskeytown Lake***

Shasta Lake and Whiskeytown Lake are in the Whiskeytown-Shasta-Trinity National Recreation Area. These watersheds in which these reservoirs are located provide opportunities for high quality, natural visual experiences, such as mountains, forests, waterfalls, streams, open water, and sky views that can be accessed during recreational activities such as boating, water skiing, swimming, fishing, camping, picnicking, hiking, hunting, and mountain biking. Panoramic views for travelers through the area can be seen from many locations, including SR 151 vista point, Shasta Dam Visitor Center, and I-5. The contrast between the open water bodies and surrounding mountains provides a wide diversity of views. The quality and diversity of visual resources at the lakes and the surrounding areas is influenced by human-built features such as highways, railroads, resorts, bridges, communities, and electrical transmission facilities. The visual quality of open waters is influenced by fluctuating water levels. Typically, the water levels decline from an annual maximum in May to a minimum in October. In extremely dry years, exposed bare mineral soils in a “bathtub ring” substantially contrast the open water and the upslope vegetation (U.S. Department of the Interior Bureau of Reclamation [Reclamation] 2013).

Pine and oak forests predominate in the areas surrounding the lakes, with intermittent chaparral and rock outcrops. The landscape features mountain ranges, volcanoes, waterways, and, below the reservoir, the agricultural vistas and communities of the Central Valley.

#### **N.1.3.1.1 Sacramento River Watershed: Keswick Reservoir to Feather River**

The scenic qualities of the upper reaches of the Sacramento River watershed south of Keswick Reservoir are generally considered to be high quality, especially in areas where there is little to no development. Varied topography, geologic formations, and natural and human-made water bodies provide visual interest and striking vistas. Similar conditions are found in the Sierra Nevada and foothills near the upper and middle Feather, Yuba, American, Mokelumne, Calaveras, and Stanislaus river watersheds.

The foothills provide views of rolling hills, open grasslands, and scattered oak and pine woodlands. In the lower elevations of the Sacramento Valley, the human-built environment becomes more dominant, and detracts from views of the natural landscape. Outside of urban and suburban areas, land use is rural in character, with agricultural areas of irrigated row crops, orchards, and grazing lands. Sporadically, flooded agricultural fields, especially rice fields managed for wetlands, are used heavily by migrating birds.

Between the Keswick Reservoir and the Feather River confluence with the Sacramento River, the landscape also includes human-built reservoirs and canals. Black Butte Reservoir is operationally integrated with the CVP, and the canal system includes the CVP Corning Canal, Tehama-Colusa Canal, and Glenn-Colusa Irrigation District's canal. The canals provide visual interest in localized areas with limited viewing opportunities (Reclamation 2015). Several wildlife refuges in the Sacramento Valley provide views of water and vegetation, enhanced seasonally by waterfowl and wildflowers.

#### **N.1.3.1.2 Scenic Highways in the Sacramento Valley Area**

In the Sacramento Valley, there are several designated State Scenic Highways and several roads that are eligible for this designation within the study area, including the following roadways:

- Shasta County: SR 151 from Shasta Dam to Lake Boulevard is designated as a State Scenic Highway because of views of the Sacramento River, Shasta Lake, and distant hills. SRs 299, 44, and 89 are eligible for State Scenic Highway designation (Caltrans 2019).
- Tehama County: SRs 89 and 36 are eligible for State Scenic Highway designation (Caltrans 2019).
- Yolo County: A portion of SR 16 is eligible for State Scenic Highway designation (Caltrans 2019).
- Solano County: A portion of SR 37 is eligible for State Scenic Highway designation (Caltrans 2019).
- Napa County: Portions of SRs 29 and 121 are eligible for State Scenic Highway designation (Caltrans 2019).

#### ***N.1.3.2 Feather River to the Delta***

Antelope Lake, Lake Davis, Frenchman Lake, Lake Oroville, and Thermalito Afterbay on the Feather River are human-built reservoirs providing visual contrast with surrounding natural and human-manipulated terrain.

### **N.1.3.2.1 Upper Feather River**

Antelope Lake, Lake Davis, and Frenchman Lake are located in the upper Feather River watershed. Antelope Lake, located on Indian Creek, has the longest dam of the three reservoirs. This remote lake, surrounded by pine and fir trees, can be viewed from Fruit Growers Boulevard and Indian Creek Road. Lake Davis is formed by Grizzly Dam on Big Grizzly Creek, and is the largest of the three dams. It is located in the upper watershed surrounded by many trees, and can be viewed from Beckwourth-Taylorville Road and Lake Davis Road. Frenchman Lake, located on Last Chance Creek, is formed by the tallest dam of the three dams. This lake also is surrounded by trees to the waterline and can be viewed from Little Last Chance Creek Road and Frenchman Lake Road (Reclamation 2015).

### **N.1.3.2.2 Lake Oroville and Thermalito Reservoir**

The terrain adjacent to Lake Oroville is generally quite steep with limited vehicular access. Most views of the water are from the bridges on SR 162, SR 70, and several county roads. Some residents live in the lands around Lake Oroville and Thermalito Afterbay. The residents can easily view the water and visitors can view the structures. As described above for Shasta Lake and other reservoirs in the upper Sacramento River watershed, Lake Oroville water levels decline as summer progresses, leaving a ring of bare soil along the water's edge. In extremely dry years at Lake Oroville, more than 200 vertical feet of bare mineral soils in a "bathtub ring" may be exposed when the surface water elevation approaches 710 feet above mean sea level (California Department of Water Resources [DWR] 2007).

