Chapter 3I. Environmental Setting, Impacts, and Mitigation Measures - Visual Resources

This chapter describes the visual resources of the portions of Mono Basin and Owens River Basin that have been or could be affected by LADWP water diversions from Mono Basin. It describes these resources as they existed before diversions from Mono Basin began in 1940, as they existed in more recent years, and as they exist under the point-of-reference conditions for this EIR. Additional background information on the visual resources in these basins can be found in the Mono Basin EIR auxiliary report, "Visual Resources", available from SWRCB.

Potential impacts of the project alternatives and available mitigation measures are presented in later portions of this chapter. Potential visual impacts of the project alternatives along the Lower Owens River are not considered significant and are not evaluated here. The information in this chapter is organized by major basin (Mono Basin and Upper Owens River Basin).

PREDIVERSION CONDITIONS

The appearance of the landscape evolves over time in response to natural forces and human activities. After settlement of the study area began in 1852, many of the changes in the visual environment resulted from human activities. The visual conditions that existed in the study area before water diversions began in 1940 are described below.

Sources of Information

SWRCB consultants reviewed available literature that contains descriptions of the physical setting of Mono Basin during prediversion times. One of the most complete and detailed descriptions is that given by Israel Russell, which has been reprinted (Russell 1984 [1889]) from the Eighth Annual Report to the United States Geological Survey 1889. Other works reviewed include those by Browne (1961), Calhoun (1984), Chase (1911), Fletcher (1987 [c1887]), Gaines (1989), La Braque (1984), and Muir (1987 [c1911]).

SWRCB consultants interviewed other researchers conducting studies for the EIR and Dr. Scott Stine, who has written reports to the SWRCB about riparian vegetation, tufa groves, and islands during prediversion times (Stine 1991, 1992a, 1992b). Other knowledgeable individuals also were interviewed,

including Ilene Mandelbaum (Mono Lake Committee), David Carle (California Department of Parks and Recreation, Tufa State Reserve), and Randy Neudeck (Los Angeles Department of Water and Power).

Finally, photographs depicting the Mono Basin, including Mono Lake and its environs, were examined. Some of these photographs appeared in the published sources named above. However, most were included in the extensive collection of historic photographs in the possession of the Mono Lake Committee. Many of these photographs were the work of Burton Frasher. Others were taken by Wallis McPherson and others.

Mono Basin

Historical Impressions

John Muir described Mono Basin as "a country of wonderful contrasts, hot deserts bordered by snow-laden mountains, cinders and ashes scattered on glacier-polished pavement, frost and fire working together in the making of beauty" (Muir 1987 [c1911]).

In 1909, J. Smeaton Chase described Mono Basin as follows: "It was a weird yet fascinating land through which we drove. Mono Lake and the region surrounding it are unique within the United States". He reported the lake surface to be 80 or 90 square miles in extent, and observed that, in ancient times, the lake was much larger and the old shorelines were still plainly marked on the higher ground. He mentioned two islands and a number of islets that "lie out in the middle of the lake", and noted that the lakeshores were whitened with alkaline incrustations. He described the road he was traveling as "deep in sand, merging into interminable wastes of sage and greasewood brush. Here and there lay huge isolated tufae, covered with ugly blisters, knobs, and corrugations". Chase reported the existence of

> one or two little settlements along the lake-side, situated naturally where streams from the mountains enter the lake. The hamlets are quite idyllic spots, riotously verdant, with neat houses and every appearance of modest prosperity. Thickets of wild rose 6 feet high, and heavy crops of alfalfa, clover, and timothy give proof of the magical effect of water upon this otherwise dreary desert. [Chase 1911.]

J. Ross Browne visited Mono Basin between 1863 and 1865. He described the scene one evening from Lawrence's Ranch.

> We sat on the front porch, overlooking the whole magnificent panorama outspread before us. The glowing atmosphere hung over the lake like a vast prismatic canopy. Myriads of aquatic fowl sported on the glassy surface of the water, which reflected the varied outlines and many-colored slopes of the surrounding mountains. Trees, rocks, islands and all visible objects were duplicated with wonderful clearness and accuracy. . . . A soft,

> delicious air, fragrant with the odors of wildflowers and new-made hay, made it a luxury to breathe (Browne 1961 [c1865]).

Browne observed that the shores of the lake near the water had a whitish color, because of calcareous (tufa) deposits. Describing old, tufa-encrusted shorelines, he noted that "on the eastern shore low plains or alluvial bottoms, encrusted with alkali, show in distinct curvicular rims, composed of calcareous deposits, the gradual retrocession of the lake to its present level". Referring to the presence of tufa deposits, he states that "white columns and elaborate facades, like those of the ruined temples of Greece, stand on the desert shore to the north. Archways and domes and embattlements are represented with astonishing fidelity". (Browne 1961 [c1865].)

Browne also noted the abundance of alkali fly larvae. According to his description, "a curious and rather disgusting deposit of worms, about 2 feet high and three or four in thickness, extends like a vast rim around the shores of the lake". Browne noted two islands and described them as being situated a few miles from shore. In addition, he reported that immense swarms of gulls visit these islands and that "myriads upon myriads of them hover over the rocks from morning till night, deafening the ear with their wild screams, and the water is literally covered by them for a circle of many miles". (Browne 1961 [c1865].)

Perhaps the most comprehensive early account of Mono Basin landscape is that prepared by Israel Russell, noted geologist, after studying Mono Basin and nearby Lahontan drainage from 1881 to 1883. His accounts were published in the Eighth Annual Report of the U.S. Geological Survey in 1889 (Russell 1984 [c1889]). On entering Mono Basin from the east (Aurora) in 1881, Russell said

> We obtain an extended view embracing nearly the entire Mono Basin, and are much impressed with the magnificence of the High Sierra which limits the landscape to the south. . . . In front of us stretches a sloping, featureless plain, with scattered clumps of cedars and dunes of drifting sand. In the middle distance there rests upon the desert plain what appears to be a wide sheet of burnished metal, so even and brilliant is its surface. It is Mono Lake. At times the waters reflect the mountains beyond with strange distinctness and impress one as being in some way peculiar, but usually their ripples gleam and flash in the sunlight like the waves of ordinary lakes. . . . But the feature in the landscape that absorbs the attention and overshadows all else is the vast mountain mass which rises abruptly from the southern border of the lake and forms a portion of the far famed High Sierra. The level plain of water in the foreground, broken by islands in the middle distance and washing the bases of the mountains which form its distant shore, furnish a base from which to estimate vertical distances and aids one in comprehending the grandeur and magnitude of the scene. (Russell 1984 [c1889].)

Landforms and Tufa Deposits

The elevation of the lake and its surface area fluctuate naturally according to climatic conditions. In historical times, the surface elevation varied between a low of 6,404 feet occurring around 1862 and a high of 6,428 feet in 1919 (Stine 1981, 1987). From about 1885 to 1948, the lake surface was consistently above 6,414 feet. At these levels, Paoha and Negit Islands were distinct and appeared to stand near the middle of the lake, some distance from the nearest shore (Figure 3I-1).

Tufa deposits, the majority of which form on the bottom of the lake where freshwater springs emerge and mix with the saline waters of the lake, became exposed as the surface elevation of the lake declined. Some tufa formations were exposed within the range of lake levels before diversions began in 1940. The elevation at which the lake stood at any particular time determined how much tufa could be seen, either on land or rising in the lake above the water's surface. Most of the visually valued formations seen today near the shore or standing in the lake were submerged, however, in 1940.

Russell (1984 [c1889]) reported rugged crags and towerlike masses of calcareous tufa at several locations in the 1880s. Ancient formations were found at higher elevations, back some distance from the lake's north shore and also in the vicinity of Warm Springs. Younger, less weathered formations also were known. Some with rounded or domelike shapes existed on land or were partially submerged in the vicinity of Black Point. Tufa towers with a tubular or trunklike appearance were found at locations on the lake's south shore.

Russell may have been referring to an area near the presently exposed South Tufa grove when in the 1880s he described tubular lithoid tufa on the southern shore of the lake, about a mile east of the end of the Mono Craters:

> Several acres at this locality are covered with irregular tubular trunks, from a few inches to five or 6 feet in height, with a diameter of 6 or 8 inches. . . . The formation as a whole resembles a forest of gnarled and contorted trunks and stumps changed to stone. . . . The impression which this imitation forest leaves on the mind is that it is in some way weird or uncanny. The silent and motionless trunks with their uncouth shapes recall Dante's description of the wood of suicides. This fancy is heightened by the proximity of a sea whose flowerless shores seem scarcely to belong to the habitable earth. (Russell 1984 [c1889].)

These small tufa structures were apparently not the larger towers, bulwarks, and domes that now constitute the South Tufa grove (Stine 1992a).

The presence of near-shore alkali flats along the east shore prior to 1941, as alluded to by Browne (1961 [c1865]) and others, is unclear. Some confusion of alkaline evaporite deposits with calcareous or tufa deposits apparently occurs in the historical literature. The presence and size of alkali flats in any given

year was probably not extensive compared to present conditions. Because the formation of dust storms with resulting loss of regional visibility is attributable to the exposure of extensive alkali flats, dust storms probably occurred infrequently during the prediversion period (see Chapter 3H, "Air Quality").

Wildlife

Large concentrations of several species of birds were a part of the prediversion Mono Lake landscape (see Chapter F, "Wildlife"). J. Ross Browne commented that "during the winter months the waters of the lake are literally covered with swans, geese, brant, ducks, and smaller aquatic fowl. It is incredible the number of these birds that appear after the first rains" (Browne 1961 [c1865]). Likewise, Russell stated that "in the autumn and early winter, the lake surface is literally darkened with countless numbers of ducks, geese, swans, gulls, grebes, and other aquatic birds, attracted thither by the brine shrimps and larvae" (Russell 1984 [c1889]). Mono Lake was a major stopover point for waterfowl and shorebirds migrating through the Great Basin before 1940. Wildlife was also abundant along the riparian stream corridors before 1940. Wildlife in the prediversion period was an important visual element of the Mono Lake environment.

Vegetation

The basin's natural vegetation was influenced by early settlement, cattle and sheep grazing, and irrigation of pastures. By the 1890s, nearly 4,000 acres of irrigated land in Mono Basin produced hay, grain, and vegetable crops (Fletcher 1987 [c1887]). The few streams and numerous springs, particularly on the west side of the lake, supported riparian vegetation and meadow lands (Figure 3I-2). Prior to 1941, vegetation on the west side of the lake extended to the water's edge. When the lake rose, shoreline vegetation was inundated (Figure 3I-3). Prediversion vegetation resources, both around the lake and along the tributary streams, are described in Chapter 3C, "Vegetation".

As today, the riparian vegetation along Lee Vining Creek and Rush Creek and its tributaries was in marked contrast to the vastly predominant scrub communities throughout the basin. On Lee Vining Creek, the riparian vegetation along the stream corridor upstream of U.S. Highway 395 (U.S. 395) to the LADWP diversion point looked essentially the same prior to 1941 as it does today. Below (northeast of) U.S. 395 was a broad, continuous, dense riparian forest of cottonwoods and willows that filled the floodplain along the creek, reaching from toe to toe of the steep bluffs and extending toward the lake several hundred yards below the county road. Conifers also were scattered in among the willows and cottonwoods (Figure 3I-4) (Stine 1991). Riparian vegetation along lower Rush Creek in the prediversion period is shown in Figure 3I-4.

The riparian vegetation that existed along Rush Creek varied along different reaches of the stream. Dense willow thickets occurred among meadows below the county road to within 1,000 feet of the lakeshore. Above the county road, a dense, continuous, wide cottonwood-willow forest extended

upstream for several miles to an area of rock outcrop and rapids known as the narrows. Several large, wet meadows also occurred in this reach, which provided a strong visual contrast to the adjacent sagebrush vegetation. From "the ford" on Rush Creek to "the narrows", the stream lies in a wide-floored valley between steep bluffs. Springs, which may have been enhanced by irrigation upslope, may have helped to support the wet meadows and riparian vegetation, at least locally (Stine 1991).

A narrow band of cottonwood-willow woodland along both sides of the stream extended from the narrows upstream almost to U.S. 395. Scattered Jeffrey pine also were present. Upstream of the highway, a wider riparian forest of cottonwoods, willows, and conifers extended for 0.7 mile. This corridor narrowed again in the upper reach below Grant Lake reservoir. Above the pre-1940 Grant Lake reservoir, willow and aspen dominated the stream community. (Stine 1991.)

Human-Made Features

Early development in Mono Basin was in the form of ranches and farms (see Chapter 3G, "Land Use"). In addition to a concentration of homesteads located around Mill Creek and the northwest corner of the lake, at least 10 homesteads were established by about 1890 on lower Lee Vining, Walker, and Rush Creeks and along the shore of the lake between Lee Vining Creek and Rush Creek. A narrow-gauge railway between Mono Mills and Bodie ran along the eastern shore of the lake and began operation in 1882 (Fletcher 1987 [c1887]). A wagon road and toll station along the west side of the lake (Figure 3I-5) later was improved and realigned, evolving into the present-day U.S. 395. In 1909, a road from Tioga Pass was opened, providing a connection between Yosemite Valley and Mono Basin. In the mid-1920s, lots were first laid out and sold in the townsite of Lee Vining. Near the lake, the Tioga Lodge and the Mono Inn were developed.

Grant Lake reservoir, which was naturally formed by a glacial moraine, was dammed before 1940 to provide local irrigation water. Between 1935 and 1940, the reservoir was enlarged by LADWP as part of the aqueduct project. The dam, now 87 feet high at its maximum from its base to crest, was about 25 feet high in the prediversion period and was located about one-quarter mile upstream from the present dam site.

Upper Owens River Basin

As today, the area along the Upper Owens River, from East Portal downstream to Lake Crowley Reservoir was used for cattle ranching in the prediversion period. With the exception of recent summer cabin development, the area's appearance prior to diversions was similar to its appearance today. Scattered small patches of willows, meadows, marshes, and irrigated pastures bordered the stream and occupied most of the valley bottom north of Benton Crossing. South of this crossing, extensive meadow-marsh vegetation extended quite a distance from the river due to lateral inflows from several tributary streams.

Construction of the Lake Crowley dam first began in the mid-1920s but was suspended prior to completion. The dam was completed around 1940, creating Lake Crowley Reservoir with a surface area of approximately 4,000-5,000 acres. As today, this water body was surrounded by open, rolling sagebrush communities and meadowlands and was nearly devoid of shrubs and trees.

ENVIRONMENTAL SETTING

Sources of Information

SWRCB consultants reviewed available and relevant published sources, including those by the California Department of Parks and Recreation (DPR), LADWP, USFS (Mono Basin National Forest Scenic Area Comprehensive Management Plan and the Final Environmental Impact Statement on the Comprehensive Management Plan), and the U.S. Bureau of Land Management (BLM) (Bishop Area Resource Management Plan and Environmental Impact Statement, adopted in 1992). Other literature reviewed included publications by the Community and Organization Research Institute (CORI) (1988), Gaines (1989), and the National Research Council (1987).

