2.6 DEMOGRAPHY

2.6.1 REGIONAL DEMOGRAPHY

The Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS) presents a population characterization method that is based on two factors: "sparseness" and "proximity" (Reference 77). "Sparseness" measures population density and city size within 20 miles of a site and categorizes the demographic information as follows:

Demographic Categories Based on Sparseness

		Category
Most sparse	1.	Less than 40 persons per square mile and no community with 25,000 more persons within 20 miles
	2.	40 to 60 persons per square mile and no community with 25,000 or more persons within 20 miles
	3.	60 to 120 persons per square mile or less than 60 persons per square mile with at least one community with 25,000 or more persons within 20 miles
Least sparse	4.	Greater than or equal to 120 persons per square mile within 20 miles

Source: Reference 77

"Proximity" measures population density and city size within 50 miles and categorizes the demographic information as follows:

Demographic Categories Based on Proximity

		Category
Not in close proximity	1.	No city with 100,000 or more persons and less than 50 persons per square mile within 50 miles
	2.	No city with 100,000 or more persons and between 50 and 190 persons per square mile within 50 miles
	3.	One or more cities with 100,000 or more persons and less than 190 persons per square mile within 50 miles
In close proximity	4.	Greater than or equal to 190 persons per square mile within 50 miles

Source: Reference 77

The GEIS then uses the following matrix to rank the population category as low, medium, or high.

GEIS Sparseness and Proximity Matrix

		Proximity			
Sparseness		1	2	3	4
	1	1.1	1.2	1.3	1.4
	2	2.1	2.2	2.3	2.4
	3	3.1	3.2	3.3	3.4
	4	4.1	4.2	4.3	4.4

Source: Reference 77

Low Population Area	Medium Population Area	High Population Area

PG&E used ~~2000~~ *2010* census data from the U.S. Census Bureau ~~(Reference 74) and the estimates prepared by California Department of Finance~~ to determine most demographic characteristics in the DCPP vicinity. The calculations determined that ~~119,840~~*165,059* people live within 20 miles of DCPP, producing a population density of ~~153~~ *352* persons per square mile. Applying the GEIS sparseness measures identifies DCPP as falling into sparse Category 4 (greater than or equal to 120 persons per square mile within 20 miles).

To calculate the proximity measure, PG&E determined that ~~424,013~~*471,981* people live within 50 miles of DCPP, which equates to a population density of ~~82~~ *119* persons per square mile. Applying the GEIS proximity measures, DCPP is classified as Category 2 (No city with 100,000 or more persons and between 50 and 190 persons per square mile within 50 miles). Therefore, according to the GEIS sparseness and proximity matrix, DCPP ranks of sparseness, Category ~~3~~*4*, and proximity, Category 2, result in the conclusion that DCPP is located in a medium population area.

~~The nearest major metropolitan area is Santa Barbara (approximately 85 miles southeast), with a 2000 population of 92,325 (Reference 74).~~ The population distribution within a 50-mile radius of DCPP is generally considered rural. Minor exceptions to this are Atascadero (~~20~~ *21* miles *north*-northeast), San Luis Obispo (12 miles *east*-northeast), Five Cities encompassing Arroyo Grande, Grover Beach, Pismo Beach, Oceano, and Shell Beach (15 miles southeast) and Santa Maria (~~30~~ *29* miles southeast) where the ~~2000~~ *2010* populations were ~~31,256~~*28,310*, ~~40,541~~*45,119*, ~~46,129~~*45,349*, and ~~51,228~~*99,553*, respectively (Figure 2.1-1). The municipality nearest the DCPP is the City of San Luis Obispo (12 miles *east*-northeast) with a ~~2000~~ *2010* population of ~~40,541~~*45,119* (Reference ~~74~~*142*).

San Luis Obispo County and parts of Santa Barbara County are located within 50 miles of DCPP. The Metropolitan Statistical Areas (MSA) are San Luis Obispo, Atascadero, *Arroyo Grande,* and Paso Robles of San Luis Obispo County and Santa Maria and ~~Lompoc~~ *Santa Barbara* of Santa Barbara County (Reference ~~74~~*143*).

From 1990 to 2000, the population of the San Luis Obispo-Paso Robles*-Arroyo Grande* MSA ~~decreased~~ *increased* from ~~246,681 to~~ 217,162 *to 246,681*, a*n* ~~decrease~~ *increase* of ~~11.96~~*13.6* percent (Reference 74). *From 2000 to 2010, the population of the San Luis Obispo-Paso Robles-Arroyo Grande MSA increased from 246,681 to 269,637, an increase of 9.3 percent (Reference 143). From 2000 to 2010, the*~~The~~ population of Santa Maria increased from ~~61,284 to~~ 77,423 *to 99,553*, an increase of ~~26.33~~*28.6* percent *(Reference 144)*. ~~The population of Lompoc increased from 37,649 to 41,103, an increase of 9.17 percent.~~

Because more than 86 percent of employees at DCPP reside in San Luis Obispo County and *the City of* Santa Maria of Santa Barbara County, *San Luis Obispo County and northern Santa Barbara County have*~~they are the counties with~~ the greatest potential to be socioeconomically affected by license renewal ~~at~~ *of* DCPP. Table 2.6-1 shows population estimates and decennial growth rates for these two counties. Values for the State of California are provided for comparison.

Over the last several decades, San Luis Obispo and Santa Barbara Counties have shown fluctuating ~~positive~~ growth rates. From both 1970 to 1980 and from 1980 to 1990, San Luis Obispo and Santa Barbara Counties' growth rates were ~~all~~ relatively large. From 1990 to 2000, the San Luis Obispo County population growth rate was 13.59 percent, while *the* Santa Barbara County population increased by 8.08 percent. *From 2000 to 2010, the San Luis Obispo County population growth rate was 9.3 percent, while Santa Barbara County population increased by 6.1 percent (Reference 144).*

2.6.2 MINORITY AND LOW-INCOME POPULATIONS

NRC's Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (Reference 76) and Nuclear Reactor Regulation's (NRR) Office Instruction LIC-203 (Reference 72) conclude that a 50-mile radius could reasonably be expected to contain potential environmental impact sites and that the state was the appropriate geographic area for comparative analysis. PG&E has adopted this approach for identifying the DCPP minority and low-income populations that could be affected by DCPP operations.

~~ArcView® geographic information system software~~*U.S. Census Bureau, 2007-2011 American Community Survey Official 5-Year Estimates* ~~was~~ *were* used to determine the minority *and low-income* characteristics by block group. PG&E included all block groups if any part of their area lay within 50 miles of DCPP~~[1]~~. The 50-mile radius includes ~~294~~ *297* block groups (Table 2.6-2).

2.6.2.1 Minority Populations

The NRC Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues defines a "minority" population as: American Indian or Alaskan Native; Asian; Native Hawaiian or other Pacific Islander; Black *or African American* Races, and Hispanic Ethnicity (Reference 75). Additionally, NRC's guidance requires that (1) all other single minorities are to be treated as one population and analyzed, and (2) the aggregate of all minority populations are to be treated as one population and analyzed. The guidance indicates that a minority population exists if either of the following two conditions exists:

- The minority population *percentage* in the ~~census~~ block group or environmental impact ~~site~~ *area* exceeds 50 percent.

- The minority population percentage ~~of~~ *in* the *block group* environmental impact area is significantly greater (typically at least 20 percentage points) than the minority population percentage in the geographic area chosen for comparative analysis.

For each of the ~~294~~ *297* block groups within the 50-mile radius, PG&E calculated the percent of the block group's population represented by each minority. *In determining the aggregate minority populations, everyone except persons who identified themselves as White, Not Hispanic or Latino were considered a minority (Reference 145).* If any block group minority percentage exceeded 50 percent, then the block group was identified as containing a minority population. DCPP selected the entire State of California as the geographic area for comparative analysis, and calculated the percentages of each minority category in the State. If any block group percentage exceeded the corresponding State percentage by more than 20 percent, then a minority population was determined to exist.

2007-2011 U.S. Census Bureau, American Community Survey Estimates~~Census 2000 data~~ for California characterizes *61.8*~~46.7~~ percent of the population White, ~~6.4~~*6.1* percent Black *or African American*, ~~10.8~~*13.1* percent Asian, ~~0.3~~*0.4* percent Native Hawaiian/Pacific Islander, ~~0.5~~*0.8* percent American Indian/Alaskan Native, ~~32.4~~*37.2* percent Hispanic *or Latino*, ~~0.2~~*13.9* percent Other, ~~2.7~~*3.9* percent multi-racial, and ~~53~~ *59.3* percent aggregate of minority races.

~~[1] ArcView uses data from the U.S.Census Bureau. This data contains all correctional institutions, including prisons, jails, detention centers, or halfway houses (counted at the institution). The California Men's Colony, located north of San Luis Obispo, is included in the Aggregate Minority block group and is shown in Figure 2.6-1.~~

Table 2.6-2 presents the numbers of block groups in each county in the 50-mile radius that exceed the threshold for minority populations. Figures 2.6-1, ~~and~~ 2.6-2, *2.6-4, and 2.6-5* locate the minority block groups within the 50-mile radius.

Based on the "more than 20 percent" or the "exceeds 50 percent" criteria, ~~2~~ *4* of the following minority populations exist in the geographic area:

- American Indian or Alaskan Native;
- Asian;
- Native Hawaiian or Pacific Islander;
- Black *or African American*;
- *Hispanic or Latino*
- All Other Single Minorities;
- Multi-Racial Minorities; or
- Aggregate of Minorities.

Based on the "more than 20 percent" *or the "exceeds 50 percent"* criterion:

- ~~The~~ Aggregate of ~~Minority Races~~*Minorities* populations exist in ~~65~~ *90* block groups (Table 2.6-2). Figure 2.6-1 displays the locations of these block groups.

- ~~The~~ Hispanic ~~Ethnicity~~ *or Latino* populations exist in ~~52~~ *71* block groups (Table 2.6-2). Figure 2.6-2 displays the locations of these block groups.

- *All Other Single Minorities populations exist in 7 block groups (Table 2.6-2). Figure 2.6-4 displays the locations of these block groups.*

- *Black or African American populations exist in 2 block groups (Table 2.6-2). Figure 2.6-5 displays the locations of these block groups.*

Overall, minorities appear to be underrepresended in the assessment area compared to the comparative analysis area, the state of California.

2.6.2.2 Low-Income Populations

NRC *procedural* guidance defines low-income population based on statistical poverty thresholds ~~(Reference 5)~~ if either of the following two conditions is met:

- The low-income population *percentage* in the ~~census~~ block group or the environmental impact ~~site~~ *area* exceeds 50 percent.

- The *low-income population percentage*~~percentage of households below the poverty level~~ in a~~n~~ *block group or* environmental impact area is significantly greater (typically that least 20 percentage points) than the low-income population percentage in the geographic area chosen for comparative analysis.

Based on the "more than 20 percent" criterion *or the "exceeds 50 percent"*, ~~12~~ *23* block groups contain a low-income population ~~(Reference 74)~~. ~~All block groups are in Santa Barbara County.~~ Table 2.6-2 identifies the low-income block groups in the region of interest. Figure 2.6-3 locates the low-income block groups.

~~The San Luis Obispo County labor market shows an average family income for 2000 at $43,149. For 2001, the county unemployment rate was at 3.0 percent. The 2000 US Census Data reports the median household income in 2000 at $41,349, which is below the 2000 California median household income of $46,499. For 2006-2008, the US Census Bureau reports the San Luis Obispo County median household income at $57,722, which is below the California median household income of $61,154 (Reference 131).~~ *U.S. Census Bureau, 2007-2011 American Community Survey official 5-year estimates report the average household income for San Luis Obispo County at $77,132, which is below the California average household income of $85,148. The same survey reports the median San Luis Obispo County household income at $58,630 which is below the California median household income at $61,632. For 2011, the county unemployment rate was at 8.1 percent. (Reference 146)*

2.6.3 TRANSIENT POPULATION

In addition to the resident population presented in the tables and population distribution charts, there is a seasonal influx of vacation and weekend visitors within a 50-mile radius, especially during the summer months. The influx is heaviest to the south along the coast from Avila Beach to south of Oceano.

During August, the month of heaviest influx, the maximum overnight transient population in motels and state parks in this area is approximately 100,000 persons. ~~However, there are no significant seasonal or diurnal shifts in population or population distribution within the low population zone (LPZ).~~

Table 2.6-3 lists transient population for recreation areas within 50 miles of the site for the periods of record listed. *However, there are no significant seasonal or diurnal shifts in population or population distribution within the low population zone (LPZ).* Within the LPZ, the maximum-recorded number of persons at any single time is estimated to be 5,000. This figure is provided by the State Department of Parks and Recreation and corresponds to the maximum daytime use of Montana de Oro State Park. Overnight use is considerably less, with an estimated maximum of 400. Evacuation of these numbers of persons from the park in the event of a release of radioactive material could be accomplished as noted in Chapter 15 of the DCPP FSAR (Reference 2).

In addition to the seasonal influx of vacation and weekend visitors, the San Luis Obispo and Santa Barbara County transient populations also includes migrant farm workers. Migrant farm labor was reviewed using the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS) data for ~~2007~~*2012 (Reference 132)*. Actual migrant worker numbers are not directly reported; however, county level data on hired farm labor are available. NASS reported ~~166 of 905~~*135 of 1,040* farms hired migrant labor in San Luis Obispo County, and ~~81~~ *24* farms, hiring only contract labor, hired migrants. NASS reported *81 of 926*~~148 of 776~~ farms hired migrant labor in Santa Barbara County, and ~~35~~ *5* farms, hiring only contract labor, hired migrants. (Reference 132)

A total of ~~9,175~~*10,669* hired workers were reported in San Luis Obispo County, of which ~~4,805~~*5,965* were reported to work less than 150 days per year. In Santa Barbara County, a total of ~~21,768~~*22,333* hired workers were reported, of which ~~10,490~~*11,295* were reported to work less than 150 days per year. (Reference 132)

2.7 TAXES

PG&E pays annual property taxes to San Luis Obispo County based on the value of DCPP. The current tax revenues represent a substantial contribution to the local economy and are expected to continue to benefit the local population by helping to fund the local government and support necessary improvements to infrastructure.

For fiscal year ~~2008-09~~*2013-14*, the DCPP property tax payment to San Luis Obispo County was approximately $~~22.3~~*25.7* million (Reference ~~83~~*147*). San Luis Obispo County is expected to generate $~~425~~ *432* million for fiscal year ~~2008-09~~*2013-14* based on the current taxable value (Reference ~~82~~*147*). *For the 2010-11 fiscal year, 53.5* ~~Between 48.4 and 48.9~~ percent of the ~~2007-08 and 2008-09~~ DCPP property tax payment ~~has~~ *was* been ~~received by~~*allocated to* ~~the~~ *county school services, county community college, and county* Unified School Districts (References ~~81 and 82~~*148*).

For fiscal years 2004-05 through ~~2008-09~~*2013-14*, DCPP's property taxes represented 5.6 to 6.6 percent of San Luis Obispo County's total property tax revenues (Table 2.7-1).

The annual property taxes on DCPP are expected to remain relatively constant through the license renewal period. The State of California initiated deregulation of utilities in 1995. However, due to fluctuations in wholesales prices and numerous other issues, the California Public Utilities Commission suspended the deregulation effort in 2001. Should deregulation ever be reenacted in California, this could affect utilities' tax payments to counties. However, any changes to DCPP property tax rates due to deregulation would be independent of license renewal.

2.8 LAND USE PLANNING

This section focuses on San Luis Obispo County and Santa Barbara County because the majority of the permanent DCPP workforce lives in these two counties (see Section 3.4) and because DCPP pays property taxes in San Luis Obispo County.

As described in Section 2.6, over the last several decades, San Luis Obispo and Santa Barbara Counties have experienced fluctuating positive growth rates. From both ~~1970~~ *1980* to ~~1980~~ *1990* and from ~~1980~~ *1990* to ~~1990~~*2000*, San Luis Obispo and Santa Barbara Counties' growth rates were relatively large. From ~~1990~~ *2000* to ~~2000~~*2010*, the San Luis Obispo County population growth rate was ~~13.59~~*9.3* percent, while Santa Barbara County population increased by ~~8.08~~*6.1* percent (References ~~87 and 88~~ *144*).

As shown in Table 2.8-1, over the same period, ~~1990~~ *2000* to ~~2000~~*2010*, the number of housing units in San Luis Obispo County increased by ~~11.8~~*14.7* percent, and the number of housing units in Santa Barbara County increased by ~~3.3~~*7.0* percent, while the total number of units in the state increased by ~~10.8~~*12.0* percent. Median home values increased 7.3 percent in San Luis Obispo County, while values increased 14.9 percent in Santa Barbara County. The vacancy in San Luis Obispo and Santa Barbara Counties ~~fell~~ *increased significantly* from ~~1990~~ *2000* to ~~2000~~*2010*. Santa Barbara County had the highest change in vacancy of approximately ~~24.8~~*70.9* percent in ~~2000~~ *2010* (References ~~89 and~~ 90 *and 144*)

For 2000 to 2050, the California Department of Finance projects the population of San Luis Obispo County to increase by 32.4 percent, while the Santa Barbara County population to increase by 25.3 percent (Reference 73).