The Diversion Pool between Oroville Dam and Thermalito Diversion Dam extends about 4.5 miles along the Feather River and meanders through hillsides with substantial vegetation in widths ranging from 50 to 200 feet (DWR 2007). Vistas of the Diversion Pool are primarily viewed by recreationists on the water or along the adjacent trails. A 1.9-mile-long concrete Thermalito Power Canal appears as a contrast from SR 70 and county roads to the undeveloped landscape between the Diversion Dam and the Thermalito Forebay. The Thermalito Forebay is a 630-acre reservoir, approximately 3 miles in length that can be viewed by recreationists along or within the open water and travelers along SR 70 as the roadway extends from the foothills to the valley floor. Water levels in these human-built features generally vary by 2 to 4 feet during a week. When the water levels are low, exposed bare soils create a "bathtub ring" effect.

Thermalito Afterbay is located in a more flat terrain than Lake Oroville and can be viewed from many locations and residences. The Thermalito Afterbay Dam is parallel to SR 99 and rises over 30 feet above the roadway (DWR 2007). The Thermalito Afterbay is approximately 4,300 acres and is visible from SR 162, several county roads, recreation areas, and neighboring residences. Because the afterbay is located on flat lands with minimal foothills, vistas from the water or lands surrounding the afterbay extend from the Sierra Nevada foothills to the Feather River on the valley floor. Water levels in the afterbay generally vary by 2 to 6 feet during a week, but can decline by as much as 11 feet. When the water levels are low, exposed bare soils create a "bathtub ring" effect (Reclamation 2015).

The low flow channel of the Feather River extends from the Thermalito Diversion Dam through the community of Oroville (DWR 2007). Urban land uses and other buildings, including the Feather River Fish Hatchery, are located along the channel upstream of the SR 70 bridge. The Oroville Wildlife Area extends from SR 70 on the east, downstream of the bridge, and includes the Thermalito Afterbay area. Dredge tailings from hydraulic mining that occurred over 100 years ago occur along the low flow channel with some of the tailings reaching heights of more than 40 feet above the roadway.

The remaining portions of the Sacramento Valley between the Feather River and the San Francisco Bay Area region contain the Delta and areas located to the east and west of the Delta. Land uses located to the south of the Feather River and outside of the Delta include agricultural, open space, and major urban centers that all use SWP water supplies. Much of this reach of the Sacramento River flows along private property. The urban areas are the cities of Vacaville, Fairfield, and Vallejo in Solano County and unincorporated areas of Napa County.

#### **N.1.3.2.3 Wild and Scenic Rivers and Scenic Highways in the Feather River Watershed**

Within the Feather River region considered in this Appendix, the Middle Fork Feather River (from Beckworth to Lake Oroville) was designated as part of Public Law 90-542 (Wild and Scenic Rivers Act) to be part of the National Wild and Scenic Rivers System on October 2, 1968.

In the Feather River watershed and the adjacent Bear River watershed, there is one designated State Scenic Highway and several roads that are eligible for this designation, including the following roadways.

- Butte County: SR 70 is eligible for State Scenic Highway designation (Caltrans 2019).
- Plumas County: SRs 70 and 89 are eligible for State Scenic Highway designation (Caltrans 2019).
- Nevada County: SR 20 from Skillman Flat Campground to a half-mile east of Lowell Hill Road is designated a State Scenic Highway and a “U.S. Forest Service (USFS) Scenic Byway” because of views of pine forests and the dramatic results of hydraulic mining. I-80 and SRs 20, 49, and 174 are eligible for State Scenic Highway designation (Caltrans 2019).

#### **N.1.3.2.4 Clear Creek Watershed**

The upper portion of lower Clear Creek is characterized by a deep gorge with flowing, cascading water surrounded by a forested upland landscape. The lower portion is characterized by broad alluvial floodplains, meandering gravel bars, and lush riparian vegetation. Varying sections of this reach of lower Clear Creek are influenced by visual impacts from residential homes, industrial areas, commercial developments and SR 273. In addition, mine tailings are visible in areas from past gold dredger and placer mining operations (BLM 2008).

The public lands administered by BLM within the stream reach from the southern Whiskeytown National Recreation Area boundary downstream to Clear Creek Road Bridge have been determined to be eligible as a component of the National Wild and Scenic Rivers System and have been classified as Scenic (BLM 2008) based on the presence of outstandingly remarkable Recreation and Scenic Quality values.

#### **N.1.3.2.5 American River Watershed**

The middle and lower American River watershed extends through Placer, El Dorado, and Sacramento Counties. Upstream of Folsom Dam, much of Placer and El Dorado Counties are characterized by undeveloped rolling grasslands and oak woodlands with sporadic agricultural activities related to orchards, vineyards, ornamental flowers, and Christmas tree farms in the wooded foothills. Communities throughout the counties are located especially near I-80, US 50, and SRs 49 and 89.

Folsom Lake, on the American River, is a human-built reservoir providing visual contrast with the foothill landscape. Views from the water surface provide panoramic vistas of the foothills with open grasslands, oak woodlands, and pine woodlands. Folsom Lake is generally considered to provide a

pleasing visual setting for recreationists, residences, and from roadways along the foothills above the reservoir, especially from the Lake Overlook and the Folsom Dam Observation Point vista points. Scenic views from around the edges of the lake are of the water and of human-built structures such as electric transmission facilities, roadways, dams, and residential subdivisions. Reservoir levels fluctuate and decline as summer progresses, leaving a “bathtub ring” of bare soil along the water’s edge. The visual quality also degrades because visitors drive vehicles onto the exposed soils which cause tire tracks and erosion (Reclamation et al. 2006).

