4.13 NOISE

4.13.1 INTRODUCTION

To describe noise environments and to assess impacts on noise-sensitive areas, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that *A-weighting* of sound intensities best reflects the human ear's reduced sensitivity to low frequencies, and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. Figure 4.13-1 provides an illustration of a typical range of common sounds heard in the environment.

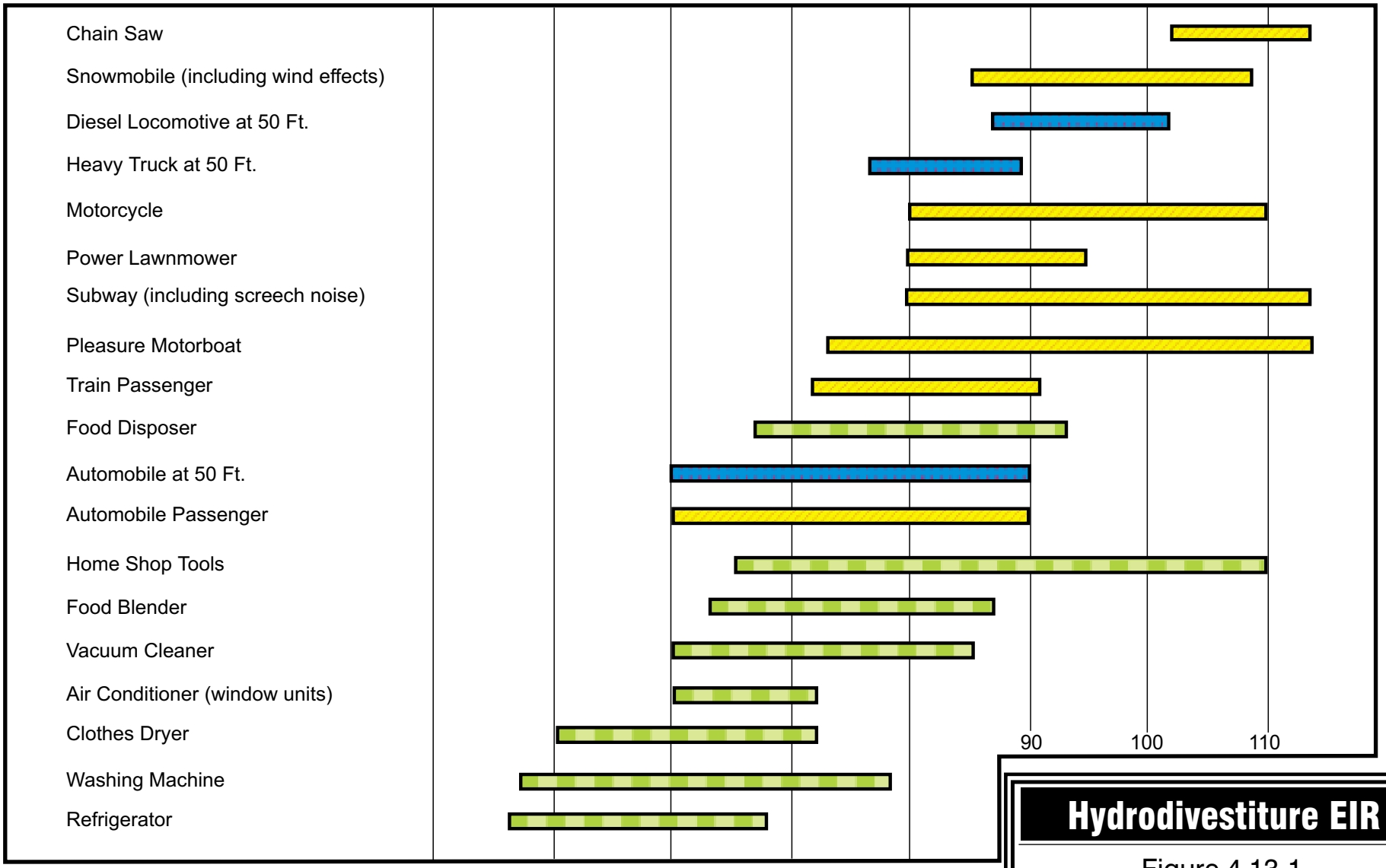
Several time–averaged scales represent noise environments and consequences of human activities. The most commonly used descriptors are: equivalent A-weighted sound level over a given time period (Leq)[1]; average day and night noise level (Ldn)[2] with a nighttime increase of ten dBA to account for sensitivity to noise during the nighttime; and community noise equivalent level (CNEL)[3], also a 24-hour average which includes both an evening and a nighttime weighting. Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. As illustrated in Figure 4.13-2, outdoor day-night sound levels (Ldn) vary over 50 dBA, depending on the specific type of land use. In wilderness areas (such as the project Watershed Lands), the Ldn noise levels average approximately 35 dBA, 40 to 50 dBA in small towns or wooded residential areas, 75 dBA in major metropolis downtown areas, and 85 dBA near major freeways and airports. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be adverse levels of noise to public health.

Various environments can be characterized by levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night noise level difference in rural areas away from roads and other human activity can be considerably less. Noise levels above 45 dBA at night can result in the onset of sleep interference (USEPA, 1971). At 70 dBA, sleep interference becomes considerable.

1 The Equivalent Sound Level (Leq) is a single value of sound level for any desired duration, which includes all of the time-varying sound energy in the measurement period.

2 Day-night average sound level that is equal to the 24-hour A-weighted equivalent sound level with a ten-decibel penalty applied to nighttime levels.

3 The average A-weighted noise level during a 24-hour day, obtained by addition of five decibels in the evening from 7:00 p.m. to 10:00 p.m., and an addition of a ten-decibel sound level in the night between 10:00 p.m. and 7:00 a.m.



