

4.10 Noise

Affected Environment

Regional Setting

The Battle Creek watershed lies on the volcanic slopes of Mt. Lassen in southeastern Shasta and northeastern Tehama Counties. The Restoration Project is a portion of the larger Battle Creek watershed and is located in southern Shasta and northern Tehama Counties. The Restoration Project is located south of Shingletown and SR 44 and north of Paynes Creek and SR 36.

Area of Potential Noise Impacts

Land in the Restoration Project is primarily privately owned with some areas of public land. The Restoration Project is in the unincorporated areas of the counties and is devoid of large residential areas. Because most of the land in the Restoration Project is privately owned and remote, public access for recreational activities, including fishing, is rather limited. Public access is discussed further in Section 4.14, "Recreation." As discussed in Section 4.9, "Transportation," the Restoration Project is located away from major transportation corridors. Access to the Restoration Project sites will be primarily along many unpaved, unimproved county- or privately owned access roads. Areas located away from major transportation corridors, including the Restoration Project sites, are much less affected by noise generated by human activities. Based on the nature of the Restoration Project, predominant noise sources at the Restoration Project sites result primarily from operation of the Hydroelectric Project, wildlife (e.g., birds chirping), and wind in the trees.

A number of sites may be subject to construction, modification, or removal activities under one or more of the Restoration Project alternatives. These sites include Wildcat Diversion Dam, Eagle Canyon Diversion Dam, North Battle Creek Feeder, Coleman Diversion Dam (including the Inskip Powerhouse bypass facility and tailrace connector), Inskip Diversion Dam (including the tailrace connector and connector tunnel), South Diversion Dam, Soap Creek, and Lower Ripley Creek Feeder. More information on these sites is provided in Chapter 3, "Project Alternatives."

Characteristics of Noise

Noise often is defined simply as the presence of unwanted or undesirable sound in one's community or environment and, thus, is a subjective reaction to the characteristics of a physical phenomenon. What is a pleasing sound to one can be a severe irritant to another. Most environmental sound includes a

conglomeration of distant sources that create a relatively steady “background noise” in which no particular source is identifiable. These distant sources of sounds could include traffic, wind in the trees, or industrial activities. Community noise is commonly described in terms of an *ambient* noise level, which is defined as the all-encompassing noise level associated with a given noise environment. Sound levels in this report are measured in terms of A-weighted sound pressure levels, or decibels (dBA). A-weighting de-emphasizes very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards use A weighting because it provides a high correlation with human annoyance and health effects. Table 4.10-1 illustrates some common noise sources and their dBA levels.

Table 4.10-1. Noise Levels from Common Sources

Source	dBA
Jet takeoff at 200 feet	130
Pile driver at 50 feet	100
Subway train at 20 feet	90
Pneumatic drill at 50 feet	80
Light traffic at 100 feet	50
Soft whisper at 5 feet	30
Rustling leaves	20

Source: Shasta County 1998.

Note: The distances indicated above are the distances between the noise source and the listener.

A common statistical tool to measure the ambient noise level is the average or equivalent sound level (L_{eq}), which is the sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given time period (usually 1 hour). The L_{eq} is the foundation of the composite noise descriptors. These descriptors include the community noise equivalent level (CNEL), day-night noise level (L_{dn}), and sound exposure level (SEL). The CNEL is the average A-weighted noise level during a 24-hour day, obtained after adding 5 decibels (dB) to sound levels between 7 p.m. and 10 p.m. and adding 10 dB to sound levels between 10 p.m. and 7 a.m. The addition of dB during the evening and night hours accounts for a person’s higher sensitivity to noise during periods of rest and sleep. The CNEL and L_{dn} descriptors are virtually identical because each was developed to evaluate the community noise environment. However, L_{dn} does not differentiate between day and evening noise levels.

In general a change in a noise level of 3 dB is considered to be a barely perceptible change. A 5 dB change is considered to be a distinctly perceptible change, and a 10 dB change is perceived as being twice or half as loud.

Blasting may be required as part of the construction process. The two primary environmental effects of blasting are airborne noise and groundborne vibration. A brief discussion of each of these effects and standards commonly used to assess the impacts of blasting follows.