Lake Natoma extends from Folsom Dam along the American River to Nimbus Dam. The land along the river is mostly undeveloped and includes wooded canyon areas, sheer bluffs, and dredge tailings from the gold mining era. Residential and community developments have been constructed along the foothills that overlook the canyon, and these structures can be seen by recreationists from the water or adjacent trails. Lake Natoma can be viewed from US 50 and local roads.

Downstream of Nimbus Dam to Gristmill Recreation Area (downstream of William B. Pond Recreation Area and approximately 2 miles upstream from the Watt Avenue Bridge), the American River flows through a landscape characterized by steep bluffs, terraces, mid-river sand and gravel bars, backwater areas along the edges, and riparian vegetation. This viewshed is seen from the recreational areas on the water and adjoining trails, from the bridge crossings, and from residences along the terraces and foothills. Downstream of the Gristmill Dam Recreation Area, the visual characteristics are less complex with an increased number of bridges, water treatment plant intakes, and artificial bank protection. The communities along the American River corridor include the cities of Folsom, Roseville, Rancho Cordova, and Sacramento and unincorporated areas. The communities, transportation infrastructure, and water-river corridor are visible from multiple vantage points.

#### **N.1.3.2.6 Wild and Scenic Rivers and Scenic Highways in the American River Watershed**

Within the American River watershed, the lower American River from Nimbus Dam to the confluence with the Sacramento River were designated by the Secretary of the Interior to be part of the National Wild and Scenic Rivers System on January 19, 1981. The State of California also designated the lower American River under Public Resources Code sections 5093.54 and 5093.545 as part of the California Wild and Scenic River System. In addition, the state designated the North Fork American River from the source to Iowa Hill Bridge as part of the System.

In the portion of the American River watershed in the study area, there is one roadway designated as a State Scenic Highway and one road that is eligible for this designation. In El Dorado County, US 50 from Government Center Interchange in Placerville to South Lake Tahoe is designated as a State Scenic Highway because of vistas of the American River canyon, suburban foothills, granite peaks, and Lake Tahoe. Also in El Dorado County, SR 49 is eligible for State Scenic Highway designation (Caltrans 2019).

#### **N.1.4 San Joaquin Valley**

For the purposes of this analysis, the San Joaquin Valley includes the San Joaquin River and Stanislaus River regions. The San Joaquin Valley land cover ranges from high alpine vegetation near the crest of the Sierra Nevada, through coniferous forest, mixed forest, oak woodlands, and oak savanna to grasslands and agricultural areas at the lower elevations (Reclamation 1997, 2005a, 2005b). Water bodies include reservoirs, natural lakes and ponds, rivers, and tributary streams. The San Joaquin, Stanislaus, Merced, and Tuolumne Rivers are the principal water features that flow from the Sierra Nevada foothills. One or

more reservoirs are located along each of these rivers, including the CVP New Melones Reservoir on the Stanislaus River and Millerton Lake on the San Joaquin River. The human-built environment is more dominant at lower elevations, and includes roadways, communities, roadside businesses, and transmission lines, detracting from views of the natural environment. On the valley floor, the San Joaquin Valley is characterized by agricultural lands, including many that are irrigated with CVP and/or SWP water supplies. The valley is arid to semi-arid, and there are few natural lakes or streams on the valley floor. The Tehachapi Mountains rise abruptly along the southern boundary of the valley.

Several wetlands have been established as wildlife refuges in the San Joaquin Valley, providing views of water and vegetation, enhanced seasonally by waterfowl and wildflowers.

The predominant land use is agricultural, with sparse to moderate populated areas. I-5 and major railroads pass along the western San Joaquin Valley at the base of the Coast Range foothills. SR 99 and other railroads are located along the eastern San Joaquin Valley at the base of the Sierra Nevada foothills. I-580 and SRs 152, 198, and 46 cross the San Joaquin Valley from east to west between I-5 and SR 99. Larger cities have been established in the northern San Joaquin Valley, including Lodi, Stockton, Lathrop, Manteca, and Tracy; and along SR 99, including Merced, Fresno, Visalia, and Bakersfield. Both I-5 and SR 99 are extensively traveled and provide numerous viewing opportunities (Reclamation 2015).

#### **N.1.4.1      *New Melones Reservoir***

The CVP New Melones Reservoir is in the western foothills of the Sierra Nevada along the Stanislaus River. The area is characterized by foothills, ridges, and small valleys with vegetated slopes and the open water surface (Reclamation 2010). The vegetation is primarily grasslands and oak woodlands of varying densities, with gray pine and low shrubs along some slopes. Views of the water are primarily from the water surface, adjacent recreation areas, and SR 49. The surrounding lands are rural and undeveloped except for the infrastructure associated with the dam, canals, power generation facilities, and some minor structures associated with the recreation areas and utility lines. When the water level of the reservoir is drawn down, broad bands of bare soil are exposed.

#### **N.1.4.2      *Tulloch Reservoir***

Tulloch Reservoir is on the Stanislaus River just downstream of New Melones Reservoir and upstream of the Goodwin Dam. Accessible via mostly private lands and docks, there is substantial residential development on the Calaveras County portion of its shoreline.