Direct observations of existing conditions were made at various times throughout summer 1991. An extensive field reconnaissance was made in fall 1991 to observe and record existing conditions over the entire study area.

SWRCB consultants conferred with resource specialists on the study team and Dr. Scott Stine regarding resource conditions relevant to visual resources. Agency personnel with knowledge of the visual resources of Mono Basin were consulted, including Nancy Upham (Mono Basin National Forest Scenic Area), Ted Rickford (Inyo National Forest), and David Carle (DPR, Tufa State Reserve). Randy Neudeck and Steven McBain (LADWP) and knowledgeable individuals at the Mono Lake Committee, particularly Ilene Mandelbaum and Sally Miller, also were consulted.

Mono Basin

In 1984, Congress designated 116,000 acres of Mono Basin as the Mono Basin National Forest Scenic Area, the first of its kind in the National Forest System. The Scenic Area is managed by the USFS's Inyo National Forest. The enabling legislation identifies the protection of scenic values as a priority (U.S. Forest Service 1989a, 1989b). The BLM, which previously had responsibility for managing the entire area, now manages the land outside the Scenic Area to the north and east. Since 1982, the State of California has managed the land exposed by declining lake levels (the "relicted" lands); this area has been designated as the Mono Lake Tufa State Reserve.

Visual Character of Mono Basin

Mono Basin encompasses two dissimilar physiographic provinces, the Sierra Nevada and the Great Basin. The basin is recognized as a sensitive, fragile visual resource, with a landscape character typical of the Great Basin but greatly enhanced by the presence of Mono Lake. Elevations range from less than 6,400 feet at Mono Lake to more than 13,000 feet along the Sierran Crest. The lake occupies about 65 square miles of the 700-square-mile basin, currently extending 13 miles from east to west and 8 miles from north to south. The visual character of Mono Lake is shown in Figure 3I-6.

West of the lake, the sparsely forested eastern escarpment of the Sierra Nevada drops steeply almost to the shore of Mono Lake, interrupted by steep-sided canyons occupied by perennial streams. The range rises more than 6,000 feet above the lake and is the most visually dominant landform in the basin. Snow is usually visible on the range, either covering the upper elevations or in isolated fields below north-facing cliffs. South of the lake, the Mono Craters rise 2,500 feet above a pumice- and ash-covered plain and are visually prominent from most locations near the lake. North of the lake, the Bodie Hills, a relatively low, old volcanic range covered in places with coniferous woodland, rise about 2,000 feet above the basin floor. Cowtrack Mountain and the Anchorite Hills form the basin's eastern boundary.

Mono Lake is the largest and most visually dominant water feature in Mono Basin. The Sierra Nevada, seen as a backdrop, vastly increases the lake's visual value. The surface of the lake is highly reflective and mirrors surrounding elevated landforms. In calm summer conditions, the water is clear and usually reflects the vivid blue of the sky; in winter, the lake may appear green.

Various elements associated with the lake also are important visually, including Black Point and Paoha and Negit Islands (U.S. Forest Service 1989a). Paoha Island is low and dome shaped, with rugged topography and strikingly light color. In contrast, Negit Island is almost black and consists of two domes, four lava flows, and a cinder-breccia cone. Black Point, a 13,000-year-old volcano on the lake's northern shore, is a large, 585-foot-high, steep wave-cut dome of dark cinder that is often seen as an element related to the two nearby islands. The land bridge that exists between Negit Island and the north shore is a predominant visual feature of present-day Mono Lake. This feature can be seen from many points in the basin.

Tufa formations scattered around the lake's current shoreline are a unique scenic resource of the basin. Lithoid tufa towers form groves of often spectacular, varied structures resembling slender pinnacles, castlelike towers, or craggy boulders. Several groves of smaller scale, intricately formed, fragile sand tufas are also scattered around the lake.

Large areas covered with salt deposits, known as playas or alkali flats, line portions of the lake's northeast shoreline. Within these areas, noticeable concentric rings circling portions of the shoreline indicate former lake levels. The alkali flats, which are almost 1 mile wide in places, contribute to occasional large

dust storms in the basin. Other prominent and varied landform elements include a 10-square-mile area of small sand dunes northeast of the lake; a sheer bluff, up to 80 feet high, cut by wave action, along the southwest shore; and ancient beach terraces and berms, formed by the waves during the last ice age when Mono Lake was 700 feet above the lake's present level, now visible as horizontal lines or bands.

Nearly 300 bird species have been identified at Mono Lake, including 98 species of water birds. Large populations of several species of migratory and nesting birds, including California gull, eared grebe, Wilson's phalarope, and red-necked phalarope, use the lake as nesting habitat or as a stopover site during migration. These birds are sometimes readily visible in large concentrations to visitors in the basin. Alkali flies, an important prey for these bird concentrations, feed on algae in shallow areas of the lake in dense swarms and are a visually conspicuous element of the lake shoreline.

Wetlands at various places around the lake, usually near the shore, add visual variety and contrast with the brushland and playa surrounding the lakeshore, especially in late summer when the dominant saltgrass is a rich green and in fall when it turns yellow. Coniferous woodlands, located primarily around the periphery of Mono Basin on some of the higher terrain, are a less prominent visual element. Low, sparse juniper woodland covers an area northeast of the lake and portions of the Bodie Hills and extends in long, irregular belts toward the lake. Other portions of the Bodie Hills are brushy to their summits.

The lake's scenery, including the appearance of the tufa towers, benefits from unusual or dramatic lighting conditions, such as low-angle sunlight very early or late in the day; mist; a calm, reflective lake surface; snow; or dramatic cloud forms over the surrounding ranges. Popular images of Mono Basin suggest that water-based tufa is the most popular visual element. The lake itself, often with the Sierra Nevada as a backdrop, and birds also are common images. The black color of Negit Island, contrasted with the almost white color of Paoha Island, is also a popular subject.

Riparian vegetation, occasionally interspersed with conifers, occurs along the tributary streams and in patches along irrigation ditches. Where riparian vegetation is still present in lush, dense stands, it is a strongly positive visual element in the landscape, adding variety in form, line, and color and contrasting with the surrounding sagebrush scrub vegetation. The smaller streams have meandering courses through willow thickets and meadows. The larger streams flow through recently disturbed floodplains where remnant riparian thickets alternate with broad unvegetated cobble deposits. About 2,000 acres of meadow add visual variety to the slopes near Walker and Parker Creeks between the diversion conduit and U.S. 395.

Landforms surrounding Grant Lake reservoir on Rush Creek vary from a steep, rugged canyon at the south end of the reservoir to rolling hills on the north end. The dam impounding Grant Lake reservoir is a large structure, but it is not visually dominant when viewed from most locations, such as major roads or use areas. The water surface of the reservoir is subject to drawdown, resulting in a barren shore zone

during certain periods of the year. Buildings serving public boating activities are located on a peninsula midway along the reservoir.

Important human-made components of Mono Basin include the small town of Lee Vining; scattered buildings, mostly residences and ranch and commercial structures; overhead utility lines; road cuts; diversions and buried pipeline routes of the Los Angeles water supply system; paved and unpaved roads; quarries; and other water and power developments. Land in the basin purchased by the city to acquire water rights remains largely undeveloped. The extensive federal lands in the basin are generally managed to preserve their natural landscape character.

Mono Lake

This section describes the potentially affected landscape elements at Mono Lake and identifies sensitive viewers and observation points for viewing the lake. Locations of many of the landscape elements at Mono Lake are shown in Figures 1-1 and 1-2 in Chapter 1.

Potentially Affected Landscape Elements. The visual character of landscape elements at Mono Lake that could be affected by changing lake levels is described in this section. These elements include:

- the lake surface, waters, and shoreline;
- islands;
- tufa groves;
- alkali flats;
- pumice blocks;
- birds;
- alkali flies;
- lakeside vegetation; and
- human-made features.

Lake Surface, Waters, and Shoreline. The lake's surface is one of the most important visual elements in Mono Basin. Because Mono Basin has no outlet, variations in precipitation and runoff naturally control the lake's surface elevation (refer to Chapters 2, "Project Alternatives", and 3A, "Hydrology"). When diversions began in 1940, the lake surface covered about 86 square miles (54,900 acres); in 1989, coverage was reduced to about 66 square miles (42,400 acres). Figure 3I-7 shows the lake as it appeared from the Wilson Tufa Grove (along the northwest shore) in 1968, when the lake surface was at approximately 6,388 feet, and in 1982, when it was at its historical lowstand of approximately 6,372 feet.

The lake's water varies in clarity and color over the year, depending on the population density of algae. In summer, visibility through the water extends to a depth of 25-35 feet, and the lake surface reflects the sky's color. In winter, visibility drops to approximately 1.5-3 feet, and the lake shows a range of green

colors, depending on wind conditions and the consequent reflectivity of the surface (California Department of Parks and Recreation 1987, NAS 1987, Gaines 1989).

Islands. Paoha is the largest of the lake's islands, currently covering about 3 square miles (see Figure 3I-8). The old lake-bottom sediments forming the island are white (gray when wet) in most lighting conditions. The island has a low, domed profile rising 312 feet above the current lake level (6,373 feet). Vegetation is not a strong visual element on Paoha Island, and no human-made features are visible from the mainland.

A small cluster of islets off the western shore of Paoha Island, at current lake levels, vary in size from more than 10 acres to isolated single rocks. The islets are light colored and often appear as an extension of Paoha Island; they did not appear above the lake surface until about 1961, when the lake surface had dropped to about 6,395 feet (Stine 1992b). As the lake dropped further, more islets have been exposed.

Negit Island currently covers about 0.4 square mile. The majority of the island is composed of very dark brown or charcoal gray lava, and the base of the island is a light tan, buff color. In places, a distinct horizontal line divides the two colors. The topography of Negit Island is striking, consisting of a flat-topped, steep-sided cone rising about 220 feet above the current lake surface. Vegetation appears on certain portions of the cinder cone as a sparse to moderately dense growth of brush. No human-made elements are visible on Negit Island from the mainland.

Negit Island becomes a peninsula of the mainland near Black Point when the lake surface drops to 6,375 feet (1.2 feet below the point-of-reference elevation). The emerging land bridge is composed of a wide, flat expanse of lake sediments along its northwest side and is a conspicuous visual element at lake levels below about 6,390 feet.

A cluster of islets, including Twain and Java, lie off the northeast shore of Negit Island. At current lake levels, the islets vary in size from about 16 acres to isolated single rocks. The islets are white (from the coating of alkaline or tufa deposits), except for the medium brown high points of a few of the larger islets. The highest islets have always been above the lake surface during historic times. Twain and Java Islets become land bridged when the lake surface drops to 6,372 feet. (Stine 1992b.)

Tufa. Groups of tufa towers and sand tufa deposits are scattered around Mono Lake's shores. The towers, which range in height from a few inches to 10-25 feet, are unusual light gray or white rock formations of spines, pinnacles, or knobs rising abruptly from the shore or near-shore lakebed. Some old tufa deposits appear at higher elevations, much farther back from the current lakeshore. Tufa towers are formed when calcium-bearing freshwater springs well up through the alkaline lake water, which is rich in carbonates.

The tufa deposits at Mono Lake are a significant scenic resource. While tufa is found in other alkaline bodies of water, the variety and quantity of Mono's towers is unique (California Department of

Parks and Recreation 1987). The deposits have been described as a distinctive scenic resource of the basin, a significant scenic attraction, and picturesque (NAS 1987). They contribute to Mono Lake's unique aesthetic qualities and are important scenic resources to many viewers (CORI 1988). Most currently visible portions of the major groups of tufa towers (tufa groves) have been exposed by the receding lake and are a designated and protected scenic resource (the focus of the Mono Lake Tufa State Reserve).

Figure 3I-9 shows the locations of important tufa deposits at the lake (Stine 1992a). The tufa groves stand at elevations varying from 6,368 feet to 6,430 feet. Table 3I-1 shows the general visibility of each of the nine tufa tower groves at three lake levels: the historic high level (6,428 feet), the level when diversions started (6,417 feet), and the level at the 1989 point of reference (6,376 feet). During the temporary rise in lake elevation from 6,372 feet in 1982 to 6,381 feet in 1986, wave action at the advancing shoreline undercut the soft sediment at the bases of many tufa towers at the South Tufa grove, and the towers toppled.

The Mono Lake County Park tufa grove, also known as the DeChambeau Creek tufa grove (Figure 3I-10), is reached easily by a boardwalk. The tufa structures are older and more rounded or domelike in most cases than those at the Lee Vining or South Tufa groves (see Figures 3I-11 and 3I-12). The currently visible portion of the Old Marina grove (Figure 3I-10) is of moderate size and is both water and land based. A boardwalk provides partial access. There are several relatively tall castlelike structures, but many are in the form of craggy boulders that grade imperceptibly into tufa-covered pumice blocks.

The Lee Vining grove is large and spectacular. It is currently both water and land based. The tufa structures here are varied, with numerous tall, slim pinnacles that show little evidence of damage from human use or weathering. Public access into the tufa grove is not convenient and may serve to limit the number of persons who visit here as compared to tufa groves at South Tufa, the Old Marina, and the Mono Lake County Park.

South Tufa is the largest of the visible Mono Lake tufa groves. It is currently both land and water based. Access is easy via a well-used trail leading from the large parking lot. The structures are varied, with many being tall and dramatic in form. These tufa deposits are relatively young and may have formed after irrigation began in the upslope Pumice Valley in 1920 as percolating irrigation waters reached the lake (Stine 1992a). They are shallow rooted and susceptible to undercutting by wave action during rises in lake level.

The Wilson Creek tufa grove lies near the mouth of Wilson Creek east of the Mono Lake County Park tufa grove. Access is difficult; a locked gate associated with a quarry operation near the lake requires approach by foot and public use of the area is therefore limited. The grove contains the "benchmark tufa", which have been photographed at different lake levels and which provide a striking visual record of the fall in lake surface elevation. At the point of reference, all the tufa towers at this grove are completely land based; the bases of these formations lie at elevations between 6,383 and 6,386 feet (Stine 1992a). One of the few remaining freshwater ponds remaining around the lake (the "gull bath") also occurs here.

The Simon's Spring grove is widely scattered and contains relatively few structures overall, arranged in small subgroups. All the structures are land based, some as far as one-quarter mile from the shore. Access is relatively difficult. The structures are somewhat varied in form.

Several concentrations of sand tufa occur on the south and southeast shores of Mono Lake (Figure 3I-13). Sand tufa consists of intricate, irregular, small-scale forms, usually in the shape of tubes, columns, and walls, groups of which are sometimes topped by caplike or rooflike structures. These structures formed, not on the surface of the submerged lakebed, but within the sand beneath the lakewater. As the lake level has fallen, the sand tufa structures have been revealed by wind erosion of the surrounding sand.