Airblast

Energy released in an explosion creates an air overpressure (commonly called an airblast) in the form of a propagating wave. If the receiver is close enough to the blast, the overpressure can be felt as the pressure front of the airblast passes. The accompanying booming sound lasts for only a few seconds. The explosive charges used in mining and mass grading typically are wholly contained in the ground, resulting in an airblast with frequency content below about 250 cycles per second, or Hz.

Because an airblast lasts for only a few seconds, use of L_{eq} (a measure of sound level averaged over a specified period of time) to describe blast noise is inappropriate. Airblast is properly measured and described as a linear peak air overpressure (i.e., an increase above atmospheric pressure) in pounds per square inch (psi). Modern blast monitoring equipment is also capable of measuring peak overpressure data in terms of unweighted dB. Decibels, as used to describe airblast, should not be confused with or compared to dBA, which are commonly used to describe relatively steady-state noise levels. An airblast with a peak overpressure of 130 dB can be described as being mildly unpleasant, whereas exposure to jet aircraft noise at a level of 130 dBA would be painful and deafening.

Ground Vibration

Blasting creates seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Airblast and ground vibration can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes and high frequency content will decrease with increasing distance from the blasting source.

As seismic waves travel outward from a blast, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (ppv).

Human Response to Airblast and Vibration

Human response to blast vibration and airblast is difficult to quantify. Vibration and airblast can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does blast frequency. Blast events are relatively short, on the order of several seconds for sequentially delayed blasts. Generally, as blast duration and vibration frequency increase, the potential for adverse human response increases. Studies have shown that a few blasts of longer duration will produce a less adverse human response than short blasts that occur more often.

Table 4.10-2 summarizes the average human response to vibration and airblast that may be anticipated when a person is at rest in quiet surroundings. If the person is engaged in any type of physical activity, the level required for the responses indicated is increased considerably.

It is important to understand that the foregoing describes the responses of average individuals. Individual responses can fall anywhere within the full range of the human response spectrum. At one extreme are those people who receive some tangible benefit from the blasting operation and probably would not be disturbed by any level of vibration and airblast, as long as it does not damage their property. At the opposite extreme are people who would be disturbed by even barely detectable vibration or airblast. Individuals at either of these two extremes were not considered in the listing of average human response or in the impact conclusions that follow.

Table 4.10-2. Human Response to Airblast and Ground Vibration from Blasting

Response	Ground Vibration Range ppv (inches per second)	Airblast Range (dB)
Barely to distinctly perceptible	0.02–0.10	50–70
Distinctly perceptible to strongly perceptible	0.10–0.50	70–90
Strongly perceptible to mildly unpleasant	0.50–1.00	90–120
Mildly unpleasant to distinctly unpleasant	1.00–2.00	120–140
Distinctly unpleasant to intolerable	2.00–10.00	140–170

Source: Bender 1996

Sensitive Receptors

For the purpose of this noise analysis, the potential effect is generally defined by the number and nature of “sensitive receptors” that could be affected by noise generated during the implementation of the Restoration Project. Sensitive receptors for noise can be defined as people at various locations who are participating in activities for which low noise levels are important (e.g., activities

conducted at residences, hospitals, schools, libraries, recreational areas, and places of worship).

Noise at sensitive receptor locations is often cited as a health problem, not in terms of actual physiological damage such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise arise from its interference with sleep, speech, recreation, and tasks demanding concentration or coordination. When community noise interferes with human activities or contributes to stress, public annoyance with noise sources increases and the acceptability decreases. This decrease in acceptability and the threat to public well-being are the bases for land use planning policies to prevent exposure to excessive community noise levels at sensitive receptor locations.

The Restoration Project sites are very remote and not heavily populated with either residences or other sensitive receptors. In addition, most of the Restoration Project sites and the access roads to these sites are either on property owned by PG&E or on other privately owned property. Public access to the sites is further discouraged by locked gates at most access road entry points. Public access to many of the Restoration Project sites (specifically including Wildcat, Eagle Canyon, and South Diversion Dams) is limited by the remote nature of the area, the rough terrain of the roads used to access the sites, and the sites' inaccessibility by vehicles.