#### **N.1.4.3      *Millerton Lake***

Millerton Lake is also located in the western foothills of the Sierra Nevada along the San Joaquin River in an area that ranges from grasslands and rolling hills near Friant Dam to steep, craggy slopes in the upper reaches of the lake (Reclamation 2015). The lake, dam infrastructure, and surrounding hills can be viewed from the lake surface and adjacent county roads. Development has occurred along the hillsides that can be viewed from the lake surface and adjacent recreation areas; however, future development will be regulated by Madera and Fresno Counties to protect visual and scenic resources. When the water level of the reservoir is drawn down, broad bands of bare soil are exposed. The Madera Canal and Friant-Kern Canal extend from Millerton Lake to the north and south, respectively. The canals are located along the Sierra Nevada foothills through mostly agricultural landscapes and limited residences (Reclamation 2015). The canals are only intermittently visible from county roads.

#### **N.1.4.4 San Luis Reservoir Complex**

The CVP and SWP San Luis Reservoir complex is located within the western Coast Range foothills on the western side of the northern San Joaquin Valley; and the CVP and SWP water supply canals are located at the base of the foothills to the north and south of the San Luis Reservoir. This area is sparsely populated and characterized by mountainous to hilly terrain with grasslands and scattered oak woodlands along narrow streams.

The CVP and SWP water supply facilities are prominent features in the overall viewshed of the San Joaquin Valley, including facilities at or near the San Luis Reservoir, Delta-Mendota Canal, San Luis Canal-California Aqueduct, Cross Valley Canal, New Melones Reservoir, and Millerton Lake. SR 152 is along the northern and eastern rims of the San Luis Reservoir and the western rim of the O'Neill Forebay. The O'Neill Forebay and Los Banos Creek Reservoir can be seen to the west from I-5. The reservoirs are also part of the visual resources for the San Luis Reservoir State Recreation Area and Cottonwood Creek Wildlife Area (which are described in Appendix S, *Recreation Technical Appendix*). The shorelines of the reservoirs are undeveloped, except for recreational facilities. Views include annual grassland, coastal sage, and riparian woodland. When the reservoir waters are drawn down, broad bands of bare soil are exposed. Open water viewing opportunities also occur to the south of the San Luis complex at the Little Panoche Reservoir located to the west of I-5 (Reclamation 2015).

The open water and canal infrastructure of the Delta-Mendota Canal, San Luis Canal-California Aqueduct, Cross Valley Canal, and irrigation district canals can be seen from I-5 and the railroad lines along the western San Joaquin Valley. The open water of Mendota Pool is at the terminus of the Delta Mendota Canal and can be viewed from county roads.

#### **N.1.4.5 Wild and Scenic Rivers and Scenic Highways in the San Joaquin Valley**

In or near the San Joaquin Valley region, four rivers are designated to be part of the National Wild and Scenic Rivers System. Portions of the Tuolumne River from the source waters to the Don Pedro Reservoir were designated through Public Law 98-425 as wild and scenic. Portions of the Merced River were designated through Public Laws 100-149 and 102-432 as wild and scenic, including the entire South Fork and the mainstem from the source waters to Lake McClure. Portions of the Kings River were designated as wild and scenic through Public Law 100-150, including the Middle Fork and South Fork from their respective sources to the confluences with the mainstem; and the mainstem from these confluences to an elevation of 1595 feet above mean sea level (upstream of the confluence with the North Fork and Pine Flat Lake). Portions of the Kern River were designated as wild and scenic through Public Law 100-174, including the North Fork from the source to the Tulare County/Kern County boundary; and the South Fork from the source to the Domeland Wilderness. Most of these reaches are located outside of the San Joaquin Valley region; however, the flows from these reaches could influence the visual resources of downstream reaches in the San Joaquin Valley region and elsewhere.

In the San Joaquin Valley, there are five roadway sections designated as a State Scenic Highway and seven roadway sections that are eligible for this designation.

- San Joaquin County and Alameda County: I-580 from I-5 to SR 205 is designated as a State Scenic Highway because of vistas of the Coast Ranges and Central Valley. I-5 from the Stanislaus County boundary to I-580 is designated as a State Scenic Highway because of vistas of agricultural lands and the Delta Mendota Canal and California Aqueduct (Caltrans 2019).

- Stanislaus County: I-5 from the San Joaquin County boundary to the Merced County boundary is designated as a State Scenic Highway because of vistas of agricultural lands and the Delta Mendota Canal and California Aqueduct (Caltrans 2019).
- Merced County: I-5 from SR 152 to the Stanislaus County boundary is designated as a State Scenic Highway because of vistas of agricultural lands and the Delta Mendota Canal and California Aqueduct. SR 152 from I-5 to the Santa Clara County boundary is designated as a State Scenic Highway because of vistas of agricultural lands and the San Luis Reservoir State Recreational Area (Caltrans 2019).
- Fresno County: SR 168, 180, and 198 are eligible for State Scenic Highway designation (Caltrans 2019).
- Tulare County: SRs 190 and 198 are eligible for State Scenic Highway designation (Caltrans 2019).
- Kern County: SRs 14 and 58 are eligible for State Scenic Highway designation (Caltrans 2019).