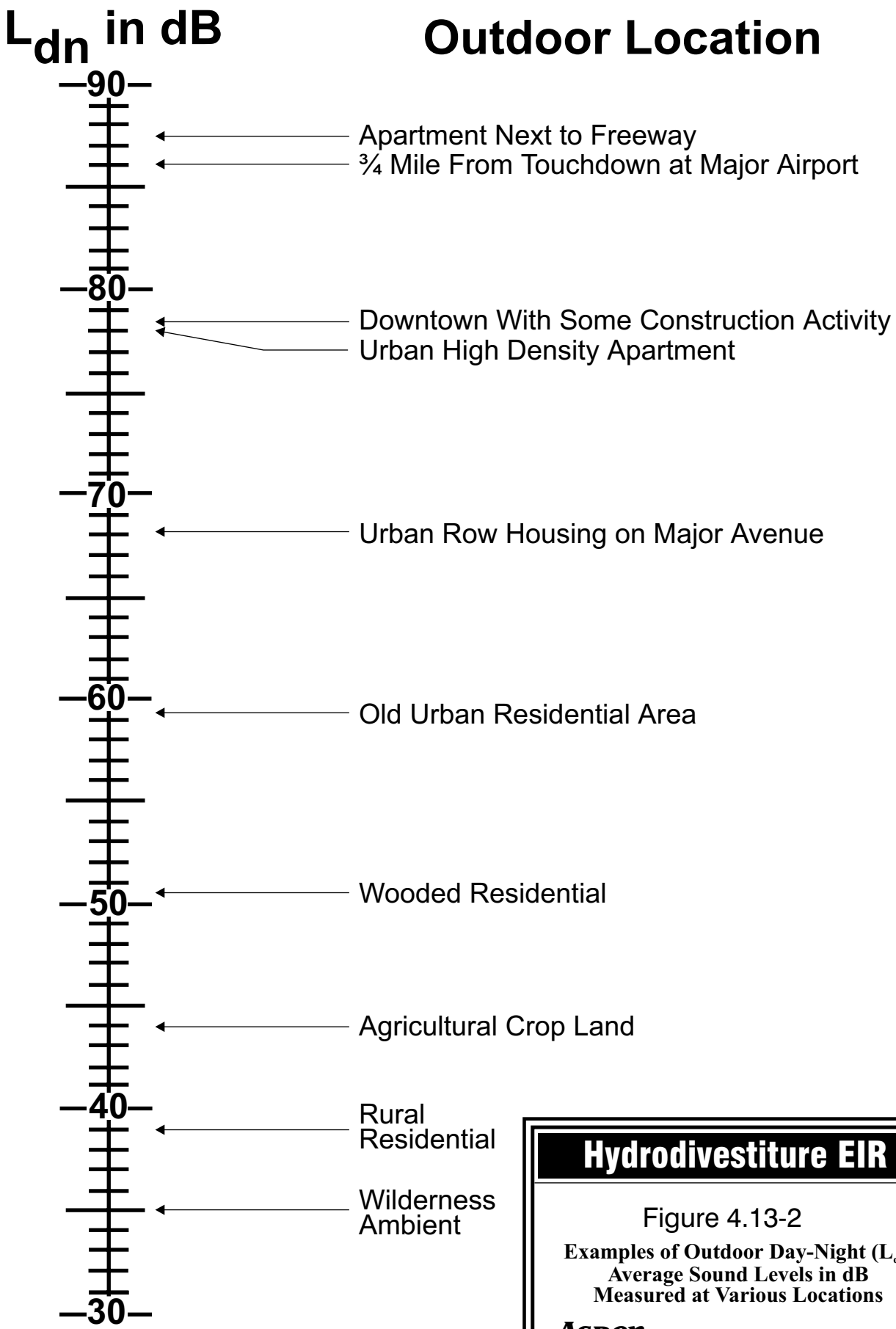
Source: USEPA, 1978. Protective Noise Levels Condensed Version of EPA Levels Document.

Hydrodivestiture EIR

Figure 4.13-1

Typical Range of Common Sounds

Aspen Environmental Group



Source: USEPA, 1978. Protective Noise Levels Condensed Version of EPA Levels Document

Hydrodivestiture EIR

Figure 4.13-2

Examples of Outdoor Day-Night (L_{dn}) Average Sound Levels in dB Measured at Various Locations

Aspen Environmental Group

4.13.2 SYSTEM-WIDE REGULATORY CONTEXT

4.13.2.1 Federal Regulations and Policies

There are no Federal noise standards that directly regulate environmental noise from operation of hydroelectric power facilities. However, it should be noted that the U.S. Environmental Protection Agency (USEPA) has developed guidelines on recommended maximum noise levels to protect public health and welfare (USEPA, 1974). Table 4.13-1 provides examples of protective noise levels recommended by the USEPA. With regard to noise exposure and workers, the Occupational Safety and Health Administration (OSHA) regulations safeguard the hearing of workers exposed to occupational noise. A list of permissible noise exposures is given in Table 4.13-2 (Code of Federal Regulations: 29 CFR - Section 1910.95).

Table 4.13-1 Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety

Effect	Safety Level	Area
Hearing Loss	Leq (24) < 70 dB	All areas
Outdoor Activity Interference and Annoyance	Ldn < 55 dB	Outdoors in residential areas and farms, and other outdoor areas where people spend widely-varying amounts of time, and other places in which quiet is a basis for use.
	Leq (24) < 55 dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor Activity Interference and Annoyance	Ldn < 45 dB	Indoor residential areas
	Leq (24) < 45 dB	Other indoor areas with human activities, such as schools, etc.

Source: U.S. EPA, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." March 1974.