Both San Luis Obispo County and Santa Barbara County use comprehensive land use plans and zoning and subdivision regulations to guide development.

2.8.1 EXISTING LAND USE TRENDS

San Luis Obispo County covers 3,616 square miles of total area; 3,304 square miles is land and 311 square miles is water. Farming is a significant land use in the county (Figure 2.8-1). Land in the DCPP immediate vicinity is used for agriculture & livestock grazing (Reference 86).

Land use planning in San Luis Obispo County is guided by the Department of Planning and Building. The Agency has developed a land use plan, the Comprehensive Plan for San Luis Obispo County, to assess current land use trends and guide future land use decision-making. As shown in Table 2.8-1, there are approximately 102,275 homes sites within San Luis Obispo County (Reference 88).

Santa Barbara County covers 3,789 square miles of total area; 2,737 square miles is land and 1,052 square miles is water. Land use planning in Santa Barbara County is guided by the Department of Planning and Development. The Agency has developed a land use plan, the Comprehensive Plan for Santa Barbara County, to assess current land use trends and guide future land use decision-making. As shown in Table 2.8-1, there are approximately 142,901 homes sites within Santa Barbara County (Reference 88).

2.8.2 FUTURE LAND USE TRENDS

The San Luis Obispo County planning goals (Reference 84) are as follows:

- To maintain a high quality of life, sustain natural resources, and protect agricultural lands and rural character.
- To provide livable communities through plans that are responsive to local needs and vision.
- To encourage excellence in building design, cohesive and pedestrian oriented layouts, and streetscape improvements that help stimulate economic vitality and enhance downtown charm.

The Santa Barbara County planning goals (Reference 85) are as follows:

- To develop, promote and implement plans, policies and public improvements which enhance the quality of life for Santa Barbara County residents.
- To protect natural resources and promote sound long term economic development, while recognizing the differing needs and values of each of the County's unique communities and diverse rural areas.

2.9 SOCIAL SERVICES AND PUBLIC FACILITIES

2.9.1 PUBLIC WATER SUPPLY

DCPP is located in San Luis Obispo County, and the majority of site employees also reside within the County. Therefore, the discussion of public water supply systems will be limited to San Luis Obispo County.

The City of San Luis Obispo has adopted a multi-source water supply strategy and obtains water from five sources: Salinas Reservior (Santa Margarita Lake), Whale Rock Reservior, Nacimiento Reservoir, ground water, and recycled water. ~~Potable water for the city of San Luis Obispo is obtained principally from~~ Salinas Reservoir~~,~~ *is located* approximately 23 miles east-northeast of the DCPP site,~~.~~ Whale Rock Reservoir *is* on Old Creek, 17 miles north of the site, and ~~Chorro~~ *Nacimiento* Reservoir~~,~~ *is located much further north in the northern portion of the county.* ~~approximately 13 miles northeast of the site, are also used.~~ A few small reservoirs are used in connection with the San Luis Obispo water system and are located approximately 18 miles northeast of the site. A reservoir in Lopez Canyon is 20 miles east of the site. Water is also imported into San Luis Obispo County from the California Water Project (Table 2.9-1). Smaller towns in the region of San Luis Obispo depend on wells for domestic water.

There are two public water supply groundwater basins within 10 miles of the DCPP site. Avila Beach ~~County Water and Sewer District~~*Community Services District, Avila Valley Mutual Water Company,* and the San Miguelito Mutual Water ~~and Sewer~~ Company provide water to the Avila Beach and Avila Valley area.

The licensees to the north and south of the DCPP site capture surface water from small intermittent streams and springs for minimal domestic *and stockwater* use. ~~Specifically, one resident approximately 1.5 miles north of the plant site maintains an artisan spring that supplies domestic water to the residence.~~ PG&E and its grazing licensee north of the DCPP site capture water from springs in Crowbar Canyon, 1 mile north of the DCPP site, and from Diablo Creek. PG&E's grazing licensee south of the DCPP captures water from streams and springs between Pecho Canyon and Rattlesnake Canyon for livestock and low volume drip irrigation.

A seawater reverse osmosis desalinization facility was installed at the DCPP industrial site in 1985, and has been in continuous operation since then. As discussed in Section 3.1.2, it provides the majority of freshwater for plant primary and secondary systems makeup, fire protection system source water, and plant domestic water (including potable water) supply.

2.9.2 TRANSPORTATION

The existing roadway system within the DCPP property consists of a single private two-lane paved roadway (Diablo Canyon Road) that begins at Avila Beach Drive (approximately 6.75 miles from the plant). This roadway's secured entry prevents public traffic from entering the site and using the road. This primary access road accommodates the current DCPP employee population during routine vehicle commute into and out of the industrial plant site. Immediately after leaving the access point, the primary roadway crosses east of San Luis Hill before continuing along a route parallel to the coastline near the base of the Irish Hills (References 86 and 91).

The primary road remains paved north of the power plant for a short distance and then connects with an unpaved road, which continues to the northerly PG&E boundary into Montana De Oro State Park. There is a secured gate across the road at this boundary. There are several other unpaved roads on the property. These unpaved roads, however, do not provide primary access for the majority of DCPP employees, and are used mainly by grazing licensees.

DCPP is accessed via the Avila Beach area. Only two routes connect to Highway 101 interchanges: Avila Beach Drive and San Luis Bay Drive. These two routes, west of the freeway, join into a single roadway leading to Avila Beach and the Harford Pier. Other roadways in the study area are generally classified as collectors or minor roadways. Employees traveling from either south or north will mostly use Highway 101 to reach either Avila Beach Drive or San Luis Bay Drive to access DCPP.

These routes are shown in Figure 2.9-1.

- **Avila Beach Drive.** Avila Beach Drive is a winding 4-1/2 mile long two-lane roadway from U.S. Highway 101 to its terminus at Port San Luis. East of Cave Landing Road, Avila Beach Drive maintains minimal shoulders as the roadway width is constrained on the south by steep rocky slopes and on the north by the parallel San Luis Obispo Creek. A short section of Avila Beach Drive was widened to install a left turn bay for eastbound vehicles turning north on San Luis Bay Drive. Additional left turn bays exist on the segment of Avila Beach Drive at Cave Landing Road and Ontario Road. West of Cave Landing Road, Avila Beach Drive maintains left-turn pockets at all intersecting collector roadways and generally accommodates summer peak parking demands along both shoulders.

- **San Luis Bay Drive.** San Luis Bay Drive begins just east of U.S. Highway 101 and terminates with an active traffic-light controlled intersection at Avila Beach Drive. The arterial roadway is generally used by trips originating or terminating north of Avila Beach, primarily in San Luis Obispo. Shoulders are provided along San Luis Bay Drive that are not wide enough to allow for parking.

- **Other Collector Roadways.** Collector roadways in the study area include Front Street, San Luis Street, San Miguel Street, Palisades Road, Cave Landing Road, See Canyon Road, and Monte Road. Front, San Luis, and San Miguel Streets are located in central Avila Beach. Front Street is located between the beach on the south and commercial shops to the north, beginning at Avila Beach Drive and terminating at the Unocal Pump Station entrance. San Luis Street and San Miguel

Street provide access from Avila Beach Drive to the commercial and parking facilities at Avila Beach.

In determining the significance levels of transportation impacts for license renewal, the NRC uses the Transportation Research Board's Level of Service (LOS) definitions (Reference 77). LOS is a quantitative measure describing operational conditions within a traffic stream and their perception by motorists. Table 2.9-2 lists the current and future traffic conditions and LOS for the vicinity of DCPP.

2.9.3 EDUCATION

The state of California is divided into numerous school districts. San Luis Obispo County, where DCPP is located, has ~~13~~ *12* school districts and ~~83~~ *87* public schools. Santa Barbara County has ~~25~~ *21* school districts and ~~125~~ *123* public schools. Table 2.9-3 displays current *(2011-2012 school year)* San Luis Obispo County school district statistics, including the number of schools, number of students, and the student-to-teacher ratio.

2.10 METEOROLOGY AND AIR QUALITY

The DCPP site is adjacent to the Pacific Ocean in San Luis Obispo County, California, which is part of the South Central Coast Intrastate Air Quality Control Region (40 CFR 81.166).

The climate of the area is typical of the central California coastal region and is characterized by small diurnal and seasonal temperature variations and minimal summer precipitation. The prevailing wind direction is from the northwest, and the annual average wind speed is about 10 mph. In the dry season, which extends from May through September, the Pacific high-pressure area is located off the California coast, and the Pacific storm track is located far to the north. Moderate to strong sea breezes are common during the afternoon hours of this season while at night, weak offshore drainage winds (land breezes) are prevalent. There is a high frequency of fog and low stratus clouds during the dry season, associated with a strong low-level temperature inversion (Reference 2).

The mean height of the inversion base is approximately 1,100 ft. During the wet season, extending from November through March, the Pacific high-pressure area moves southward and weakens in intensity, allowing storms to move into and across the state. More than 80 percent of the annual rainfall occurs during this 5-month period. Middle and high clouds occur mainly with winter storm activity, and strong winds may be associated with the arrival and passage of storm systems. April and October are considered transitional months separating the two seasons (Reference 2).

The coastal mountains that extend in a general northwest-to-southeast direction along the coastline affect the general circulation patterns. The wind direction in many areas is more likely a result of the local terrain than it is of the prevailing circulation. This range of mountains is indented by numerous canyons and valleys, each of which has its own land-sea breeze regime. As the air flows along this barrier, it is dispersed inland by the valleys and canyons that indent the coastal range. Once the air enters these valleys and canyons, it is controlled by the local terrain features.

In areas where there are no breaks in the coastal range, the magnitude of the wind speed is increased and the variation in the wind direction decreases as the air is forced along the barrier. However, because of the irregular terrain profile and increased mechanical turbulence due to the rough terrain, vertical mixing and lateral meandering under the inversion are enhanced. Therefore, emissions injected into the coastal regime are transported and dispersed by a complex array of land-sea breeze regimes that lead to rapid dispersion in both the vertical and horizontal planes.

The annual mean number of days with severe weather conditions, such as tornadoes and ice storms at west coast sites, is zero. Thunderstorms and hail are also rare phenomena, the average occurrence being less than 3 days per year. The maximum recorded precipitation in the San Luis Obispo region is 3.28 inches in 1 hour at the

DCPP site, and 5.98 inches in 24 hours at San Luis Obispo. The 24-hour maximum and the 1-hour maximum occurred on March 4, 1978 (Reference 2).

The maximum recorded annual precipitation at San Luis Obispo was 54.53 inches during 1969. The average annual precipitation at San Luis Obispo is 21.53 inches. Rainfall recorded at the DCPP facility for the 10-year period July 1, 1997 through June, 30, 2007 averaged 21.46 inches. There are no fastest mile wind speed records in the general area of DCPP; surface peak gusts at 46 mph have been reported at Santa Maria, California, and peak gusts of 56 mph have been recorded at the 250-ft level at the DCPP site.

The current onsite meteorological monitoring system supporting DCPP operations will serve as the onsite meteorological measurement program for the period of extended operation. The system consists of two independent subsystems that measure meteorological conditions and process the information into useable data. The measurement subsystems consist of a primary meteorological tower and a backup meteorological tower. The program has been designed and continually updated to conform with Regulatory Guide 1.23, Revision 0 (Reference 97).

A supplemental meteorological measurement system is also located in the vicinity of DCPP. The supplemental system consists of two Doppler acoustic sounders and six tower sites. Data from the supplemental system are used for emergency response purposes to access the location and movement of any radioactive plume.

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS), which specify maximum concentrations for carbon monoxide (CO), particulate matter with aerodynamic diameters of 10 microns or less (PM_{10}), particulate matter with aerodynamic diameters of 2.5 microns or less ($PM_{2.5}$), ozone, sulfur dioxide (SO_2), lead, and nitrogen dioxide (NO_2). Areas of the United States having air quality as good as or better than the NAAQS are designated by EPA as attainment areas. Areas having air quality that is worse than the NAAQS are designated by EPA as non-attainment areas. Those areas that were previously designated nonattainment and subsequently redesignated to attainment due to meeting the NAAQS are maintenance areas. States with maintenance areas are required to develop an air quality maintenance plan as an element of the State Implementation Plan.

A summary of the attainment status for SLO County is provided in Table 2.10-1. Ambient air quality in the County is generally good (i.e., within applicable ambient air quality standards), with the exception of ozone (O_3) *and PM_{10}*.

Meteorology information, as it relates to the analysis of severe accidents, is included in Attachment F of this Environmental Report.

2.11 HISTORIC AND ARCHAEOLOGICAL RESOURCES

2.11.1 AREA HISTORY IN BRIEF

San Luis Obispo County lies within the traditional ethnographic territory of the Northern Chumash. The Chumash were among the most populous and socially complex groups in all of native California. By the ~~beginning of the Protohistoric Period~~*time of European contact*, the Chumash were living in large villages along the Santa Barbara Channel coast, with less dense populations in the interior regions, on the Channel Islands, and in coastal areas north of Point Conception. Population density was unusually high for a nonagricultural group; some villages may have had as many as 1,000 inhabitants. Occupational specialization went beyond craft activities such as bead production to include politics, religion, and technology. Complex social and religious systems tied many villages together and regulated regional trade, procurement and redistribution of food and other resources, conflict, and other aspects of society. Leadership was hereditary, and some chiefs had influence over several villages, indicating a simple chiefdom level of social organization (References 98 and 115).

The Northern Chumash *in the vicinity of DCPP* apparently were ~~never~~ *not* as populous as their relatives in the Santa Barbara region, and archaeological research suggests societies *that were relatively mobile that established small seasonal encampments in the context of resource intensification and growing population density* ~~less dependent on fishing~~ (Reference 106). Local populations may have led a less sedentary lifestyle with a dietary focus on inland rather than coastal or maritime resources and greater reliance on logistic mobility than their southern neighbors (Reference 127). ~~The Northern Chumash may not have attained the levels of social and political development of their southern counterparts, and t~~*T*he extent to which they participated in regional networks integrating social and economic activities remains to be clarified.

The historic occupation of this region began with the Mission Period. The Mission Period was ushered in by Gasper de Portolá, who camped at the mouth of the Santa Maria River in July 1769. The establishment of the Spanish Presidio in Santa Barbara and five Franciscan missions in Chumash territory significantly disrupted social, economic, and political organization. Introduction of domestic plants and animals as well as European wild grasses caused irreversible changes in the local environment. Native Californians had limited resistance to European diseases, which caused significant deaths among the Chumash.

Spanish occupation *severely disrupted* ~~brought~~ Chumash culture ~~to the brink of extinction~~. Although people of Chumash ancestry still live in the region today and many strive to retain ~~parts of~~ their culture, the ~~complex~~ *traditional* social system*s were changed radically* ~~of the Chumash ended~~ during the Mission Period (1769–~~1830~~*1821*). Larson et al. (1989) (Reference 128) suggest that climatic variability, prolonged droughts, and warmer sea-surface temperatures during this period forced the Chumash into the missions as a strategy to minimize economic and social risk. However, Price (2006) (Reference 120) argues that Mission agricultural yields were insufficient to support the native population, and the Northern Chumash continued to practice the full suite of traditional foodways well into the Mission period.

Following the Mexican Revolution of 1821, California became part of the Republic of Mexico. With independence, the Mexican government began to secularize the mission properties, a process that was concluded in 1833. The missions were converted into churches, and regional commissions were established to dispose of the properties and resettle the ~~Indians~~ *neophytes* affiliated with the missions. Mexican government policy was to grant mission properties and other unclaimed land to prominent citizens who were required to inhabit and develop properties. This period of California history, known as the Rancho Period *(1821-1848)*, brought in a class of wealthy landowners who controlled the subsequent development of the state. The deterioration of relations between the United States and Mexico resulted in the Mexican War, which ended with Mexico relinquishing California to the United States under the Treaty of Guadalupe Hidalgo of 1848.

The political and economic unrest in California during the early and mid-1840s is evident in the Mexican government's conveyance of the *Cañada De Los Osos y Pecho y Islay*, a 32,431-acre land grant that includes the now PG&E-owned lands. In 1842, Governor Alvarado granted the *Cañada De Los Osos* to Victor Linares; one year later, Alvarado's successor as governor, Manuel Micheltorena, awarded the *Pecho y Islay* to Francisco Padillo. In 1845, Micheltorena was replaced by Pio Pico (Reference 123). In September of that year, Pico consolidated the two grants and issued them to Diego (James) Scott and Juan (John) Wilson. By 1850, Wilson became the sole proprietor of the *Cañada De Los Osos y Pecho y Islay*.

The Pecho y Islay Rancho (or Pecho Ranch) was likely used as pasture land. Although the eastern boundary of the ranch lay only 10-12 miles from the town of San Luis Obispo, the property was largely isolated and undeveloped. Until fairly recently, the Pecho Valley Road—which extends just north of the present DCPP site and on through Montana De Oro State Park, then eastward through the Los Osos Valley, and on towards San Luis Obispo—was the only land route between the ranch and the outside world.