The Oasis Springs Lodge, a 3,000-acre fly-fishing lodge and dude ranch along South Fork Battle Creek, is located immediately upstream of Inskip Diversion Dam and just downstream of the South Powerhouse. The lodge is the largest noise-sensitive receptor in the Restoration Project. In addition, residences are located along Manton School Road and the access road to the Inskip Diversion Dam and South Powerhouse. The Oasis Springs Lodge and the residential area are the closest sensitive receptors to any of the Restoration Project sites or access routes and would be the only noise-sensitive uses potentially affected by project-related activity.

Noise levels in this type of remote area are typically in the range of 25 to 45 dBA.

Regulatory Setting

A number of federal, state, and local laws, regulations, and policies relate to noise within the Restoration Project area. The following is a summary of those that relate to this assessment:

U.S. Bureau of Mines

Conventional noise criteria (for steady-state noise sources) and limits established for repetitive impulsive noise (such as for gun-firing ranges) do not apply to air overpressures from blasting. U.S. Bureau of Mines (USBM) Report of Investigations 8485 (USBM 1980a) and the regulations issued more recently by the U.S. Office of Surface Mining and Reclamation Enforcement specify a maximum safe overpressure of 0.013 psi (133 dB) for impulsive airblast when recording is accomplished with equipment having a frequency range of response of at least 2–200 Hz.

USBM Report of Investigations 8507 (USBM 1980b) contains blasting-level criteria that can be appropriately applied to keep ground vibration well below levels that might cause damage to neighboring structures. At low-vibration frequencies, velocities of ground vibration are restricted to low levels. As vibration frequency increases, higher velocities are allowed up to a maximum of 2.00 inches per second. As discussed earlier, high frequencies are attenuated with increasing distance from the blast source. Figure 4.10-1 depicts blasting-level criteria as a function of frequency.

To determine the velocity limit from Figure 4.10-1 that would apply to the neighboring properties, the dominant frequency ranges of the vibration must first be determined. The distribution of explosives, distance from the blast, and the nature of the transmitting medium (soil and rock) between the blast site and the affected structure all play a part in determining the dominant frequency of the blast vibration. Timing between the detonation of charges also affects the frequency but only in relatively close proximity to the blast.

At a distance of 500–1,000 feet from the blast, vibration frequency would be 25–100 Hz. At a distance of 1,000–2,500 feet, the frequency would be 10–40 Hz. At a distance of 2,500–5,000 feet, the frequency would be 4–35 Hz. The ppv limits specified in Figure 4.10-1 range from 0.50 inch per second at 4 Hz to 2.00 inches per second at 40 Hz and above.

Bureau of Reclamation Standard Construction Specifications

Construction specifications developed by Reclamation for this project limit noise-generating construction activity to the hours between 7:00 a.m. and 9:00 p.m. The specifications require that noise not exceed 70 dBA (L_{10}) at the nearest noise-sensitive land use during daytime hours and 50 dBA (L_{10}) during nighttime hours.

Tehama County General Plan Noise Element

The Tehama County noise element (Tehama County Community Development Group 1983) generally identifies the range of desired levels for residential areas as being from 40 to 50 dBA for rural-suburban residential areas and from 50 to 60 dBA for medium- and high-density residential areas. These ranges could increase to 60 and 70 dBA, respectively, in areas where transportation noise is a significant factor. Noise in the Tehama County general planning area that is at or approaching problem magnitudes is typically concentrated in urban areas, at certain industrial operations, and along the corridors of transportation routes.

Shasta County General Plan Noise Element

Shasta County applies an interior noise level criterion of 45 dBA, which is consistent with the interior noise level criterion suggested by the State Office of Noise Control and Office of Planning and Research for interior spaces of noise-sensitive uses affected by transportation noise sources. The Shasta County General Plan (Shasta County 1998) noise element identifies recommended maximum noise levels for sensitive receptors within the county as shown in Table 4.10-3.

Table 4.10-3. Shasta County General Plan Maximum Allowable Noise Exposure from Transportation Noise Sources

Land Use	Outdoor Activity (L _{dn} /CNEL, dB)	Interior Spaces (L _{dn} /CNEL, dB)
Residential	60–65	45
Transient lodging	60	45
Hospitals, nursing homes	60–65	45
Theaters, auditoriums, music halls	NA	NA
Churches, meeting halls	60–65	NA
Office buildings	NA	NA
Schools, libraries, museums	NA	NA
Playgrounds, parks	70	NA

Source: Shasta County 1998
NA = Not applicable

Shasta and Tehama County Noise Ordinances

The Shasta and Tehama County general plan policies discussed above relate to long-term noise compatibility and not noise from construction activity. They are

not used for noise enforcement. Noise ordinances are normally the legal mechanism for limiting noise from construction activity. However, neither Shasta County nor Tehama County has adopted a noise ordinance.