U.S. Forest Service Plans and Policies

The U.S. Forest Service does not currently have a policy or standard that directly regulates environmental noise from construction or operation of a project. With regard to permitting projects, the U.S. Forest Service requires an applicant to comply with all applicable Federal, State, and local policies and standards (USDA, 2000).

Table 4.13-2 OSHA Worker Noise Exposure Standards

Duration of Noise (hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: OSHA Standards: 29 CFR 1910.95, Subpart G (Occupational Noise Exposure, Table G-16).

4.13.2.2 State Regulations and Policies

California requires each local government entity to perform noise studies and implement a noise element as part of their general plan. The California Office of Noise Control administers standards and implementation measures. California Administrative Code, Title 4, has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in Table 4.13-3.

4.13.2.3 Regional Regulations and Policies

The Pacific Gas and Electric Company hydroelectric generating system facilities and associated lands are located within 19 different counties, and extend from Lassen and Shasta counties in the north to Kern County in the south. Noise Elements are required elements in county general plans. The noise elements generally contain land use compatibility guidelines such as those shown in Table 4.13-3. These guidelines are used in the decision-making process regarding proposed new developments, and are intended to assist in project review and long-range planning (Madera County, 1995; Fresno County, 2000; Kern County, 1975; Tulare County, 1988). A typically desired range for day-night average ambient noise level in these regions is between 40 and 55 dBA, with 65 dBA being an acceptable level where transportation noise may be significant.

4.13.3 SYSTEM-WIDE SETTING

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residential areas, schools, and hospitals generally are more sensitive to noise than are commercial and industrial land uses. Land uses near the hydroelectric facilities are primarily open space, recreation, rural residential, and timberland.

Hydroelectric facilities are generally not major noise sources, and are primarily in remote areas where there are few sensitive receptors. Noise sources associated with the hydroelectric facilities are most attributable to powerhouse equipment, water falling and flowing in natural streams and manmade water conveyances, powerline static noise (known as “corona”), vehicle traffic, and service center activities. Intermittent or short-term noise may be caused by construction and maintenance activities, blasting, large water releases, helicopter flights, timber harvesting and, at some projects, by sirens used to warn downstream recreational users of large water-flow events. Recreational activities such as boating and hunting, and associated traffic, cause seasonal increases in noise levels.

Table 4.13-3 Land Use Compatibility for Community Noise Environment

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE - Ldn or CNEL (db)													
	50		55		60		65		70		75		80	
Residential - Low Density Single Family, Duplex, Mobile Home														
Residential - Multi-Family														
Transient Lodging, Motel, Hotel														
Schools, Libraries, Churches, Hospitals, Nursing Homes														
Auditorium, Concert Hall, Amphitheaters														
Sports Arena, Outdoor Spectator Sports														
Playgrounds, Neighborhood Parks														
Golf Courses, Riding Stables, Water Recreation, Cemeteries														
Office Buildings, Business Commercial and Professional														
Industrial, Manufacturing, Utilities, Agriculture														
	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.													
	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made, and needed noise insulation features are included in the design.													
	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made, and needed noise insulation features included in the design.													
	Clearly Unacceptable New construction or development generally should not be undertaken.													

Source: OPR, State of California General Plan Guidelines, Office of Planning and Research, June 1990.

4.13.4 REGIONAL AND LOCAL SETTING AND REGULATORY CONTEXT

4.13.4.1 Shasta Regional Bundle

Noise Environment

Hydroelectric facilities and associated watershed lands in the Shasta Regional Bundle are located within Shasta and Tehama counties. Noise associated with Pacific Gas and Electric Company facilities in the Shasta Regional Bundle is caused by 16 powerhouses that operate a total of 28 generating units and two service centers. These facilities are primarily located in remote areas and do not contain major noise sources. Sources of ambient noise in these areas are predominantly

related to local vehicle traffic, agricultural and recreational activities, water falling and flowing in natural streams and manmade water conveyances, helicopter flights, and some timber management. Because of the lack of significant noise sources associated with Pacific Gas and Electric Company's hydroelectric facilities and associated watershed lands, major noise issues or noise complaints are rare. There are few, if any, stationary sources of noise located on the watershed lands. On some watershed lands, recreation activities and their associated traffic may cause seasonal increases in noise levels. The following are instances of potential noise sources within the Shasta Regional Bundle.

In compliance with FERC License Article 36, Pacific Gas and Electric Company has installed a warning system (siren) along the Pit 3 River Reach and around the powerhouses to warn the public of fluctuations in water flows. Timber harvesting occurs within the Pit 3, 4, and 5 Project area and the McCloud-Pit Project area, and is conducted in compliance with respective timber harvest plans (THPs). Within the last three years, Pacific Gas and Electric Company received one verbal complaint about the noise level associated with operation of the Kilarc-Cow Creek Powerhouse when the powerhouse doors were opened for cooling during a hot day. Pacific Gas and Electric Company representatives explained to the complainant that the reason for opening the doors was because of hot weather, and no further noise complaints have been received.

Noise sources on watershed lands associated with the Hat Creek 1 and 2 FERC Licenses include water flowing in streams or water conveyances, and limited traffic on minor roads. Sources of noise on watershed lands associated with the Pit 1 Project include water flowing in the Pit River and water conveyances, and traffic on State Highway 299 and minor roads. Sources of noise on watershed lands associated with the Pit 3, 4, and 5 Project include water flowing in the Pit River and water conveyances, timber harvesting, helicopter flights, traffic on State Highway 299 and minor roads (see Section 4.12, Transportation), a rifle club, and a fire station. Timber harvesting on the watershed lands is conducted using ground-based equipment and helicopters pursuant to two active THPs. Sources of noise on watershed lands associated with the McCloud-Pit Project include water flowing in the Pit River and water conveyances, timber harvesting, helicopter flights, and limited traffic on minor roads. Timber harvesting on the watershed lands is conducted using ground-based equipment and helicopters pursuant to two active THPs (PG&E Co. 1999b, and PG&E Co. 1999c). Sources of noise on watershed lands associated with the Kilarc-Cow Creek Project include water flowing in streams or water conveyances, and limited traffic on minor roads. Sources of noise on watershed lands associated with the Battle Creek Project include water flowing in water conveyances, and limited traffic on minor roads.