The emergence of the dairy industry following the 1862-1864 drought attracted many northern Italian immigrants as well as Portuguese from the Azores Islands to San Luis Obispo County (Reference 116). Among these immigrants was Luigi Marre, native of Genoa, Italy. Marre leased the Pecho Ranch for 18 years, after which he bought 3,800 acres of the property. Marre's parcel lay south of Diablo Creek. The northern portion of the Pecho Ranch is associated with another prominent stockman in San Luis Obispo County, Alden Bradford Spooner, Jr., who leased a 6,500-acre swath extending from just north of Islay Creek to Diablo Creek in 1892 (Reference 118). That same year he built his ranch house, which today serves as the visitors' center for Montaña de Oro State Park.

Along with livestock, agriculture was part of the Spooner Ranch's economy from the very beginning. According to Ed Petersen, a *former* resident on the northern PG&E-owned land, crops were grown primarily on the coastal terrace, while livestock grazed in the hills further inland (Reference 120). During the 1920s and 1930s, much of the coastal terrace, including the project area, was leased to Japanese farmers. The impact of Asian farmers on the county's agricultural economy was considerable; by 1938, the market value of vegetable crops—led by peas, lettuce, and tomatoes—totaled just over $2.8 million, surpassing the $2.2 million combined figure for wheat, barley, and beans (Reference 105). The Japanese continued to farm the land until 1942, when they were involuntarily relocated to interment camps established during World War II under Executive Order 9066.

Oscar Field acquired the Spooner Ranch in 1942. In 1954 he sold the northern half of the ranch to Irene McAllister. Following financial troubles, the land passed into federal receivership and became part of the Montana de Oro State Park in 1965 (Reference 117). Eventually, Field gave up farming because of difficulties in tapping enough water to irrigate his crops. PG&E purchased the property and incorporated it into the the grounds of DCPP. In 1985, PG&E began commercial operation of DCPP.

2.11.2 INITIAL OPERATION

The Final Environmental Statement (FES) for operation of DCPP identified four sites in San Luis Obispo County listed on the National Register of Historic Places: the Dana Adobe in Nipomo, Caledonia Adobe in San Miguel, Mission San Miguel in San Miguel, and Hearst San Simeon State Historic Park, about 3 miles northeast of San Simeon (Reference 3). Since that time, some ~~30~~ *28* additional buildings, structures, sites, and districts in San Luis Obispo County have been added to the National Register. Of these, only the *Rancho Cañada De Los Osos y Pecho y Islay* prehistoric archaeological district is located within 6 miles of the plant; it encompasses much of the PG&E-owned land at DCPP.

Systematic archaeological research began in the early twentieth century. The first professional surveys in the DCPP area were performed by Arnold Pilling in the late 1940s. He surveyed the marine terraces from Avila Beach to Morro Bay and recorded sites CA-SLO-2 (SLO-2), CA-SLO-3, and CA-SLO-61 at the mouth of Diablo Creek (Reference 119). In addition he identified two other sites, CA-SLO-7 and CA-SLO-8, located northwest of Diablo Creek.

In 1966, State Archaeologist Francis Riddell conducted a survey of approximately 250 acres slated to be the future site of the DCPP. Riddell identified five archaeological sites in the area—Riddell Nos. 1, 2, 3, 4, and 5—but his report provides very little descriptive information concerning the sites, area surveyed, and method of survey (Reference 122). Although it is not stated in the report, CA-SLO-2 is the same as Riddell's No. 1 and CA-SLO-61 is Riddell's No. 2. Thus, as a result of Riddell's survey, two previously recorded sites were relocated and three new sites (Riddell Nos. 3, 4, and

5) were recorded. One of the new sites, Riddell No. 4 ~~was~~ *has since been* assigned the designation CA-SLO-584 ~~in 1966~~.

In 1968, Roberta Greenwood conducted extensive excavations at CA-SLO-2, CA-SLO-61, CA-SLO-584, and three other sites within the construction areas for the DCPP facilities and a proposed access road from the plant to Avila Beach. Excavation appears to have been restricted to the direct impact areas of proposed facilities or remaining portions of the sites which had not been disturbed by grading or construction.

The excavations at CA-SLO-2 revealed a rich midden deposit more than 3 m deep, and exposed a cemetery complex containing 54 inhumations (Reference 107). Due to grading for road construction, an additional six inhumations were recovered from the site in November of 1968 and six fragmentary inhumations were collected in June 1969. A total of 66 burials were exposed. Grave goods were associated with some of the burials. The burials recovered from these excavations were turned over to a local Native American group and were reported to have been reburied.

The artifact inventory from the site includes 2,885 stone, bone, wood, and shell artifacts including projectile points, blades, knives, choppers, scrapers, boring or drilling implements, and cores. Ground stone items include steatite bowls, bowl mortars, manos, milling stones, pestles, pitted stones, and charmstones. Numerous mammal, shell, and bird bone artifacts were recovered in addition to 1,607 shell beads. A few shards of unglazed brownware pottery also were collected. Three radiocarbon assays reported in the original site report *(since calibrated to adjust for the reservoir effect)* suggest~~ed~~ a nearly continuous occupation spanning ~~close to~~*approximately* ~~10,000~~*10,250* years, making CA-SLO-2 one of the oldest and most intensively occupied sites known from coastal *mainland* California (References 103 and 104).

Greenwood also excavated at CA-SLO-61 along the bluff overlooking the coast, where she recovered 40 artifacts including a bowl mortar, pitted stones, a cobble pestle, a drill, and 21 scrapers. These materials are similar to those recovered from the upper levels of CA-SLO-2 and were assigned by Greenwood (Reference 107) to the same cultural complex. Much of CA-SLO-61 was destroyed during construction of DCPP, only a small remnant of the site remains.

CA-SLO-584 was also excavated by Greenwood (Reference 107). The site was located on a small flat on the south bank of Diablo Creek, *which was covered by 40+ feet of fill to construct the*~~now the site of the~~ DCPP switchyard*s*. Materials collected included 10 projectile points, leaf-shaped blades, scrapers, three bowl fragments, a hopper mortar fragment, a pestle, pitted cobbles, brownware shards, *Olivella* disks, and *Mytilus* and *Tivela* beads. Historic materials included five glass trade beads and one brass ring. In addition, three cupule boulders were located within the site boundaries. Based on cross-dating of artifact types similar to the upper levels of CA-SLO-2 and the occurrence of historic period artifacts, the site was associated with short-term, seasonal occupation by the late prehistoric and historic Chumash (Reference 107).

The last site examined during the 1968-69 investigations was Riddell Site 3 *(CA-SLO-1159)*, located at the southern tip of Diablo Cove. Greenwood (Reference 107) provides the following description of the work completed at the site:

> "It should be noted that one additional locale was described in the contract agreement but not excavated during the fieldwork described in this report. A light scatter of shell which appeared fresh and recent was on the surface in 1968, but test pits dug by shovel disclosed only a very shallow soil covering on the volcanic outcrop and no shell, chipping waste, or artifacts below the surface. In view of the total priorities, no systematic excavation was attempted."

In 1974, Robert Hoover realized the importance of the *Rancho Canada de los Osos y Pecho y Islay* area and nominated 15 sites to the National Register as an archaeological district; his nomination included CA-SLO-50, -51, -52, -53, -54, -55, -58, -63, -585, -682, -684, -686, -687, -688, and -689 (Reference 114). Following her 1978 survey of the area surrounding CA-SLO-2, Greenwood submitted a NRHP nomination for CA-SLO-2/3 and CA-SLO-8 to be included within the archaeological district (Reference 112).

2.11.3 PROTECTION MEASURES FOR CA-SLO-2

CA-SLO-2 suffered substantial damage during construction of DCPP. Although portions of the site may have been destroyed, portions of the site have also been preserved and protected since that time. The 1980 Archeological Resources Management Plan (ARMP) notes:

> "The central part of the terrace between Diablo Canyon and next drainage to the northwest has been subject to both grading and fill and was the area most extensively used in the past. The amount of resource loss in this area is unknown. On so deep a midden, however, disturbance has likely been limited to the upper levels. In addition, in the course of preparing for the construction of Units 1 and 2, the central portion of the terrace was used as a depositary for soil removed from the plant site. Based on a comparison of maps prepared in 1966 and 1971, there is as much as 25 feet of fill presently concealing and protecting the midden in the center of the site (Reference 111)."

The fill deposited over the central portion of CA-SLO-2 effectively caps what remained of the main archaeological deposit. Portions of the site, however, remain exposed around the edges of the fill cap.

Since the 1968 investigations, PG&E has instituted various procedures for the protection and management of CA-SLO-2. In 1980, an ARMP was incorporated into the DCPP operating license (Reference 111). The ARMP addressed fire protection and limited further surface alterations at the site by confining storage of materials to areas protected by fill, restricting traffic flow, and limiting maintenance of roads and existing utility lines to areas which have been previously disturbed. The site area has been *partially* fenced and warning signs are posted at entry points *and along* ~~of~~ roads *through* ~~access to~~ the site. Since November of 1983, photographs have been taken at regular intervals from 23 stations within the site in order to monitor any physical changes to the site caused by natural or other processes. The ARMP requires PG&E to complete annual monitoring of CA-SLO-2 to determine if there are impacts to the site. In the past 20 years, the annual site condition assessment monitoring of CA-SLO-2 has shown no project induced impacts to the site.

In addition to the cultural resource protection measures, *and project-focused compliance work, the DCPP Land Stewardship Team actively conserves and interprets the property's archaeological resources as part of an interdisciplinary approach to ecosystem management.* ~~PG&E has created a Diablo Canyon Stewardship Committee. A PG&E Cultural Resources Specialist sits on this committee, which reviews all activities on PG&E-owned lands.~~

2.11.4 RECENT STUDIES

In 1986, Holson reported on the unsurveyed portions the NRC license regulated area for DCPP (Reference 113). A total of six prehistoric sites were reported. Three new sites, CA-SLO-1161, CA-SLO-1162, and CA-SLO-1163, two of Riddell's sites, CA-SLO-1159 (Riddell 3) and CA-SLO-1160 (Riddell 5), and a new site form were prepared for CA-SLO-61.

In 1988, Wilcoxon conducted intensive background research and a pedestrian survey of the access road between the power plant's northern guard station and the gate at Montana de Oro State Park. He documented five sites, including CA-SLO-7, -8, -1196, -1197, and -1198 (Reference 126). Later that year Breschini and Haversat tested CA-SLO-7 and CA-SLO-8, and found both sites to be significant cultural resources (Reference 99).

More recent studies include a survey of the northern portion of the DCPP property in 1991 that resulted in the identification of 36 cultural resources within the 370 acre area referred to as the North Ranch (Reference 100), followed by more detailed documentation of four sites (CA-SLO-5, -6, -9, and 1197/H) (Reference 101). In 1992, an intensive archaeological survey of 420 acres in the south portion of the property, referred to as the South Ranch, resulted in the documentation of 41 sites including 16 previously unidentified resources (Reference 125).

In 2005, archaeological studies were undertaken on the North Ranch of the DCPP lands. A baseline cultural resource resources inventory and site condition assessment were initiated for the area in proximity to the proposed Point Buchon Trail (public access). As part of the study, PG&E's consultant examined and re-recorded 22 previously identified prehistoric and historical archaeological sites between Coon Creek *and Crowbar Canyon (Reference 120). PG&E then developed a program to monitor these sites through regular inspection to assess changes in site conditions resulting from intensified recreational use. Monitoring and condition assessments began in 2007 and are continuing.*

In ~~2006 and~~ 2007, a ~~new NRHP~~*National Register* nomination ~~package~~ *update* was completed for the ~~Rancho Canada de los Osos y Pecho y Islay Prehistoric Archaeological Site~~ *Pecho* District. The ~~new~~ nomination updated and expanded the district to include approximately 9,000 acres of PG&E property on the coastal bluff between Coon Creek and the Port San Luis lighthouse; the number of resources included within the district was thus expanded from 17 to 84 (Reference 102). The grouping of Native American sites within the archaeological district includes major villages, long-term residences, short-term residences, locations, ideological sites, and quarry sites. *The nomination was submitted to the State Historic Preservation Officer (SHPO) in 2007; two rounds of comments on the draft nomination package were received by PG&E in 2013. PG&E is currently conducting supplemental surveys and research required to respond to SHPO's comments and update the nomination. An updated nomination package will likely be submitted in late 2015.*~~Of particular importance is CA-SLO-2(/3), one of the oldest prehistoric village sites identified along the central coast of California (previous NRHP listing #75000477).~~

~~Most recently, 25 sites on the North Ranch and an additional 44 sites on the South Ranch were revisited. At that time, sites were rerecorded on the current California Department of Parks and Recreation cultural resource records (DPR 523), and site locations were recorded using state-of-the-art GPS technology (References 102 and 120). The current condition of each site was assessed, with particular attention to bluff erosion and the effects of grazing and agriculture. Marine shell samples also were collected from many of the sites to obtain additional radiocarbon dates. A PG&E archaeologist reported on an additional five sites in close proximity to the DCPP. Seven sites recorded at the north end of the property by INFOTEC Research in 1991 were not formally revisited, nor were the two historic sites without prehistoric components. One additional site, CA-SLO-688, originally nominated to the NRHP by Hoover, was also not revisited. Subsequently, each site is periodically revisited in an on-going program of site monitoring and condition management.~~

In 2008, a 'hot spot' survey was completed of the transmission lines and on PG&E property adjacent to DCPP. This field study consisted of reviewing areas that have not been surveyed in the past and appear to be sensitive for cultural resources. Additionally, visits to previous recorded cultural resources were completed to assess the condition of the sites and the adequacy of the site records. This field study is documented in the Cultural Resources Technical Report (Reference 121). No new cultural resources were identified during field work.

Beginning in 2009, PG&E has partnered with California Polytechnic State University, San Luis Obispo (Cal Poly) to sponsor an archaeological field school at sites affected by trail use and coastal erosion on DCPP lands. To date, Cal Poly has salvaged material *and information from three sites (CA-SLO-5, -1366/H and -1370/H). Results have been published for the 2009 and 2011 investigations (References 153 and 154, respectively). The technical report for the most recent excavation at CA-SLO-5 is in preparation.*

A DCPP project was implemented in 2010 that required land disturbing activities near the southern margin of CA-SLO-2. Consistent with the ARMP, the project prompted enhanced monitoring on a portion of the site and collection of supplementary information on the nature and extent of the archaeological deposit along a deep road-cut through the site. The project area was surveyed by PG&E archaeologists, followed by a subsurface examination of the project area (augering and mapping) by PG&E consultants to verify the site boundary. Archaeological monitoring was accomplished in conjunction with buried utility prospecting and was monitored by a professional archaeologist and Northern Chumash representative.

In 2011, site CA-SLO-61 was encountered following the excavation of a narrow (12-inch-wide) trench across a paved area. The trench exposed midden deposits that had been covered since the plant was built between 1968 and 1973. Upon recognizing that the dark soil could represent an archaeological deposit, work was immediately suspended and PG&E's Cultural Resource Specialist was notified. Data recovery, in consultation with a Northern Chumash monitor, was undertaken to retrieve column samples from the midden at intervals along the trench, which were processed and analyzed according to standard archaeological procedures to compensate for the loss of information resulting from trenching through the remaining portion of the site. The findings were reported by Price et al. (Reference 155) and concluded that the upper stratum of the site had been truncated during construction, but that the deeper portion of the site retains important information related to chronology, site function and cultural development.

During the summer and fall of 2012, PG&E conducted studies related to the Onshore Seismic Imaging Project (OSIP) within and adjacent to numerous archaeological sites on the DCPP lands, including CA-SLO-2. The OSIP was designed to avoid impacts to cultural resources and other aspects of the environment. In compliance with Section 4.2.2 of the DCPP Environmental Protection Plan (EPP), PG&E reported the planned work associated with OSIP within CA-SLO-2 to the NRC in a letter dated August 21, 2012 (Reference 156). The notification was deemed necessary in light of requirements in the ARMP (Reference 111). PG&E's archaeological consultant developed and implemented a series of procedures to ensure impact avoidance during installation and operation of seismic survey equipment within archaeological sites. Their observations were memorialized in technical memoranda that conclude that the protection measures developed for the OSIP study were effective and resources were not adversely impacted (References 157 and 158).

In 2013, PG&E sponsored an ethnography to document the historic Japanese-American occupation of the North Ranch of the DCPP lands (Reference 159). While conducting the study, PG&E's consultant conducted extensive interviews with former occupants and *their descendants. The rich story that was captured is being actively used for interpretation along the Point Buchon Trail.*

2.11.5 CURRENT STATUS

As of ~~2008~~*2014*, the National Register of Historic Places listed ~~30~~ *32* locations in San Luis Obispo County, California (Reference 124). Of these ~~30~~ *32* locations, one falls within a 6 mile (9.7 km) radius of DCPP (Figure 2.1-2): Rancho Cañada de Los Osos y Pecho y Islay, *which* includ*es*~~ing~~ CA-SLO-2. Additionally, the National Register of Historic Places listed ~~139~~ *159* locations in all counties DCPP transmission lines cross (San Luis Obispo, Kern, Monterey, King*s*, and Fresno Counties) (Reference 124). Of these ~~139~~ *159* locations, only two fall within a 1.2-mile (2 km) radius of DCPP transmission lines (Figure 3.1-6). Two ~~Historical Places~~*historic properties* listed on the National Register fall just outside of the 6 mile buffer and are directly adjacent to PG&E-owned lands, these include the Port San Luis Site and the San Luis Obispo Light Station located on Point San Luis. Table 2.11-1 lists the three National Register of Historic Places sites within six miles of DCPP or within 1.2 miles of the transmission lines (the study area).