### **N.1.5 Bay-Delta Region**

The Bay-Delta region includes the Delta and Suisun Marsh, which extends south to San Francisco Bay. Most of the Delta is used for agricultural purposes with major waterways and sloughs that connect the Sacramento, San Joaquin, Mokelumne, Cosumnes, and Calaveras Rivers (CALFED Bay-Delta Program [CALFED] 2000). Flood management and irrigation facilities include levees, impoundments, pumping plants, and control gate structures. Bodies of open water occur where historic levee failures were not repaired, including Franks Tract and Liberty Island. The Sacramento Deep Water Ship Channel is a large water feature between levees that extends from the Sacramento River near Rio Vista to West Sacramento. Cities in the Delta are the southern portion of Sacramento, Isleton, West Sacramento, Rio Vista, Lathrop, western portions of Stockton and Manteca, Tracy, Brentwood, Oakley, Antioch, and Pittsburg. Smaller communities include Freeport, Clarksburg, Hood, Courtland, Locke, Walnut Grove, Ryde, Thornton, Knightsen, and Collinsville. Vistas of the Delta can be seen from residences and agricultural areas in the Delta, open water areas used by recreationists, and from vehicles on roadways and railroads that cross the Delta. Waterfront industries are located along the rivers, especially along the San Joaquin River.

Suisun Marsh is characterized by tidal and freshwater wetlands and riparian woodlands (Reclamation et al. 2011). The area is bounded by I-80 and SR 12 on the north; the Montezuma Hills and Sulphur Springs Mountains on the east and west, respectively; and on the south by the open waters of Suisun Bay, Grizzly Bay, and Honker Bay with adjoining wetlands, marshes, and riparian forests. The marsh is relatively flat and composed primarily of tidal marsh and submerged lands. Upland areas serve as a backdrop with grasslands and nearby rolling foothills. Vistas of Suisun Marsh can be viewed from adjacent roadways, railroads, and trails within the marsh; a few residences within the marsh; and open water that can be accessed by boats, kayaks, and canoes. Much of Suisun Marsh is managed wetlands and provides habitat for resident and migrating birds and waterfowl.

The San Francisco Bay Area includes portions of Contra Costa, Alameda, Santa Clara, and San Benito Counties that are within the CVP and SWP service areas. The San Francisco Bay Area ranges in topography from sea level up to the foothills of the East Bay and South Bay that reach elevations of 3,500 feet and higher (CALFED 2000; Water Transit Authority [WTA] 2003). The physical and natural environment is diverse, with a wide range of visual resources. Typical views and landscapes include urban development, natural and altered open-space areas, major ridgelines, and scenic waterways. The terrain ranges from alluvial plains to gently sloping hills and wooded ravines. Striking views of iconic

scenes are available throughout the area: the San Francisco Bay, the San Francisco skyline, Angel Island, Mount Tamalpais, Peninsula foothills, and the East Bay hills. Views to the east are dominated by Mount Diablo and adjacent Diablo Ridge and valleys. Views in the South Bay extend through the baylands along Contra Costa, San Mateo, Santa Clara, and Alameda Counties' shorelines; the river floodplains of the Guadalupe River and Coyote Creek in Santa Clara County; and toward the Santa Cruz Mountains (Santa Clara County 1994).

Urban and industrial areas are located throughout the San Francisco Bay Area region, including along the San Francisco Bay shoreline. Smaller, localized scenic resources include wetlands, isolated hilltops, rock outcroppings, mature stands of trees, lakes, reservoirs, and other natural features. City parks and recreation areas, open-space areas adjacent to ravines, golf courses, and resource preserves provide visual opportunities in urban areas. The reservoirs that store CVP or SWP water or water from other surface water sources are human-built reservoirs in the foothills or at the edge of the foothills. The water can be viewed from roadways at elevations higher than the reservoirs and by recreationists on the reservoirs. Agricultural areas that use CVP and SWP water are in coastal valleys, especially the Livermore and Amador Valleys of Alameda County, southern Santa Clara County, and northern San Benito County.

#### **N.1.5.1      *Scenic Highways in the Bay-Delta***

In the Bay-Delta Region, there are six roadway sections designated as a State Scenic Highway and several roadway sections that are eligible for this designation.

- Sacramento County: SR 160 between the southern limits of the city of Sacramento to the Contra Costa County boundary is designated as a State Scenic Highway because of the views of historic Delta agriculture and small towns along the Sacramento River (Caltrans 2019).
- Contra Costa County: SR 160 from the Antioch Bridge to SR 4 and SR 4 continuing on toward Brentwood are eligible for State Scenic Highway designation (Caltrans 2019).
- Contra Costa County: SR 24 from the Alameda County boundary to I-680, and I-680 from SR 24 to I-580 at the Alameda County boundary are designated as State Scenic Highways because of the views of Mount Diablo and attractive residential and commercial areas (Caltrans 2019).
- Alameda County: I-580 between I-80 and SR 92 is designated as a State Scenic Highway. Portions of I-680 from the Contra Costa County line to Mission Boulevard in Fremont and portions of SR 84 are designated as State Scenic Highways because of vistas of wooded hillsides and valleys. Other portions of I-580 are eligible for State Scenic Highway designation (Caltrans 2019).
- Santa Clara County: Portions of SRs 152 and 280 within the San Francisco Bay area are eligible for State Scenic Highway designation (Caltrans 2019).
- San Benito County: Portions of SRs 156 and 25 within the San Francisco Bay Area are eligible for State Scenic Highway designation (Caltrans 2019).

#### **N.1.6      *CVP and SWP Service Areas (south to Diamond Valley) and Nearshore Pacific Ocean on the California Coast***

No project or program-level measures or actions would take place with mechanisms for changes in visual resources conditions in the nearshore coastal region or CVP and SWP export areas. Therefore, no background setting information for these regions is provided for this analysis.

## **N.2 Evaluation of Alternatives**

This section describes potential mechanisms and analytical methods for change in visual resources associated with the No Action Alternative as compared to Alternatives 1, 2, 3, and 4. This section describes the results of the impact analysis, potential mitigation measures, and cumulative effects.