Sensitive Receptors

The majority of the Shasta Regional Bundle and associated watershed lands are located in rural or remote areas of Tehama and Shasta counties. In general, the areas around this regional bundle are sparsely populated. Potential sensitive receptors are generally limited to temporary recreational users and Pacific Gas and Electric Company residences that are rented by Pacific Gas and Electric

Company staff. Table 4.13-4 includes a summary of residential and recreational potential sensitive receptors in the study area.

Table 4.13-4 Shasta Regional Bundle Residential and Recreational Receptors

Bundle	PG&E Residences	Private Residences	RECREATIONAL FACILITIES
Hat Creek 1 and 2	one rented residence	0	Cassel Campground
			Baum Lake day use and fishing access
Pit 1	0	0	Big Lake day use and fishing access
Pit 3, 4, and 5	five residences, one rented	0	Northshore and Dusty Group Campgrounds
			Jamo Point day use and boat launch
			Pines Picnic Area day use and picnic area
McCloud-Pit	0	0	Hawkins Landing campground and boat ramp
Kilarc-Cow Creek	one rented residence	0	Kilarc Reservoir day use, picnic area, and fishing access
Battle Creek	0	0	North Battle Creek Campground
			Lake Macumber Campground and day use
			Lake Grace and Lake Nora day use and picnic areas

Source: Pacific Gas and Electric Company, 1999. Proponent's Environmental Assessment Volume 3, Pages 5-24 to 5-27 and 5-167 to 5-176.

4.13.4.2 DeSabla Regional Bundle

Noise Environment

Hydroelectric facilities and associated watershed lands in the DeSabla Regional Bundle are located within Butte, Tehama, Plumas, and Lassen counties. Noise associated with Pacific Gas and Electric Company facilities' operation in the DeSabla Regional Bundle is caused by 15 powerhouses operating a total of 25 generating units, and four service centers. These facilities are primarily located in remote areas and do not contain major noise sources. Sources of ambient noise in these areas are predominantly related to local vehicle traffic, trains along the Union Pacific tracks along the North Fork Feather River (NFFR), timber management and agricultural activity, water falling and flowing in natural streams and manmade water conveyances, and recreational activities including boating. Because of the lack of significant noise sources associated with Pacific Gas and Electric Company's hydroelectric facilities and associated watershed lands, major noise issues or noise complaints are rare. There are few, if any, stationary sources of noise located on the watershed lands. On some watershed lands, recreation activities and their associated traffic may cause seasonal increases in noise levels. The following are instances of potential noise sources within the DeSabla Regional Bundle.

Sources of noise are fairly limited at the Canyon Dam and Prattville Weather Station service centers. Typical noise sources include vehicle engines and activities associated with loading and unloading of supplies for utility and cloud seeding operations. Timber harvesting occurs at the

Upper North Fork Feather River Project and is conducted in compliance with a THP. In 1989, ambient noise levels were measured at Rock Creek Reservoir and the community of Storrie, between the two reservoirs. The day-night average sound levels (Ldn) at both reservoirs were about 66 dBA. The primary noise sources recorded were traffic on State Highway 70, freight trains along the Union Pacific tracks on the southern side of the river, and natural sounds such as wind and water.

Sources of noise on watershed lands associated with the Upper North Fork Feather River Project include timber harvesting, water flowing in the North Fork Feather River and other streams or water conveyances, traffic on minor roads and State Highways 70 and 36, and freight trains along the Union Pacific tracks along the NFFR (see Section 4.12, Transportation). Timber harvesting on watershed lands is conducted using ground-based equipment pursuant to an active THP. Sources of noise on the watershed lands associated with the Rock Creek-Cresta Project include water flowing in the North Fork Feather River and water conveyances, traffic on minor roads and State Highway 70, and freight trains on the Union Pacific tracks along the NFFR.

Sensitive Receptors

The majority of the DeSabla Regional Bundle and associated watershed lands are located in rural or remote areas of Butte, Tehama, Plumas, and Lassen counties. In general, the areas around this regional bundle are sparsely populated. Potential sensitive receptors are generally limited to temporary recreational users and Pacific Gas and Electric Company residences that are rented by Pacific Gas and Electric Company staff. Table 4.13-5 includes a summary of residential and recreational potential sensitive receptors in the study area.

4.13.4.3 Drum Regional Bundle

Noise Environment

The proposed divestitures in this regional bundle consist of 15 powerhouses and three service centers. These facilities are located within three watersheds spread throughout Nevada, Placer, El Dorado, Lake, and Mendocino counties. Operational noise is caused by 16 generating units at the Drum-Spaulding Project (the Spaulding, Drum, Dutch Flat, Alta, Deer Creek, Halsey, Wise, and Newcastle powerhouses), one generating unit at the Narrows Project (the Narrows No. 1 powerhouse), one generating unit at the Chili Bar Project (the Chili Bar powerhouse), and three generating units at the Potter Valley Project. Other noise-generating facilities include the Alta Service Center near State Highway 49 in the unincorporated town of Alta. The Bear Valley Service Center is located within the Drum-Spaulding Project boundary, and the Rock Creek Yard Service Center is located within the Auburn city limits near State Highway 49. Noise is mainly caused by traffic accessing these facilities, water falling and flowing in natural streams and manmade water conveyances, timber management, helicopter flights, and agricultural and recreational activities.