The study area, as defined above, lies within San Luis Obispo, Monterey, Fresno, Kings, and Kern Counties. Additional records searches were therefore conducted at the Northwest Information Center at Sonoma State University, the Southern San Joaquin Valley Information Center at California State University, Bakersfield, and the Central Coastal Information Center at the University of California, Santa Barbara. The Information Centers are part of the California Historical Resources Information System. PG&E Records were also reviewed at this time to identify previously recorded or otherwise known cultural resources and previously recorded archaeological sites within 6 miles of DCPP or within 1.2 miles of the DCPP transmission lines. The record searches identified 636 prior cultural resource studies and 439 prehistoric and historical sites within the project area. Seventy-nine sites have been recommended or determined eligible for the National Register, eight sites have been recommended as not eligible, and the remaining sites have either not been evaluated or the status is unknown. Unevaluated sites or status unknown are treated as eligible until otherwise determined not eligible*, with SHPO concurrence*. Additional information is provided in the Cultural Resources Technical Report (Reference 121), which includes a bibliography of studies, maps depicting studies and sites, and a CD containing site records and a record of consultation.

2.12 KNOWN OR REASONABLY FORESEEABLE PROJECTS IN THE SITE VICINITY

As indicated on Figure 2.1-3, there are no urban areas or industrial development within the 6-mile radius of DCPP.

In 2003, ~~Duke Energy LLC proposed~~ a modernization and replacement project on the existing Morro Bay Power Plant site, approximately 10 miles north of DCPP *was proposed*. ~~If the project is approved and implemented, two new generating units would replace the existing four fossil fuel boiler units. The replacement facility would include two 600 MW gas-fired and steam driven combined cycle units. In addition, the existing three 450-ft tall stacks would be replaced with four 145-ft tall stacks. The new combined cycle units would continue to use the existing once-through seawater cooling system which draws from Morro Bay and discharges into Estero Bay. Power from the combined cycle units would tie into the existing 230 kV PG&E transmission system at the Morro Bay Power Plant Switchyard. Thus, no new transmission lines would be constructed for the proposed project. Natural gas would be delivered by the existing PG&E pipeline and distribution system (Reference 129). Currently, the Morro Bay Power Plant is owned and operated by Dynegy. Dynegy continues to pursue the modernization and replacement project (Reference 130).~~ *In 2014, the permanent closure of the Morro Bay Power Plant was announced (Reference 160).*

Per the California Energy Commission, electrical power generation sources within 80 km (50 mi) of DCPP include two natural gas power plants (9.8 MW total), four hydroelectric power plants (5.94 MW total), three solar installations (677.64 MW total), and one landfill gas installation (1.48 MW total). (Reference 161)

PG&E identified facilities on the California Independent System Operator (CALISO) interconnection queue that, if successfully permitted and constructed in the future, would be located in the four counties within 50 mi of DCPP. A facility's presence on the interconnection queue does not guarantee that it will ultimately begin operation. Per the CALISO, 23 potential power generation facilties are actively in the application review process in the four counties within 50 mi of DCPP: 22 photovoltaic solar facilties and one natural gas steam turbine facility (Reference 197).

Twelve industrial facilities within the 80-km (50-mi) radius of DCPP have NPDES permits (Reference 162).

~~Construction and operation of the new plant should have no environmental impact on DCPP.~~ PG&E is not aware of any other substantial existing or reasonably foreseeable industrial projects in the vicinity of DCPP.

2.13 GEOLOGY AND SOILS

2.13.1 REGIONAL AND SITE GEOLOGY

DCPP is in the southern end of the Coast Ranges Geomorphic Province. This province is characterized by northwest-trending mountains and valleys composed of Mesozoic and Cenozoic marine and terrestrial sedimentary deposits underlain by Franciscan formation metamorphic rocks and/or granite rocks. The Coast Ranges Geomorphic Province is bounded by the offshore Santa Maria Basin to the west. Figure 2.13-1 depicts the terrains, basins, and structural blocks in the DCPP vicinity.

DCPP is located on the Point Buchon peninsula, on the southwestern slope of an area known as the Irish Hills. This peninsula is at the northern and highest end of the San Luis Range, a prominent west-northwest-trending mountain range. The Irish Hills are approximately 11 miles (18 kilometers [km]) long and 8.5 miles (14 km) wide, and are bordered on the north and west by the Los Osos Valley and Estero/Morro Bays, and on the south and east by San Luis Obispo Creek Valley and San Luis Obispo Bay. The Irish Hills reach elevations of 1,600 to 1,800 feet (500 to 550 m) (Reference 163). Islay, Coon, Diablo, Pecho, and See creeks originate near the center of the range and flow radially toward the shore (Reference 163).

The continental shelf in the DCPP area is approximately 3 to 12 nautical miles (nm) (5 to 20 km) wide and generally lies between the coastline and a prominent slope change to the steeper (1.0 to 2.0 degree) continental slope at water depths of approximately 330 to 740 feet (100 to 225 m). Numerous rocks extend above sea level close to the shoreline, including Lion Rock near Diablo Canyon, and Pecho Rock west of Olson Hill. The Santa Rosa Reef and Wesdahl Rock are shallow bedrock projections west of Point San Luis that lie approximately 18 feet (6 m) below mean sea level (Reference 163). Geologic strata in the offshore continental shelf and slope within the DCPP area include shales, claystones, siltstones, sandstones, unconsolidated clays and sands, and volcanic and metamorphic rocks.

2.13.2 SITE STRATIGRAPHY

Geologic units at DCPP and in the vicinity are summarized in Table 2.13-1 and their distribution is shown on Figure 2.13-2. This table lists each geologic formation, a description of the formation's general rock type or lithology, the location of the formation, and age.

2.13.3 POTENTIAL GEOLOGICAL HAZARDS

Land Subsidence

The site is underlain by folded bedrock strata consisting predominantly of sandy mudstone and fine-grained sandstone. Unbroken and otherwise undeformed upper Pleistocene terrace deposits overlying a wave-cut bedrock bench indicate that folding *and faulting in the bedrock antedated formation of the terrace, and that no significant tectonic subsidence is occurring at the site. There is also no evidence for subsidence due to fluid withdrawal due to pumping (water or oil), mining, or collapsible soils. Local depressions and other irregularities on the bedrock surface plainly reflect erosion in an ancient surf zone. (Reference 164)*

Tsunamis

Tsunamis are sea waves generated by rapid displacement of a large volume of sea water, resulting from submarine vertical faulting or warping of the sea floor, from large-scale submarine slides, or from volcanic eruptions in or near ocean basins. In the open ocean, these waves have a very long period and wavelength. The waves are spaced far apart and travel at speeds up to hundreds of miles per hour.

As a tsunami approaches the shoreline, the speed of the wave decreases and the wave height increases, resulting in potentially destructive effects. Historical records indicate that the severity of tsunami-generated damage varies greatly, depending on factors such as coastal topography, the existence of offshore islands, and the direction of the incoming waves.

More than 80 tsunamis have been historically recorded in California; the majority caused little to no damage (Reference 165). The California Emergency Management Agency (Cal EMA) has prepared tsunami inundation maps for emergency planning purposes (Reference 165). These maps indicate that the potential for tsunami-related inundation exists along the shoreline of the DCPP area and various historical river and stream inlets.

DCPP was designed and constructed to withstand the maximum combined wave runup from a distantly-generated tsunami (30 feet) and the maximum combined wave runup for a near-shore tsunami (34.6 feet) (Reference 166). A search of the National Oceanic and Atmospheric Administration (NOAA) Global Historical Tsunami Database was conducted for the California Central Coastline near DCPP (Reference 167). The search showed that the maximum water height resulting from tsunamis was 2.02 m (6.6 feet). This is well below the analyzed water heights discussed above.

The only safety-related system that has components within the projected sea wave zone is the auxiliary saltwater (ASW) system. The ASW pump motors are housed in watertight compartments within the intake structure. These compartments are designed for a combination tsunami-storm wave activity to elevation +48 feet MLLW (+45.4 feet MSL). The massive concrete intake structure ensures that the pumps remain in place and operate during extreme wave events. The intake structure is arranged to provide redundant paths for seawater to the pumps, ensuring a dependable supply of seawater. (Reference 166)

In 2013, the California Coastal Commission evaluated sea-level rise for policy guidance purposes. The State of California Sea-level Rise Guidance Document prepared by the

Ocean Protection Council was also updated in 2013 to include sea-level rise projections from the National Research Council report. For the time period of 2000 – 2050, the sea-level rise projections are 4.68 – 24 in (0.39 – 2 feet) (Reference 168). PG&E evaluated this amount of sea-level rise for DCPP and determined that it will have no impact on the tsunami evaluation since the ASW system is designed for 45.4 feet MSL which has more than enough margin to accommodate an increase in sea level rise of up to 6 feet combined with a maximum tsunami water level of 34.6 feet.

Landslides

Slopes in the Irish Hills are subject to mass-wasting processes, including landslides, debris flows, creep, gully and stream erosion, and sheet wash (Reference 169). A large (exceeding 40 hectares [100 acres]) ancient landslide complex is present on the slopes of Diablo Canyon, approximately 120 m (400 ft) east of the site (Figure 2.13-2), at the closest point (References 170 and 171). The dip of the bedrock in the vicinity of these large slides is downslope, contributing to unsupported bedding and resultant slope instability.

This large landslide complex has a subdued geomorphic expression in the landscape, and has been considerably modified by erosion. Thin stream-terrace deposits locally cover the toes of the slide mass and remnants of a 430,000-year-old marine terrace appear to have cut into the toe of this slide complex, indicating that the landslides are old and likely formed in a wetter climate during the early Holocene to late Pleistocene (References 170 and 171). Landslides within the complex were evaluated and determined to have no adverse effect on safety-related structures at DCPP (Reference 164).

Liquefaction

Liquefaction is defined as the transformation of a granular material from a solid state into a liquefied state as a consequence of increased pore pressure, which results in the loss of grain-to-grain contact. Seismic ground shaking is capable of providing the mechanism for liquefaction, usually in fine-grained, loose to medium dense, saturated sands and silts. The effects of liquefaction may be damaging if total and/or differential settlement of structures occurs on liquefiable soils.

Potential liquefaction and seismically induced settlement was addressed during the design and construction of DCPP. DCPP structures are founded on a competent bedrock beneath the terrace deposits, and the groundwater level lies well below grade, at a level corresponding to that of Diablo Creek. There is no likelihood that DCPP site could experience artificially induced and potentially damaging subsidence, uplift, collapse, or changes in subsurface effective stress related to pore pressure phenomena. (Reference 164)

Faults

Numerous faults have been identified in the DCPP site vicinity (see Figure 2.13-3). Faults do not usually consist of a single, clean fracture in the Earth's crust, so geologists use the term "fault zone" when referring to the zone of complex fractures associated with an identified fault. Figure 2.13-3 shows the known and suspected faults in the DCPP vicinity.

The State of California considers a fault segment historically active if it has generated earthquakes accompanied by surface rupture during historic time (that is, approximately the last 200 years). A fault that shows evidence of movement within the Holocene epoch (approximately the last 11,000 years) is defined as active. A fault segment is considered potentially active if there is evidence of displacement during the Quaternary period or approximately the last 2 million years (Reference 173).

The major active faults that could affect the DCPP site are discussed below and include the Hosgri Fault Zone (approximately three miles offshore), the Shoreline Fault Zone (approximately 1 kilometer offshore of DCPP), the Los Osos Fault Zone, and San Luis Bay Fault Zone.

***The Hosgri Fault Zone (HFZ)** – The HFZ is an active right-slip fault zone located approximately 4.5 km (3 miles) southwest of DCPP. Geologists believe the HFZ controls the break between the continental shelf and slope (Figure 2.13-1). The fault zone itself is up to 1.5 miles (2.5 km) wide and 68 miles (110 km) long. The HFZ has a right-lateral slip movement of 0.04 to 0.12 inch per year (in/yr) (1 to 3 millimeters per year [mm/yr]) (References 179 and 180); the rate of slip is greatest to the north along the larger, interconnected San Gregorio-San Simeon-Hosgri fault system. The HFZ was mapped along its entire length using petroleum industry multichannel seismic-reflection data that imaged the traces to depths of 0.9 to 1.8 miles (1.5 to 3 km) beneath the seafloor. Part of the fault zone was remapped using single-channel, high-resolution USGS sparker data, which provides better near-surface resolution of the fault traces and associated structures in the upper few hundred meters (Reference 181).*

***The Shoreline Fault Zone (SFZ)** – The Shoreline Fault is up to 45 km long, with an estimated slip rate of 0.01-0.51 mm/yr and preferred rate of 0.01-0.06 mm/yr (Reference 196). This fault zone is located between Point Buchon and Point San Luis, east of the HFZ, and was initially identified through indirect seismic information. PG&E named the SFZ and conducted a two-year study to constrain the location and extent of this fault zone. Using geologic, geophysical (gravity and magnetic surveys, multibeam echo sounding, and seismic reflection profiling), and seismicity data collected from 2008 to 2010, PG&E has defined the following three distinct segments within the SFZ 15 (Reference 172):*

(1) A 9.7- to 14.5-mile (6- to 9-km) northern segment that is defined by a distinct 40-degree northwest-trending discontinuous scarp;

(2) A 12-mile (8-km) central segment expressed as a distinct linear feature that appears in bathymetric and magnetic data plots; and

(3) A 9.7-mile (6-km) southern segment expressed as a poorly to moderately defined linear feature in bathymetric data plots.

Findings from these detailed studies of the Shoreline fault were presented to the NRC in January 2011 (Reference 163).

***The Los Osos Fault Zone** – The Los Osos fault zone is approximately 31 miles (50 km) long and 1.2 miles (2 km) wide, and extends along the north-northeast side of the Irish Hills, from Estero Bay to the northwest to an intersection with the West Huasna fault southeast of the city of San Luis Obispo. This fault zone is a system of discontinuous, subparallel faults that has been interpreted by PG&E to have oblique-slip offset. PG&E has determined a vertical rate of separation across the fault zone of less than 0.1 in/yr (about 0.2 mm/yr) (Reference 172).*

***Southwestern Boundary Fault Zone** – The southwestern margin of the San Luis Range is bordered by a complex zone of late Quaternary reverse, oblique-slip, and possibly strike-slip faults. This fault zone is approximately 2 to 6 miles (4 to 10 km) wide and over 36 miles (60 km) long. The faults generally strike west-northwest and dip steeply to moderately to the northeast. PG&E has estimated that the rate of vertical separation across the fault zone is less than 0.1 in/yr (about 0.1 to 0.2 mm/yr) (Reference 172).*

2.13.4 SEISMIC HISTORY

The DCPP area has experienced numerous historical seismic events centered on both onshore and offshore faults. Based on a USGS National Earthquake Information Center database search performed in May 2014, approximately six earthquakes with a magnitude of 6.0 or greater were recorded within a 100-mile radius of DCPP from 1973 through 2013 (Reference 174). Table 2.13-2 presents the results of that database search. The largest historic earthquake is shown to be magnitude 6.5 earthquake in 2003.

2.13.5 SOILS

The soil in the DCPP vicinity consists predominantly of Lodo clay loam. The Lodo series consists of shallow, somewhat excessively drained soils, formed from weathered hard shale and fine-grained sandstone. This soil occurs at elevations of 300 to 3,400 feet (90 to 1,040 m), in the sub-humid mountain ranges at lower elevations and foothills throughout California (Reference 175). Further discussion of regional soil composition can be found in Section 2.13.2.

Bluff Retreat and Erosion Potential

Within the DCPP property, the coastline trends about N30W and consists of a series of small coves, resistant headlands, sea stacks, and pocket beaches that have been eroded into bedrock sea-cliffs. As described in Table 2.13-1, DCPP sea-cliffs are formed of early and middle Miocene Obispo Formation bedrock. The Obispo Formation is divided into two members: a fine-grained, massively bedded, resistant zeolitized tuff (mapped as unit Tor), and a thick sequence of interbedded marine sandstone, siltstone, and dolomite (mapped as unit Tof). The Tor unit consists of relatively hard, strongly-cemented rock that is resistant to erosion, and forms the headlands and sea stacks along the coast, and resistant vertical to overhanging sea-cliffs. This unit exerts a major influence on the sea-cliff retreat geometry and rates.