Sand tufa, which consists of small structures of calcium carbonate cemented sand, is always land based and usually is 3-4 feet high or reaches heights in excess of 6 feet (Figure 3I-13). The estimated elevations of their bases range from 6,390 feet to 6,432 feet. The structures are very fragile and susceptible to damage from human use and destruction from rising lake waters. Because of their small size and location back from the lakeshore, they are not nearly so well known or sought out as tufa towers. However, sand tufas are actively sought by photographers, who value them highly. Almost all sand tufa formations were under the sands of the lakebed at the time of the historic high lake level; most were still beneath the lakebed at the beginning of diversions (lake level 6,417 feet).

Alkali Flats. Alkali flats, also known as playa, salt flats, or exposed lakebed, are a readily evident visual element around portions of Mono Lake's shores, especially along the northeastern shores and between Negit Island and Black Point and the east shore, as well (Figure 3I-14). An area of lesser salt deposits also extends east from Navy Beach. Areas of exposed alkali flats have widened as the lake has declined. These flats are almost 1 mile wide in places as compared to a relatively narrow band before diversions began. When dry at the surface, they are a vivid white, and when wet, they darken to light tan or gray. These flats are widest where the shoreline is flattest. Some amount of playa is considered by some to provide definition to the lake (NAS 1987).

Alkali flats contribute to dust storm episodes in the basin (Figure 3I-15). High winds, generally blowing from the southwest, pick up salts and mineral sediments and carry them for long distances. The dust often originates on the alkali flats, especially those on the northeast and east shores of the lake, northwest of Negit Island, and on Paoha Island. Dust storm episodes occur throughout the year but are most frequent in spring. They can abbreviate sight-seeing activities and experiences. Obscuring views of landforms, they are highly visible from many areas when they occur. The dust storm phenomenon is described in Chapter 3H, "Air Quality".

Pumice Blocks. Substantial portions of the current shoreline area of Mono Lake are littered with pumice blocks, which impart an unusual texture to the shoreline. The blocks are covered with tufa deposits and thus are typically very light in color. They vary in dimensions from less than a foot to many feet (Figure 3I-16). At higher lake elevations associated with prediversion conditions, no pumice blocks were present above the shoreline. The major location of visible pumice blocks is the west and northwest shores of the lake from Old Marina to the mouth of Cottonwood Creek. (Stine 1992a.) Pumice

blocks are probably a minor visual element when compared to tufa towers and other important visual characters.

Birds. Large populations of several species of migratory and nesting birds are found at Mono Lake (refer to Chapter 3E, "Wildlife"). These birds occur in large concentrations that often can readily be observed by viewers. Although some of the bird populations may be concentrated at times in remote areas of the lake, many can be seen in large numbers at the accessible lakeshores (especially where there is freshwater inflow) feeding on the brine shrimp and alkali flies.

Four bird species currently use Mono Lake in large numbers: California gull, eared grebe, Wilson's phalarope, and red-necked phalarope. The snowy plover also is present but not in large numbers; however, the population that uses Mono Lake represents 11% of the California population. Approximately 40,000-65,000 California gulls currently use Mono Lake for nesting. The gulls arrive in March and April, nest from May through July, and depart in early August. An estimated 750,000 eared grebes are found at Mono Lake during fall, using the lake as a stopover site during their migration.

About 90,000-125,000 Wilson's phalaropes are estimated to use Mono Lake during migration, with 70,000-80,000 present at one time. The birds begin arriving in mid-June to late June and begin to depart near the end of July. About 50,000-65,000 red-necked phalaropes use Mono Lake as a stopover on their fall migration. They begin to arrive in early July to mid-July. Populations increase until early August, remaining high until early September. Most are gone by mid-October. The phalarope populations concentrate along the western and northern portions of the lake when the lake surface elevation was at or higher than the point-of-reference elevation but recently shifted to the eastern portion of the lake as the lake surface has dropped. Concentrations on the eastern portion of the lake are much less accessible to recreational visitors. Many other species of birds are readily and commonly observed, including Brewer's blackbirds, violet-green swallows, killdeer, ravens, sandpipers, and nesting osprey. Birds are a constant element of the Mono Lake environment.

Alkali Flies. Adult alkali flies, after emergence from Mono Lake, concentrate on Mono Lake's shoreline in such numbers that they become visually conspicuous. At peak populations, the flies settle on a strip of shore several feet wide, immediately adjacent to the water's edge, so that even from a distance the area may appear black. These flies are not attracted to humans or animals; they feed on algae in shallow areas of the lake. It is uncertain whether the magnitude of alkali fly concentrations has changed since diversions began. (See Chapter 3E, "Aquatic Productivity".)

Lakeside Vegetation. The exposed Mono Lake shoreline and lakebed supports marsh, meadow, grass, and scrub vegetation that is verdant during the summer growing season and mostly dormant and golden brown throughout the long fall and winter. Trees are generally absent. Vegetation is extensive and continuous along the west shore from Mono Lake County Park south to Old Marina where wide green

swaths fringe the lake margin. Elsewhere, the shoreline's scattered, small to relatively extensive wetlands provide color interest and visual diversity with green, luxuriant patches interspersed among unvegetated alkali and sand flats.

Wetland vegetation adds diversity, variety, and interest to the semi-arid scenery surrounding the lake because of its dense, lush quality and relatively vivid color. Most wetlands along the west half of the shoreline are associated with tufa groves. Wetlands are spotty and less prominent along the eastern shoreline, with the exception of Simon's Spring and Warm Springs.

Vegetation along the western shoreline below U.S. 395 and the northwest shoreline to Black Point consists of extensive marsh and meadow wetlands. Wide bands of willow scrub encircle the upper margin of these wetlands and are especially dense around Mono Lake County Park and the Mill and Wilson Creek delta. The lake margin is bordered by a narrow, unvegetated fringe where alkali crusts form a whitish contrasting band when viewed against the green wetlands and blue lake.

Smaller meadow, marsh, and willow wetlands are associated with the Lee Vining and South Tufa groves. Large wetlands in the less accessible and less visible northern and eastern shoreline include Simon's Spring, Warm Springs, and an extensive band from the mouth of Cottonwood Creek west to the Wilson Tufa Grove at the base of Black Point.

The Simon's Spring wetland extends from the historic high stand down almost to the present shoreline. Tufa towers aligned on a fault jut into the wetland, forming a visually pleasing craglike parapet. The Warm Springs wetland is less extensive; it is mostly separated from the lake by a wide alkali flat. Likewise, the wetland band along the north shore west of Cottonwood Creek is narrow and separated from the lake by a wide alkali flat. Drier areas surrounding these wetlands and alkali flats support saltgrass and other species that provide visual interest, especially by their rich golden brown color during winter and spring.

Dryland shrubs encircling the Mono Lake shore generally occur above the zone of wetlands and alkali and sand flats. Except for the western shoreline from Black Point to Old Marina, the shoreline is encircled by rabbitbrush scrub that provides a golden yellow floral display during late summer. Occasional greasewood scrub stands occur along the southern shoreline near the lake and on Paoha and Negit Islands. Great Basin sagebrush scrub community encircles the entire shoreline area above the elevation of the lake's historic high stand (6,428 feet). This gray-colored shrub vegetation adds color and diversity to the Mono Lake scene.

Since diversions began, the extent of wetlands vegetation has increased (see Chapter 3C, "Vegetation").

Human-Made Features. Most human-made features in Mono Basin are at some distance from the lake and not directly affected by change in lake elevation. The only existing human-made features that are visually associated with the lake are the brine shrimp processing plant with its boat dock

south of Mono Lake County Park and the parking lots, restrooms, and boardwalks/trails with their associated interpretive signs at Mono Lake County Park, Old Marina, South Tufa, and Navy Beach. The shrimp plant buildings are small scale and inconspicuous, and the boat dock can be viewed as a natural arrangement of rocks. The boardwalks and signs of Mono Lake County Park are small and inconspicuous to serve the recreational viewer of the lake.

Noticeable changes in the built environment that have occurred since diversions began are the mostly small developments and isolated residences scattered along State Route (SR) 167 and U.S. 395 north and south of Lee Vining (Figure 3I-17). Roads and overhead utility lines also contrast with the natural qualities in parts of the basin (Figure 3I-18). These changes, however, were not the result of stream diversions, and the acquisition of land by LADWP for diversion purposes may have actually limited the amount of such changes (see Chapter 3G, "Land Use"). Most of the powerlines creating visual impacts along U.S. 395 and SR 167 have been removed.

Viewers and Key Observation Points. Different types of viewers have differing levels of expectations, knowledge, and concern about the lake and its visual environment. Their focus on the lake environment, number of viewers, and duration of exposure also vary. These factors combine to give specific levels of visual concern, or visual sensitivity.

The three main types of viewers of the Mono Lake environment are local residents, destination recreationists, and travelers through the area. Table 3I-2 identifies the factors and resulting levels of visual sensitivity. In general, travelers through Mono Basin are considered to have high concern for visual quality, whereas local residents and destination recreationists have very high concern.

Mono Basin can be seen from many different viewpoints. However, the vast majority of viewers concentrate at only a few locations, principally developed recreation sites near the south, west, and northwest shores of Mono Lake and along U.S. 395, which runs north and south along the west side of the lake at the base of the Sierra Nevada.

Five locations have been identified from which most of the public views the lake and its setting: the Mono Lake Vista Point (highway overlook) on U.S. 395 below Conway Summit, the Mono Lake County Park, U.S. 395 adjacent to the Old Marina, the Mono Basin National Forest Scenic Area Visitor Center (opened in spring 1992), and the South Tufa area. Less visited locations include the southeast side of Black Point, SR 167 northeast of the lake, the Bodie Road north of the lake, the four-wheel-drive road around the east side of the lake, SR 120 east of Mono Craters, Panum Crater, points north of Grant Lake reservoir on Highway 158, and the town of Lee Vining.

Following is a brief description of the character of the five key viewpoints and the character of the view from each location. Lake-level simulations were prepared at each of these locations, as shown in

Figure 3I-19. The descriptions of the following viewpoints do not detail the actual experience of the area or site by visitors, but are meant to characterize visual features from those viewpoints.

Conway Summit. This observation point is a roadside overlook on U.S. 395 just south of Conway Summit with some minor information/interpretive facilities. Many viewers stop at this popular location, although the typical duration of view is relatively short (15 minutes or less). The viewpoint is elevated 1,500 feet above the lake and is about 4.25 miles from the nearest shoreline. The vertical view angle to the lake is therefore steep.

The view offers a wide, sweeping panorama of almost the entire basin, dominated in the center by the lake, but extending far to the east along the southern face of the Bodie Hills, around the east end of the basin, along the south side of the lake bounded farther south by Cowtrack Mountain, to the Mono Craters, to the community of Lee Vining and along the west shore of the lake, bounded by the steep rise of the Sierra Nevada. The lake's islands, Paoha and Negit, are seen beyond and to the east of Black Point.

The white alkali land bridge and east shore are prominent also. The Conway Ranch, a historical ranching operation, and two housing developments (Conway Ranch and Mono City) are visible in the middle ground of the scene, set on a broad plain in the northwest corner of the basin. A view from this observation point at the approximate point-of-reference lake elevation is shown in Figure 3I-20.

Mono Lake County Park. This viewpoint is reached from Cemetery Road, east of U.S. 395 at the northwest corner of Mono Lake. Facilities include a parking lot, restrooms, picnic tables, and a boardwalk trail with interpretive signs. The many viewers here have generally a moderate duration of view (usually 15 minutes or longer). The boardwalk trail slopes down from an elevation 65 feet above the lake to the water level.

The distance to the shoreline from the parking lot is 0.5 mile. The viewpoint from the parking area is of the parking lot and the remaining park facilities. A dense band of riparian vegetation in the area between the park and the lake screens views to the lake.

Past the band of riparian vegetation and along the boardwalk trail, the lake is fully revealed and dominates the view. From the boardwalk, the focal points are the tufa deposits, the lake, and islands; a residential development immediately east is also evident. The scene from the boardwalk is characterized by the riparian vegetation and wet meadow in the foreground. Toward the lake, several land-based tufa deposits are visible. The flat terrain extending from Black Point is highly visible, along with various tufa deposits standing out in the water, and a playa area that forms the very northwest corner of the lake. U.S. 395 is visible at the base of the Sierra Nevada. The Mono Craters, although quite distant, are dramatic visual elements beyond the south shore of the lake. Paoha Island can be seen near the left edge of the visible portion of the lake. Negit Island is mostly obscured by Black Point. The boardwalk is an excellent location for bird watching. A view from this observation point under the approximate point-of-reference conditions is shown in Figure 3I-21.

U.S Highway 395 at the Old Marina. This observation point is along U.S. 395 where it passes near the west shore of the lake, south of Mono Lake County Park and north of Lee Vining. All travelers north-south through Mono Basin pass this location and can pull off to the side of the road for viewing. The viewpoint is approximately 110 feet above the surface of the lake and about 0.5 mile from the nearest point to the shore. The vertical view angle to the lake is therefore moderate to steep.

Views from this area are focused along the entire west shore and extend north to Mono Lake County Park and northwest to Black Point. The Bodie Hills form the north boundary of the scene. The large exposed alkali flat north of Negit Island is visible. Negit Island is in full view, its dark color contrasting with the light tan and buff of Paoha Island. The Old Marina tufa formations stand at the southwest corner of the lake. The near shore, in the immediate foreground, is littered with pumice blocks, which give a unique texture to the shore. To the west, the Sierra Nevada rises abruptly from U.S. 395, its face featuring varied densities of conifer with some open areas and rock outcrops. The vegetation patterns in this area are varied and interesting; the west shore has numerous springs and seeps and therefore a rich texture of wetland vegetation interspersed with dryland species. In addition, an abundance of bird life can be observed in this area. A view from this observation point under approximate point-of-reference conditions is shown in Figure 3I-22.

Mono Basin National Forest Scenic Area Visitor Center. The visitor center is located at the end of a short spur road heading east off U.S. 395, about one-third mile north of Lee Vining. Opened in 1992, the visitors center provides a full range of facilities. It is expected to attract many visitors who probably will visit for a moderate duration. The best view is from the patio on the east side of the building, which is about 325 feet above the lake and a distance of 1 mile from the nearest shore.

The viewing experience from the visitor center is dramatic and unique because it offers a relatively near view of the lake, but also a relatively elevated view as compared with many other key viewing locations. The viewer is able to take in panoramic views of the basin, beginning with the east face of the Sierra Nevada to the west. The entire west shore is revealed, including the interesting vegetative patterns created by the wetland communities found there. The northwest corner of the lake is in view, including the area at Mono Lake County Park. Interesting vegetative patterns, created by larger trees, are visible at and behind the county park. Some of the development at Mono City can be seen on a low ridge in the distance. The land bridge and alkali flats north of Negit Island are also visible. Negit Island is very dark in color, and Paoha Island is fully exposed, as are the small islets off its northwest corner. The far eastern lake shore is obscured by the upper portions of Paoha Island. The southeast shore of the lake, visible off the southern tip of Paoha Island, is seen against a backdrop of relatively uniform hills. Subtle horizontal lines or bands on these hills indicate former beach terraces. To the south, the view of the lake surface is cut off by a bench to the east of Lee Vining Creek in the foreground, but above it is a striking view of the White Mountains forming the horizon some 50 miles distant. The Mono Craters are also prominent features on the southern horizon.