Table 4.13-5 DeSabla Regional Bundle Residential and Recreational Receptors

Bundle	PG&E Residences	Private Residences	RECREATIONAL FACILITIES
Upper North Fork Feather River	11 residences, six are rented	0	Lake Almanor, Conery Group Camp, Last Chance, Ponderosa Flat, Cool Springs campgrounds
			Almanor Scenic Overlook day use and rest area
			Canyon Dam Picnic Area and Eastshore day use and picnic areas
			Alder Creek Picnic Area day use and boat launch
			Belden Rest Stop rest area and picnic area
			Lake Almanor Camp Overflow and Butt Lake Camp Overflow informal camping areas
Bucks Creek	one vacant residence	0	Grizzly Forebay and Haskins Valley Campgrounds
			Sandy Point Day Use and picnic area
			Grizzly Forebay day use and fishing access
Rock Creek-Cresta	17 cottages, six are rented	0	Shady Rest day use picnic area and rest area
			Yellow Creek Campground
Poe	0	0	No public recreational facilities
DeSabla-Centerville	0	0	Philbrook Campground
			Philbrook day use and picnic area
			Philbrook day use, fishing area, and boat ramp
			DeSabla Forebay group picnic area
Hamilton Branch Powerhouse	three vacant residences	0	No public recreational facilities
Lime Saddle Powerhouse	one vacant residence	0	No public recreational facilities
Coal Canyon Powerhouse	two vacant residences	0	No public recreational facilities

Source: Pacific Gas and Electric Company, 1999. Proponent's Environmental Assessment Volume 5, Pages 7-28 to 7-33 and 7-207 to 7-215.

Timber harvesting currently occurs at Drum-Spaulding and Potter Valley project areas. Around the Drum-Spaulding Project, overnight campers, visitors to day use areas, boating enthusiasts, and four-wheel-drive enthusiasts make use of the area, and are temporary sources of noise. At the Potter Valley Project, an additional source of noise is the fish screen cleaning, which uses compressed air. When initially operated in 1996, the noise associated with compressed air caused disruptive noise for nearby residents. In response to residents' concerns, Pacific Gas and Electric Company installed an enclosure for the air compressors with noise reducing baffles, an enclosure for the electric motor and gear system, and blankets on facilities that were projecting noise at the site. These measures dramatically reduced the noise levels and have effectively mitigated the noise impact (PG&E Co., 1999a; Ebert, 2000).

Short-term, daytime ambient noise levels measured during site visits to the Drum-Spaulding Project powerhouses varied from a high of approximately 80 dBA (at an open powerhouse door at Halsey) to less than 65 dBA (at picnic tables near the Halsey forebay).

Sensitive Receptors

The majority of the Drum Regional Bundle and associated watershed lands are located in rural or remote areas of Placer, Nevada, Eldorado, Mendocino, and Lake counties. In general, the areas around this regional bundle are sparsely populated. Potential sensitive receptors are generally limited to temporary recreational users and Pacific Gas and Electric Company residences that are rented by Pacific Gas and Electric Company staff. Table 4.13-6 includes a summary of residential and recreational potential sensitive receptors in the study area.

Table 4.13-6 Drum Regional Bundle Residential and Recreational Receptors

Bundle	PG&E Residences	Private Residences	RECREATIONAL FACILITIES
Drum-Spaulding	eight residences, six are rented	two	Lake Spaulding, Lodgepole, and Kidd Lake Group campgrounds
			Bear Valley, Deer Creek, Halsey Forebay, Kelly Lake, and Silver Tip day use and picnic areas
			Lower Feeley, Upper Lindsey Lake, Middle Lindsey Lake, Lower Lindsey Lake, Culbertson Lake, Lower Rock, and Upper Rock informal campgrounds
Narrows	0	0	No public recreational facilities
Chili Bar	0	0	No public recreational facilities
Potter Valley	0	Numerous residences in the project vicinity	Trout Creek, Pogie Point, Fuller Grove, Navy Camp, Sunset, and Oak Flat Overflow campgrounds
			Fuller Grove day use and boat launch
			Pillsbury Pines day use, boat launch and picnic area
			Eel River Visitors Center day use

Source: Pacific Gas and Electric Company, 1999. Proponent's Environmental Assessment Volume 5, Pages 9-19 to 9-22 and 9-138 to 9-141.

4.13.4.4 Motherlode Regional Bundle

Noise Environment

The hydroelectric facilities in this regional bundle consist of eight powerhouses and two service centers located in Alpine, Amador, Calaveras, Tuolumne, and Merced counties. Operational noise is caused by eight generating units at the Mokelumne River Project (the Electra, West Point, Tiger Creek, and Salt Springs powerhouses), two generating units at the Spring Gap-Stanislaus Project (the Stanislaus and the Spring Gap powerhouses), one unit at the Phoenix Project powerhouse, and one generating unit at the Merced Falls Project (the Merced Falls powerhouse). Other noise-generating facilities include the Tiger Creek Service Center adjacent to the Tiger Creek Powerhouse, about 16 miles northeast of Jackson. Noise sources associated with the Tiger Creek

Service Center are primarily related to vehicles accessing the facilities. The service center is accessed from State Highway 88 via secondary and unimproved roads. Other sources of noise in the region include timber harvesting at Mokelumne and Phoenix Project areas, recreational activities (commonly fishing, hiking, boating, picnicking, and resorts at Lower Bear Valley Reservoir and Strawberry Reservoir), agriculture uses, and scattered residential uses and associated traffic.