In 2004, a shoreline retreat study was completed for the DCPP shoreline (Reference 176). This study concluded that the estimated maximum uniform retreat rate for 75 years is 1 to 4.5 meters total. The DCPP license renewal period ends in 2044 and 2045 for Units 1 and 2, respectively. Based on the observed rates of sea cliff retreat, the existing setback of DCPP facilities (50-100 feet from the coastal bluff [Reference 176]) is adequate for the License Renewal period.

Prime Farmland Soils

Natural Resources Conservation Service (NRCS) maps show no areas of prime farmland in the DCPP vicinity (Reference 177).

2.13.6 MINERAL RESOURCES

Mineral rights in the DCPP lands are owned by PG&E. According to the 1989 California Division of Mines and Geology Mineral Resources survey of southwestern San Luis Obispo County, the DCPP lands are classified as Mineral Resources Zone – 1 (MRZ-1) (Reference 178). MRZ-1 is applied to areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence. This designation is assigned when well-developed lines of reasoning, based on economic and geologic principles, and adequate data have demonstrated that the likelihood for occurrence of significant mineral deposits is nil or slight.

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Table 2.2-1

PHYLOGENETIC LISTING OF INTERTIDAL (I) AND SUBTIDAL (S) MARINE ORGANISMS ASSOCIATED WITH THE DCPP COASTLINE (COMPILED FROM DCPP TEMP)

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
PLANTS		
Chrysophyta (golden-brown algae)		
Chrysophyte unid.	Chrysophyta	I~~, S~~
diatom chains ~~unid. (erect)~~	Chrysophyta	I~~, S~~
diatom film	Chrysophyta	I~~, S~~
Chlorophyta (green algae)		
Acrosiphonia spp.	*Cladophoraceae*	*I, S*
Bryopsis corticulans	Bryopsidaceae	I, S
Bryopsis hypnoides	Bryopsidaceae	I, S
Bryopsis spp.	*Bryopsidaceae*	*I*
Chaetomorpha spp.	Cladophoraceae	I
~~Chlorophyta (blades, juv.)~~	~~Ulvaceae~~	~~I~~
Chlorophyte ~~Chlorophyta~~ (~~filamentous,~~ unid.)	Chlorophyta	I~~, S~~
Cladophora graminea	Cladophoraceae	I, S
Cladophora spp.	Cladophoraceae	I*, S*
Codium fragile subsp. californicum	Codiaceae	I, S
Codium setchellii	Codiaceae	I*, S*
Derbesia marina ~~(filamentous)~~	Derbesiaceae	I, S
~~*Halicystis ovalis* (=Derbesia marina)~~	~~Derbesiaceae~~	~~I~~
~~*Spongomorpha/Acrosiphonia/Cladophora*~~	~~Cladophoraceae~~	~~I, S~~
Ulothrix spp.	Ulotrichaceae	I
Ulva linza	Ulvaceae	I
Ulva spp.	Ulvaceae	I, S
Phaeophyta (brown algae)		
Alaria marginata	Alariaceae	I
Analipus japonicus	Chordariaceae	I
brown filament erect	Phaeophyta	I
Coilodesme californica	Dictyosiphonaceae	S
Colpomenia peregrina	Scytosiphonaceae	I, S
Colpomenia spp.	Scytosiphonaceae	I, S
~~*Colpomenia/Leathesia/Soranthera* spp.~~	~~Scytosiphonaceae~~	~~I~~
Cystoseira osmundacea	Cystoseiraceae	I, S
Desmarestia ligulata	*Desmarestiaceae*	*I*
Desmarestia spp.	Desmarestiaceae	I, S
Desmarestia tabacoides	Desmarestiaceae	I, S
Dictyoneurum californicum	Lessoniaceae	I, S
Dictyota binghamiae	*Dictyotaceae*	*S*
Dictyota spp.	*Dictyotaceae*	*S*
Ectocarpales	Ectocarpaceae	I, S
Egregia menziesii	Alariaceae	I, S
Endarachne/Petalonia-*complex*	Scytosiphonaceae	I, S
Fucaceae ~~unid.~~	Fucaceae	I
Fucus gardneri	Fucaceae	I
Halorhipis winstonii	Punctariaceae	I
Haplogloia andersonii	Chordariaceae	I, S
Hesperophycus californicus	Fucaceae	I
Laminaria ephemera	Laminariaceae	S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Laminaria setchellii	Laminariaceae	I, S
Laminaria spp.	*Laminariaceae*	*I, S*
Laminariales ~~unid.~~	Laminariaceae	I, S
Leathesia difformis	Corynophlaeaceae	I
Macrocystis spp.	Lessoniaceae	I~~, S~~
Macrocystis pyrifera	*Lessoniaceae*	*I, S*
Nereocystis luetkeana	Lessoniaceae	I, S
~~*Pelvetia/Pelvetiopsis*~~	~~Fucaceae~~	~~I~~
Pelvetiopsis limitata	Fucaceae	I
Petrospongium rugosum	Corynophlaeaceae	I
Phaeophyta	*Phaeophyta*	*I*
Phaeostrophion irregulare	Dictyosiphonaceae	I, S
Pterygophora californica	Alariaceae	S
Ralfsia spp.	Ralfsiaceae	I
Rosenvingea anthillarum~~floridana~~	Scytosiphonaceae	I
Sargassum muticum	Cystoseiraceae	I*, S*
Scytosiphon dotyi	Scytosiphonaceae	I
Scytosiphon lomentaria	Scytosiphonaceae	I
Scytosiphon spp.	Scytosiphonaceae	I
Silvetia compressa	Fucaceae	I
Soranthera ulvoidea	Punctariaceae	I
Rhodophyta (red algae)		
Acrosorium ciliolatum~~uncinatum~~	Delesseriaceae	I, S
Ahnfeltiopsis leptophylla	Phyllophoraceae	I, S
Ahnfeltiopsis linearis	Phyllophoraceae	I, S
Ahnfeltiopsis spp.	Phyllophoraceae	S
Amplisiphonia pacifica	Rhodomelaceae	S
Anisocladella pacifica	Delesseriaceae	S
Antithamnion densum	Ceramiaceae	S
Antithamnion spp.	Ceramiaceae	I, S
~~*Antithamnion/Platythamnion* spp.~~	~~Ceramiaceae~~	~~I, S~~
Antithamnionella pacifica	Ceramiaceae	S
Bangia spp.~~fusco-purpurea~~	Bangiaceae	I
Bossiella plumosa	Corallinaceae	I
Bossiella schmittii	Corallinaceae	S
Bossiella spp.	Corallinaceae	I, S
Botryocladia pseudodichotoma	Rhodymeniaceae	S
Branchioglossum bipinnatifidum	Delesseriaceae	S
Calliarthron spp.	Corallinaceae	I, S
~~*Calliarthron/Bossiella* spp.~~	~~Corallinaceae~~	~~I, S~~
Callithamnion acutum	Ceramiaceae	I
Callithamnion biseriatum	Ceramiaceae	S
Callithamnion pikeanum	Ceramiaceae	I, S
Callithamnion rupicola	Ceramiaceae	I
Callophyllis crenulata	Kallymeniaceae	S
~~*Callophyllis firma*~~	~~Kallymeniaceae~~	~~I, S~~
Callophyllis flabellulata	Kallymeniaceae	I, S
Callophyllis spp.	Kallymeniaceae	I, S
Callophyllis violacea	Kallymeniaceae	I, S
Campylaephora californica	*Ceramiaceae*	*I*
Centroceras clavulatum	Ceramiaceae	I, S
~~*Ceramium eatonianum*~~	~~Ceramiaceae~~	~~I~~

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Ceramium spp.	Ceramiaceae	I, S
Chondracanthus canaliculatus	Gigartinaceae	I, S
Chondracanthus corymbiferus	Gigartinaceae	I, S
Chondracanthus harveyanus	Gigartinaceae	I, S
Chondracanthus spinosus	Gigartinaceae	I, S
~~*Chondracanthus volans*~~	~~Gigartinaceae~~	~~I~~
Chondria decipiens	Rhodomelaceae	I, S
Clathromorphum parcum	Corallinaceae	I, S
Corallina chilensis~~*officinalis*~~	Corallinaceae	I, S
Corallina spp.	Corallinaceae	I, S
Corallina vancouveriensis	Corallinaceae	I, S
coralline crust	Corallinaceae	I, S
Corallophila eatoniana	*Ceramiaceae*	*I*
Cryptopleura lobulifera	Delesseriaceae	I, S
Cryptopleura ruprechtiana	Delesseriaceae	I, S
Cryptopleura spp.	Delesseriaceae	I, S
Cryptopleura violacea	Delesseriaceae	I, S
Cryptosiphonia woodii	Dumontiaceae	I
Cumagloia andersonii	Helminthocladiaceae	I
Delesseria decipiens	Delesseriaceae	S
Delesseriaceae (juv.)~~Delesseriacea~~	Delesseriaceae	I, S
Dilsea californica	Dumontiaceae	I
Endocladia muricata	Endocladiaceae	I
Erythrophyllum delesserioides	Kallymeniaceae	I, S
Farlowia compressa	Dumontiaceae	I, S
Farlowia mollis	Dumontiaceae	I, S
Farlowia spp.	Dumontiaceae	I, S
Fauchea laciniata	Rhodymeniaceae	S
Fauchea spp.	Rhodymeniaceae	I, S
filamentous red algae complex	*Rhodophyta*	*I*
Fryeella gardneri	Rhodymeniaceae	S
Gastroclonium subarticulatum	Champiaceae	I, S
Gelidium coulteri	Gelidiaceae	I, S
Gelidium purpurascens	Gelidiaceae	S
Gelidium pusillum	Gelidiaceae	I
Gelidium robustum	Gelidiaceae	I, S
Gelidium spp.	Gelidiaceae	I, S
Gloiosiphonia californica	Gloiosiphoniaceae	I, S
Gracilariopsis andersonii~~*lemaneiformis*~~	Gracilariaceae	I, S
Grateloupia californica~~*doryphora*~~	Cryptonemiaceae	I, S
Grateloupia setchellii	Cryptonemiaceae	I
Grateloupia spp.	Cryptonemiaceae	I*, S*
Griffithsia pacifica	Ceramiaceae	S
Gymnogongrus chiton	Phyllophoraceae	I
Halosaccion americanum	Rhodymeniaceae	I
Halymenia schizymenioides	Cryptonemiaceae	I, S
Halymenia spp.	Cryptonemiaceae	I, S
Halymenia/Schizymenia spp.-complex	*Cryptonemiaceae*	*I, S*
Herposiphonia verticillata	Rhodomelaceae	I
Hymenena flabelligera	Delesseriaceae	I, S
Hymenena multiloba	Delesseriaceae	I
Hymenena spp.	Delesseriaceae	I, S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Hymenena spp. (on corallines)	*Delesseriaceae*	*I, S*
Janczewskia gardneri	Rhodomelaceae	I
juv. articulated coralline algae	*Corallinaceae*	*I, S*
Kallymenia spp.	Cryptonemiaceae	S
Maripelta rotata	Rhodymeniaceae	S
Mastocarpus jardinii	Gigartinaceae	I
Mastocarpus papillatus	Gigartinaceae	I, S
Mazzaella affinis	Gigartinaceae	I, S
Mazzaella californicum	Gigartinaceae	I
Mazzaella flaccida	Gigartinaceae	I, S
~~*Mazzaella heterocarpa*~~	~~Gigartinaceae~~	~~I, S~~
Mazzaella leptorhynchos	Gigartinaceae	I, S
~~*Mazzaella lilacina*~~	~~Gigartinaceae~~	~~I, S~~
Mazzaella linearis	Gigartinaceae	I
Mazzaella oregona	*Gigartinaceae*	*I, S*
Mazzaella rosea	Gigartinaceae	I, S
Mazzaella splendens	*Gigartinaceae*	*I, S*
Mazzaella spp.	Gigartinaceae	I, S
Mazzaella volans	Gigartinaceae	I
Melobesia mediocris	Corallinaceae	I, S
Membranoptera platyphylla	Delesseriaceae	S
Membranoptera spp.	Delesseriaceae	S
Membranoptera tenuis	Delesseriaceae	S
~~*Membranoptera/Branchioglossum*~~	~~Delesseriaceae~~	~~S~~
Microcladia borealis	Ceramiaceae	I, S
~~*Microcladia californica*~~	~~Ceramiaceae~~	~~I~~
Microcladia coulteri	Ceramiaceae	I, S
Microcladia spp.	Ceramiaceae	I, S
Nemalion elminthoides~~helminthoides~~	Helminthocladiaceae	I
Neoptilota densa	Ceramiaceae	I, S
Neoptilota hypnoides	Ceramiaceae	I, S
Neoptilota spp.	Ceramiaceae	S
Neorhodomela larix	Rhodomelaceae	I
Nienburgia andersoniana	Delesseriaceae	I, S
Nitophyllum northii	Delesseriaceae	S
non-coralline crust	Rhodophyta	I, S
Odonthalia floccosa	Rhodomelaceae	I
Odonthalia washingtoniensis	Rhodomelaceae	S
Opuntiella californica	Solieriaceae	S
Osmundea blinksii	Rhodomelaceae	I
Osmundea spectabilis	Rhodomelaceae	I, S
Osmundea spp.	Rhodomelaceae	I, S
Peysonneliopsis epiphytica	*Nemastomataceae*	*I, S*
Phycodrys isabelliae	Delesseriaceae	S
Phycodrys setchellii	Delesseriaceae	I, S
Phycodrys spp.	Delesseriaceae	S
~~*Phyllospadix scouleri*~~	~~Magnoliophyta~~	~~I, S~~
~~*Phyllospadix spp.*~~	~~Magnoliophyta~~	~~I, S~~
Pikea californica	Dumontiaceae	I, S
Pikea robusta	Dumontiaceae	S
Pikea spp.	Dumontiaceae	I, S
Pleonosporium spp.	Ceramiaceae	I

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Pleonosporium squarrulosum	Ceramiaceae	S
Plocamium pacificum~~cartilagineum~~	Plocamiaceae	I, S
Plocamium spp.	Plocamiaceae	I, S
Plocamium violaceum	Plocamiaceae	I, S
Polyneura latissima	Delesseriaceae	I, S
Polysiphonia hendryi	Rhodomelaceae	I
Polysiphonia paniculata	Rhodomelaceae	I
Polysiphonia spp.	Rhodomelaceae	I, S
Porphyra nereocystis	Bangiaceae	S
Porphyra occidentalis	Bangiaceae	S
Porphyra spp.	Bangiaceae	I, S
Prionitis australis	Cryptonemiaceae	I, S
Prionitis lanceolata	Cryptonemiaceae	I, S
Prionitis sternbergii~~lyallii~~	Cryptonemiaceae	I, S
Prionitis spp.	Cryptonemiaceae	I, S
Ptercladiella caloglossoides	*Gelidiaceae*	*I,S*
Pterochondria woodii var. *woodii*	Rhodomelaceae	S
~~*Pterocladia caloglossoides*~~	~~Gelidiaceae~~	~~I, S~~
Pterocladia media	Gelidiaceae	S
Pterosiphonia baileyi	Rhodomelaceae	I, S
Pterosiphonia bipinnata	Rhodomelaceae	I
Pterosiphonia dendroidea	Rhodomelaceae	I, S
Pterosiphonia spp.	Rhodomelaceae	I, S
Pterothamnion heteromorphum	Ceramiaceae	S
Pterothamnion spp.	Ceramiaceae	S
Pterothamnion villosum	Ceramiaceae	I, S
Pugetia firma	*Kallymeniaceae*	*I, S*
red algal turf	*Rhodophyta*	*S*
red filaments (prostrate)	*Rhodophyta*	*S*
Rhodophyta	*Rhodophyta*	*I, S*
Rhodoptilum plumosum	Dasyaceae	S
Rhodymenia californica	Rhodymeniaceae	S
Rhodymenia callophyllidoides	Rhodymeniaceae	S
Rhodymenia pacifica	Rhodymeniaceae	I, S
Rhodymenia spp.	Rhodymeniaceae	I, S
Sarcodiotheca gaudichaudii	Solieriaceae	I, S
~~*Schizymenia epiphytica*~~	~~Nemastomataceae~~	~~I, S~~
Schizymenia pacifica	Nemastomataceae	I, S
Schizymenia spp.	Nemastomataceae	S
Scinaia confusa	Chaetangiaceae	I, S
Scinaia johnstoniae	Chaetangiaceae	I
Smithora naiadum	Erythropeltidaceae	I, S
Stenogramme interrupta	Phyllophoraceae	S
Tiffaniella snyderae	Ceramiaceae	S
Weeksia digitata	Dumontiaceae	S
Weeksia reticulata	Dumontiaceae	S
Weeksia spp.	Dumontiaceae	S
Plantae (vascular plants)		
Phyllospadix scouleri (incl. rhizome)	*Magnoliophyta*	*I, S*
Phyllospadix spp.	*Magnoliophyta*	*I, S*
PROTOZOA (protozoans)		