The main focal points from the visitors center are the tufa at Old Marina, the lake surface, and, from left to right, Black Point, Negit Island, and Paoha Island. Lower Lee Vining Creek and its riparian corridor create a major focal point. A view from this observation point under approximate point-of-reference conditions is shown in Figure 3I-23.

South Tufa. This observation point, located near the south shore of the lake, is reached from Highway 120, 5 miles from U.S. 395. Facilities include a parking lot, a 1-mile self-guided nature trail, interpretive exhibits, toilets, and picnic tables. This location is visited more often than any other at the lakeshore. The duration of view of most of these visits is moderate to long. The parking lot is about 40 feet above the lake and about 0.25 mile distant, which provides a low vertical view angle. The main visual attraction here is the large tufa group, which is mostly land based at the point-of-reference lake level and the shoreline. However, water-based tufa is probably of greater focal interest than land-based tufa. Panoramic views are visible from the shore over and through the tufa, including the east face of the Sierra Nevada, Black Point, and Paoha Island (Negit Island is mostly hidden behind Paoha Island), against a backdrop of the Bodie Hills toward the west and north. The view to the east is open and expansive. South Tufa is the main site where visitors experience Mono Lake's water, shrimp, flies, birds, tufa, and vistas.

The focus of the viewpoint is the tufa, and, to a lesser extent, the surface of the lake, the island and the Sierra Nevada. The scene, strongly influenced by the tufa, is highly diverse. A view from this observation point under approximate point-of-reference conditions is shown in Figure 3I-24.

Diverted Tributary Streams

This section describes the potentially affected landscape elements along the diverted tributary streams and other landscape elements that comprise the visual character along the diverted tributary streams. It also identifies the key observation points for viewing the streams.

Potentially Affected Landscape Elements. The visual character of certain landscape elements along the diverted tributary streams could be affected by changing streamflows. These elements include channel and floodplain characteristics, streamflow characteristics, riparian vegetation, and irrigated pastureland. Streamflow characteristics of the diverted tributary streams are discussed in Chapter 2, "Project Alternatives", and Chapter 3A, "Hydrology". Channel characteristics and riparian vegetation are discussed in detail in Chapter 3C, "Vegetation".

Channel and Floodplain Characteristics. The channels of Lee Vining and Rush Creeks are varied in character. In places, especially in their lower reaches, the creeks are relatively wide and shallow, even braided, with much of the streambed in the lower reaches composed of cobbles. Near the lakeshore, Rush Creek and, to a lesser extent, Lee Vining Creek have cut their channels deeply (incised)

into the unconsolidated floodplain sediments during the diversion period, creating new floodplains up to 20 feet below the prediversion floodplains.

Broad cobbly bars without topsoil and often scant vegetation occur where the floods of the 1960s caused major alterations of stream morphology. Three such cobble deposits occur on Rush Creek (just above the old highway bridge, upstream of the narrows, and between the county road and the lake), and another occurs on Lee Vining Creek near the county road crossing. The visual character of unvegetated cobble deposits contrasts with the vegetated riparian and upland landscapes that predominated when diversions began.

The channels of Walker and Parker Creeks are small, being only a few feet wide. Above U.S. 395, Parker Creek and, to a lesser degree, Walker Creek are very sinuous, creating interesting visual patterns and supporting a mosaic of riparian and meadow vegetation along their banks. Figures 3I-25, 3I-26, 3I-27, and 3I-28 show some of the channel and vegetation characteristics of Lee Vining, Walker, Parker, and Rush Creeks, respectively.

StreamflowCharacteristics. After several decades of dewatering due to the diversions, flows were restored to Parker and Walker Creeks in 1990. Flows in Rush and Lee Vining Creeks, earlier quite low or absent, were enhanced gradually in the 1980s. The high streamflows that occur during snowmelt and the low streamflows that occur during late summer and fall have generally been moderated through flow releases since diversions began.

The visual effects of flowing water within a stream channel are strongly positive. The quantity of the flow is visually less important than the presence of flowing water. If streamflow tends to fill the channel (i.e., bank to bank), increases in the amount of water beyond that quantity may do little to further improve visual quality. After being shown photographs of Rush Creek at 20, 60, and 100 cfs, visitors to Rush and Lee Vining Creeks were asked in a 1991 survey which (if any) of the streamflow conditions was most appealing to them for their primary recreation activity. Of the visitors interviewed, 5% indicated that they preferred 20 cfs, 36% preferred 60 cfs, 43% preferred 100 cfs, and 15% had no preference.

Riparian Vegetation. Riparian vegetation has a positive visual effect on the landscape, adding variety of shape, texture, and color. Figures in Appendix P show the extent of existing riparian vegetation along the creeks in 1989, although additional riparian growth has occurred in some areas since then.

As described in Chapter 3C, "Vegetation", existing riparian vegetation on Lee Vining Creek from several miles above the diversion to just below U.S. 395 consists of a rather dense, irregular belt of forest consisting of conifers, hardwoods, and willow scrub. From a third of a mile below U.S. 395 to the lakeshore, riparian vegetation is sparse, consisting of clusters of cottonwoods and willows that survived dewatering or established recently. Sagebrush scrub, with charred stumps and fallen logs of cottonwood and pine, dominates most of the area formerly occupied by dense cottonwood-willow forest. Near the county road, vegetation is more continuous along the main channel, although it is still in an early stage of

recovery from the unrestricted diversion period. Many 10- to 20-foot-tall cottonwoods and a few isolated and visually conspicuous conifers occur near the county road. Clumps of willow scrub and small cottonwoods are found on the creek delta near the lake. The lower Lee Vining Creek riparian community of today is significantly different than the prediversion community in density, diversity, and complexity.

Along Walker Creek above its diversion point is a dense, clearly defined stand of mature aspen. Below the diversion, the aspen ends abruptly, and the creek is lined with a corridor of dense but drought-stressed willow scrub, with a few scattered aspens and conifers. At its crossing of U.S. 395, Walker Creek has only a low, sparse growth of willow scrub along its immediate banks.

Directly above its diversion point, Parker Creek is bordered by a wide zone of moderately dense willow scrub with scattered conifers and aspen. Below the diversion, the vegetation is very similar to that on Walker Creek.

Below the Grant Lake reservoir dam, Rush Creek flows through a variety of landforms, each with different patterns of vegetation. Along the permanently dewatered reach just below the dam, former riparian vegetation is mostly dead. Below the return ditch (where flows are returned to the channel), a narrow strip of mixed riparian vegetation borders the stream descending through a ravine. Below, a broader strip of willow scrub and cottonwood forest with scattered pines extends to an area above the old highway bridge. From here to U.S. 395, vegetation is mostly absent. A narrow, nearly continuous strand of willows and young cottonwoods borders the stream to the narrows.

From the narrows to an area one-half mile upstream of the county road, the Rush Creek bottomlands support remnants of the extensive prediversion riparian forest. Dense thickets of willow and mountain rose, with an occasional mature cottonwood, are present. Most of the prediversion meadows remain, but are reduced in area and are dry rather than wet meadows.

Mature vegetation is absent from the deeply incised segment from the county road to the lakeshore, but willow seedlings have established extensively across the current floodplain. The visual character of lower Rush Creek and its delta has substantially changed because of the lowering of lake level during the diversion period.

IrrigatedPastureland. Irrigated pastureland is a landscape element that could be affected by streamflow changes. Approximately 2,000 acres of irrigated pastureland occurs west of U.S. 395 adjacent to Walker and Parker Creeks.

Other Landscape Elements - Human-Made Features. Other landscape elements that make up the visual character of the diverted tributary streams are the human-made features, primarily components of the Los Angeles Aqueduct. One conspicuous feature is the gravel road over the buried Lee Vining conduit from Lee Vining Creek to Grant Lake reservoir. The road appears as a straight, horizontal line across sagebrush-covered slopes west of U.S. 395. It is evident from U.S. 395, and less so from locations east of the highway.

The dam at Grant Lake reservoir, a large structure 87 feet high at its maximum and approximately 700 feet long, also is readily evident, although it generally does not appear as a dominant feature within the visual context of the surrounding natural topographic features. A bypass ditch is immediately downstream of the dam that, as seen from the road, is a relatively unobtrusive feature. On the reservoir side of the dam, a concrete structure where diverted water is delivered into the reservoir and the intake structure that conveys water out of the lake are visible, along with two rather small buildings (gage houses) at the dam.

Grant Lake reservoir, enlarged by the construction of the present dam over its prediversion condition, is easily visible from points within its topographic basin, primarily from the road on the west side of the reservoir. Less conspicuous components of the aqueduct system include the concrete diversion structures on Lee Vining Creek, Parker Creek, and Walker Creek. These features are generally visible only within their immediate vicinity; viewers must approach to within a few hundred feet or closer to see them.

Viewers and Key Observation Points. Because the highway does not pass along the diverted tributary streams, views of the streams from U.S. 395 are limited to the vicinity of the crossings of the four streams. The number of viewers from the highway is very high, but the visitors may not notice the Walker and Parker Creek crossings at all.

The June Lake Loop road passes near Rush Creek for some distance, affording relatively distant viewing. SR 120 to Yosemite crosses Lee Vining Creek and passes near it upstream of the town of Lee Vining, providing some additional views. The number of viewers from these roads is moderate to high, respectively. Lower Lee Vining Creek also is plainly visible from the new Mono Basin National Forest Scenic Area Visitor Center near town and from several locations in the town of Lee Vining and is thus apparent to both the relatively small number of local residents and the high number of travelers visiting the center or staying in overnight accommodations.

Improved and primitive unsurfaced roads provide closer viewing of the diverted tributary streams. The county road along the lake, providing secondary access from U.S. 395 to South Tufa, is the most heavily used and crosses both Lee Vining and Rush Creeks at their deltas. A public road passes along the Rush Creek bottomlands for several miles from U.S. 395 to the county road, but it is used infrequently. Roads open to the public on LADWP lands provide views of and access to Parker, Walker, and Rush Creeks in several places, and these roads also are relatively lightly used. Most sustained views of the diverted tributary streams are by fly fishers and other recreationists reaching the streams by these roads and walking their streambanks. The total number of such users is moderate.

Grant Lake Reservoir

This section describes the potentially affected landscape elements at Grant Lake reservoir, describes other landscape elements that comprise the visual character, and identifies the key observation points for viewing the reservoir.

Potentially Affected Landscape Elements. The landscape elements that are potentially affected by fluctuating reservoir levels at Grant Lake reservoir include shorelines and vegetation. Reservoir levels are discussed in Chapter 3A, "Hydrology", and vegetation characteristics are discussed in Chapter 3C, "Vegetation".

Shoreline. The shoreline of Grant Lake reservoir is generally composed of coarse sands, gravels, and cobbles. The highest possible level of water, corresponding to the elevation of the spillway of the dam, is immediately evident. The water surface, however, rarely reaches this highest elevation; the water level is almost always drawn down, often far down below this level. Historical records of the surface elevation of Grant Lake reservoir from 1970 to 1989 show a typical pattern of low water elevation in spring, an abrupt rise in early summer, followed by a slower decline. Over the 20-year period between 1970-1989, high levels were reached as early as April or as late as November, but most often in June. Low levels usually have occurred in April, but occasionally as early as December or as late as May. The average annual drawdown has been 32 feet.

Vegetation. Vegetation patterns around the south end of the reservoir are varied and visually interesting, with conifers and aspen above the unvegetated drawdown zone, juniper on parts of the hillside, and a large grove of aspen on the east-facing slope. North of this point, vegetation becomes simpler, generally a uniform growth of sagebrush scrub. The pattern is varied only by plantings (including mature trees) around the recreational developments about 1.5 miles from the reservoir's upstream end.

Other Landscape Elements. Other landscape elements that comprise the visual character at Grant Lake reservoir include landform and human-made features.

Landform. The south end of Grant Lake reservoir is enclosed by a steep and rugged canyon from which Rush Creek issues. Beyond the reservoir to the south is a highly scenic landscape, given visual variety by the many broken, angular rock outcrops on the canyon walls. As the viewer moves north, the valley changes character, grading into smoother, more rolling hillsides with even slopes. A low, mounded landform stretches across the valley 1.5 miles from its upper end. North of this point, the slopes forming the valley become progressively lower, smoother, and less varied, giving the impression of a topographic bowl, an unexceptional but visually pleasant landform.

Human-Made Features. At the south end of the reservoir are a few minor recreational facilities, parking lots, and interpretive signs. The main concentration of human-made elements is at the peninsula that extends into the reservoir from its west shore. Here are extensive recreation facilities, including campsites, picnic grounds, a cafe, boat rental, boat ramps, and miscellaneous buildings. When

the reservoir is drawn down, these may be far from the water. The only structures at the northern end are the dam, a rock-faced structure that appears similar to rocky portions of the drawn down shoreline, and two gage houses.

Viewers and Key Observation Points. The viewpoint along the main, paved road at the peninsula that extends into Grant Lake reservoir from its west shore is typical of most viewpoints at the reservoir, although its extreme southern end is more rugged and scenic. This viewpoint is the site of a concentration of recreational facilities, including a campsite, picnic ground, cafe, and boat rental facilities. The number of viewers here is high, particularly because the highway along the reservoir is part of the scenic June Lake Loop, and the duration of view, on average, is moderate. The view is of the moderately steep topographic bowl, open at its north end, which holds the reservoir. The reservoir is visually dominant as it fills most of the floor of the valley. The drawn down shore of the reservoir is evident. Vegetation is moderately varied, with a mosaic of shrubs and talus on the hillsides. Planted trees are found around the recreational facilities. The diversity of the scenes is moderate. The dam, the drawn down shoreline of the reservoir, and some of the recreational facilities are artificial intrusions into an otherwise natural setting (Figure 3I-29).

Relevant Plans and Policies

Four government agencies have responsibility for managing the lands within Mono Basin. The agencies' plans and policies that are relevant to visual resources are briefly outlined in the following sections.

U.S. Forest Service. The USFS has responsibility for managing Mono Basin National Forest Scenic Area (Scenic Area) (Figure 3J-1). The USFS has published its goals, standards, guidelines, management practices, and specific actions for the Scenic Area in 1989 Scenic Area Final Comprehensive Management Plan (U.S. Forest Service 1989a), which was accompanied by a final environmental impact statement (U.S. Forest Service 1989b). The Scenic Area is administered by the Inyo National Forest.