Environmental Consequences

Summary

No significant noise impacts are anticipated to occur under the No Action Alternative. Significant noise impacts are anticipated to occur with implementation of any of the Action Alternatives (Five Dam Removal, No Dam Removal, Six Dam Removal, and Three Dam Removal). These impacts are predicted to occur at the Oasis Springs Lodge and the small residential area located along the access road to the Inskip Diversion Dam/South Powerhouse site as a result of proposed construction activity. Reclamation will implement mitigation measures to reduce significant impacts to a less-than-significant level.

Impact Significance Criteria

In general, noise impacts are considered significant if implementation of the Restoration Project would result in the following (criteria taken from Appendix G of the State CEQA Guidelines):

- exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels; or
- substantial permanent increase or substantial temporary or periodic increase in ambient noise levels in the Restoration Project vicinity above levels existing without the Restoration Project.

Shasta and Tehama Counties have not adopted noise standards that can be applied to noise from construction activity. Noise limits specified in Reclamation's standard construction specifications, USBM guidelines, and the commonly accepted threshold for a distinctly perceptible change in noise (5 dB) are used to assess the significance of construction noise impacts. Accordingly, a construction noise impact is considered significant if:

- airblast from blasting exceeded 133 dB at a noise-sensitive land use,
- vibration from blasting exceeded USBM vibration standards,
- noise from general construction activity exceeded noise limits in Reclamation noise standard specifications, or

- noise from general construction activity exceeded the ambient noise level by more than 5 dB at any time.

Consideration is given to the duration of construction noise impacts. Noise exceeding the thresholds above that occurs for a short period of time may not be considered significant.

Impact Assessment

As applicable, the General Environmental Protection Measures listed in the introduction to this chapter shall be used for this resource. In addition, specific mitigation measures for this resource are identified below.

No Action Alternative

The No Action Alternative would not increase noise levels above existing levels in the vicinity of the Restoration Project or at the locations of nearby sensitive receptors. Under the No Action Alternative, the Hydroelectric Project would continue to generate noise related to operations and maintenance at current levels.

Five Dam Removal Alternative (Proposed Action)

The activities proposed under the Five Dam Removal Alternative would entail the use of various types of construction equipment and site access routes and could result in temporary noise impacts. While noise impacts could result throughout construction activities, they would be most severe during discrete phases of construction. These phases include initial access road improvements and earth-moving activities during which noise levels may be heightened.

Impact 4.10-1 Significant—Exposure of noise-sensitive uses to noise and vibration from blasting.

It is anticipated that blasting using chemical expansion agents, explosives, or drill-and-shoot techniques would be required at some of the Restoration Project sites. The Oasis Lodge is located within 200 feet of the Inskip Diversion Dam/South Powerhouse site and is the only noise-sensitive area that would be potentially exposed to noise and vibration from blasting. Details on the blasting methods to be used are not known at this time; however, it is known that some blasting would be conducted completely underground with no disturbance of the ground surface. Noise will not be an issue for this type of blasting. Some surface blasting may be required. Accordingly, there is potential for noise from blasting to exceed 133 dB and vibration to exceed USBM vibration criteria at the Oasis Springs Lodge. This impact is therefore considered to be significant. Implementation of the following mitigation measure would reduce this impact to a less-than significant level.

Mitigation Measure for Impact 4.10-1. Implement a blast noise and vibration mitigation and notification plan. Reclamation will implement a blast noise mitigation and notification plan that will include, but is not limited to, the following measures.

- Blasting notification identifying the date and time of blasting will be provided to nearby residents, local law enforcement, newspapers, and sensitive receptors located within 1,000 feet of blasting.
- Pre-blast alarms will be sounded. Immediately before blasting, the construction contractor will be required to sound a signal announcing the blast. Construction contractors will follow the construction safety plan that will provide for these measures.
- Best available practices will be employed to limit airblast from blasting to 135 dB and vibration to USBM limits at the nearest noise-sensitive land uses.
- Noise and vibration monitoring will be performed at nearby residences and sensitive receptors to ensure that airblast from blasting is limited to 135 dB and that vibration is limited to USBM criteria.