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Gromia oviformis	*Protozoa*	*I*
Quinqueloculina spp.	*Protozoa*	*I*
INVERTEBRATES		
Porifera (sponges)		
Acanthancora cyanocrypta	Demospongiae	*I,* S
Acarnus erithacus	Demospongiae	I, S
Antho karykina	Demospongiae	I
Clathria pseudonapya	Demospongiae	I
Clathrina spp.	*Calcarea*	*S*
Cliona spp.	Demospongiae	S
Craniella arb	Demospongiae	S
Haliclona spp.	Demospongiae	I, S
Haliclona spp. (poss. permollis)	*Demospongiae*	*I*
Leucandra heathi	Calcarea	I, S
Leucetta losangelensis	Calcarea	I, S
Leucilla nuttingi	Calcarea	I, S
Leucosolenia eleanor	Calcarea	I, S
Leucosolenia spp.	Calcarea	I, S
Paresperella psila	*Demospongiae*	*S*
Porifera ~~unid.~~ (encrusting)	Porifera	I, S
Porifera unid.	*Porifera*	*S*
Spheciospongia confoederata	*Demospongiae*	*I, S*
Tethya californiana	Demospongiae	I, S
Cnidaria (hydroids, anemones)		
Abietinaria/Sertularella/Sertularia spp.	Hydrozoa	I, S
Aglaophenia spp.	Hydrozoa	I, S
Aglaophenia struthionides	*Hydrozoa*	*S*
Anthopleura artemisia	Anthozoa	I, S
Anthopleura elegantissima	Anthozoa	I, S
Anthopleura sola	Anthozoa	I
Anthopleura spp.	*Anthozoa*	*S*
Anthopleura xanthogrammica	Anthozoa	I, S
Anthozoa ~~unid.~~	Anthozoa	I, S
Balanophyllia elegans	Anthozoa	I, S
Cactosoma arenaria	Anthozoa	I, S
Ceriantharia unid.	Anthozoa	S
Clavularia spp.	Anthozoa	S
Corynactis californica	Anthozoa	I, S
Diadumene spp.	Anthozoa	S
Epiactis prolifera	Anthozoa	I, S
Halcampa decemtentaculata	Anthozoa	I, S
hydroid, epiphytic	Hydrozoa	S
hydroid, thecate	Hydrozoa	I, S
Hydroidolina ~~unid.~~	Hydrozoa	I, S
Manania spp.	Scyphozoa	S
Obelia spp.	Hydrozoa	I, S
Paracyathus stearnsii	Anthozoa	S
Plumularia spp.	Hydrozoa	S
Stylantheca porphyra	Hydrozoa	I
Stylantheca spp.	Hydrozoa	I
Tubularia spp.	Hydrozoa	*I,* S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Urticina coriacea	Anthozoa	I, S
Urticina crassicornis~~felina~~	Anthozoa	I, S
Urticina lofotensis	Anthozoa	I, S
Urticina piscivora	*Anthozoa*	*S*
Urticina spp.	Anthozoa	I, S
Platyhelminthes (flatworms)		
Alloioplana californica	Platyhelminthes	I
Eurylepta californica	Platyhelminthes	I, S
Eurylepta spp.	Platyhelminthes	I, *S*
Notocomplana~~Notoplana~~ spp.	Platyhelminthes	I
Platyhelminthes ~~unid.~~	Platyhelminthes	I, S
Prostheceraeus bellostriatus	Platyhelminthes	S
Pseudoceros montereyensis	Platyhelminthes	S
Stylochus franciscanus	Platyhelminthes	I
Stylochus spp.	Platyhelminthes	I, S
Nemertea (ribbon worms)		
Amphiporus imparispinosus	Nemertea	I
Micrura verrilli	Nemertea	S
Nemertea unid.	Nemertea	I, S
Paranemertes peregrina	Nemertea	I
Tubulanus polymorphus	Nemertea	I, S
Tubulanus sexlineatus	Nemertea	I, S
Nematoda (round worms)		
Nematoda	*Nematoda*	*I*
Polychaeta (segmented worms)		
Ampharetidae	*Ampharetidae*	*S*
Aphrodita spp.	Aphroditidae	I, S
Capitellidae	*Capitellidae*	*I*
Chaetopteridae ~~unid.~~	Chaetopteridae	I
Chaetopterus variopedatus	Chaetopteridae	I
Circeis spirillum	*Serpulidae*	*I*
Cirratulidae/Terebellidae unid.	Polychaeta	I, S
Diopatra ornata	Onuphidae	I, S
Diopatra spp.	*Onuphidae*	*S*
Dodecaceria fewkesi	Cirratulidae	I, S
Dodecaceria spp.	*Cirratulidae*	*I*
Eudistylia polymorpha	Sabellidae	I, S
Flabelliderma essenbergae	Nereidae	S
Halosydna brevisetosa	Polynoidae	I
Hydroides elegans	Serpulidae	S
Myxicola infundibulum	Sabellidae	I, S
Neosabellaria cementarium	*Sabellariidae*	*I*
Nereididae ~~unid.~~	Nereidae	I, S
Nereis grubei	Nereidae	I
Nereis pelagica	Nereidae	I
Nereis spp.	*Nereidae*	*I,S*
Phragmatopoma californica	Sabellariidae	I, S
Phragmatopoma spp.	*Sabellariidae*	*I,S*
Phyllochaetopterus prolifica	Chaetopteridae	I, S
Pista pacifica	Terebellidae	I
Pista spp.	Terebellidae	I, S
Polychaeta ~~unid.~~	Polychaeta	I, S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Polynoidae ~~unid.~~	Polynoidae	I, S
Sabella spp.	*Sabellidae*	*S*
Sabellaria spp.	*Sabellariidae*	*S*
Sabellidae ~~unid.~~	Sabellidae	I, S
Salmacina tribranchiata	Serpulidae	I, S
Serpula vermicularis	Serpulidae	I, S
Serpulidae ~~unid.~~	Serpulidae	I, S
Serpulidae colonial	*Serpulidae*	*I*
Spiochaetopterus pottsi~~costarum~~	Chaetopteridae	I, S
Spionidae ~~unid.~~	Spionidae	I
Spirobranchus spinosus	Serpulidae	I, S
Spirorbidae ~~unid.~~	Serpulidae	I*, S*
Spirorbis spp.	Serpulidae	I, S
Streblosoma crassibranchia	Terebellidae	I
Terebellidae ~~unid.~~	Terebellidae	I, S
Mollusca - Gastropoda (snails)		
Acanthinucella punctulata	*Muricidae*~~Neogastropoda~~	I
Acanthinucella spirata	*Muricidae*~~Neogastropoda~~	I
Acanthinucella spp.	*Muricidae*~~Neogastropoda~~	I
Acmaea mitra	Archaeogastropoda	I, S
Acmaeidae~~*Acmaea* spp.~~	Archaeogastropoda	*S*~~I~~
Alia carinata	Neogastropoda	I, S
Alia spp.	Neogastropoda	I, S
Alia tuberosa	Neogastropoda	I
Amphissa columbiana	Neogastropoda	S
Amphissa spp.	Neogastropoda	I, S
Amphissa versicolor	Neogastropoda	I, S
Aptyxis luteopictus	Neogastropoda	I, S
Barleeia acuta	Mesogastropoda	I
Barleeia spp.	Mesogastropoda	I, S
Barleeia haliotiphila	*Mesogastropoda*	*I*
~~*Bittium eschrichtii*~~	~~Mesogastropoda~~	~~I, S~~
~~*Bittium* spp.~~	~~Mesogastropoda~~	~~I, S~~
Caesia spp.	*Neogastropoda*	*I*
Callianax biplicata	Olividae	S
Calliostoma annulatum	Archaeogastropoda	I, S
Calliostoma canaliculatum	Archaeogastropoda	I, S
Calliostoma gloriosum	Archaeogastropoda	S
Calliostoma ligatum	Archaeogastropoda	I, S
Calliostoma spp.	Archaeogastropoda	I, S
Calliostoma supragranosum	Archaeogastropoda	I, S
Ceratostoma foliatum	*Muricidae*~~Neogastropoda~~	*I,* S
Ceratostoma nuttalli	*Muricidae*	*I*
Chlorostoma brunnea	*Trochidae*~~Archaeogastropoda~~	I, S
Chlorostoma funebralis	*Trochidae*~~Archaeogastropoda~~	I
Chlorostoma montereyi	*Trochidae*~~Archaeogastropoda~~	I, S
Chlorostoma spp.	*Trochidae*~~Archaeogastropoda~~	I*, S*
Conus californicus	Conidae	I, S
Crepidula perforans	*Calyptraeidae*	*I*
Crepidula spp.	*Calyptraeidae*~~Mesogastropoda~~	I, S
Crepipatella lingulata	*Calyptraeidae*	*S*
Dendropoma lituella	Mesogastropoda	I, S

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Dendropoma spp.	Mesogastropoda	I, S
Diodora aspera	Archaeogastropoda	I, S
Diodora spp.	Archaeogastropoda	I, S
~~*Discurria insessa*~~	~~Archaeogastropoda~~	~~I, S~~
Epitonium spp.	*Epitoniidae*	*I, S*
Epitonium tinctum	*Epitoniidae*	*I, S*
Epitonium/Opalia spp.	*Epitoniidae*	*I, S*
Erato spp.	Mesogastropoda	I, S
Erato vitellina	Mesogastropoda	I, S
Eulithidium compta	Archaeogastropoda	S
Eulithidium pulloides	*Phasianellidae*~~Archaeogastropoda~~	I, S
Eulithidium spp.	*Phasianellidae*~~Archaeogastropoda~~	I, S
Fissurella volcano	Archaeogastropoda	I, S
Fissurellidea bimaculata	Archaeogastropoda	I, S
Garnotia adunca	*Calyptraeidae*~~Mesogastropoda~~	I, S
Gastropoda, neopic	*Gastropoda*	*I*
Gastropoda, unid.	*Gastropoda*	*S*
Granulina margaritula	Neogastropoda	I, S
Haliotis cracherodii	Archaeogastropoda	I
Haliotis rufescens	Archaeogastropoda	I, S
Haliotis spp.	Archaeogastropoda	I, S
Haliotis walallensis	*Archaeogastropoda*	*S*
Hima mendica~~*mendicus*~~	Neogastropoda	I, S
~~*Hima* spp.~~	~~Neogastropoda~~	~~I~~
Hipponix spp.	Mesogastropoda	I, S
Homalopoma baculum	Archaeogastropoda	I
Homalopoma luridum	Archaeogastropoda	I*, S*
Homalopoma spp.	Archaeogastropoda	I, S
Kelletia kelletii	Neogastropoda	I, S
Lacuna marmorata	Mesogastropoda	I, S
Lacuna spp.	Mesogastropoda	I, S
Lamellaria diegoensis	Mesogastropoda	I, S
Lamellariidae	*Mesogastropoda*	*I*
Lirabuccinum dirum	Neogastropoda	S
Lirobittium eschrichtii	*Mesogastropoda*	*I, S*
Lirobittium spp.	*Mesogastropoda*	*I, S*
Lirularia spp.	Archaeogastropoda	S
Littorina keenae	*Littorinidae*~~Mesogastropoda~~	I
Littorina scutulata/L. plena	*Littorinidae*~~Mesogastropoda~~	I
Littorina spp.	*Littorinidae*~~Mesogastropoda~~	I
Lottia asmi	Archaeogastropoda	I, S
Lottia digitalis	Archaeogastropoda	I
Lottia fenestrata	Archaeogastropoda	I, S
Lottia gigantea	Archaeogastropoda	I
Lottia insessa	*Archaeogastropoda*	*I, S*
Lottia instabilis	Archaeogastropoda	I, S
Lottia limatula	Archaeogastropoda	I*, S*
Lottia ochracea	Archaeogastropoda	I, S
Lottia paleacea	Archaeogastropoda	I, S
Lottia pelta	Archaeogastropoda	I*, S*
Lottia persona	Archaeogastropoda	I, S
Lottia scabra	Archaeogastropoda	I

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Lottia scutum	Archaeogastropoda	I, *S*
Lottia spp.	Archaeogastropoda	I, S
Lottia strigatella	Archaeogastropoda	I, S
Lottiidae ~~unid.~~	Archaeogastropoda	I, S
Lucapinella callomarginata	*Archaeogastropoda*	*I*
Maxwellia santarosana	*Muricidae*~~Neogastropoda~~	S
Megathura crenulata	Archaeogastropoda	I, S
Melanella thersites	Mesogastropoda	S
Mitra idae	*Mitridae*	*I, S*
~~*Nitidiscala tinctum*~~	~~Mesogastropoda~~	~~I, S~~
~~*Nitiscala spp.*~~	~~Mesogastropoda~~	~~I, S~~
Norrisia norrisi	Archaeogastropoda	S
Nucella analoga compressa	*Muricidae*~~Neogastropoda~~	I
Nucella ostrina~~*emarginata*~~	*Muricidae*~~Neogastropoda~~	I
Nucella spp.	*Muricidae*~~Neogastropoda~~	I
Ocinebrina~~*Ocenebrina*~~ *atropurpurea*	*Muricidae*~~Neogastropoda~~	I
Urosalpinx~~*Ocenebrina*~~ *circumtexta*	*Muricidae*~~Neogastropoda~~	I, S
Ocinebrina~~*Ocenebrina*~~ *foveolata*	*Muricidae*~~Neogastropoda~~	I, S
Ocinebrina~~*Ocenebrina*~~ *interfossa*	*Muricidae*~~Neogastropoda~~	I, S
Ocinebrina~~*Ocenebrina*~~ *lurida*	*Muricidae*~~Neogastropoda~~	I, S
Ocinebrina~~*Ocenebrina*~~ spp.	*Muricidae*~~Neogastropoda~~	I, S
Ocinebrina subangulata	*Muricidae*	*I, S*
Odostomia spp.	Neogastropoda	I, S
Opalia funiculata	Mesogastropoda	I
Opalia spp.	Mesogastropoda	I, S
Pomaulax gibberosa	Archaeogastropoda	I, S
Pomaulax undosa	Archaeogastropoda	S
Promartynia pulligo	*Trochidae*~~Archaeogastropoda~~	I, S
Pseudomelatoma torosa	Neogastropoda	I, S
Pteropurpura festiva	*Muricidae*	*I, S*
Rictaxis punctocaelatus	Neogastropoda	S
~~*Searlesia/Amphissa spp.*~~	~~Neogastropoda~~	~~I, S~~
Serpulorbis squamigerus	Mesogastropoda	I, S
Trimusculus reticulatus	Archaeogastropoda	I
Trivia californiana	Mesogastropoda	I, S
Trivia solandri	*Mesogastropoda*	*S*
Trivia spp.	Mesogastropoda	S
Turbonilla Spp.~~*Urosalpinx subangulata*~~	Neogastropoda	I
Velutina velutina	Mesogastropoda	I
Mollusca - Opisthobranchs (sea slugs)		
Acanthodoris lutea	Nudibranchia	I, S
Acanthodoris rhodoceras	Nudibranchia	S
Aegires albopunctatus	Nudibranchia	I, S
Aeolidia papillosa	Nudibranchia	I, S
Aeolidiacea unid.	Nudibranchia	I, S
Aeolidiella oliviae	Nudibranchia	I, S
Aldisa sanguinea	Nudibranchia	I, S
Ancula pacifica	*Goniodorididae*~~Nudibranchia~~	S
Aplysia californica	Aplysiidae	I, S
Aplysia vaccaria	Aplysiidae	S
~~*Archidoris montereyensis*~~	~~Nudibranchia~~	~~I, S~~
Babakina festiva	Nudibranchia	S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Berthella californica	Notaspidea	S
Berthella strongi	*Notaspidea*	*I, S*
Cadlina flavomaculata	*Chromodorididae*~~Nudibranchia~~	I, S
Cadlina luteomarginata	*Chromodorididae*~~Nudibranchia~~	I, S
Cadlina modesta	*Chromodorididae*~~Nudibranchia~~	S
Cadlina spp.	*Chromodorididae*	*I, S*
Chromodoris macfarlandi	*Chromodorididae*~~Nudibranchia~~	S
Dendronotus albus	*Nudibranchia*	*S*
Dendrodoris spp.	Dendrodorididae	I, S
Dendronotus iris	Nudibranchia	I
Dendronotus spp.	*Nudibranchia*	*I, S*
Diaulula sandiegensis	Nudibranchia	I, S
Dirona albolineata	Nudibranchia	S
Doridacea ~~unid.~~	Nudibranchia	I, S
Doriopsilla albopunctata	Nudibranchia	I, S
Doriopsilla gemela	Nudibranchia	S
Doris montereyensis	*Nudibranchia*	*I, S*
Doris odhneri	*Nudibranchia*	*S*
Doto kya	Nudibranchia	I, S
Elysia hedgpethi	Sacoglossa	I, *S*
Flabellina iodinea	Nudibranchia	S
Flabellina spp.	Nudibranchia	I
Flabellina trilineata	Nudibranchia	I, S
Geitodoris heathi	Nudibranchia	S
Haminoea spp.	*Haminoeida*~~Cephalaspidea~~	I
Hancockia californica	Nudibranchia	S
Hermissenda crassicornis	Nudibranchia	I, S
~~*Hopkinsia rosacea*~~	~~Nudibranchia~~	~~I, S~~
Laila cockerelli	Nudibranchia	I, S
Melibe leonina	Nudibranchia	S
Mexichromis porterae	*Chromodorididae*	*S*
Navanax inermis	Cephalaspidea	I, S
Nudibranchia ~~unid.~~	Nudibranchia	I
Okenia angelensis	*Nudibranchia*	*I*
Okenia rosacea	*Nudibranchia*	*I, S*
Onchidella borealis	Basommatophora	I
Peltodoris nobilis	Nudibranchia	I, S
Phidiana hiltoni	Nudibranchia	I, S
Rostanga pulchra	Nudibranchia	I, S
Triopha catalinae	Nudibranchia	I, S
Triopha maculata	Nudibranchia	I, S
Triopha spp.	Nudibranchia	I, S
Tritonia festiva	Nudibranchia	*I,* S
Tylodina fungina	*Tylodinidae*	*I*
Williamia peltoides	Basommatophora	I, S
Mollusca - Polyplacophora (chitons)		
Callistochiton crassicostatus	*Ischnochitonidae*~~Polyplacophora~~	S
Cryptochiton stelleri	Polyplacophora	I, S
Cyanoplax dentiens	*Ischnochitonidae*	*I,S*
Cyanoplax hartwegii	*Ischnochitonidae*	*I*
Cyanoplax spp.	*Ischnochitonidae*	*I,S*
Ischnochiton radians	*Ischnochitonidae*	*I*