The Land and Resource Management Plan for the Inyo National Forest applies to the Scenic Area and other USFS lands in Mono Basin. These other areas are west and south of the Scenic Area, sometimes abutting it directly, or separated from it by areas of private land or land owned by LADWP.

Visual Resources Goal. The legislative direction for the Scenic Area is to protect its natural resources, including its scenic resources, while allowing recreational and other appropriate activities. The USFS examined several alternative approaches for managing the Scenic Area. The alternative selected emphasizes ecological, interpretive, and scenic values based on a lake elevation between 6,377 feet and 6,390 feet, with a maintenance level near the midpoint of this range (i.e., elevation 6,383.5 feet). The basic visual resource goal selected for the Scenic Area is to maintain and enhance the visual resource.

Visual Management System. The USFS uses its nationwide Visual Management System (VMS) to formulate goals and apply standards for managing visual resources in the Scenic Area.

As a first step, the VMS defines "variety classes" for all Scenic Area landscapes. The greater the variety, the greater the visual value of the landscape, assuming other conditions are equal. Three classes are defined: distinctive, common, and minimal. The highest class, distinctive, refers to those areas where features, including water features, are of unusual or outstanding visual quality. Distinctive variety class landscapes are usually not common in a surrounding region. Common variety class scenery typically includes forested lands on rolling terrain, with a few vegetative or topographic variations. Minimal variety class lands are generally expansive and brush-covered with little variation. Mono Basin is typical of most Great Basin landscapes, with a high percentage of minimal variety class land. About 46% of Scenic Area lands are classified as distinctive, 11% common, and 42% minimal, excluding the surface area of Mono Lake.

The VMS also defines "visual sensitivity" levels for viewers as the measure of the potential impacts of actions affecting concern for scenic quality. The levels related to the types of viewers (recreationists) and the importance of the viewpoint and number of viewers. Most Scenic Area lands are visually sensitive primarily due to the high visibility of the landscape and the many observation points that are the locations of visually sensitive (usually recreational) viewers. Ninety percent of the Scenic Area is Sensitivity Level 1 (most sensitive), 6% is Sensitivity Level 2 (moderately sensitive), and 4% is Sensitivity Level 3 (least sensitive). Sensitivity Level 1 observation points include:

- U.S. 395 and SRs 120 and 167;
- Lundy Canyon Road;
- Cemetery Road (from U.S. 395 to Mono Lake County Park);
- the Mono Basin National Forest Scenic Area Visitor Center; and
- South Tufa, Panum Crater, Navy Beach, Old Marina, Mono Basin County Park and Black Point visitor sites.

Variety class and visual sensitivity are considered together to yield visual quality objectives (VQOs). VQOs define degrees of acceptable alteration of the natural landscape and range from highly restrictive to relatively permissive. In descending order of restrictiveness, they are Preservation, Retention, Partial Retention, Modification, and Maximum Modification. The VQOs that have been applied to Scenic Area lands in their current condition are listed in Table 3I-3, with the permissible constraints or management activities of each and the percentage of the Scenic Area that each occupies.

USFS also inventoried existing visual conditions (EVCs) for the Scenic Area. These conditions describe the degree to which the natural appearance of the landscape has been altered. There are five

EVCs that generally relate to the VQOs. The types, with their general degree of disturbance and the percentage of the Scenic Area that each occupies, are shown in Table 3I-4.

Visual Absorption Capability (VAC) is the degree to which the landscape can absorb land-disturbing activities, usually by vegetative or topographic screening. The Scenic Area has a low capability of visually absorbing land-disturbing activities. Screening vegetation is frequently sparse, and areas near the lake contain relatively little topographic relief. Many views encompass nearly the entire basin. About 6% of the Scenic Area has a high VAC, 48% a moderate VAC, and 46% a low VAC.

Management Practices. Based on the results from applying the Visual Management System, the USFS formulated policies concerning management practices in the Scenic Area to meet the basic visual goal. These policies are as follows:

- Meet the VQOs of retention or partial retention for all public lands according to specified land use zones.

- Maintain or enhance the size and diversity of all riparian zones, aspen stands, and meadows in the most sensitive and moderately sensitive areas.

- Plant and maintain vegetation at developed sites to provide screening and a natural-appearing setting.

- Prohibit additional overhead utility corridors within or through areas of most visual sensitivity.

- Encourage the undergrounding or relocating of existing utility lines to minimize visual impacts in specific areas.

- Work with Mono County and other interested parties to identify existing visually detracting uses in the Scenic Area and implement mitigation as feasible.

Based on USFS (1989b) information, successful application of the management practices would result in VQOs within the Scenic Area of 80% Retention and 20% Partial Retention. Future visual conditions using the EVC criteria previously described would be as follows: Type I, Untouched Landscape, 44%; Type II, Changes Unnoticed, 26%; Type III, Minor Disturbances, 20%; Type IV, Disturbances, 6%; and Type V, Major Disturbances, 3%. These percentages, which do not equal 100% due to rounding, are not substantially different from those for the current EVCs (Table 3I-4).

The USFS also established guidelines to assess compatibility of proposed commercial uses or developments on private lands with the purposes of the Scenic Area. These guidelines are designed to protect natural resources, including visual resources.

U.S. Bureau of Land Management. The BLM is responsible for most of the public land to the north and east of the National Forest Scenic Area. BLM-managed land serves as a backdrop for Scenic Area views and includes the Bodie Hills, the eastern portions of Mono Basin, and Cowtrack Mountain. Visual resource management along travel corridors to the Scenic Area and Bodie State Park is recognized as important. The BLM has identified its general management intentions and Visual Resource Management (VRM) objectives in the 1992 final Bishop Resource Area Management Plan and EIS.

The BLM evaluated several management approaches for the resource area and selected one that seeks to provide a balance between developing resources and protecting or enhancing environmental values, including scenic values. The management approach also will preserve certain public lands in their natural condition and will provide for outdoor recreation, among other uses. Riparian vegetation will be protected. Specific management intentions for the BLM-managed portion of the periphery of the Scenic Area include protecting and enhancing scenic values and providing opportunities for dispersed recreation.

The BLM defines four VRM classes, but all the BLM-managed public land surrounding the Mono Basin National Forest Scenic Area is VRM Class II. The objectives of this class are as follows:

> Retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen from key observation points, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.

California Department of Parks and Recreation. The California Department of Parks and Recreation (DPR) is responsible for managing lands within the Mono Lake Tufa State Reserve (within the Scenic Area and below 6,417 feet elevation on lands adjacent to nonfederally held parcels). State Reserves consist of areas embracing Outstanding Natural or Scenic characteristics of statewide significance. DPR policy for managing state reserves calls for protection of ecological, scientific, and natural values. The purpose of state reserves is to preserve native ecological associations, unique fauna or floral characteristics, geological features, and scenic qualities in a condition of undisturbed integrity. Physical features may be established in state reserves to further research or to provide for guarded public visitations, but should be kept to a minimum as necessary and irreparable damage to the natural or physical values must be avoided. DPR does not have a formal visual analysis system corresponding to the USFS's VMS. No campgrounds or other such types of development are permitted. (Carle pers. comm.)

Los Angeles Department of Water and Power. LADWP manages several parcels of land in the Scenic Area, as well as the Cain Ranch on upstream reaches of Rush, Parker, and Walker Creeks. The agency's policies to preserve visual quality limit signs and billboards.

Upper Owens River Basin

The potentially affected visual resources in Upper Owens River basin include the Upper Owens River and Lake Crowley reservoir. The lands adjacent to these resources are managed for multiple uses. In addition to being elements of the Los Angeles water conveyance system, these water features support grazing and recreational use, the latter resulting in many visually sensitive viewers in the area.

The Upper Owens River basin is a broad, relatively featureless valley through which the Upper Owens River flows. The floodplain near the East Portal is one-quarter mile wide, widening through broad meadowlands downstream toward the relatively shallow reservoir. The valley is bounded by moderately steep, moderately rugged hills on its north side, rising 3,000 feet above the valley floor. To the east, west, and southwest are more gently sloping hills, forming a broken and irregular topography rising gradually to almost 2,000 feet above the valley floor.

Upper Owens River

This section describes the potentially affected landscape elements along the Upper Owens River, describes other landscape elements that comprise the visual character of the Upper Owens River, and identifies sensitive viewers and key observation points for viewing the river. (A map of the Upper Owens River area is shown in Figure 1-4 in Chapter 1.)

Potentially Affected Landscape Elements. The visual character of certain landscape elements could be affected by changing streamflows. These elements include channel characteristics, streamflows, and vegetation, including irrigated pasturelands.

Channel Characteristics. The Upper Owens River has a relatively low gradient, meandering extensively with multiple cutoffs and oxbows, dividing into two or more parallel channels as it progresses downstream. The channels are typically wide and shallow, and their beds are composed of silts, sands, and gravels. These conditions are in contrast to the presence of undercut banks, diverse substrates, and narrower and deeper channels in the preaugmented flows from Mono Basin (EBASCO Environmental et al. 1993).

Streamflows. Since diversions began from Mono Basin, the average flows in the Upper Owens River have increased substantially because the river channel now serves as a conveyance facility for the Los Angeles water supply system. In general, the flows below the East Portal are two to three times as great as those above it and fluctuate over a proportionately greater range. Chapter 3A, "Hydrology", and Chapter 3C, "Vegetation", describe the flow characteristics of the river.

Vegetation. Above the East Portal, the vegetation of the valley floor is varied. Lower stream terraces support meadows with bands of mature conifers randomly scattered among willows concentrated along the river. Sagebrush and rabbitbrush inhabit higher terraces bordering the stream.

Below the East Portal, the vegetation along the banks of the Owens River and on the valley floor is mostly a uniform grassy meadow, wet in places, which is irrigated and is grazed by cattle. The only woody riparian vegetation here consists of scattered willow stands immediately below the East Portal. Local ranchers claim that because of more alkaline soil types below East Portal, riparian vegetation was historically sparse (Arcularias pers. comm.). This flat, grassy valley floor is flanked by low, level or rolling benches covered by sagebrush and rabbitbrush, which occasionally extend to the riverbanks (see Figure 3I-30). Approximately 1,350 acres of irrigated pasturelands occur mostly within a 1-mile-wide swath along the river from East Portal to Lake Crowley reservoir.

Other Landscape Elements. Other landscape elements that comprise the visual character of the Upper Owens River basin include certain human-made features. Human-made features are present but inconspicuous in most of the river valley and include many cattle fences and other ranch facilities, typically consisting of small groups of buildings. A prominent transmission line on wood H-frame structures crosses the valley about midway between East Portal and Lake Crowley reservoir. An active landfill is located on a low bench southwest of Benton Crossing, but it is not highly visible.

Viewers and Key Observation Points. A moderate number of recreationists visit both private and public land along the Upper Owens River to hunt and fish. Local residents and destination recreationists are the two main types of viewers of the landscape elements in the Upper Owens River. Both viewer types are considered to have high concern for scenic quality. Travelers on U.S. 395 are not expected to be affected by potential project-related visual changes.

Lake Crowley Reservoir

This section describes the potentially affected landscape elements at Lake Crowley reservoir, described in the "Other Landscape Elements" section, that affect the visual character of Lake Crowley reservoir, and identifies sensitive viewer and key observation points.

Potentially Affected Landscape Elements. The visual character of certain landscape elements could be affected by fluctuating reservoir levels. These elements include shoreline and lake surface and vegetation.

Shoreline and Lake Surface. The shoreline of Lake Crowley reservoir is composed of sands and sedimentary bluffs (Figure 3I-31). Although it is difficult to perceive in the distance from U.S. 395, much of the shoreline is evident from every vantage point around the reservoir. Drawn down reservoirs are sometimes regarded as visually displeasing presumably because they do not appear natural.

However, boaters, anglers, or other water-dependent recreationists using a drawn down reservoir apparently find the adverse visual effect to be acceptable.

Records of the surface elevation of Lake Crowley reservoir from 1970 to 1989 show an irregular drawn down pattern, with a typical (but not invariable) low water level in winter or spring, and an abrupt rise to an early summer high, followed by a slower drop (refer to Chapter 3A, "Hydrology"). Over the 20-year period of record, high levels were reached most often in June or July, with highs in March, April, and May common. Low levels typically occurred October-March, but occasionally later in the spring. High elevations reached the spillway during only 2 years of the 20-year period of record. During 10 other years, however, the high water elevation was within a few feet of the maximum level. The average low over the period of record was about 18 feet below maximum level.

Vegetation. Vegetation around Lake Crowley reservoir is a sagebrush and rabbitbrush community, with a few small meadows near the lake margins. This same brush community extends from the lake in all directions except upstream along the Upper Owens River, which is bordered by meadows and marshes. The surrounding hills and the Sierra Nevada have sparse to dense conifer cover.

Other Landscape Elements. Other landscape elements that comprise the visual character of Lake Crowley reservoir include landforms and human-made elements.

Landform. Lake Crowley reservoir is set in a bowlike landform extension of the southeast Upper Owens River basin. Overall, it is relatively featureless and expansive, bounded on the east by moderately rugged hills rising steadily to 1,000 feet or more above the valley floor. The 600-foot-deep, narrow Owens River gorge leads east from the southeast corner of the bowl. To the south and southwest is the steep, rugged face of the Sierra Nevada. To the northwest are moderately rugged hills rising to about 1,500 feet above the valley floor to create a varied and irregular topography. In the immediate vicinity of the reservoir, most landforms are low rolling hills. Occasional bluffs rise steeply from the east and northwest shores of the reservoir. These sometimes show unvegetated, white vertical faces of eroded sediment (see Figure 3I-31).

Human-Made Features. Scattered pockets of residential and other development occur along U.S. 395 where it passes Lake Crowley reservoir to the south and southwest. A small group of recreation-related buildings are located at the reservoir's south boat landing; some of them have an industrial appearance. The dam that forms the lake is an earthen structure armored with coarse rock. Associated with it are several small industrial-type buildings, as well as security fences, electrical distribution lines, and a spillway structure.

Viewers and Key Observation Points. The number of local residents potentially affected is low; the number of destination recreationists potentially affected is relatively high. Lake Crowley Campground, a developed recreation site located west of U.S. 395, is a popular destination site between the fishing season opener in late April and Memorial Day weekend. Most visits are associated with fishing and

general leisure. Recreational viewers are located primarily around Lake Crowley reservoir and at Benton Crossing where camping is also popular (see Chapter 3J, "Recreation Resources").

Relevant Plans and Policies

Three government agencies have responsibility for managing the lands within the Upper Owens River basin. The agencies' plans and policies that are relevant to visual resources are briefly outlined in the following sections. They are not applicable to the private lands along the river from the East Portal to a point several miles downstream.

Los Angeles Department of Water and Power. LADWP is responsible for managing all the lands surrounding Lake Crowley reservoir and along more than one-half of the Upper Owens River below the East Portal. The agencies' policies concerning visual resources limit affecting signage and billboards.