Short-term, daytime ambient noise levels measured during site visits to the powerhouses of the Mokelumne Project varied from a high of approximately 74 dBA (immediately outside of an open powerhouse door at Salt Springs) to less than 68 dBA (downstream of the Tiger Creek powerhouse near the service center).

Sensitive Receptors

The majority of the Motherlode Regional Bundle and associated watershed lands are located in rural or remote areas of Amador, Calaveras, Tuolumne, Mariposa, and Merced counties. In general, the areas around this regional bundle are sparsely populated. Potential sensitive receptors are generally limited to temporary recreational users and Pacific Gas and Electric Company residences that are rented by Pacific Gas and Electric Company staff. Table 4.13-7 includes a summary of residential and recreational potential sensitive receptors in the study area.

Table 4.13-7 Motherlode Regional Bundle Residential and Recreational Receptors

Bundle	PG&E Residences	Private Residences	RECREATIONAL FACILITIES
Mokelumne River	12 residences, six are rented	0	Lower Blue Lake, Middle Creek, Upper Dam Site, Upper Blue Dam Expansion, Upper Blue Lake, and Blue Lakes Overflow campgrounds.
			Salt Springs and Tiger Creek Powerhouse day use, fishing access areas
			Tiger Creek Afterbay, Lake Tabeaud, and Electra day use, fishing access and picnic areas.
Spring Gap-Stanislaus	two vacant residences	0	Stanislaus Forebay Access day use and fishing area.
Phoenix	one vacant residence	0	Lyons Reservoir day use and fishing access area
Merced Falls	0	0	Rivers Edge day use and fishing access area
			Merced Falls day use and car top boat launch area

Source: Pacific Gas and Electric Company, 1999. Proponent's Environmental Assessment Volume 6, Pages 11-21 to 11-23 and 11-143 to 11-148.

4.13.4.5 Kings Crane-Helms Regional Bundle

Noise Environment

Hydroelectric facilities in the Kings Crane-Helms Regional Bundle consist of 13 powerhouses and a pumped storage plant, which operate a total of 25 generating units, and one service center. These facilities and associated watershed lands are located within Madera, Fresno, Tulare, and Kern

counties. Pacific Gas and Electric Company lands in the Kings Crane-Helms Regional Bundle are primarily located in remote areas that do not contain significant noise sources. Sources of ambient noise in this regional bundle are typical of hydroelectric facilities, and consist mainly of equipment operation and water flow in natural streams and manmade water conveyances. Intermittent or short-term noise includes water release, construction and maintenance activities, timber harvesting, helicopter flights, and recreational use, such as boat engine noise and occasional gunfire associated with hunting. Timber harvesting in compliance with current THPs occurs at the Crane Valley, Kerckhoff, and Helms Pumped Storage Project areas. Other noise sources in the area include Highway and County Road 426.

Noise level measurements of various powerhouses in California have been collected for reference noise levels for this project (EIP, 2000). The measurement data indicate that the majority of powerhouses have interior noise levels from the high 80 to low 90-dBA range. Noise levels approximately 30 to 50 feet from the operating powerhouses were generally found to be in the low 60-dBA range.

Sensitive Receptors

The majority of the Kings Crane-Helms Regional Bundle and associated watershed lands are located in rural or remote areas of Madera, Fresno, Kern, and Tulare counties. In general, the areas around this regional bundle are sparsely populated. Potential sensitive receptors are generally limited to temporary recreational users and Pacific Gas and Electric Company residences that are rented by Pacific Gas and Electric Company staff. Table 4.13-8 includes a summary of residential and recreational potential sensitive receptors in the study area.

4.13.5 STANDARDS OF SIGNIFICANCE

Based on the California Environmental Quality Act (CEQA) Guidelines (Governor's Office, 1997), a project may be deemed to have a significant effect on the environment if it would substantially increase the ambient noise levels for adjoining areas. A change in noise levels of less than three dBA is not discernible to the general population; an increase in average noise levels of between three and five dBA is clearly discernible to most people. An increase in the noise environment at sensitive receptor locations of five dBA or greater is considered to be the minimum required increase for a change in community reaction (USDOT, 1990) and, for the purposes of this analysis, constitutes a significant noise impact. With temporary noise impacts, identification of "substantial increases" depends upon the duration of the impact, the temporal daily nature of the impact, and the absolute change in dBA levels.

For operational impacts, operational noise that would exceed the "normally acceptable" land use compatibility noise range of the general plan in the jurisdiction where a project element is proposed would be considered a significant noise impact. If a land use already exists in a "conditionally acceptable" or "normally unacceptable" noise-compatible environment, as designated in the general

Table 4.13-8 King Crane-Helms Regional Bundle Residential and Recreational Receptors

Bundle	PG&E Residences	Private Residences	Recreational Facilities
Crane Valley Bundle	seven rented residences	residential development areas	Manzanita Lake Day use area
			Base Lake campgrounds, day use areas, lodges, marinas, and a boat launch
Kerchoff Bundle	0	0	Smalley Cove campground and day use area
Helms Pumped Storage	24 residences, 23 are rented	two occupied residences	Trapper Springs, Marmot Rock, Upper Kings River Group, and Lily Pad campgrounds
			Whee Mee Kute and Helms day use picnic areas
			Courtright Dam and Wishon picnic area and boat launch
			Short Hair Creek, Wishon Dam, Upper Kings River, Spillway, and Coolidge Meadow fishing access.
Haas-Kings River	0	0	No developed recreational facilities
Balch Project	Balch Camp[a] - 12 rented, 1.4 miles west of the powerhouses.	0	Black Rock campground
			Williams Creek fishing access
Tule River	three, one is rented	0	Wishon campground
Kern River	one rented residence	0	No developed recreational facilities