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Ischnochiton spp.	*Ischnochitonidae*	*I,S*
Ischnochitonidae ~~unid.~~	*Ischnochitonidae*~~Polyplacophora~~	I, S
Katharina tunicata	Polyplacophora	I
~~*Lepidochitona dentiens*~~	~~Polyplacophora~~	~~I~~
~~*Lepidochitona hartwegii*~~	~~Polyplacophora~~	~~I~~
~~*Lepidochitona* spp.~~	~~Polyplacophora~~	~~I~~
Lepidozona cooperi	*Ischnochitonidae*~~Polyplacophora~~	I, S
Lepidozona mertensii	*Ischnochitonidae*~~Polyplacophora~~	I*, S*
Lepidozona spp.	*Ischnochitonidae*~~Polyplacophora~~	I, S
Mopalia ciliata	Polyplacophora	I, S
Mopalia hindsii	Polyplacophora	*I,* S
Mopalia lignosa	Polyplacophora	I, S
Mopalia muscosa	Polyplacophora	I, S
Mopalia spp.	Polyplacophora	I, S
Nuttallina californica	*Ischnochitonidae*~~Polyplacophora~~	I
Nuttallina spp.	*Ischnochitonidae*~~Polyplacophora~~	I
Placiphorella velata	Polyplacophora	I, S
Polyplacophora unid.	Polyplacophora	I, S
Stenoplax fallax	*Ischnochitonidae*~~Polyplacophora~~	I
Stenoplax heathiana	*Ischnochitonidae*~~Polyplacophora~~	I, S
Stenoplax spp.	*Ischnochitonidae*~~Polyplacophora~~	I, S
Tonicella lineata	*Ischnochitonidae*~~Polyplacophora~~	I, S
Mollusca - Bivalvia (clams)		
Bivalvia	*Bivalvia*	*I, S*
Chama arcana	*Chamidae*~~Bivalvia~~	I
Chama pellucida	*Chamidae*	*I*
Chama spp.	*Chamidae*~~Bivalvia~~	I, S
Crassadoma gigantea	Bivalvia	I, S
Epilucina californica	Bivalvia	I
Gari californica	Bivalvia	I
Glans subquadrata	Bivalvia	I, S
Hiatella arctica	Bivalvia	I, S
Hiatella spp.	Bivalvia	I, S
Irusella lamellifer	Bivalvia	I, S
Kellia laperousii	Bivalvia	I
Limaria hemphilli	*Limidae*~~Bivalvia~~	S
Macoma nasuta	*Tellinidae*	
Macoma spp.	*Tellinidae*~~Bivalvia~~	I
Modiolus capax	*Bivalvia*	*I, S*
Modiolus spp.	Bivalvia	I, S
Musculus pygmaeus	Bivalvia	I
Mytilidae unid.	Bivalvia	I, S
Mytilimeria nuttalli	Bivalvia	I
Mytilus californianus	Bivalvia	I, S
Mytilus galloprovincialis	Bivalvia	I, S
Mytilus spp.	Bivalvia	I*, S*
Pelecypoda unid.	Bivalvia	I, S
Pholadidae unid.	Bivalvia	I, S
Pododesmus cepio	Bivalvia	I, S
Protothaca laciniata	*Bivalvia*	*S*
Protothaca staminea	*Bivalvia*	*I*
Pseudochama spp.	Bivalvia	I*, S*

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Septifer bifurcatus	Bivalvia	I
Transennella spp.	Bivalvia	I
Transennella tantilla	Bivalvia	I
Mollusca - Cephalopoda (octopus*, squid*)		
Octopus spp.	Octopodidae	I, S
Pycnogonida (sea spiders)		
Ammothea hilgendorfi	*Pycnogonida*	*I*
Nymphopsis spinosissima	*Pycnogonida*	*I*
Pycnogonida ~~unid.~~	Pycnogonida	I, S
Pycnogonum stearnsi	*Pycnogonida*	*S*
Crustacea (barnacles, copepods, isopods, amphipods, crabs, shrimps)		
Alpheidae ~~unid.~~	Alpheidae	*I,* S
Alpheus clamator	Alpheidae	S
Alpheus spp.	Alpheidae	*I,* S
Amphipoda	*Amphipoda*	*S*
Anomura ~~unid.~~	Anomura	I
~~*Balanus aquila*~~	~~Cirripedia~~	~~S~~
Balanus crenatus	*Balanidae*~~Cirripedia~~	I
Balanus nubilus	*Balanidae*~~Cirripedia~~	I, S
Balanus spp.	*Balanidae*~~Cirripedia~~	I, S
Betaeus harfordi	*Alpheidae*	*I*
Brachyuran	*Brachyura*	*S*
~~*Balanus/Tetraclita* spp.~~	~~Cirripedia~~	~~I, S~~
~~Brachyura unid.~~	~~Brachyura~~	~~I, S~~
~~*Cancer antennarius*~~	~~Cancridae~~	~~I, S~~
~~*Cancer anthonyi*~~	~~Cancridae~~	~~I, S~~
~~*Cancer branneri*~~	~~Cancridae~~	~~I~~
~~*Cancer jordani*~~	~~Cancridae~~	~~I~~
Cancer productus	Cancridae	I*, S*
Cancridae~~*Cancer* spp.~~	Cancridae	I, S
Candacia spp.	Copepoda	S
Caprellidea	*Amphipoda*	*I*
Chthamalus fissus	*Chthamalidae*~~Cirripedia~~	I, S
Cirolana harfordi	Isopoda	I
Cirolanidae unid.	Isopoda	I
Cirripedia unid.	Cirripedia	I
Clausocalanus jobei	Copepoda	S
Crangon nigricauda	Crangonidae	I*, S*
Crangon spp.	Crangonidae	I, S
Crangon stylirostris	Crangonidae	S
Cryptolithodes sitchensis	Lithodidae	I, S
Decapoda ~~unid.~~	Decapoda	I
Diptera larvae	*Insecta*	*I*
Exosphaeroma inornata	Isopoda	I
Gammaridea ~~unid.~~	Amphipoda	S
Grapsidae ~~unid.~~	Grapsidae	I*, S*
Hapalogaster cavicauda	*Lithodidae*	*I, S*
Hemigrapsus nudus	Grapsidae	I
Hemigrapsus oregonensis	Grapsidae	I
Hemigrapsus spp.	*Grapsidae*	*I*
Heptacarpus sitchensis	Hippolytidae	I

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Heptacarpus spp.	Hippolytidae	I, S
Heterocrypta occidentalis	*Parthenopidae*	*S*
Hippolytidae ~~unid.~~	Hippolytidae	I, S
Idotea fewkesi	*Isopoda*	*S*
Idotea resecata	*Isopoda*	*I*
Idotea spp.	Isopoda	I, S
Idotea stenops	Isopoda	I
Idotea urotoma	Isopoda	I
Idotea wosnesenskii	Isopoda	I, *S*
Isopoda ~~unid.~~	Isopoda	I, S
Lebbeus lagunae	Hippolytidae	S
Lepas anatiferal	*Lepadidae*	*I*
Ligia occidentalis	Isopoda	I
Lophopanopeus leucomanus heathi	Xanthidae	I
Lophopanopeus spp.	Xanthidae	I, S
Loxorhynchus crispatus	Majidae	I, S
Loxorhynchus spp.	Majidae	I, S
Majidae ~~unid.~~	Majidae	I, S
Megabalanus californicus	*Balanidae*~~Cirripedia~~	I, S
Menesiniella aquila	*Balanidae*	*I, S*
Metacarcinus anthonyi	*Cancridae*	*I, S*
Mimulus foliatus	Majidae	I, S
~~*Mitra idae*~~	~~Majidae~~	~~I, S~~
Natantia ~~unid.~~	Natantia	I, S
Pachycheles rudis	Porcellanidae	I, *S*
Pachycheles spp.	Porcellanidae	I, S
Pachygrapsus crassipes	Grapsidae	I
Pagurus spp.	Paguridae	I, S
Pandalus danae	*Pandalidae*	*S*
Pandalus spp.	*Pandalidae*	*I, S*
Panulirus interruptus	Palinuridae	I
Paracalanus parvus	*Copepoda*	*S*
Paracerceis cordata	Isopoda	S
Paraconcavus pacificus	*Balanidae*	*S*
Paraxanthias taylori	Xanthidae	I, S
Pelia tumida	*Majidae*	*S*
Petrolisthes cinctipes	Porcellanidae	I
Petrolisthes spp.	Porcellanidae	I, S
Photis conchicola	*Isaeidae*	*I*
Photis spp.	*Isaeidae*	*I*
Pleustidae	*Amphipoda*	*S*
Podochela hemphilli	*Majidae*	*S*
Pollicipes polymerus	*Pollicipedidae*~~Cirripedia~~	I
Porcellanidae ~~unid.~~	Porcellanidae	I, S
Pugettia gracilis	Majidae	I
Pugettia producta	Majidae	I, S
Pugettia richii	Majidae	I, S
Pugettia spp.	Majidae	I, S
Quadrimaera vigota	*Amphipoda*	*I*
Romaleon antennarius	*Cancridae*	*I,S*
Romaleon jordani	*Cancridae*	*I,S*
Scyra acutifrons	Majidae	S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Sphaeromatidae ~~unid.~~	Isopoda	I, S
Spirontocaris spp.	Hippolytidae	S
Tetraclita rubescens	*Tetraclitidae*~~Cirripedia~~	I, S
Xanthidae ~~unid.~~	Xanthidae	I, S
Sipuncula (peanut worms)		
Phascolosoma agassizii	*Phascolosomatidae*~~Sipuncula~~	I, S
Sipuncula ~~unid.~~	Sipuncula	I, S
Sipunculidae	*Sipunculidae*	*S*
Themiste pyroides	*Themistidae*~~Sipuncula~~	I, S
Bryozoa (moss animals)		
Barentsia spp.	Entoprocta	*I,* S
bryozoa ~~unid.~~ (encrusting)	Bryozoa	I, S
bryozoa ~~unid.~~ (erect)	Bryozoa	I, S
bryozoa ~~unid.~~ (foliose)	Bryozoa	I, S
bryozoan (epiphytic)	*Bryozoa*	*S*
Cauloramphus spiniferum	*Cheilostomata*	*S*
Entoprocta unid.	Entoprocta	I, S
Eurystomella bilabiata	Cheilostomata	I, S
Flustrella~~*Flustrellidra*~~ *corniculata*	Ctenostomata	I, S
Heteropora spp.	Cyclostomata	S
Hippodiplosia insculpta	Cheilostomata	I
Membranipora spp.	Cheilostomata	S
Microporella californica	Cheilostomata	I, S
Phidolopora pacifica	Cheilostomata	S
Phidolopora spp.	Cheilostomata	S
Tricellaria spp.	Cheilostomata	I, S
Echinodermata (sea stars, brittle stars, sea cucumbers, sea urchins)		
Amphiodia occidentalis	Ophiuroidea	I
Amphipholis spp.	*Amphiuridae*~~Ophiuroidea~~	I
Amphipholis squamata	*Amphiuridae*~~Ophiuroidea~~	I
Asteroidea ~~unid.~~	Asteroidea	I, S
Cucumaria spp.	Holothuroidea	I, S
Dermasterias imbricata	Asteroidea	S
Eupentacta quinquesemita	Holothuroidea	I, S
Henricia leviuscula	*Echinasteridae*~~Asteroidea~~	I, S
Holothuroidea ~~unid.~~	Holothuroidea	I, S
Leptasterias hexactis	*Asteriidae*~~Asteroidea~~	I, S
Leptasterias spp.	*Asteriidae*~~Asteroidea~~	I, S
Lissothuria nutriens	*Psolidae*~~Holothuroidea~~	I, S
Lytechinus spp.	*Toxopneustidae*	*S*
Ophiactis simplex	*Ophiactidae*~~Ophiuroidea~~	I, S
Ophioplocus esmarki	*Ophiuridae*~~Ophiuroidea~~	I, S
Ophioplocus spp.	*Ophiuridae*	*I, S*
Ophiopteris papillosa	*Ophiocomidae*~~Ophiuroidea~~	I*, S*
Ophiothrix spiculata	*Ophiothricidae*~~Ophiuroidea~~	I, S
Ophiothrix spp.	*Ophiothricidae*~~Ophiuroidea~~	I, S
Ophiuroidea ~~unid.~~	Ophiuroidea	I, S
Orthasterias koehleri	*Asteriidae*~~Asteroidea~~	I, S
Pachythyone rubra	*Sclerodactylidae*~~Holothuroidea~~	I
Parastichopus californicus	*Stichopodidae*~~Holothuroidea~~	I, S
Parastichopus parvimensis	*Stichopodidae*~~Holothuroidea~~	I, S
Patiria miniata	*Asterinidae*~~Asteroidea~~	I, S

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Pisaster brevispinus	*Asteriidae*~~Asteroidea~~	S
Pisaster giganteus	*Asteriidae*~~Asteroidea~~	I, S
Pisaster ochraceus	*Asteriidae*~~Asteroidea~~	I, S
Pisaster spp.	*Asteriidae*	*I, S*
Psolus chitonoides	*Psolidae*~~Holothuroidea~~	S
Pycnopodia helianthoides	*Asteriidae*~~Asteroidea~~	I, S
Strongylocentrotus franciscanus	*Strongylocentrotidae*~~Echinoidea~~	I, S
Strongylocentrotus purpuratus	*Strongylocentrotidae*~~Echinoidea~~	I, S
Strongylocentrotus spp.	*Strongylocentrotidae*	*I, S*
Stylasterias forreri	*Asteriidae*~~Asteroidea~~	S
Ascidiacea (sea squirts)		
Amaroucium californicum	*Ascidiacea*	*S*
Archidistoma psammion	Ascidiacea	I, S
Archidistoma spp.	Ascidiacea	I, S
Ascidia ceratodes	Ascidiacea	S
Ascidia spp.	Ascidiacea	S
Boltenia villosa	Ascidiacea	*I,* S
Chelyosoma productum	Ascidiacea	S
Chelyosoma spp.	Ascidiacea	S
Clavelina huntsmani	Ascidiacea	I, S
Cnemidocarpa finmarkiensis	Ascidiacea	*I,* S
Didemnum carnulentum	*Ascidiacea*	*I*
Didemnum/Trididemnum spp.	Ascidiacea	S
Distaplia spp.	Ascidiacea	S
Euherdmania claviformis	Ascidiacea	S
Metandrocarpa taylori	Ascidiacea	I, S
Perophora annectens	Ascidiacea	S
Pycnoclavella stanleyi	Ascidiacea	S
Pyura haustor	Ascidiacea	I, S
Ritterella pulchra	Ascidiacea	S
Ritterella spp.	Ascidiacea	S
Styela montereyensis	Ascidiacea	I, S
Styela spp.	Ascidiacea	S
Synoicum spp.	Ascidiacea	S
tunicate, colonial/social	*Tunicata*	*I*
tunicate, colonial ~~unid. a~~ (white)	*Tunicata*~~Ascidiacea~~	I, S
tunicate, colonial ~~unid. b~~ (yellow)	*Tunicata*~~Ascidiacea~~	S
tunicate, colonial ~~unid. c~~ (orange)	*Tunicata*~~Ascidiacea~~	I, S
tunicate, solitary unid.	*Tunicata*~~Ascidiacea~~	I, S
tunicate, compound/social	*Tunicata*	*I, S*
FISHES		
Chondrichthys (sharks, rays)		
Apristurus kampae	*Scyliorhinidae*	*I*
Cephaloscyllium ventriosum	Chondrichthys	S
Myliobatis californica	Chondrichthys	S
Platyrhinoidis triseriata	Chondrichthys	S
Raja binoculata	Chondrichthys	S
Raja inornata	Chondrichthys	S
Raja spp.	Chondrichthys	S
Rhinobatos productus	*Rhinobatidae*~~Chondrichthys~~	S
Torpedo californica	Chondrichthys	S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Triakis semifasciata	Chondrichthys	S
UrobatisUrolophus halleri	Chondrichthys	S
Osteichthys (bony fishes)		
Agonidae unid.	Agonidae	S
Anarrhichthys ocellatus	Anarhichadidae	S
Anoplarchus purpurescens	Stichaeidae	I, S
Anoplarchus spp.	*Stichaeidae*	*I*
Apodichthys flavidus	Pholidae	I, S
Apodichthys fucorum	Pholidae	I, S
Artedius corallinus	Cottidae	I
Artedius lateralis	Cottidae	I, S
Artedius spp.	Cottidae	I, S
Atherinops affinis	*Atherinopsidae*	*S*
Atherinopsidae unid.	Atherinopsidae	I, S
Atherinopsis californiensis	Atherinopsidae	S
Atherinops affinis	Atherinopsidae	S
Atractoscion nobilis	Sciaenidae	S
Aulorhynchus flavidus	Gasterosteidae	S
Blenniidae	*Blenniidae*	*I*
Bothragonus swanii	*Agonidae*	*I*
Brachyistius frenatus	Embiotocidae	S
Cebidichthys violaceus	Stichaeidae	I, S
Chilara taylori	Ophidiidae	I, S
Chirolophis nugator	Stichaeidae	S
Chromis punctipinnis	Pomacentridae	S
Citharichthys spp.	Paralichthyidae	S
Citharichthys stigmaeus	Paralichthyidae	S
Clinocottus recalvus	Cottidae	I
Clinocottus spp.	Cottidae	I
Clinidae unid.	Clinidae	*I,* S
Cottidae unid.	Cottidae	I, S
Cymatogaster aggregata	Embiotocidae	S
Embiotoca jacksoni	Embiotocidae	S
Embiotoca lateralis	Embiotocidae	S
Embiotocidae unid.	Embiotocidae	S
Engraulis mordax	Engraulidae	S
Gibbonsia montereyensis	Clinidae	S
Gibbonsia metzi	Clinidae	I
Gibbonsia spp.	Clinidae	I, S
Girella nigricans	Kyphosidae	I, S
Gobiesocidae unid.	Gobiesocidae	I, S
Gobiesox maeandricus	Gobiesocidae	I, S
Halichoeres semicinctus	Labridae	S
Hermosilla azurea	Kyphosidae	S
Heterostichus rostratus	Clinidae	I, S
Hexagrammos decagrammus	Hexagrammidae	S
Hyperprosopon anale	Embiotocidae	S
Hyperprosopon argenteum	Embiotocidae	S
Hypsurus caryi	Embiotocidae	S
Hypsypops rubicundus	Pomacentridae	S
Jordania zonope	Cottidae	S
Leptocottus spp.	*Cottidae*	*I*