Impact 4.10-2 Significant—Exposure of noise-sensitive land uses to noise from on-site construction activities.

Numerous pieces of large equipment, including those listed in Table 4.10-4, would be used during the demolition of existing facilities and construction of project components such as fish screens, fish ladders, and access road improvements. Also, because of the remote nature of and limited access to many of the Restoration Project sites, helicopters may be used both to remove construction debris from sites and to deliver material and equipment to sites. No more than five helicopter flights to each construction site are anticipated for the Inskip Diversion Dam/South Powerhouse site.

Table 4.10-4. Noise Levels Associated with Typical Construction Activities

Equipment	Noise Level Ranges at 50 Feet from Source (dBA, L _{max})
Trucks	82–94
Concrete mixer trucks	74–88
Bulldozers	72–96
Front loaders	71–84
Scrapers/graders ¹	79–92
Water trucks	82–94
Cranes	75–87
Backhoes	71–93
Saws/vibrators	68–82

Equipment	Noise Level Ranges at 50 Feet from Source (dBA, L_{max})
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Source: Colusa Basin Drainage District and Bureau of Reclamation 2000.

L_{max} = maximum noise output level.

¹ Could include the Cat 311 excavator equipped with a hoe-ram.

The Oasis Springs Lodge is the only noise-sensitive land use that would be exposed to noise from on-site construction activity. Noise from a construction site typically drops off at a rate of 6 dB per doubling of distance. This indicates that the Oasis Springs Lodge, which is located within several hundred feet of construction areas, would be exposed to construction noise that could exceed Reclamation noise thresholds. Noise also could exceed the ambient noise level by more than 5 dB. This impact is therefore considered to be significant.

Noise from helicopters could also exceed the significance thresholds. However, because no more than five helicopter events are anticipated at the Inskip Diversion Dam/South Powerhouse site and the noise impact would only last a short period of time, the noise impact from helicopter operations is not considered significant.

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure for Impact 4.10-2. Employ noise-reducing construction practices. Reclamation will implement noise-reducing construction practices such that construction noise at the Oasis Lodge does not exceed Reclamation noise standards or the ambient noise level by more than 5 dB. These practices include but are not limited to the following:

- Residents and other sensitive receptors within the areas affected by noise generated during construction activities will be notified of the approximate dates of construction and the potential resulting increases in noise at least 2 weeks before construction begins.
- When near sensitive receptors and whenever practicable, noise-generating construction equipment will be turned off or left running at the lowest setting possible when not in use.
- Construction equipment will be properly outfitted and maintained to reduce noise output.
- Whenever practicable, noise-generating construction equipment will be shielded from nearby sensitive receptors by acoustical enclosures, berms, or temporary construction noise barriers.

Additional mitigation measures will be developed during the construction design phase before construction activities begin. If physical measures to reduce noise to the limits specified above are infeasible, Reclamation will purchase the use of

the lodge during the construction period. If purchasing for the use is not feasible, this impact would be significant and unavoidable.

Impact 4.10-3 Significant—Exposure of noise-sensitive land uses along site access roads to construction-related truck noise.

Implementation of the Five Dam Removal Alternative would require extensive hauling of materials to and from the Inskip Diversion Dam/South Powerhouse site. Reclamation estimates that up to 40 truck trips per day averaging five trips per hour could occur. Table 4.10-5 summarizes the estimated number of truck trips as a function of the construction activity.

Table 4-10.5. Estimated Construction Truck Trips

Activity	Number of truck trips
South Powerhouse Trailrace Connector	973
Inskip Canal Wasteway	93
Inskip Diversion Dam Fish Screen Ladder	521
Access Roads	1,717
Total	3,304

Reclamation is proposing to use Manton School Road as the primary haul route into the site. Residences are located along this road. Assuming five heavy-truck round trips per hour, or a total of 10 truck pass-bys per hour, the estimated 1-hour average sound level at 50 feet for trucks traveling at 25 miles per hour would be 58 dBA (based on the FHWA traffic noise prediction model FHWA-RD-77-108). The maximum sound level during a pass-by would be 78 dBA at 50 feet (Hoover 1995). Because the truck noise level would exceed both the daytime and nighttime construction noise standards of 70 and 50 dBA, respectively, used by Reclamation and because truck noise would exceed the ambient noise level by more than 5 dBA, this impact is considered to be significant. Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure for Impact 4.10-3. Construct an alternative haul route and limit the hours of trucking operations. Reclamation will construct an alternative haul route that is at least 750 feet from the nearest occupied residences and limit trucking operations to the hours of 7:00a.m. to 9:00p.m.