Source: Pacific Gas and Electric Company, 1999. Proponent's Environmental Assessment Volume 7, Pages 13-23 to 13-29 and 13-182 to 13-187.

a. Balch camp also has a dormitory, a recreation hall, a dining hall, a tennis court, a pool and changing room, four guesthouses, an eight-car garage, and a school. The residences are in two areas separated by Dinkey Creek and are known as the Indian Rock and Oak Flat Residential Areas.

plan, then an increase in operational noise that would result in a change of land use compatibility category would be considered a significant noise impact. For land uses designated as within a "clearly unacceptable" noise compatibility environment, operational noise that would result in a three dBA or greater increase to the existing noise environment would be considered significant, if sensitive receptors were present that would be affected. If sensitive receptors would not be present but the land use is considered sensitive to noise, then a five dBA increase would be considered significant. Otherwise, an increase would only be considered significant if it violated a local noise ordinance or substantially contributed to an existing violation of a noise ordinance.

4.13.6 ANALYTICAL METHODS

Evaluation of potential noise impacts was conducted based on the potential development assumptions for land use, future hydrological operations, timber harvest, and mineral extraction outlined in Chapter 3. The assumptions were reviewed to determine if they would result in noise level increases greater than the significance criteria. The magnitude of noise impacts is very

dependent upon site-specific information regarding the ambient noise conditions, the noise sources, noise receptors, the distance between noise sources and receptors, and other attenuating factors such as intervening barriers that could block the noise. Because much of the information about the possible developments is general (only the general location and arrangement of units are known), the analysis relies upon the general noise levels identified in Figure 4.13-2 to predict the magnitude of noise increases when land is converted from wilderness to more urban land uses. To identify a reasonable conservative-case comparison, the value for wooded residential (50 dBA, Ldn) was used rather than the value for rural residential (40 dBA, Ldn). Mining activity levels were assumed to be 80 dBA at 50 feet from the property boundary.

The hydrological modeling of the powerhouse flows was reviewed to determine how flows could change at the powerhouses. Theoretically, transfer of ownership could cause changes in noise patterns at the facilities if the new owner times water releases or generation activity differently than Pacific Gas and Electric Company. This would not change the peak levels of noise, merely the timing. Scheduling operations with increased noisy activity at night could change day-night noise levels (Ldn). It is anticipated that the new owner would continue to engage in maintenance activities in the future that may lead to short-term or intermittent noise from activities such as blasting, large water releases, or helicopter flights. Such maintenance activities would continue to occur on an as-needed basis, and would not likely be substantially changed as a result of the change of ownership. If new service centers are established in the future, noise patterns associated with operations of these facilities (including associated traffic noise) may shift to new or different locations. Such shifts may be accompanied by decreases in noise levels at existing facilities and increase of noise levels at the new facilities. The exact nature of any such changes is currently unknown. Traffic noise changes due to employment or activity changes are not anticipated to be substantial (See Section 4.12, Transportation).

4.13.7 Introduction to Impacts and Mitigation Measures

For Noise, the following impacts have been identified:

- Impact 13-1: Change in operations of the hydroelectric powerhouses would not result in substantial increases in dBA levels above the existing ambient noise conditions (Less than Significant).
- Impact 13-2: Potential land use changes associated with the Watershed Lands would contribute substantial noise levels above the existing ambient noise conditions. (Significant)

Where impacts are significant, mitigation measures are recommended at the conclusion of the analysis of each impact.

4.13.8 Impact 13-1: Impact, Analysis, and Mitigation Measures

Impact 13-1: Change in operations of the hydroelectric powerhouses would not result in substantial increases in dBA levels above the existing ambient noise conditions (Less than Significant).

This impact is addressed on a system-wide level because the effects of noise from changes in the predicted operation of the powerhouses would have similar effects throughout all bundles.

4.13.8.1 Evaluation of Impact 13-1 to Entire System

Both the PowerMax and the WaterMax scenarios could potentially involve seasonal and/or daily shifts in power generation. However, neither of the scenarios involves dramatic increases in total power generation at any powerhouse, nor development of new powerhouses. Also, the scenarios are not expected to shift more power generation into the more noise-sensitive nighttime hours. Because the powerhouses are already part of the ambient setting and the operations of new owners would not substantially increase power generation (and resultant noise), the shifting of the generation between hours, days, and months would have no negative effects upon the noise environment. Any changes in the noise environment would have a less-than-significant effect.

4.13.8.2 Impact 13-1: Mitigation Measures

None required.

4.13.9 IMPACT 13-2: IMPACT, ANALYSIS, AND MITIGATION MEASURES

Impact 13-2: Potential land use changes associated with the Watershed Lands would contribute substantial noise levels above the existing ambient noise conditions. (Significant)

This impact is addressed on a system-wide level because the effects of noise from development of Watershed Lands would have similar effects throughout the bundles and because the bundles are generally located in areas with very low ambient noise levels. As identified in Table 4.13-3, all land use categories are considered to be compatible in locations with community noise levels below 60 dBA (Ldn or CNEL). Since all Watershed Lands are likely to have existing community noise levels below 60 dBA (Ldn or CNEL), the assumed land use development would be "Normally Acceptable" on the Watershed Lands. Simply stated, from the noise perspective of the new use, the Watershed Lands are an acceptable location for almost any use. Thus, the concern of this impact analysis is not whether the Watershed Lands have an acceptable noise environment for the potential new developments, but whether the development would negatively affect the existing noise environment on or adjacent to the Watershed Lands.

4.13.9.1 Evaluation of Impact 13-2 to Entire System

Noise impacts could result if the new owners increase residential development, timber harvesting, and/or mining activities.