### **N.2.1 Potential Mechanisms for Change and Analytical Methods**

This impact analysis considers changes in visual resources conditions related to continuation of CVP and SWP operations, with some changes, under Alternatives 1, 2, 3, and 4, as compared to the No Action Alternative.

Continuation of CVP and SWP operations, with some changes, under the action alternatives as compared to the No Action Alternative could change the vistas at reservoirs that store CVP and SWP water during dry and critical dry water years and at irrigated agricultural lands during dry and critical dry water years when the crops are idle. Visual changes may occur in the short-term related to construction at the Tracy Fish Collection Facility, the Skinner Fish Facility, and the Delta Fish Species Conservation Hatchery.

#### **N.2.1.1 *Changes in Visual Resources at Tributaries and Reservoirs that Store CVP and SWP Water***

Vistas at tributaries and reservoirs that store CVP and SWP water provide a wide diversity of visual experiences related to the contrasts between the open water surface and surrounding vegetated banks, foothills, or mountainsides. By the end of September, the surface water elevations generally decline, and a bare mineral “bathtub ring” appears in contrast to the open water and the upslope vegetation. Changes in CVP and SWP operations under the action alternatives would have only minor changes to the water levels in tributaries and reservoirs. Figure S.2.3.1-4 of Appendix S, shows changes in Shasta Lake water elevations as an example; other reservoirs show similar patterns of elevations compared to the No Action Alternative. As such, water levels at tributaries and reservoirs under the action alternatives would have only small changes and would not affect visual quality at these locations. The flow changes are relatively small during each year type and would not result in substantive changes to the visual resources.

#### **N.2.1.2 *Changes in Vistas at Irrigated Agricultural Lands***

Farmland vistas of irrigated row crops, orchards, and grazing lands intermixed within a landscape of grasslands, large water canals, isolated riparian corridors, and several small communities exist throughout the San Joaquin Valley, Bay-Delta, and Nearshore Coastal regions. Changes in CVP and SWP operations under the action alternatives could change the irrigated acreages and the associated agrarian vistas over the long-term average condition and in dry and critical dry years as compared to the No Action Alternative. As described in Appendix R, *Land Use and Agricultural Resources Technical Report*, the extents of irrigated acreage under the action alternatives would be similar to the existing irrigated acreage under the No Action Alternative; however, restoration and temperature change could result in reduction of agricultural land. Changes in CVP and SWP operations would not generally change irrigated acreage and as a result they are not analyzed in this technical appendix.

#### **N.2.1.3 *Effects Related to Project Actions***

Project and program-level actions in the CVP and SWP operations areas may include habitat restoration, facility improvements, or fish intervention (hands on measures to affect fish directly, rather than affecting

their habitat). Most actions are analyzed in this technical appendix at a programmatic level, and would be subject to future, site-specific analysis on a case-by-case basis. Therefore, projecting future visual conditions related to programmatic activities is included in this analysis at a broad level. Furthermore, many project actions would have minor or no direct visual effects, such as ongoing maintenance activities, replacement of aging apparatus with similar apparatus, gravel placement, drought temperature management, control of nutrients in the water, and study and monitoring of specific habitats or species. However, there are three project-specific conservation measures that are analyzed for visual effects herein: the Tracy Fish Collection Facility, the Skinner Fish Facility, and the Delta Fish Species Conservation Hatchery.

## **N.2.2 No Action Alternative**

Under the No Action Alternative, operations would continue as they currently are under the existing condition. Operations changes and non-flow habitat and facility improvements, as well as the proposed conservation measures (habitat restoration, facility improvements, or fish intervention), would not take place with the exception of 8,000 acres of tidal habitat restoration required by the U.S. Fish and Wildlife Service (USFWS) Biological Opinion (BO) (USFWS 2008) in the Suisun Marsh and/or the north Delta.

The No Action Alternative is evaluated based on 2030 conditions. Changes that would occur over the next 11 years without implementation of the action alternatives are not analyzed in this technical appendix. However, the changes to visual resources that are assumed to occur by 2030 under the No Action Alternative are summarized in this section.

### **N.2.2.1 Common Changes in Conditions under the No Action Alternative**

Conditions in 2030 would be different than existing conditions because of the following factors:

- Climate change and sea-level rise
- General plan development throughout California, including increased water demands in portions of the Sacramento Valley
- Implementation of reasonable and foreseeable water resources management projects to provide water supplies

It is anticipated that climate change would result in more short-duration high-rainfall events and less snowpack in the winter and early spring months. The reservoirs would be full more frequently by the end of April or May by 2030 than in recent historical conditions. However, as the water is released in the spring, there would be less snowpack to refill the reservoirs. This condition would reduce reservoir storage and available water supplies to downstream uses in the summer. The reduced end-of-September storage would also reduce the ability to release stored water to downstream regional reservoirs. These conditions would occur for all reservoirs in the California foothills and mountains, including reservoirs that are not part of the CVP and SWP.

These changes would result in a decline of the long-term average CVP and SWP water supply deliveries by 2030 as compared to recent historical long-term average deliveries under the No Action Alternative.

Under the No Action Alternative, land uses in 2030 would occur in accordance with adopted general plans. Development under the general plans would change visual resources, especially near municipal areas.

