7.0 PHYSICAL AND CULTURAL RESOURCES

7.1 Topography and Geology

Topography

The topography of Corte Madera is varied, from the lowlands along the edge of the San Francisco Bay to the steeply-sloping hillsides of residential neighborhoods on Chapman Hill and Corte Madera Ridge (the location of Christmas Tree Hill). The visual effects of the Town's changing topography is particularly evident in the southwest quadrant, where elevations change from just above sea level (by Highway 101) to nearly 1,000 feet (atop the Corte Madera Ridge near Blithedale Summit – all in the space of about 1½ miles. **Figure 7.1.1** depicts the Town's topographic variety.

Geology

Three structural blocks roughly separated by the active San Andreas and Hayward faults characterize the geology of Marin County. Corte Madera lies within the San Francisco-Marin block, approximately nine miles northeast of the San Andreas Fault. Bedrock underlying the San Francisco-Marin structure block consists primarily of rocks associated with the Franciscan Formation. This includes an assemblage of sandstone, shale, greenstone and chert, conglomerate in lesser amounts, serpentine, calcium-silicate rock, and various metamorphic rocks. The Franciscan Formation often is fractured and loosely consolidated, leading in some instances to increased slope failure potential.

Corte Madera is located on the Bay side of southern Marin County, which consists of two geological terrains: upland terrain of hills and ridges with steep slopes (such as the Corte Madera Ridge), and lowland terrain with subdivisions of valley lands and Bay lands.v Different types of bedrock underlie the upland terrain. The Tiburon Peninsula Ridge (east of Highway 101) is topped by sheets of serpentine separated from the underlying sandstones and shale by a thick zone called the Franciscan mélange. Melange is composed of small to large hard rocks embedded in sheared and crushed rock material, formed by a fault that is no longer active. West of Highway 101 the ridges and knolls are made up of Franciscan sandstone. Melange underlies some of the lower slopes in the older parts of the Town.

The valley lands have surface deposits of alluvium or colluvium. Alluvium consists of clay, silt, sand, and gravel deposited by streams, and colluvium is deposits of unsorted soil material and rock fragments that accumulate at the base of slopes by gravity or landslide movement. The Bay lands are underlain by bedrock of the old valleys, now filled by sediments. Bay lands include Bay plains, marshes, and mudflats, which are primarily silt and clay transported by the Sacramento River and deposited by Bay tidewaters. These deposits are called Bay Mud. This soft mud is the most recent sediment deposited in the Bay consisting of unconsolidated, dark, silty clay rich in organic material, layers of well-sorted sand silt, mollusk shells and beds of peat. Corte Madera's lowlands are characterized by contrasting extremes, with hard bedrock

peninsulas and islands rising sharply out of Bay Mud marshlands. The lowland terrain also includes large areas of man-placed fill within the Bay lands.

Issues associated with geologic hazards, including seismicity, landsliding, liquefaction and subsidence, are addressed in Section 8.0, Public Safety.

7.2 Air Quality

Air Quality Climatology

Corte Madera is located in eastern Marin County, part of the nine-county San Francisco Bay Air Basin. Marin County is bounded on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate and on the north by the Petaluma Gap. Corte Madera is partially sheltered from prevailing northwesterly winds from off the Pacific Ocean by elevated terrain. The prevailing wind directions are northwesterly and southeasterly reflecting the influence of marine air flows through the Golden Gate to the south and the Petaluma Gap to the northwest.

The eastern side of Marin County has warmer weather than the western side because of its distance from the ocean and because the hills that separate eastern Marin from western Marin occasionally block the flow of marine air. Temperatures in Corte Madera are moderated by the cooling effect of the San Francisco Bay in summer and the warming effect of the Bay in winter.

Eastern Marin County has a relatively high potential for air quality compared to the rest of Marin County. Air pollution potential is a function of climate alone and not indicative of actual air pollution levels. High air pollution potential that means that the sheltering terrain and relatively light winds often limits the atmosphere's ability to transport and dilute pollutants. Marin County does not have many polluting industries and is located on the up-wind edge of the air basin, so that current air quality is good despite a high climatological pollution potential.