U.S. Forest Service. The Upper Owens River, from above East Portal to a point about 5 miles above Lake Crowley reservoir, is within the Inyo National Forest boundary, but the land along the potentially affected river segment is entirely privately owned. Lands immediately to the north forming the background of the river valley are USFS lands managed with a VQO of Partial Retention.

U.S. Bureau of Land Management. BLM is responsible for managing public lands south of the National Forest boundary. It adopted a management approach for the Upper Owens River basin that is similar to the policy described above for lands in Mono Basin. All the BLM-managed public land in this area is designated VRM Class II, which was described above for Mono Basin.

IMPACT ASSESSMENT METHODOLOGY

Changes in water exports from Mono Basin will affect visual resources in Mono Basin and Upper Owens River basin. Specific areas where visual resources will be affected include Mono Lake, the lower tributaries, Grant Lake reservoir, Upper Owens River, and Lake Crowley reservoir.

This section describes the methods used to analyze impacts on visual resources at these areas and to assess the significance of these impacts.

Impact Prediction Methodology

The analysis of visual resources impacts focuses on determining the effects of the water diversion alternatives on the scenic quality of affected resource areas. Scenic quality can be thought of as the

perceived property of the visual environment that relates to beauty and the impressions formed about the degree of excellence.

An important consideration in evaluating effects on scenic quality is how the character of a landscape is altered. Landscape character is defined as the perceived combined effect of different visual elements (or objects) that gives a landscape distinction and through which it becomes recognized and identified. The influence of a particular visual element on landscape character depends largely on the visual strength it demonstrates.

The basic steps of the visual resource assessment to determine impacts on scenic quality include:

- identifying important landscape elements that will be visually changed by the diversion alternatives,

- determining whether the contribution of each element to scenic quality is positive (enhances scenic quality) or negative (diminishes scenic quality) and how strong the effect is,

- determining the relative importance of each landscape element in terms of its influence on scenic quality,

- identifying the extent of change to important landscape elements and evaluating the collective influence of the changes on landscape character and scenic quality, and

- evaluating changes in the visual environment of the affected area relative to criteria for determining significant impacts.

The approach typically used for assessing impacts and for managing visual resources on lands managed by the USFS is the Visual Management System (VMS). The VMS was developed for analyzing the visual effects of resource management actions that entail potential increased evidence of human activity (e.g., such as the introduction of roads or electrical transmission lines, or significant changes in landscape elements, such as altered vegetation patterns associated with timber harvests). Because this project involves hydrologic-related changes to the visual environment that a casual observer might perceive as natural, direct application of VMS procedures to assess the visual impacts of this project is not considered appropriate; however, certain premises embodied in VMS do apply for the analysis. These premises, which address the landscape itself, viewers of the landscape, and modifications to the landscape are as follows:

- The landscape
  - Diverse landscape character is important.
  - Retention of landscape character is desirable.
  - The capacity of the landscape to absorb change without loss of character is variable.

- # Viewers of the landscape
  - Viewers have expectations regarding the image of the landscape.
  - Expectations are related to identifiable regions.
  - Viewers expect a natural-appearing landscape character.
  - Viewer concern for scenic quality varies by type of viewer.
  - The duration of the viewing experience is critical.
  - The focus of the viewer's attention is critical.
  - The number of viewers is critical.

- # Landscape modifications
  - The visual impact and character of management activity is critical.
  - Alteration of character in landscapes with little variety may be desirable.

The visual impact assessment for this evaluation considers long-term, near-term, and drought effects of the diversion alternatives. The long-term analysis focuses on changes to the landscape that occur at dynamic equilibrium, which includes the normal range of fluctuations in lake level and streamflows for each project alternative. The near-term analysis considers the transition period for the alternatives (i.e., the time frame needed to achieve dynamic equilibrium under the normal range of fluctuations). Infrequent extremes in lake levels and streamflows are evaluated in the drought analysis.

The assessment methods for analyzing impacts at each affected area within Mono Basin and Upper Owens River basin are described below.

Mono Lake

Landscape elements at Mono Lake that will be visibly changed include the following:

- # lake surface area,
- # water-based tufa,
- # land-based tufa,
- # sand tufa,
- # alkali flats,
- # pumice blocks,
- # islands,
- # islets,
- # regional visibility,
- # visually conspicuous birds,
- # visually conspicuous alkali flies and brine shrimp,
- # wetland vegetation near the lakeshore, and
- # human-made (built) features.

A survey of visitors to Mono Lake was conducted to obtain judgments of scenic quality of scenes depicting Mono Lake at different lake levels, to determine preference for those scenes, and to identify key

elements that affect scenic quality. (Additional details of the survey are included in Appendix V.) Actual photographs at lake surface elevation of 6,374.5 feet (the level in September 1991), and simulated scenes representing the appearance of the landscape under four different lake surface elevations (6,372 feet, 6,380 feet, 6,390 feet, and 6,410 feet) were prepared at five popular locations: South Tufa grove, the Mono Lake County Park, the Mono Lake vista point along U.S. 395 near Conway Summit, the new Mono Basin National Forest Scenic Area Visitors Center, and along northbound U.S. 395 near Old Marina. One set of these simulations, depicting alternative lake levels along U.S. 395 near Old Marina, is shown in Figure 3I-32; a complete set of the simulations is included in Appendix V.

Survey respondents were asked to judge the scenic beauty of each of the 25 scenes on a scale from 1 to 10. Respondents were then asked to view five variations of one scene and indicate their preferences by ranking the five images in order of preference. Finally, respondents were asked to rate the importance of each element to the overall scenic beauty of Mono Basin. This question allowed for identifying elements that were perceived by the public to contribute positively to the scenic quality and those perceived to have a minimal contribution or to detract from scenic beauty. The 10 elements evaluated by respondents included birds, land-based tufa, wetland vegetation near the lakeshore, alkali flats, water-based tufa, alkali flies and brine shrimp, islands and islets, exposed pumice blocks, human-made elements near the lakeshore (boardwalks and interpretive displays), and sand tufa.

Results of the survey suggest that no pattern is clearly identifiable by which the public judges scenic beauty of the 25 test scenes. The results also indicate that the higher surface elevations are preferred, except for lake elevation 6,410 feet where tufa towers, pumice blocks, and wetland vegetation in the foreground are totally inundated. The results further indicate that tufa towers, especially those that are surrounded by water at their base; visually conspicuous birds; and sand tufa are judged by the public to be the most important positive elements relative to scenic quality. Other elements judged as important to scenic quality include islands, near-shore wetland vegetation, and pumice blocks.

The next step was to identify whether changes to the elements would be positive or negative. This evaluation was performed primarily from analysis of the public perception survey data. Where appropriate, professional judgments of the SWRCB consultants, based on direct observations made in the field and knowledge gained through consulting with agency personnel and other experts, reviewing published sources, and studying the conditions depicted in the 25 simulated scenes of the lake, contributed to identifying positive and negative elements.

The relative importance to landscape character and scenic quality of different elements was determined by studying the results of the public perception survey and changes revealed in the 25 simulated scenes. The consequences of the alternatives from vantage points not represented by the simulated scenes also were considered. Approximate thresholds for these elements to protect scenic quality and preserve landscape character were then established.

The change in each element resulting from alternative lake levels was then identified and evaluated in terms of its consequences or influence on scenic quality of Mono Basin. The status of important landscape elements at these points was determined from resource inventories and from the impact analyses performed for different affected resources. Historical accounts and descriptions of Mono Basin also were examined.

Finally, the summary effect on scenic quality was evaluated relative to the impact significance criteria. Beneficial effects on scenic quality were also identified. The landscape conditions at the point of reference were compared to historical landscape conditions to identify changes between the prediversion period and 1989.

Lower Tributary Streams

The assessment of visual resource impacts on Lee Vining, Parker, Walker, and Rush Creeks followed a similar but more simplified process. Landscape elements that could be visibly changed include:

- streamside vegetation,
- streamflow, and
- irrigated pastureland.

Data on the extent and type of streamside vegetation affected, streamflow levels, and acres of irrigated pasture under each project alternative were reviewed. Based on review of the ranges of probable impacts and their relationship to scenic quality, streamside vegetation was determined to be is the most important element in assessing potential impacts on scenic quality. The changes in streamside vegetation were then identified as adverse, neutral, or positive and evaluated in terms of their potential impact on scenic quality. These effects were then evaluated relative to the visual impact criteria to assess their significance.

Grant Lake Reservoir

The assessment of visual resource impacts at Grant Lake reservoir followed similar procedures. Landscape elements that could be visibly changed include:

- shoreline vegetation and
- exposed land from drawdown of the reservoir.

Data on the pattern and extent of drawdown of the reservoir and potential shoreline vegetation effects of project alternative relative to point-of-reference conditions were reviewed. Based on review of the ranges of probable impacts and their relationship to scenic quality, exposed land from drawdown of the reservoir was determined to be the key element in assessing potential impacts on scenic quality. The

amount of land inundated and exposed in wet years when the reservoir is drawn down was determined for each alternative because this zone will be generally devoid of vegetation. The impacts of these effects on scenic quality were then evaluated relative to the impact criteria to assess their significance.

Upper Owens River

Landscape elements along the Upper Owens River that could be visibly changed by the diversion alternatives are:

- streamside vegetation,
- streamflow, and
- irrigated pasture.

Data on the extent and type of streamside vegetation affected, streamflow levels, and acres of irrigated pasture for each project alternative were reviewed. Similar to the lower tributaries, streamside vegetation was determined to be the most important element in assessing potential impacts on scenic quality based on the ranges of probable effects. The changes in streamside vegetation were then identified as adverse, neutral, or positive and evaluated in terms of their potential impact on scenic quality. These impacts were then evaluated relative to the visual impact criteria to assess their significance.

Lake Crowley Reservoir

Landscape elements at Lake Crowley reservoir that could be visibly changed by the diversion alternatives include:

- shoreline vegetation and
- exposed land from drawdown of the reservoir.

Data on the pattern and extent of drawdown of the reservoir and potential shoreline vegetation effects of project alternative relative to point-of-reference conditions were reviewed. Similar to Grant Lake reservoir, exposed land from drawdown of the reservoir was determined to be the key element in assessing potential impacts on scenic quality. The amount of land exposed when the reservoir is drawn down to different levels and the drawdown period was determined for each alternative. The impacts of these effects on scenic quality were then evaluated relative to the impact criteria to assess significance.

Criteria for Determining Significant Adverse Impacts

To determine the significance of adverse visual resource impacts, expected changes in key landscape elements were evaluated relative to the visual impact significance criteria described below.

A project alternative is considered to have a significant adverse impact on scenic quality if one of the following conditions would occur:

- total inundation or toppling of more than 10% of tufa towers at visually important locations, or destruction of existing sand tufa at Mono Lake;
- greater than 10% reduction in nesting capacity of gulls or a major change in the observability of visually important species;
- major changes to other landscape elements;
- loss of streamside vegetation along the lower tributaries that is substantially noticeable;
- increase in reservoir drawdown at Grant Lake reservoir or Lake Crowley reservoir that results in a substantially noticeable increase in barren lakeshore, assumed to occur with a doubling of vertical drawdown; and
- loss of streamside vegetation along the Upper Owens River that is substantially noticeable.

Possible changes to VQO's and the BLM's visual resource management classes also were considered in establishing these criteria. Because none of the alternatives, with the possible exception of the No-Restriction Alternative, would result in visual resource impacts that would be inconsistent with the visual resource goals of these management systems, changes were not evaluated using the systems.

SUMMARY COMPARISON OF IMPACTS AND BENEFITS OF THE ALTERNATIVES

As described above in the "Impact Assessment Methodology" section, relative visual resource effects of the alternatives are assessed in this chapter through several key variables:

- inundation and erosion of tufa towers and sand tufa at Mono Lake;
- numbers of visually conspicuous birds at Mono Lake;
- changes to other landscape elements at Mono Lake (i.e., Negit Island, wetland vegetation, alkali flats, pumice blocks, and dust storms);
- amount of riparian vegetation along the lower tributary streams and the Upper Owens River;

- exposed lake area from drawdown of Grant Lake and Lake Crowley reservoirs; and

- the overall effect of changes to these landscape features on scenic quality at each affected area.

Table 3I-5 provides a summary comparison of the alternatives using these variables. Values of the variables for each alternative are compared to values for prediversion and point-of-reference conditions. Those values representing significant adverse conditions or significant adverse changes from the point-of-reference condition are indicated with an asterisk. Table 3I-6 provides supporting information about effects of tufa tower toppling and submergence for each important tufa grove.

Significant adverse impacts on scenic quality at Mono Lake would occur from destruction or reduced exposure of tufa if the 6,390-Ft, 6,410-Ft, or the No-Diversion Alternatives were implemented. Significant reductions in scenic quality from declines in populations of visually conspicuous birds would occur at Mono Lake if the No-Restriction or the 6,372-Ft Alternatives were implemented. Implementation of the No-Restriction Alternative also would result in a significant loss of scenic quality along the lower tributaries because of substantial reductions in riparian vegetation. Visually significant increases in drawdown at Lake Crowley reservoir would occur for the higher lake level alternatives. A discussion of these and other visual effects of the project alternatives is provided in the following sections of this chapter.

IMPACTS AND MITIGATION MEASURES FOR THE NO-RESTRICTION ALTERNATIVE

Changes in Resource Conditions

Changes in resource conditions at Mono Lake, lower tributaries, Grant Lake reservoir, Upper Owens River, and Lake Crowley reservoir are described in this section. Long-term, near-term, and drought effects are considered for each area; however, near-term and drought effects are reported only when the impacts are substantially different from long-term changes.

Mono Lake

Long-Term Changes. The key landscape elements for determining the impact on scenic quality at Mono Lake are tufa (including towers and sand tufa) and visually conspicuous birds. The effects of the No-Restriction Alternative on these and other visual elements at Mono Lake under long-term (i.e., dynamic equilibrium) conditions are described below.

Tufa. Tufa towers are the most important landscape element contributing positively to the landscape character and scenic quality of Mono Lake. Under the No-Restriction Alternative, most or all of the towers that protrude above the water's surface under point-of reference conditions would become land based. Additional, currently submerged towers would become visible. Sand tufa would not be affected because it lies entirely above an elevation of 6,390 feet.

Visually Conspicuous Birds. Under the No-Restriction Alternative, large decreases would occur in the numbers of visually conspicuous birds at Mono Lake. Gulls could abandon nests, and grebes and phalaropes could bypass the area during their migration. Populations of gulls would be most affected, but grebes and phalaropes would also be affected.

Other Landscape Elements. The effects of the No-Restriction Alternative on other landscape elements are described below.

- Islands - Under this alternative, Negit Island would be joined to the mainland along its entire northwest side and would appear to be a mainland peninsula.

- Wetland vegetation - The amount of wetland vegetation near the lakeshore would decrease by approximately 2,500 acres (from about 2,800 acres to about 300 acres).