Impact 4.10-4 Less than Significant—Exposure of noise-sensitive land uses to noise from operation of the Restoration Project facilities.

The operation of the Restoration Project facilities after implementation of the Five Dam Removal Alternative would generate noise. Periodic monitoring and maintenance activities would require PG&E staff to continue to visit the sites by truck. It is not expected that the frequency of monitoring and maintenance activities would increase over current similar activities. Therefore, it is also not

expected that the post-implementation noise levels would increase over the current noise levels. In some cases, the construction of new facilities and the upgrading of access roads would result in a reduction in noise associated with routine operation and maintenance activities, thereby resulting in less traffic- and maintenance-related noise than that produced by the current operation and maintenance activities. This impact is therefore considered to be less than significant.

No Dam Removal Alternative

Noise impacts would be similar to those described for the Five Dam Removal Alternative. Each impact is described briefly below. With the implementation of the proposed mitigation measures, these potential impacts would be mitigated to a less-than-significant level.

Impact 4.10-5 Significant—Exposure of noise-sensitive uses to noise and vibration from blasting.

It is anticipated that blasting using chemical expansion agents, explosives, or drill-and-shoot techniques would be required at some of the Restoration Project sites under the No Dam Removal Alternative. Only one noise-sensitive receptor, the Oasis Springs Lodge, is located near the Inskip Diversion Dam/South Powerhouse and potentially would be exposed to noise and vibration from blasting. Noise levels could exceed 133 dB and vibration could exceed USBM vibration criteria at the Oasis Springs Lodge. This impact is therefore considered to be significant. This impact is similar to Impact 4.10-1. Implementing the Mitigation Measures for Impact 4.10-1 would reduce this impact to a less-than-significant level.

Impact 4.10-6 Significant—Exposure of noise-sensitive land uses to noise from on-site construction activities.

Numerous pieces of large equipment, including those listed in Table 4.10-4, would be used during the demolition of existing facilities and construction of project components such as fish screens, fish ladders, and access road improvements under the No Dam Removal Alternative. Because of the remote nature of and limited access to many of the Restoration Project sites, helicopters may also be used both to remove construction debris from sites and to deliver material and equipment to sites. The Oasis Springs Lodge is the only noise-sensitive land use that would be exposed to noise from on-site construction activity. Noise levels at Oasis Springs Lodge could exceed Reclamation noise thresholds. Noise also could exceed the ambient noise level by more than 5 dB. This impact is therefore considered to be significant. This impact is similar to Impact 4.10-2. Implementing the Mitigation Measures for Impact 4.10-2 would reduce this impact to a less-than-significant level.

Impact 4.10-7 Significant—Exposure of noise-sensitive land uses along site access roads to construction-related truck noise.

Implementation of the No Dam Removal Alternative would require hauling of materials to and from the Inskip Diversion Dam/South Powerhouse site.

Reclamation estimates that up to 40 truck trips per day averaging five trips per hour could occur. Table 4.10-5 summarizes the estimated number of truck trips as a function of the construction activity. This impact is similar to Impact 4.10-3. Implementing the Mitigation Measure for Impact 4.10-3 would reduce this impact to a less-than-significant level.

Impact 4.10-8 Less than Significant—Exposure of noise-sensitive land uses to noise from operation of the Restoration Project facilities.

The operation of the Restoration Project facilities after implementation of the No Dam Removal Alternative would generate noise. Periodic monitoring and maintenance activities would require PG&E staff to continue to visit the sites by truck. It is not expected that the frequency of monitoring and maintenance activities would increase over current similar activities. Therefore, it is also not expected that the post-implementation noise levels would increase over the current noise levels. In some cases, the construction of new facilities and the upgrading of access roads would result in a reduction in noise associated with routine operation and maintenance activities, thereby resulting in less traffic- and maintenance-related noise than that produced by the current operation and maintenance activities. This impact is therefore considered to be less than significant.