Historical Background and Air Quality Programs

Efforts to combat air pollution began in the Bay Area in 1955 with the formation of the Bay Area Air Pollution Control District (currently the Bay Area Air Quality Management District). The earliest rules and regulations controlled agricultural burning and household incinerators.

Federal Air Quality Programs

Air pollution control and planning began in earnest in 1967 with the passage of the Federal Clean Air Act. In 1970 the National Ambient Air Quality Standards (NAAQS) were established for six pollutants. These pollutants are commonly referred to as "criteria" pollutants because criteria documents, which establish the relationship between exposure and effects on human health, have been prepared for each contaminant. The Act required states exceeding the NAAQS to prepare air quality plans showing how the standards were to be met by 1987. The Act was amended in 1977

and in 1990 to extend the deadline for compliance. Failure to submit and implement an acceptable plan meant a state could be denied federal highway funding.

The Bay Area was initially classified as a federal non-attainment area (standards are not attained) for carbon monoxide and ozone. Ambient levels of carbon monoxide have been steadily declining in the Bay Area since the 1970's, and in 1998 the entire Bay Area was re-designated as an attainment area for this pollutant.

Ozone levels also have been declining since the 1970's, but in a less consistent manner. Based on monitoring data from 1990 to 1992 the Bay Area was re-designated as a federal attainment area for ozone in 1995. However, violations of the ozone standard in 1995 and 1996 lead the U.S. Environmental Protection Agency to re-designate the Bay Area back to non-attainment status, requiring preparation of an updated air quality plan. The Bay Area is considered to have attained all the NAAQS with the exception of the standard for ozone.

On January 22, 2002, the Bay Area fell into an official "conformity lapse" following failure of the Environmental Protection Agency to approve the 2001 Revised Bay Area Ozone Attainment Plan. This made it impossible for the latest Regional Transportation Plan (RTP) to be found to "conform" with an approved attainment plan. During a lapse, regionally significant highway and transit projects cannot receive federal approvals, nor can regionally significant projects that are funded with non-federal monies proceed. Resolution of the problem will require the EPA determine that the "motor vehicle emissions budget" contained in the attainment plan is adequate for conformity purposes. The Metropolitan Transportation Commission must then make a conformity finding for the 2001 Regional Transportation Plan, and once the Federal Highway Administration and the Federal Transit Administration have approved this finding, the lapse will be lifted. According to the Federal Highway Administration there have been 33 areas that have undergone a conformity lapse since July 1999, with durations ranging from a few days to over three years.

State Air Quality Programs

The State of California has its own air quality standards and air pollution planning programs. While both processes attempted to avoid health-related effects, the federal and state ambient standards were developed independently with differing purposes and methods. As a result, the federal and state standards differ in some cases. In general, the California state standards are more stringent. This is particularly true for ozone and particulate matter (PM_{10}).

In 1988 the California legislature passed the California Clean Air Act, which required air districts to develop air quality plans for the state standards. In general, the California Clean Air Act required the reduction of air pollutants by five percent or more per year or the implementation of "all feasible measures" to meet the state air quality standards as expeditiously as possible.

The Bay Area was initially determined to be a state non-attainment area for carbon monoxide, ozone and PM_{10}. The Bay Area was reclassified as attainment for carbon monoxide, but remains an ozone non-attainment area.

The California Legislature, when it passed the California Clean Air Act in *1988*, recognized the relative intractability of the PM_{10} problem with respect to the state ambient standard and excluded it from the basic planning requirements of the Act.

Ambient Air Quality Standards

The federal and California State ambient air quality standards are summarized in **Table 7.2.1** for important pollutants. The federeal and State ambient standards were developed independtly with differing purposes and methods, although both processes attempted to avoid health-related effects. As a result, the federal and State standards differ in some cases. In general, the State standards are are more stringent.