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
~~larval/post-larval fish unid.~~	~~Osteichthys~~	~~I, S~~
Lethops connectens	Gobiidae	S
Liparis mucosus	Liparidae	I
Liparis spp.	Liparidae	S
Medialuna californiensis	Kyphosidae	S
Micrometrus aurora	Embiotocidae	I
Micrometrus minimus	Embiotocidae	I
Morone saxatilis	Percichthyidae	S
Nautichthys oculofasciatus	*Cottidae*	*S*
Neoclinus stephensae	Chaenopsidae	S
Neoclinus uninotatus	*Chaenopsidae*	*S*
Oligocottus maculosus	Cottidae	I
Oligocottus snyderi	Cottidae	I
Oligocottus spp.	Cottidae	I
Oncorhynchus tshawytscha	Salmonidae	S
Ophiodon elongatus	Hexagrammidae	S
Orthonopias triacis	Cottidae	S
Oxyjulis californica	Labridae	I, S
Oxylebius pictus	Hexagrammidae	S
Paralabrax clathratus	Serranidae	S
~~Paralichthyidae unid.~~	~~Paralichthyidae~~	~~S~~
Paralichthys californicus	Paralichthyidae	S
Parophrys vetulus	*Pleuronectidae*	*S*
Phanerodon atripes	Embiotocidae	S
Phanerodon furcatus	Embiotocidae	S
Phanerodon spp.	Embiotocidae	S
Pholidae~~Pholididae unid.~~	Pholidae	I, S
Pholidae~~Pholididae~~/Stichaeidae ~~unid.~~	Osteichthys	I, S
Platichthys stellatus	Pleuronectidae	S
Pleuronectidae ~~unid.~~	Pleuronectidae	S
Pleuronichthys coenosus	Pleuronectidae	S
Porichthys notatus	Batrachoididae	I, S
Rathbunella hypoplecta	Bathymasteridae	S
Rhacochilus toxotes	Embiotocidae	S
Rhacochilus vacca	Embiotocidae	S
Rhinogobiops nicholsi~~*nicholsii*~~	Gobiidae	S
Rimicola muscarum	Gobiesocidae	S
Rimicola spp.	Gobiesocidae	S
Sardinops sagax	Clupeidae	I, S
Sciaenidae ~~unid.~~	Sciaenidae	S
Scomber japonicus	Scombridae	S
Scorpaena guttata	Scorpaenidae	S
Scorpaenichthys marmoratus	Cottidae	S
Scytalina cerdale	Scytalinidae	I
Sebastes atrovirens	Scorpaenidae	S
Sebastes auriculatus	Scorpaenidae	S
Sebastes carnatus	Scorpaenidae	S
Sebastes caurinus	Scorpaenidae	S
Sebastes chrysomelas	Scorpaenidae	S
Sebastes melanops	Scorpaenidae	S
Sebastes miniatus	Scorpaenidae	S
Sebastes mystinus	Scorpaenidae	S

Table 2.2-1

SCIENTIFIC NAME	FAMILY / TAXON	DISTRIBUTION
Sebastes nebulosus	Scorpaenidae	S
~~*Sebastes pinniger*~~	~~Scorpaenidae~~	~~S~~
Sebastes rastrelliger	Scorpaenidae	S
Sebastes serranoides	Scorpaenidae	S
~~*Sebastes serranoides/S. flavidus*~~	~~Scorpaenidae~~	~~S~~
Sebastes spp.	Scorpaenidae	I, S
Semicossyphus pulcher	Labridae	S
Seriphus politus	Sciaenidae	S
Stichaeidae ~~unid.~~	Stichaeidae	S
Synchirus gilli	*Cottidae*	*S*
Syngnathus spp.	Syngnathidae	S
Trachurus symmetricus	Carangidae	S
Typhlogobius californiensis	Gobiidae	I
Ulvicola sanctaerosae	Pholidae	I
Xiphister atropurpureus	Stichaeidae	I
Xiphister mucosus	Stichaeidae	I
Xiphister spp.	Stichaeidae	I, S

Table 2.2-3

AQUATIC SPECIAL STATUS[1] SPECIES WITH POTENTIAL TO OCCUR OFF THE DIABLO CANYON LANDS[2]

Species	Common Name	Species Status[3] Federal	State	Record of Occurrence	Range/Habitat Assessment	Occurrence Potential
Balaenoptera musculus	*Blue whale*	*FE*	*None*	*No*	*Blue whales are found worldwide, from sub-polar to sub-tropical latitudes. Although blue whales are found in coastal waters, they are thought to occur generally more offshore than other whales.*	*Medium; documented from whale watching tours out of Morro Bay*
Physeter macrocephalus	*Sperm whale*	*FE*	*None*	*No*	*Sperm whales are found throughout the world's oceans in deep waters between about 60° N and 60° S latitudes.*	*Medium; typically found in waters deeper than those found in the vicinity of DCPP*
Balaenoptera physalus	*Fin whale*	*FE*	*None*	*No*	*Fin whales are found in deep, offshore waters of all major oceans, primarily in temperate to polar latitudes, and less commonly in the tropics.*	*Medium; documented from whale watching tours out of Morro Bay*
Megaptera novaeangliae	*Humpback whale*	*FE*	*None*	*Yes; Observed in the vicinity of DCPP*	*Humpback whales live in all major oceans from the equator to sub-polar latitudes. During migration, humpbacks stay near the surface of the ocean. While feeding and calving, humpbacks prefer shallow waters. During calving, humpbacks are usually found in the warmest waters available at that latitude. Calving grounds are commonly near offshore reef systems, islands, or continental shores. Humpback feeding grounds are in cold, productive coastal waters.*	*High; documented in vicinity of DCPP*
Balaenoptera borealis	*Sei whale*	*FE*	*None*	*No*	*Sei whales prefer subtropical to subpolar waters on the continental shelf edge and slope worldwide. They are usually observed in deeper waters of oceanic areas far from the coastline.*	*Low; outside of normal range of distribution*

Table 2.2-3

Species	Common Name	Species Status[3] Federal	State	Record of Occurrence	Range/Habitat Assessment	Occurrence Potential
Orcinus orca	Killer whale	FE	None	Yes; Observed in the vicinity of DCPP	Killer whales are found in all parts of the oceans. They are most abundant in colder waters, including Antarctica, the North Atlantic and Pacific Oceans, though they also occur, at lower densities, in tropical, subtropical, and offshore waters.	High; documented in vicinity of DCPP
Eubalaena japonica	North Pacific right whale	FE	SFP	No	Right whales have occurred historically in all the world's oceans from temperate to subpolar latitudes. They primarily occur in coastal or shelf waters, although movements over deep waters are known. During winter, right whales occur in lower latitudes and coastal waters where calving takes place and migrate to higher latitudes during spring and summer.	Medium; none have been documented, although DCPP is within the normal range of distribution
Eschrichtius robustus	Gray whale (Eastern North Pacific population)	FDL	None	Yes; Observed in the vicinity of DCPP	Gray whales are found mainly in shallow coastal waters in the North Pacific Ocean.	High; documented in vicinity of DCPP
Eumetopias jubatus	Steller (northern) sea lion	FDL	None	Yes; Haulout sites identified off Diablo Canyon Lands	Steller sea lions prefer the colder temperate to sub-arctic waters of the North Pacific Ocean. Haul outs and rookeries usually consist of beaches (gravel, rocky or sand), ledges, rocky reefs.	High; documented in vicinity of DCPP
Arctocephalus townsendi	Guadalupe fur-seal	FT	ST, SFP	No	Guadalupe fur seals reside in the tropical waters of the Southern California/ Mexico region. During breeding season, they are found in coastal rocky habitats and caves almost entirely on Guadalupe Island, Mexico. Little is known about their whereabouts during the non-breeding season.	Low; DCPP is not within the normal range distribution

Table 2.2-3

Species	***Common Name***	***Species Status³ Federal***	***State***	***Record of Occurrence***	***Range/Habitat Assessment***	***Occurrence Potential***
Enhydra lutris	*Southern sea otter*	*FT*	*SFP*	*Yes; Observed in the vicinity of DCPP*	*The current range extends along the California coast from Half Moon Bay in the north to Santa Barbara in the south. Southern sea otters inhabit shallow nearshore coastal ecosystems within 1-2 km from shore. They are usually seen in rocky marine habitats where there is a high abundance of kelp canopy and typically in water depths about 20 m.*	*High; documented in vicinity of DCPP*
Mirounga angustirostris	*Northern elephant seal*	*none*	*SFP*	*Yes; Observed in the vicinity of DCPP*	*Northern elephant seals are found in the eastern and central North Pacific Ocean. Though they range as far north as Alaska and as far south as Mexico, they typically breed in the Channel Islands of California or Baja California in Mexico. They are usually underwater, diving to depths of about 1,000-2,500 feet (330-800 m) for 20-30 minute intervals with only short breaks at the surface. They are rarely seen out at sea for this reason.*	*High; documented in vicinity of DCPP*
Oncorhynchus mykiss	*SCCC Steelhead DPS*	*FT*	*SSC*	*Yes; observed in Coon Creek*	*The south-central California coast (SCCC) DPS includes all naturally spawned O. mykiss (steelhead) populations below natural and manmade impassable barriers from the Pajaro River in Santa Cruz county south to but not including the Santa Maria River.*	*High; documented in Coon Creek*

Table 2.2-3

Species	Common Name	Species Status[3] Federal	State	Record of Occurrence	Range/Habitat Assessment	Occurrence Potential
Eucyclogobius newberryi	Tidewater goby	FE	SSC	No	The tidewater goby is a benthic fish species that inhabits coastal lagoons and streams between Del Norte County in northern California to San Diego County in southern California. They are typically found in brackish and cool water. The tidewater goby prefers salinities of less than 10 ppt (less than a third of the salinity found in the ocean,) and is thus more often found in the upper parts of the lagoons, near their inflow	Low; none documented during fishery surveys of streams in the vicinity of DCPP. Streams along Pecho Coast do not provide habitat for tidewater goby.
Acipenser medirostris	Green sturgeon	FT	SSC	No	Green sturgeon range from the Bering Sea to Ensenada, Mexico, with abundance increasing north of Point Conception, California. The species occupies freshwater rivers from the Sacramento River up through British Columbia, and inhabits coastal marine waters along the central California coast and between Vancouver Island, British Columbia, and southeast Alaska over the winter.	Low; no record of sightings, and outside of the range of peak abundance
Oncorhynchus kistuch	Coho salmon	FE	SE	No	The coho salmon spends most of its life in the ocean, but returns to freshwater streams to spawn. The range of the Central California Coast coho salmon ESU includes accessible reaches of all naturally spawned populations of coho from Punta Gorda in northern California south to, and including, the San Lorenzo River at the north end of Monterey Bay.	Low; no record of sightings, and outside of range of normal distribution

Table 2.2-3

Species	Common Name	Species Status[3] Federal	State	Record of Occurrence	Range/Habitat Assessment	Occurrence Potential
Chelonia mydas	Green sea turtle	FT	None	Yes; observed in the DCPP intake cove	The green turtle is globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30° North and 30° South. In the eastern North Pacific, green turtles have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego south.	High; documented in the DCPP intake cove
Dermochelys coriacea	Leatherback sea turtle	FE	None	No	Leatherbacks have been reported circumglobally and can forage in the cold temperate regions of the oceans, occurring at latitudes as high as 71° North and 47° South; however, nesting is confined to tropical and subtropical latitudes. Leatherbacks are commonly known as pelagic (open ocean) animals, but they also forage in coastal waters.	Medium; have documented sightings from San Luis Obispo and Monterey Bay (http://www.californiaherps.com/turtles/pages/d.coriacea.html)
Lepidochelys olivacea	Pacific olive ridley sea turtle	FE	None	No	Olive ridleys are globally distributed in the tropical regions of the South Atlantic, Pacific, and Indian Oceans. In the Eastern Pacific, they occur from Southern California to Northern Chile. The olive ridley is mainly a "pelagic" sea turtle, but has been known to inhabit coastal areas, including bays and estuaries.	Low; Rare along the CA Coast; however in 2001, 2002 and 2009 three live olive ridleys were documented offshore of Marin Co. CA (http://www.californiaherps.com/turtles/pages/l.olivacea.html)

Table 2.2-3

Species	Common Name	Species Status[3] Federal	State	Record of Occurrence	Range/Habitat Assessment	Occurrence Potential
Caretta caretta	Loggerhead sea turtle	FE	None	No	Loggerheads are circumglobal, occurring throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. In the eastern Pacific, loggerheads have been reported as far north as Alaska, and as far south as Chile, however, the only known nesting areas for loggerheads in the entire North Pacific are found in southern Japan.	Low; no sightings reported from San Luis Obispo Co, but sightings have been documented from San Diego Co to Humboldt Co. Closest sighting to DCPP was from Santa Barbara Co. (http://www.californiaherps.com/turtles/pages/c.caretta.html)
Haliotis cracherodii	Black abalone	FE	None	Yes; observed in the DCPP intake cove and discharge cove	Black abalone range from about Point Arena, CA to Bahia Tortugas and Isla Guadalupe, Mexico. During low tides, they are typically be found wedged into crevices, cracks, and holes of intertidal and shallow subtidal rocks, where they are fairly concealed. Black abalone can withstand extreme variation in temperature, salinity, moisture, and wave action.	High; documented in the DCPP intake and discharge coves

[1] - In this context, "Special Status" refers to species listed under the federal and/or state Endangered Species Acts (ESA), species proposed for listing under the federal ESA, species that are candidates for listing under the state ESA, state (CDFW) Fully Protected species, and state (CDFW) Species of Special Concern.

[2] - The North Ranch and South Ranch are the more than 11,000 acres of owner-controlled lands lying north and south of the plant site, and outside of Parcel P.

[3] - Designations used to identify special status of species presented in the table are as follows:
SE - State listed as Endangered, ST - State listed as Threatened, SCE - State candidate for listing as Endangered, SFP – State Fully Protected species (CDFW), SSC – State (CDFW) Species of Special Concern, FE - Federally listed as Endangered, FT - Federally listed as Threatened, FPE - Federally proposed for listing as Endangered, FPT - Federally proposed for listing as Threatened, FPD - Federally proposed for delisting, DL - Delisted