Six Dam Removal Alternative

Noise impacts would be the same as those described for the Five Dam Removal Alternative. Each impact is described briefly below. With the implementation of the proposed mitigation measures, these potential impacts would be mitigated to a less-than-significant level.

Impact 4.10-9 Significant—Exposure of noise-sensitive uses to noise and vibration from blasting.

It is anticipated that blasting using chemical expansion agents, explosives, or drill-and-shoot techniques would be required at some of the Restoration Project sites under the Six Dam Removal Alternative. Only one noise-sensitive receptor, the Oasis Springs Lodge, is located near the Inskip Diversion Dam/South Powerhouse and potentially would be exposed to noise and vibration from blasting. Noise levels could exceed 133 dB and vibration could exceed USBM vibration criteria at the Oasis Springs Lodge. This impact is therefore considered to be significant. This impact is similar to Impact 4.10-1. Implementing the Mitigation Measures recommended for Impact 4.10-1 would reduce this impact to a less-than significant level.

Impact 4.10-10 Significant—Exposure of noise-sensitive land uses to noise from on-site construction activities.

Numerous pieces of large equipment, including those listed in Table 4.10-4, would be used during the demolition of existing facilities and construction of project components such as fish screens, fish ladders, and access road improvements under the Six Dam Removal Alternative. Because of the remote

nature of and limited access to many of the Restoration Project sites, helicopters also may be used both to remove construction debris from sites and to deliver material and equipment to sites. The Oasis Springs Lodge is the only noise-sensitive land use that would be exposed to noise from on-site construction activity. Noise levels at Oasis Springs Lodge could exceed Reclamation noise thresholds. Noise could also exceed the ambient noise level by more than 5 dB. This impact is therefore considered to be significant. This impact is similar to Impact 4.10-2. Implementing the Mitigation Measures for Impact 4.10-2 would reduce this impact to a less-than-significant level.

Impact 4.10-11 Significant—Exposure of noise-sensitive land uses along site access roads to construction-related truck noise.

Implementation of the Six Dam Removal Alternative would require hauling of materials to and from the Inskip Diversion Dam/South Powerhouse site. Reclamation estimates that up to 40 truck trips per day averaging five trips per hour could occur. Table 4.10-5 summarizes the estimated number of truck trips as a function of the construction activity. This impact is similar to Impact 4.10-3. Implementing the Mitigation Measure for Impact 4.10-3 would reduce this impact to a less-than-significant level.

Impact 4.10-12 Less than Significant—Exposure of noise-sensitive land uses to noise from operation of the Restoration Project facilities.

The operation of the Restoration Project facilities after implementation of the Six Dam Removal Alternative would generate noise. Periodic monitoring and maintenance activities would require PG&E staff to continue to visit the sites by truck. It is not expected that the frequency of monitoring and maintenance activities would increase over current similar activities. Therefore, it is also not expected that the post-implementation noise levels would increase over the current noise levels. In some cases, the construction of new facilities and the upgrading of access roads would result in a reduction in noise associated with routine operation and maintenance activities, thereby resulting in less traffic- and maintenance-related noise than that produced by the current operation and maintenance activities. This impact is therefore considered to be less than significant.

Three Dam Removal Alternative

Noise impacts would be the same as those described for the Five Dam Removal Alternative. Each impact is described briefly below. With the implementation of the proposed mitigation measures, these potential impacts would be mitigated to a less-than-significant level.

Impact 4.10-13 Significant—Exposure of noise-sensitive uses to noise and vibration from blasting.

It is anticipated that blasting using chemical expansion agents, explosives, or drill-and-shoot techniques would be required at some of the Restoration Project sites under the Three Dam Removal Alternative. Only one noise-sensitive

receptor, the Oasis Springs Lodge, is located near the Inskip Diversion Dam/South Powerhouse and potentially would be exposed to noise and vibration from blasting. Noise levels could exceed 133 dB and vibration could exceed USBM vibration criteria at the Oasis Springs Lodge. This impact is therefore considered to be significant. This impact is similar to Impact 4.10-1. Implementing the Mitigation Measure for Impact 4.10-1 would reduce this impact to a less-than-significant level.