The No Action Alternative assumes completion of water resources management and environmental restoration projects, including regional and local recycling projects, surface water and groundwater storage projects, conveyance improvement projects, and desalination projects. The No Action Alternative also assumes implementation of actions included in the 2008 USFWS BO and 2009 National Marine Fisheries Service (NMFS) BO that would have been implemented by 2030. These include two projects that would affect visual resources:

- Restoration of more than 10,000 acres of intertidal and associated subtidal wetlands in Suisun Marsh and Cache Slough; and at least 17,000 to 20,000 acres of seasonal floodplain restoration in Yolo Bypass
- Restoration of Battle Creek

### **N.2.3 Alternative 1**

#### **N.2.3.1 Project-Level Effects**

##### **N.2.3.1.1 Sacramento Valley**

*Potential changes in visual resources at tributaries and reservoirs that store CVP and SWP water*

Alternative 1 would make changes to: Whiskeytown Reservoir operations, Clear Creek flows, and Spring Creek Debris Dam. These actions could affect seasonal water levels at the following tributaries: Clear Creek, Spring Creek, Sacramento River. Seasonal water levels could also be affected at the following reservoirs: Buckhorn, Whiskeytown, Trinity, Kenswick, and Shasta. Changes in visual resources at tributaries and reservoirs that store CVP and SWP water supplies are assumed to be related to changes in water deliveries over long-term conditions for this analysis. Monthly deliveries are not necessarily indicative of reservoir storage because all or a portion of the water deliveries could be directly conveyed to water users in any specific month. Therefore, annual deliveries are considered to be relatively proportional to the amount of water that could be stored over all water year types. As stated above, it is assumed that visual resources related to surface water elevations in the tributaries and reservoirs mentioned above that store CVP and SWP water supplies would be affected minimally or not at all by Alternative 1 related to reduced or fluctuating surface water and potentially increased “bathtub ring” conditions.

*Potential effects on visual resources related to cross Delta water transfers*

Potential effects on visual resources could be similar to those identified in a recent environmental analysis conducted by Reclamation for long-term water transfers from the Sacramento Valley to San Joaquin Valley (Reclamation 2014). Potential effects on visual resources were identified as changes in reservoir surface water elevations, streams, irrigated acreage, and water elevations in canals that would convey transferred water. The analysis indicated that these potential impacts would not be substantial because the conditions with and without the water transfers would be similar.

Under Alternative 1, the timing of cross Delta water transfers and annual volumetric quantities would be carried out in accordance with the 2019 NMFS and USFWS Biological Opinions..

##### **N.2.3.1.2 Bay-Delta Region**

*Potential changes in visual resources related to Clifton Court aquatic weed removal*

Under Alternative 1, the California Department of Water Resources (DWR) would apply two additional types of herbicides and expand the treatment season to more effectively control aquatic weeds and algal blooms in Clifton Court Forebay. These actions are consistent with those under the No Action Alternative. Therefore, changes to visual resources would not occur.

*Potential changes in visual resources at Tracy Fish Collection Facility and Skinner Fish Facility*

Under Alternative 1, Reclamation would continue to screen fish from Jones Pumping Plant with the Tracy Fish Collection Facility, and from Banks Pumping Plant with the Skinner Fish Facility. The result of these operations at Tracy Fish Collection Facility and Skinner Fish Facility to visual resources would be minimal because these operations would be a continuation of current procedures. Additionally, truck haul trips that return salvaged fish to the Delta would be temporary and short-term and would not substantially change visual resources.

**N.2.3.2      *Program-Level Effects***

**N.2.3.2.1      Trinity River Region**

*Potential effects on visual resources related to Trinity Record of Decision (ROD) flows and Lower Klamath augmentation flows*

Under Alternative 1, Reclamation would continue Trinity ROD Flows and Lower Klamath Augmentation Flows that are described in the No Action Alternative, and would also continue under Alternatives 2 and 3. Continuing these programs would not directly affect visual resources or cause substantial changes to visual quality.

**N.2.3.2.2      American River Region**

*Potential changes in visual resources at Folsom Reservoir related to American River Division flows*

Under Alternative 1, Reclamation would make changes to American River Division flows that would affect Folsom Reservoir's water levels. Visual resources related to surface water elevations in Folsom Reservoir would be minimally or not at all affected, as discussed above, related to reduced or fluctuating surface water and "bathtub ring" conditions, because such changes would not be visually noticeable.

**N.2.3.2.3      Bay-Delta Region**

*Potential changes in visual resources at Delta Fish Species Conservation Hatchery*

Under Alternative 1, Reclamation would partner with DWR to construct and operate a new conservation hatchery for Delta Smelt. Potential changes to visual resources could occur in the Delta region related to short-term, temporary construction activities, including truck hauling, construction vehicle use and storage, and equipment and materials storage.

## **N.2.4 Alternative 2**

### **N.2.4.1 *Project-Level Effects***

Alternative 2 includes flows required by D-1641, which provides protection for fish and wildlife, municipal and industrial (M&I) water quality, agricultural water quality, and Suisun Marsh salinity. These project-level changes would not directly affect visual resources or cause substantial changes to visual quality. Project-level visual effects under Alternative 2 would therefore be similar to the No Action Alternative. Additionally, under Alternative 2, project-level visual effects would be less than those under Alternative 1 because the Shasta Dam Raise, habitat restoration, and intervention measures would not occur, as they would under Alternative 1.

### **N.2.4.2 *Program-Level Effects***

No program-level actions are proposed as part of Alternative 2. Alternative 2 would have fewer visual effects than Alternatives 1 and 3, and similar effects to Alternative 4, because it would not include the program-level fish intervention (conservation) action to construct the Delta Fish Species Conservation Hatchery. The University of California at Davis Fish Culture Center Refugial Population program would continue, as it would under the No Action Alternative.