- Alkali flats - Alkali flats would nearly double in area to about 9,500 acres and would become substantially more noticeable.

- Pumice blocks - The total area of exposed pumice blocks under average conditions would increase by about 3,400 acres (from about 1,600 acres to 5,000 acres), thereby strengthening the landscape character.

- Regional visibility - Dust storms would occur more often and extend over greater areas, reducing visibility and limiting views and the appearance of the landscape on the east and north sides of the lake.

Influence on Scenic Quality. Reductions in the number of birds at Mono Lake would have an adverse effect on landscape character and scenic quality. Also, increased areas of alkali flats that provide striking evidence of the lake's recession and the appearance of Negit Island as a feature of the lake's north shore rather than as an island would have negative effects.

Although the preservation of tufa and extensive exposure of pumice blocks would work toward strengthening the landscape character, the reduction in numbers of visually conspicuous birds, combined with other negative influences, is considered to have a significant adverse impact on scenic quality.

Near-Term Changes. As the lake moves toward dynamic equilibrium, land-based tufa would gradually appear. The numbers of visually conspicuous birds would begin to decrease when the lake elevation falls below 6,375 feet. Significant reductions would occur in gull populations when the lake drops below 6,374 feet because of continued predator opportunities created by the land bridge, and in grebe and phalarope populations when the lake drops below 6,360-6,370 feet.

Mono Lake Tributary Streams

Long-Term Changes. The key landscape element for determining the impact on scenic quality along the lower tributaries is riparian vegetation. Under the No-Restriction Alternative, substantially less woody riparian vegetation would exist along Rush Creek and Lee Vining Creek. The loss of vegetation would be considered a significant adverse impact on scenic quality.

Near-Term Changes. Changes in riparian vegetation occur over time in response to flows in the tributary streams. Over the near term, recovery of degraded riparian habitat that began after initial stream rewatering would decline under the No-Restriction Alternative, and the decline would likely continue in the long term.

Grant Lake Reservoir

The key landscape element for determining the impacts on scenic quality at Grant Lake reservoir is the unvegetated shore zone resulting from drawdown of the reservoir. Under the No-Restriction Alternative, total drawdown in a wet water year would be about 20 vertical feet, or about 10 feet less than under the point of reference. The effect on scenic quality is considered to be moderately beneficial.

Upper Owens River

The key landscape element for determining the impact on scenic quality along the Upper Owens River is riparian vegetation. Implementation of the No-Restriction Alternative may result in a minor loss of riparian vegetation below East Portal because of high export flows. Grazing probably has a more important effect.

Lake Crowley Reservoir

The key landscape element for determining the impact on scenic quality at Lake Crowley reservoir is exposed lake bottom and lakeshore resulting from drawdown of the reservoir. Under the No-Restriction Alternative, drawdown in a wet water year would be about 4 vertical feet, or about the same as under the point-of-reference scenario, having no effect on scenic quality.

Summary of Benefits and Significant Impacts and Identification of Mitigation Measures (No-Restriction Alternative)

- Large reductions in the number of visually conspicuous birds at Mono Lake.
- Substantial loss of riparian vegetation along the lower tributaries.
- Moderate decrease in barren drawdown zone at Grant Lake reservoir.

Mitigation Measures. No feasible mitigation measures are available.

IMPACTS AND MITIGATION MEASURES FOR THE 6,372-FT ALTERNATIVE

Changes in Resource Conditions

Mono Lake

Tufa. Under this alternative, the bases of approximately 3% of the Lee Vining Creek tufa grove towers would emerge from the lake. Neither towers at South Tufa nor sand tufa would be affected.

Visually Conspicuous Birds. Under the 6,372-Ft Alternative, the nesting capacity of California gulls at Mono Lake would be reduced by 5,000-7,000 nests, or about 16%, because the land bridging would allow predator access. Additionally, phalaropes would concentrate in the remote east side of the lake, where they are much less likely to be observed by visitors, for foraging purposes.

Other Landscape Elements

- Islands - Under typical conditions, Negit Island would be joined along its entire northwest side to the mainland. Under the point of reference lake surface elevation of 6,376.3 feet, however, only a narrow channel of shallow water separates Negit Island from the mainland so that it appears to be connected to the mainland at longer viewing distances and from points at or near the elevation of the lake. The visual change under this alternative is therefore not significant.

- Lakeshore wetland vegetation - The amount of wetland vegetation near the lakeshore would increase slightly by about 100 acres.

- Alkali flats - Approximately 3,900 acres of alkali flats, on average, would be exposed, which is a decrease of approximately 1,500 acres compared to point-of-reference conditions. Most

of the alkali flats lie along the north and east shores of the lake, which are less visited by the public.

- Pumice blocks - The total area of exposed pumice blocks under average conditions would slightly increase by approximately 200 acres (from about 1,600 acres to around 1,800 acres). Most of this increase would be along the north shore of the lake near Black Point and Negit Island. These areas are accessible to the public but are not heavily visited compared to the South Tufa grove and the Mono Lake County Park.

- Regional visibility - The frequency and extent of dust storms would be similar to point-of-reference conditions.

Influence on Scenic Quality. The most important consequence of this alternative to scenic quality would be the substantial decreases in visually conspicuous birds. The anticipated reduction of 5,000-7,000 nests for California gulls and the shift of migratory phalaropes from the visitor-accessible west side of the lake to the relatively inaccessible east side (and therefore generally out of view) would affect landscape character. This is considered a significant adverse impact on scenic quality.

Mono Lake Tributary Streams

A slight increase in the extent of riparian vegetation along the diverted tributary streams would occur under this alternative because of increased streamflow and consequent water table effects, compared to the point of reference streamflows. This difference would not be noticeable to visitors. However, under both this alternative and the point of reference, expansion of the riparian vegetation would be expected from ongoing restoration activities.

Grant Lake Reservoir

Under the 6,372-Ft Alternative, drawdown in a wet water year would be about 27 vertical feet, or about the same as under the point-of-reference scenario, which would not affect scenic quality.

Upper Owens River

Implementation of the 6,372-Ft Alternative may result in minor loss of riparian vegetation below East Portal because of high export flows. Grazing probably has a more important effect.

Lake Crowley Reservoir

Under the 6,372-Ft Alternative, drawdown of Lake Crowley reservoir in a wet water year would be about 6 feet, or 2 feet more than under the point-of-reference scenario. The visual effect would be adverse, but it is not considered significant.

Summary of Benefits and Significant Impacts and Identification of Mitigation Measures (6,372-Ft Alternative)

- Reductions in the number of visually conspicuous birds at Mono Lake.

Mitigation Measures. No feasible mitigation measures are available.

IMPACTS AND MITIGATION MEASURES FOR THE 6,377-FT ALTERNATIVE

Changes in Resource Conditions

Mono Lake

Tufa. Under this alternative, 1-2% of tufa towers at South Tufa would be toppled by wave action when the lake climbs to its highest levels. On average, the bases of a few percent of the tufa towers at the South Tufa, County Park, and Lee Vining groves would be inundated. No towers would become completely submerged, and sand tufa would not be affected.

Visually Conspicuous Birds. Under the 6,377-Ft Alternative, gull nesting capacity would be greatly increased during most years, allowing expansion of the population to continue if regional conditions allow. During periods of prolonged drought, however, nesting would be disrupted by predators crossing to islets over temporary land bridges. Phalaropes would become more widely distributed around the lake in response to food availability, thus becoming accessible to the majority of visitors who frequent the western portions of the lake.

Other Landscape Elements

- Islands - Under typical conditions, Negit Island would not be connected to the mainland by a land bridge. However, similar to point-of-reference conditions, only a narrow channel of shallow water would separate it from the mainland, so that it would appear to be connected from most viewpoints.

- Lakeshore wetland vegetation - The amount of wetland vegetation near the lakeshore would decrease slightly by approximately 200 acres (from 2,800 acres to 2,600 acres).

- Alkali flats - Approximately 1,500 acres of alkali flats, on average, would be exposed, which is a major decrease of approximately 3,900 acres compared to point-of-reference conditions.

- Pumice blocks - The total area of exposed pumice blocks under typical conditions would decrease by approximately 700 acres (from about 1,600 acres to around 900 acres). Most of this decrease would be along the north shore of the lake near Black Point and Negit Island. These areas are accessible to the public but are not heavily visited compared to the South Tufa grove and the Mono Lake county park.

- Regional visibility - Dust storms would occur, on average, slightly less frequently than under point-of-reference conditions, but their extent would be reduced by about 50%.

Influence on Scenic Quality. The overall impact on scenic quality from changes to landscape elements described above would be small.

Drought Effects. Under the 6,377-Ft Alternative, the lake surface elevation could fall to 6,373 feet during periods of extreme drought. Under these conditions, Negit Island would be joined to the mainland, gull nesting capacity would diminish, and phalaropes would be concentrated on the east side.

Mono Lake Tributary Streams

A slight increase in the extent of riparian vegetation along the diverted tributary streams would occur under this alternative because of increased streamflow and consequent water table effects, compared to the point-of-reference streamflows, but this effect would be offset by inundation of establishing riparian vegetation by the lake. The net effect would be little change in the extent of riparian vegetation. Under both this alternative and the point of reference, however, expansion of the riparian vegetation would be expected from ongoing restoration activities.

Grant Lake Reservoir

Under the 6,377-Ft Alternative, drawdown in a wet water year would be about 17 vertical feet, slightly more than one-half as much as under the point-of-reference scenario. This would be considered a moderate visual benefit.

Upper Owens River

Under this alternative, a minor loss of riparian vegetation below East Portal may result because of high export flows. Continuing grazing on the private lands along the river, however, may have a more important effect.

Lake Crowley Reservoir

Under the 6,377-Ft Alternative, as under the 6,372-Ft Alternative, drawdown of Lake Crowley reservoir in a wet water year would be about 6 feet, or 2 feet more than under the point-of-reference scenario. The visual effect would be adverse, but it is not considered significant.

Summary of Benefits and Significant Impacts and Identification of Mitigation Measures (6,377-Ft Alternative)

- Moderate reduction in drawdown at Grant Lake reservoir elevation.

Mitigation Measures. No feasible mitigation measures are available.

IMPACTS AND MITIGATION MEASURES FOR THE 6,383.5-FT ALTERNATIVE

Changes in Resource Conditions

Mono Lake

Tufa. Under this alternative, 3-5% of tufa towers at the South Tufa Grove would be toppled by wave action when the lake climbs to its highest levels. On average, 10% of the tufa towers at the Lee Vining grove and 5% at the County Park grove would be totally submerged. In addition, the bases of many tufa towers would be inundated: 100% of the Old Marina grove, 50% of the Lee Vining grove, 30% of the County Park and Wilson groves, and 5-9% of the South Tufa grove. Sand tufa would not be affected.

Visually Conspicuous Birds. Under the 6,383.5-Ft Alternative, gull nesting capacity would be greatly increased, allowing expansion of the population to continue if regional conditions allow. Phalaropes would become more widely distributed around the lake in response to food availability, thus becoming accessible to the majority of visitors who frequent the western portions of the lake. The number of

migratory ducks using Mono Lake would probably increase as lake-fringing freshwater habitats increase from 1 to an estimated 6 acres.

Other Landscape Elements

- Islands - Under this alternative, Negit Island would be separated from the mainland by about 1 mile; it would therefore have a distinct island appearance.

- Lakeshore wetland vegetation - The amount of wetland vegetation near the lakeshore would decrease by approximately 500 acres (from 2,800 acres to about 2,300 acres).

- Alkali flats - Approximately 500 acres of alkali flats, on average, would be exposed, which is a major decrease of approximately 4,900 acres, compared to the point of reference.

- Pumice blocks - The total area of exposed pumice blocks under typical conditions would decrease substantially by approximately 1,470 acres (from about 1,600 acres to around 130 acres). A portion of the remaining areas of exposed pumice blocks would be located along the heavily visited and highly visible west shore.

- Regional visibility - Dust storms would occur less frequently than under point-of-reference conditions, and their extent would be reduced by about 70%.

Influence on Scenic Quality. Some losses of important positive features (i.e., tufa towers and near-shore wetland vegetation) would occur under this alternative. Reduction of alkali flats and Negit Island's appearance would benefit scenic quality. None of these effects is considered significant, and the net offsetting nature of the effects would result in little net change from the point of reference.

Mono Lake Tributary Streams

A slight decrease in the extent of riparian vegetation along the diverted tributary streams would occur under this alternative because of offsetting effects of increased streamflow and lake inundation. The net effect would be little change in the extent of riparian vegetation. Under both this alternative and the point of reference, however, expansion of the riparian vegetation would be expected from ongoing restoration activities.

Grant Lake Reservoir

Under the 6,383.5-Ft Alternative, Grant Lake reservoir drawdown in a wet water year would be about 4 vertical feet, compared to 30 feet under the point-of-reference scenario. This would be considered a major visual benefit.

Upper Owens River

Under this alternative, a minor loss of riparian vegetation below East Portal may result because of high export flows. Continuing grazing on the private lands along the river, however, may have a more important effect.

Lake Crowley Reservoir

Under the 6,383.5-Ft Alternative, drawdown of Lake Crowley reservoir in a wet water year would more than double to about 9 feet, compared to 4 feet for the point-of-reference scenario. The visual effect would be significantly adverse.

Summary of Benefits and Significant Impacts and Identification of Mitigation Measures (6,383.5-Ft Alternative)

- Offsetting losses of tufa and wetland vegetation, gains in Negit Island's appearance, and reduced alkali flats and dust storms.
- Substantial reduction in drawdown at Grant Lake reservoir.
- Substantial increase in drawdown at Lake Crowley reservoir.

Mitigation Measures. None may be available except for choosing another alternative. However, once a lake level alternative is selected, the aqueduct model could be used to evaluate different reservoir operation rules intended to reduce the unvegetated drawdown zone.

IMPACTS AND MITIGATION MEASURES FOR THE 6,390-FT ALTERNATIVE

Changes in Resource Conditions

Mono Lake

Tufa. Under this alternative, 50% of tufa towers at the South Tufa grove would be toppled by wave action when the lake climbs to its highest levels. On average, 18% of the tufa towers at the Lee Vining grove and 5% at the County Park grove would be totally submerged. Additionally, the bases of many tufa towers would be inundated: 100% of the Old Marina grove, 60% of the Lee Vining Creek

grove, 40% of the County Park and Wilson groves, and 20% of the South Tufa grove. All currently visible sand tufa would be destroyed once the lake surface climbs to its higher levels, but new sand tufa may appear in the scarp faces cut by wave erosion.

Visually Conspicuous Birds. The effects on visually conspicuous birds under this alternative would be similar to the effects under the 6,383.5-Ft Alternative, except that the number of migratory ducks using Mono Lake would probably increase even more as lake-fringing freshwater habitats increase from 1 acre to an estimated 16 acres.