Impact 4.10-14 Significant—Exposure of noise-sensitive land uses to noise from on-site construction activities.

Numerous pieces of large equipment, including those listed in Table 4.10-4, would be used during the demolition of existing facilities and construction of project components such as fish screens, fish ladders, and access road improvements under the Three Dam Removal Alternative. Because of the remote nature of and limited access to many of the Restoration Project sites, helicopters also may be used both to remove construction debris from sites and to deliver material and equipment to sites. The Oasis Springs Lodge is the only noise-sensitive land use that would be exposed to noise from on-site construction activity. Noise levels at Oasis Springs Lodge could exceed Reclamation noise thresholds. Noise also could exceed the ambient noise level by more than 5 dB. This impact is therefore considered to be significant. This impact is similar to Impact 4.10-2. Implementing the Mitigation Measure for Impact 4.10-2 would reduce this impact to a less-than-significant level.

Impact 4.10-15 Significant—Exposure of noise-sensitive land uses along site access roads to construction-related truck noise.

Implementation of the Three Dam Removal Alternative would require hauling of materials to and from the Inskip Diversion Dam/South Powerhouse site. Reclamation estimates that up to 40 truck trips per day averaging five trips per hour could occur. Table 4.10-5 summarizes the estimated number of truck trips as a function of the construction activity. This impact is similar to Impact 4.10-3. Implementing the Mitigation Measure for Impact 4.10-3 would reduce this impact to a less-than-significant level.

Impact 4.10-16 Less than Significant—Exposure of noise-sensitive land uses to noise from operation of the Restoration Project facilities.





The operation of the Restoration Project facilities after implementation of the Three Dam Removal Alternative would generate noise. Periodic monitoring and maintenance activities would require PG&E staff to continue to visit the sites by truck. It is not expected that the frequency of monitoring and maintenance activities would increase over current similar activities. Therefore, it is also not expected that the post-implementation noise levels would increase over the current noise levels. In some cases, the construction of new facilities and the upgrading of access roads would result in a reduction in noise associated with routine operation and maintenance activities, thereby resulting in less traffic- and maintenance-related noise than that produced by the current operation and maintenance activities. This impact is therefore considered to be less than significant.

Cumulative Impacts

Cumulative noise impacts associated with the Proposed Action and past, present, and probable future projects (including those mentioned in Chapter 6) would not occur in the Battle Creek Watershed area because the Restoration Project is not expected to result in any cumulative impacts on noise levels at the project sites. All impacts on noise levels in the area during construction generally would be temporary and short-term in nature and would not contribute to any cumulative noise level increases in the Restoration Project area. There are no expected increases in noise levels associated with routine operation and maintenance activities above existing noise levels associated with current similar activities.

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE Ldn OR CNEL, dB					
	55	60	65	70	75	80
RESIDENTIAL- LOW DENSITY SINGLE FAMILY, DUPLEX,	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
RESIDENTIAL - MULTI. FAMILY	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
TRANSIENT LODGING - MOTELS, HOTELS	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
SCHOOLS, LIBRARIES, CHURCHES, HOSPITALS, NURSING HOMES	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
AUDITORIUMS, CONCERT HALLS, AMPHITHEATRES	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Clearly Unacceptable	Clearly Unacceptable	Clearly Unacceptable
OUTDOOR SPECTATOR SPORTS	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Clearly Unacceptable	Clearly Unacceptable	Clearly Unacceptable
PLAYGROUNDS, NEIGHBORHOOD PARKS	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
GOLF COURSES, RIDING STABLES, CEMETERIES	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable	Clearly Unacceptable
OFFICE BUILDINGS, BUSINESS, COMMERCIAL AND PROFESSIONAL	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
INDUSTRIAL, MANUFAC- TURING UTILITIES.	Normally Acceptable	Normally Acceptable	Normally Acceptable	Conditionally Acceptable	Clearly Unacceptable	Clearly Unacceptable

INTERPRETATION

- | | |
|---|--|
| <p> NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.</p> <p> CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.</p> | <p> NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.</p> <p> CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.</p> |
|---|--|

Adapted from: State of California General Plan Guidelines. Governor's Office of Planning and Research. 1998. Sacramento, California.

Figure 4.10-1
Land Use Compatibility for Community Noise Environments