Land Development

New land development would result in direct increases in local ambient noise levels. The assumed land development is about 3,000 equivalent dwelling units (EDUs) for the Shasta Regional Bundle,

2,000 EDUs for the DeSabla Regional Bundle, 4,000 EDUs for the Drum Regional Bundle, 300 for the Motherlode Regional Bundle, and 700 for the Kings Crane-Helms Regional Bundle.

As shown in Figure 4.13-2, wilderness areas where it is anticipated that the majority of the land developments would be built are estimated to have average Ldn ambient noise levels of approximately 35 dBA (USEPA, 1978). Figure 4.13-2 also indicates that wooded residential areas have an average Ldn of approximately 50 dBA (USEPA, 1978). This would represent a potential 15-dBA increase in some local ambient conditions, which is well above the five-dBA increase significance criteria described in Section 4.13.5.

Because other existing sensitive receptors would generally also be wooded residential, the noise levels in these areas could already be elevated to the levels of wooded residential (50 dBA, as identified in Figure 4.13-2). Since the noise for new developments would be no greater than existing developments, the effects of the new developments on existing development would be less than significant since the levels of both would be estimated at 50 dBA. Therefore, future noise levels would have a less-than-significant effect on existing adjacent residences. Adding a development near another similar development (in this case both potentially wooded residential) is essentially compatible development. New land development near recreational areas (such as campgrounds) would also have a less-than-significant noise effect. In this case, the recreational area would have a higher ambient noise level but generally not high enough to eliminate adjacent land development for noise effects.

However, construction of new residences could result in significant short-term effects if the construction is within 1,000 feet of existing residential developments. Construction noise levels can exceed 80 dBA. It is common for construction of residential developments to last for over a year. If setback distances to existing residences are less than 1,000 feet, the construction could present a significant impact. This would be a short-term significant impact.

Another noise impact of land development is the effect a new development (project) would have on existing noise-sensitive wilderness locations. These would include Native American sacred sites, designated wilderness areas, National Forest lands, and State parks. As identified above, the increase of noise could be 15 dBA above existing levels. In noise-sensitive lands, this would be a significant noise impact. The location of the land use development areas is such that they should generally have good noise attenuation from elements of the natural environment (assumed to have a 6 dBA attenuation with each doubling of the reference distance), and thus, a 500-foot setback noise sensitive wilderness locations should reduce noise levels from new project development to the current background levels.

Logging Operations

New Timber Harvest Plans (THPs) and amendments to existing THPs could have detrimental short-term effects on local ambient noise conditions within the affected harvest areas. As mentioned

above, the remote areas where the logging activities would take place normally experience ambient Ldn noise levels of approximately 35 dBA. Peak noise levels associated with logging activities can be expected to be in the range of 80 to 90 dBA at 50 feet, which would significantly increase the local ambient noise level. However, logging activities would be short-term in nature within the audible range of any individual sensitive receptor. This would only occur at the boundary of the timber harvest area for only a short period of time (approximately one month). Therefore, impacts are considered to be less than significant.

Mining Operations

The project assumptions include mining by the new owners in the Shasta Region, Bundle 2 (between Pit 1 and Pit 3), and a parcel in the Motherlode Region, Spring-Gap area. While operating and without mitigation, mining activities are assumed to generate noise levels of 80 dBA at a distance of 50 feet from the property boundary. This would be considered a significant noise impact for any sensitive receptors within 1,600 feet of the property boundary. Noise levels would attenuate to 50 dBA at this distance, and would be compatible with existing residences. The existence of other sensitive receptors would already have raised the baseline to approximately 50 dBA.

4.13.9.2 Impact 13-2: Mitigation Measures

Mitigation Measures Proposed as Part of the Project

None identified.

Mitigation Measures Identified in This Report

Mitigation Measure 13-2a: Prior to approval of any new development on Project Lands, a Construction Noise Mitigation Plan shall be prepared for implementation during construction of the proposed development in order to mitigate construction noise impacts on existing residential receptors within 1,000 feet of the construction activities. Examples of mitigation strategies that should be included in any such Construction Noise Mitigation Plan include the following:

- All construction activities, except in an emergency, shall be limited to the daytime hours between 7:00 a.m. to 6:00 p.m., Monday through Friday.
- Air compressors and generators used for construction shall be surrounded by temporary acoustical shelters if within 300 feet of a sensitive receptor.
- All construction staging shall be performed as far as possible from occupied buildings.

Mitigation Measure 13-2b: New mining activities on Project Lands shall be limited to locations that are at least 1,600 feet from the nearest sensitive noise receptors (assumed to be residences).

Mitigation Measure 13-2c: Any new land use development (including single family homes) shall, where feasible, be set back at least 500 feet from Native American sacred sites, designated wilderness areas, National Forest lands, and State parks. Where such setbacks are not feasible,

equally effective mitigation strategies shall be employed (e.g., building orientation, landscaping, intervening or natural or artificial barriers) to ensure that noise levels at the property lines abutting such noise-sensitive lands are increased by less than five dBA (Ldn or CNEL) as a result of the new development.

Alternate Mitigation Measure 13-2: As an alternative to Mitigation Measures 13-2a, 13-2b, and 13-2c, prior to or concurrent with transfer of title for any bundle, there shall be recorded against the lands within the bundle conservation easements running with the land and (in a form and substance approved by the CPUC) precluding any further land use development, or expansion of timber harvest or mineral extraction activities.

4.13.9.3 Level of Significance After Mitigation

Implementation of Mitigation Measures 13-2a, 13-2b, and 13-2c would reduce the impact to a less than significant level. Alternatively, implementation of Alternative Mitigation Measure 13-2 would eliminate the impact altogether.

4.13.10 REFERENCES

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