Other Landscape Elements

- Islands - Similar to the 6,383.5-Ft Alternative, under this alternative Negit Island would have a distinct island appearance.

- Lakeshore wetland vegetation - The amount of wetland vegetation near the lakeshore would decrease by approximately 800 acres (from 2,800 acres to 2,000 acres).

- Alkali flats - Approximately 400 acres of alkali flats, on average, would be exposed, which is a major decrease of approximately 5,000 acres, compared to the point of reference.

- Pumice blocks - Under typical conditions, pumice blocks would not be exposed, a decrease of about 1,600 acres.

- Regional visibility - Extensive dust storms would be terminated under this alternative. Violations of the state and federal air quality standards may still occur, but these would be primarily the result of natural events, heightened somewhat by the salt emissions from the few hundred acres of alkali flats that remain exposed.

Influence on Scenic Quality. The distinct appearance of Negit Island some distance from shore, and decreases in dust storms that would otherwise reduce regional visibility, would have a beneficial effect on scenic quality. However, substantial reductions of important tufa features, including toppling of 50% of the tufa towers at South Tufa grove, widespread tufa submergence, and destruction of sand tufa, would have a substantial adverse effect. Overall changes to scenic quality under the 6,390-Ft Alternative would be significantly adverse.

Mono Lake Tributary Streams

A slight decrease in the extent of riparian vegetation along the diverted tributary streams would occur under this alternative because of offsetting effects of increased streamflow and lake inundation. The

net effect would be little change in the extent of riparian vegetation. Under both this alternative and the point of reference, however, expansion of the riparian vegetation would be expected from ongoing restoration activities.

Grant Lake Reservoir

Under the 6,390-Ft Alternative, Grant Lake reservoir drawdown in a wet water year would be about 4 vertical feet, compared to 30 feet under the point-of-reference scenario. This would be considered a major visual benefit.

Upper Owens River

Under this alternative, a minor loss of riparian vegetation below East Portal may result because of high export flows. Continuing grazing on the private lands along the river, however, may have a more important effect.

Lake Crowley Reservoir

Under the 6,390-Ft Alternative, drawdown of Lake Crowley reservoir in a wet water year would nearly double to over 7 feet, compared to 4 feet for the point-of-reference scenario. The visual effect would be significantly adverse.

Summary of Benefits and Significant Impacts and Identification of Mitigation Measures (6,390-Ft Alternative)

- Substantial loss of the tufa resource.

  Mitigation Measures. None available except for choice of a lower lake level alternative.

- Substantial reduction in drawdown at Grant Lake reservoir
- Substantial increase in drawdown at Lake Crowley reservoir

  Mitigation Measures. None may be available except for choice of another alternative. However, once a lake level alternative is selected, the aqueduct model could be used to evaluate different reservoir operation rules intended to reduce the unvegetated drawdown zone.

IMPACTS AND MITIGATION MEASURES FOR THE 6,410-FT ALTERNATIVE

Changes in Resource Conditions

Mono Lake

Tufa. Under this alternative, all tufa towers at the South Tufa grove would be toppled by wave action when the lake climbs to its highest levels. On average, all tufa towers at South Tufa grove, Lee Vining grove, and Old Marina grove would be totally submerged. At the County Park grove, 90% of the towers would be completely submerged; and at Wilson grove, 30% would be totally submerged and 65% would be basally inundated. All currently visible sand tufa would be destroyed once the lake surface climbed to its higher levels, but new sand tufa may appear in the scarp faces cut by wave erosion.

Visually Conspicuous Birds. The effects on visually conspicuous birds under this alternative would be similar to the effects under the 6,383.5-Ft Alternative, except that the number of migratory ducks using Mono Lake would probably increase even more as lake-fringing freshwater or brackish habitats increase substantially from 1 acre to an estimated 260 acres.

Other Landscape Elements

- Islands - Similar to the 6,383.5-Ft and 6,390-Ft Alternatives, under this alternative Negit Island would have a distinct island appearance.

- Lakeshore wetland vegetation - The amount of wetland vegetation near the lakeshore would decrease substantially by approximately 2,000 acres.

- Alkali flats - Approximately 160 acres of alkali flats, on average, would be exposed, which is a decrease of approximately 5,240 acres compared to the point of reference.

- Pumice blocks - Under typical conditions, pumice blocks would not be exposed, a decrease of about 1,600 acres.

- Regional visibility - Extensive dust storms would be terminated under this alternative and violations of the state and federal air quality standards may not occur at all.

Influence on Scenic Quality. The most important consequence of this alternative to scenic quality would be the near-complete loss or inundation of tufa towers and sand tufa, causing a great change in the landscape character of Mono Lake.

Although the near elimination of alkali flats, the distinct appearance of Negit Island some distance from shore, and decreases in dust storms that would otherwise reduce regional visibility would have a beneficial effect on scenic quality, the near-complete loss of the tufa resource would be a significant adverse impact on scenic quality at Mono Lake.

Mono Lake Tributary Streams

A slight decrease in the extent of riparian vegetation along the diverted tributary streams would occur under this alternative because of offsetting effects of increased streamflow and lake inundation. The net effect would be little change in the extent of riparian vegetation. Under both this alternative and the point of reference, however, expansion of the riparian vegetation would be expected from ongoing restoration activities.

Grant Lake Reservoir

Under the 6,410-Ft Alternative, Grant Lake reservoir drawdown in a wet water year would be about 4 vertical feet, compared to 30 feet under the point-of-reference scenario. This would be considered a major visual benefit.

Upper Owens River

Under this alternative, little or no loss of riparian vegetation below East Portal would occur because export flows would be low. Continuing grazing on the private lands along the river, however, could cause losses.

Lake Crowley Reservoir

Under the 6,390-Ft Alternative, drawdown of Lake Crowley reservoir in a wet water year would double to 8 feet, compared to 4 feet for the point-of-reference scenario. The visual effect would be significantly adverse.

Summary of Benefits and Significant Impacts and Identification of Mitigation Measures (6,410-Ft Alternative)

- Substantial loss of the tufa resource

Mitigation Measures. None available except for choosing a lower lake level alternative.

- Substantial reduction in drawdown at Grant Lake reservoir.
- Substantial increase in drawdown at Lake Crowley reservoir.

Mitigation Measures. None may be available except for choosing another alternative. However, once a lake level alternative is selected, the aqueduct model could be used to evaluate different reservoir operation rules intended to reduce the unvegetated drawdown zone.

IMPACTS AND MITIGATION MEASURES FOR THE NO-DIVERSION ALTERNATIVE

Changes in Resource Conditions

Mono Lake

Tufa. Effects would be similar to those of the 6,410-Ft Alternative.

Visually Conspicuous Birds. Effects would be similar to those of the 6,410-Ft Alternative.

Other Landscape Elements

- Islands - Effects would be similar to those of the 6,410-Ft Alternative.
- Lakeshore wetland vegetation - The amount of wetland vegetation near the lakeshore would decrease by approximately 2,400 acres to 400 acres.
- Alkali flats - No alkali flats would remain exposed, which is a decrease of approximately 5,400 acres, compared to the point of reference.
- Pumice blocks - All exposed pumice blocks would be inundated.
- Regional visibility - Effects would be similar to those of the 6,410-Ft Alternative.

Influence on Scenic Quality. Effects would be similar to those of the 6,410-Ft Alternative.

Mono Lake Tributary Streams

Effects would be similar to those of the 6,410-Ft Alternative.

Grant Lake Reservoir

Under the No-Diversion Alternative, Grant Lake reservoir would remain full and no drawdown would occur. This would be considered a major visual benefit.

Upper Owens River

Effects would be similar to those of the 6,410-Ft Alternative.

Lake Crowley Reservoir

Under the No-Diversion Alternative, drawdown of Lake Crowley reservoir in a wet water year would more than double to 9 feet, compared to 4 feet for the point-of-reference scenario. The visual effect would be significantly adverse.

Summary of Benefits and Significant Impacts and Identification of Mitigation Measures (No-Diversion Alternative)

- Substantial loss of the tufa resource.

  Mitigation Measures. None available except for choosing a lower lake level alternative.

- Substantial reduction in drawdown at Grant Lake reservoir.
- Substantial increase in drawdown at Lake Crowley reservoir.

Mitigation Measures. None may be available except for choosing another alternative. However, once a lake level alternative is selected, the aqueduct model could be used to evaluate different reservoir operation rules intended to reduce the unvegetated drawdown zone.

CUMULATIVE IMPACTS OF THE ALTERNATIVES

The analysis of cumulative impacts focuses on effects at Mono Lake, the lower tributaries, and the Upper Owens River. Cumulative visual effects were not analyzed for Grant Lake or Lake Crowley reservoirs because reservoir drawdown, which was used to evaluate impacts, is cyclical and does not have cumulative effects on visual resources.

Related Impacts of Earlier Stream Diversions by LADWP

Mono Lake

Several changes in landscape features near Mono Lake have occurred as a result of stream diversions by LADWP since 1940.

Around the time that diversions commenced, several freshwater ponds were maintained near the lakeshore near the mouths of Rush and Lee Vining Creeks. The ponds supported large numbers of migratory waterfowl, including ducks and geese. As the lake surface elevation dropped over time because of diversions by LADWP, the freshwater ponds could no longer be maintained and eventually were abandoned. The numbers of waterfowl that once visited these ponds declined substantially.

As the lake surface elevation and surface area declined as a result of the LADWP diversions, alkali flats were exposed and the frequency of dust storms increased, which reduced regional visibility.

As the lake became smaller, the distance separating Negit Island from the mainland decreased, diminishing Negit Island's appearance as a true island surrounded by water. When the lake surface declined to about 6,376 feet, a landbridge connecting Negit Island to the mainland was exposed.

The declining lake surface also gradually exposed most of the tufa towers at the South Tufa, Lee Vining, DeChambeau, and Wilson groves. When the surface elevation dropped below 6,390 feet, sand tufa was exposed and pumice blocks began to appear. Also, the acreage of near-shore wetland vegetation greatly increased as the lake surface declined, although the character of these wetlands lacked the species richness and maturity of the older, prediversion wetlands that had previously existed.

Tributary Streams. The dewatering of the tributary streams after diversions began resulted in significant reductions in riparian vegetation along the streams. Stream channel incision occurred in the lower reaches of Rush and Lee Vining Creeks as the surface elevation of Mono Lake declined, causing further losses of vegetation.

Upper Owens River

During the diversion period, streamflows in the Upper Owens River were augmented about 200% on the average, so that streamflows were three times the prediversion levels. These flows caused some channel changes, possibly resulting in channel straightening. Wetland and riparian losses resulted from these changes (Chapter 3C, "Vegetation"), but vegetative losses probably also occurred from cattle grazing. The overall vegetative changes did not substantially degrade the visual resource. The stream's appearance

changed because of the increased flows, which enhanced visual quality in drought years when little or no natural flows would have been present.

Related Impacts of Other Past, Present, or Anticipated Projects or Events

Mono Lake

Prediversion wetlands were a well-established, prominent feature of the northwest area of the lake. These wetlands were fed largely by water used to irrigate pastures associated with private ranches.

Diversion of water from Mill Creek (by parties other than LADWP) left the stream dry for extended periods, which resulted in a substantial loss of streamside riparian vegetation, especially along the reach approximately 1 mile upstream of Mono Lake.

Two significant development projects are planned in Mono Basin. One development would be approximately 400 residential units, a resort lodge with restaurant, shops, golf course, and a 30-acre lake on approximately 880 acres of land northeast of the intersection of U.S. 395 and SR 167. The second proposal is a mixed-use development, including a motel, gas station, mini-mart, and 10 residences. Neither development is expected to result in changes to landscape features affected by the project alternatives.

Tributary Streams

Habitat restoration work along Rush and Lee Vining Creeks to promote fisheries has had some effects on visual quality. During construction, some riparian vegetation has been destroyed for fish habitat structures, construction access, and stockpiling of spawning gravels or other materials. These disturbances are limited both spatially and temporally.

Habitat restoration has involved some planting of riparian vegetation along lower Lee Vining Creek, which, if successful, will enhance visual quality. Additional efforts to promote vegetation recovery from the period of dewatering and stream incision will have further visual resource benefits.

Upper Owens River

Expansion of the existing development on the John Arcularius Ranch, including new guest cabins, a guest lodge and restaurant, and four single-family residences, has been proposed. Expansion would not result in changes to landscape features affected by the project alternatives.

Significant Cumulative Impacts

No-Restriction Alternative

The No-Restriction Alternative would result in a significant cumulative adverse impact on scenic quality at Mono Lake because of major declines in visually conspicuous birds, the appearance of Negit Island as joined to the mainland, extensive increases in areas of alkali flats, and increases in the frequency and extent of dust storms that cause reductions in regional visibility. Although the increased exposure of tufa towers, sand tufa, and pumice blocks that, under prediversion conditions were completely inundated by the lake, would have a positive influence on scenic quality, these effects would not offset the negative influences on scenic quality.

A further decrease in riparian vegetation along the lower tributaries because of stream dewatering and incision would result in a significant cumulative adverse impact on scenic quality.

6,372-Ft Alternative

In contrast to the prediversion condition, the tufa resource would remain visible and accessible, the gull population would be reduced, phalaropes would be difficult to observe, Negit Island would be joined to the mainland, wide alkali flats would border portions of the lake, extensive areas of pumice blocks would be visible, frequent and extensive dust storms would occur, and riparian vegetation along the tributary streams would be diminished.

6,377-Ft Alternative

In contrast to the prediversion condition, the tufa resource would remain visible and accessible, the gull population would be reduced during droughts, Negit Island would appear to be part of the mainland, wide alkali flats would border portions of the lake, some areas of pumice blocks would be visible, frequent and extensive dust storms would occur, and riparian vegetation along the tributary streams would be diminished.

6,383.5-Ft Alternative

In contrast to the prediversion condition, the tufa resource would largely remain visible and accessible, wide alkali flats would border portions of the lake, a few areas of pumice blocks would be visible, fairly frequent and extensive dust storms would occur, and riparian vegetation along the tributary streams would be diminished.

6,390-Ft Alternative

In contrast to the prediversion condition, some of the tufa resource would remain visible and accessible, and riparian vegetation along the tributary streams would be diminished.

6,410-Ft Alternative

In contrast to the prediversion condition, riparian vegetation along the tributary streams would be diminished.

No-Diversion Alternative

In contrast to the prediversion condition, riparian vegetation along the tributary streams would be diminished.

Mitigation Measures for Significant Cumulative Impacts

Most of the negative influences on scenic quality at Mono Lake can be mitigated only by choosing a different lake level alternative.

The losses of prediversion riparian vegetation along the tributary streams, which would remain significant under all alternatives (and would increase under the No-Diversion Alternative) can only be partially mitigated onsite. Watering of overflow channels and plantings in selected locations can partially recover the losses during the diversion period. Additional offsite compensation would be required for full mitigation. A mitigation program for this purpose is described in Chapter 3C, "Vegetation".

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