## **N.2.5 Alternative 3**

Alternative 3 includes flows required by D-1641, which provides protection for fish and wildlife, M&I water quality, agricultural water quality, and Suisun Marsh salinity and habitat restoration and intervention measures (agricultural barriers, Clifton Court weed removal, fish collection facility improvements, and predator hotspot removal). More specifically, these include Sacramento River intervention measures (small screens, adult rescue, juvenile trap and haul), spawning and rear habitat restoration on the American and Stanislaus Rivers, San Joaquin River restoration program flows, and Lower San Joaquin River rearing habitat restoration.

### **N.2.5.1 *Project-Level Effects***

Alternative 3 project-level visual effects would be less than those under Alternative 1 because the Shasta Dam Raise would not occur.

### **N.2.5.2 *Program-Level Effects***

Alternative 3 involves approximately 25,000 more acres of habitat restoration plans than Alternative 1. While restoration efforts (such as creation or rehabilitation of spawning and rearing habitat, adult rescue, juvenile trap and haul, and small screen programs) would have no visual effects once operational, there could be short-term construction effects. Construction vehicles, trucks, and other construction equipment and activities could temporarily effect the quality of visual resources and views during habitat restoration activities at Sacramento, American, Stanislaus, and San Joaquin Rivers, and the Bay-Delta region. Alternative 3 includes construction of the program-level fish intervention (conservation) action to build the Delta Fish Species Conservation Hatchery.

Other program-level changes and project-level actions under Alternative 3 would be the same regarding visual resources impacts as described above under Alternative 1.

## N.2.6 Alternative 4

### N.2.6.1 *Project-Level Effects*

Alternative 4 would have decreased exports compared to the No Action Alternative. This would result in a range of no fluctuation to minor fluctuations of increased water elevations (zero to approximately 13 feet) in the following regions: Trinity River, Sacramento River, Clear Creek, Feather River, American River, Stanislaus River, San Joaquin River, and Bay-Delta. In the CVP and SWP Service Area under Alternative 4, increased water fluctuation would be as high as 20 feet at San Luis Reservoir between August and March. Similar to Alternatives 1, 2, and 3, the minor increases in water levels would not directly affect visual resources or cause substantial changes to visual quality. Project-level visual effects under Alternative 4 would therefore be similar to the No Action Alternative.

### N.2.6.2 *Program-Level Effects*

Alternative 4 does not include additional habitat restoration and fish intervention actions and, similar to Alternative 2, would have fewer visual effects than Alternatives 1 and 3 because there would be no short-term construction impacts on visual resources. Water efficiency use measures under this alternative would have no visual impacts. Program-level visual effects under Alternative 4 would therefore be similar to the No Action Alternative.

## N.2.7 Potential Mitigation Measures

Changes in CVP and SWP operations under Alternatives 1 through 4, as compared to the No Action Alternative, would not result in adverse changes to visual resources. Therefore, there would be no adverse impacts to visual resources and no mitigation measures are required.

## N.2.8 Summary of Impacts

Table N-1, Impact Summary, includes a summary of impacts by alternative, the magnitude and direction of those impacts, and potential mitigation measures for consideration.

**Table N-1. Impact Summary**

<b>Impact</b>	<b>Alternative</b>	<b>Magnitude and Direction of Impacts</b>	<b>Potential Mitigation Measures</b>
Potential changes in visual resources at tributaries and reservoirs that store CVP and SWP water. (Project-Level)	No Action	No effect	–
	1	No impact	–
	2	No effect	–
	3	No effect	–
	4	No effect	–
Potential effects on visual resources related to cross Delta water transfers. (Project-Level)	No Action	No effect	–
	1	Not substantial	–
	2	Not substantial	–

<b>Impact</b>	<b>Alternative</b>	<b>Magnitude and Direction of Impacts</b>	<b>Potential Mitigation Measures</b>
	3	Not substantial	–
	4	No effect	–
Potential changes in visual resources related to Clifton Court aquatic weed removal. (Project-Level)	No Action	No effect	–
	1	No effect	–
	2	No effect	–
	3	No effect	–
	4	No effect	–
Potential changes in visual resources at Tracy Fish Collection Facility and Skinner Fish Facility. (Project-Level)	No Action	No effect	–
	1	Not substantial	–
	2	Not substantial	–
	3	Not substantial	–
	4	No effect	–
Potential changes in visual resources at Delta Fish Species Conservation Hatchery. (Program-Level)	No Action	No effect	–
	1	Short-term: construction impacts	–
	2	No effect	–
	3	Short-term: construction impacts	–
	4	No effect	–
Potential effects related to Trinity ROD flows and Lower Klamath augmentation flows. (Program-Level)	No Action	No effect	–
	1	No effect	–
	2	No effect	–
	3	No effect	–
	4	No effect	–
Potential changes in visual resources at Folsom Reservoir related to American River Division flows. (Program-Level)	No Action	No effect	–
	1	No effect	–
	2	No effect	–
	3	No effect	–

Impact	Alternative	Magnitude and Direction of Impacts	Potential Mitigation Measures
	4	No effect	–

### N.2.9 Cumulative Effects

As described in Appendix Y, *Cumulative Methodology*, the cumulative effects analysis considers projects, programs, and policies that are not speculative and are based upon known or reasonably foreseeable long-range plans, regulations, operating agreements, or other information that establishes them as reasonably foreseeable.

The action alternatives would have minimal adverse effects on visual resources and visual quality, therefore the action alternatives are not expected to contribute to cumulative visual quality impacts.

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