Table 7.2.1: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standard	State Standard
Ozone	1-Hour 8-Hour	0.12 ppm 0.08 ppm	0.09 ppm --
Carbon Monoxide	8-Hour 1-Hour	9.0 ppm 35.0 ppm	9.0 ppm 20.0 ppm
Nitrogen Dioxide	Annual 1-Hour	0.05 ppm --	-- 0.25 ppm
Sulfur Dioxide	Annual 24-Hour 1-Hour	0.03 ppm 0.14 ppm --	-- 0.05 ppm 0.5 ppm
PM_{10}	Annual 24-Hour	50 ug/m^3 150 ug/m^3	30ug/m^3 50 ug/m^3
$PM_{2.5}$	Annual 24-Hour	15 ug/m^3 65 ug/m^3	-- --
Lead	30-Day Avg. Month Avg.	-- 1.5 ug/m^3	1.5 ug/m^3 --

ppm = parts per pillion
ug/m^3 = Micrograms per Cubic Meter

Air Pollutants of Concern in the Bay Area and Corte Madera

The state and national ambient air quality standards cover a wide variety of pollutants. Only a few of these pollutants are problems in the Bay Area either due to the strength of the emission or the climate of the region. The BAAQMD monitors several pollutants at its monitoring site in nearby San Rafael. **Table 7.2.2** summarizes violations of air quality standards in San Rafael for the five-year period 1997-2001.

Table 7.2.2: Air Quality Data Summary for San Rafael, 1997-2001

Pollutant	Standard	Days Standard Exceeded In:				
		1997	1998	1999	2000	2001
Ozone	Federal 1-Hour	0	0	0	0	0
Ozone	State 1-Hour	1	0	2	0	0
Ozone	Federal 8-Hour	0	0	0	0	0
PM_{10}	Federal 24-Hour	0	0	0	0	0
PM_{10}	State 24-Hour	2	1	2	0	1
Carbon Monoxide	State/Federal 8-Hour	0	0	0	0	0
Nitrogen Dioxide	State 1-Hour	0	0	0	0	

Source: Air Resources Board, Aerometric Data Analysis and Management (ADAM), 2002.

Table 7.2.2 shows that the federal ambient air quality standards are met in Marin County, but the more stringent state standards for ozone and PM_{10} are exceeded. The following is a description of problem pollutants in Marin County or the greater Bay Area.

Ozone

Ground level ozone, often referred to as smog, is not emitted directly, but is formed in the atmosphere through complex chemical reactions between nitrogen oxides (NO_x) and reactive organic gases (ROG) in the presence of sunlight. The principal sources of NO_x and ROG, often termed ozone precursors, are combustion processes (including automobiles) and evaporation of solvents, paints and fuels. Motor vehicles are the single largest source of ozone precursors emissions in the Bay Area. Exposure to ozone can cause eye irritation, aggravate respiratory diseases and damage lung tissue, as well as damage vegetation and reduce visibility.

Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas that is formed by the incomplete combustion of fuels. Motor vehicles are by far the single largest source of CO in the Bay Area. At high concentrations, CO reduces the oxygen-carrying capacity of blood and can cause headaches, dizziness, unconsciousness, and even death. CO is currently a minor concern in the Bay Area. While violations of the ambient air quality standards were recorded in all years prior to 1991, concentrations of this pollutant have been steadily declining, and the region has been designated an attainment area for both the state and federal ambient air quality standards.

Particulate Matter

Fine particulate matter (PM_{10}) includes as wide range of solid or liquid particles, including smoke, dust, aerosols and metallic oxides. There are many sources of PM_{10} emissions, including combustion, industrial processes, grading and construction, and motor vehicles. Of the PM_{10} emissions associated with motor vehicle use, some are tailpipe and tire wear emissions, but greater quantities are generated by re-suspended road dust. Consequently, improvements in motor vehicle engines and fuels have not reduced PM_{10}, emissions as significantly as they have reduced emissions of other pollutants. Reductions in motor vehicle use are needed to significantly reduce PM_{10} emissions from re-suspended road dust.

Wood burning in fireplaces and stoves is a significant source of PM_{10}, particularly during episodes when PM_{10} levels are highest.

Fine particulate matter is a concern because it can bypass the body's natural filtration system more easily than larger particles, and can lodge deep in the lungs. Health effects of PM_{10} vary depending on a number of factors, including the type and size of particle. Research has shown a correlation between high PM_{10}, concentrations and increased mortality rates. Elevated levels can also aggravate chronic respiratory illness such as bronchitis and asthma.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern in the Bay Area. Unlike criteria pollutants, no safe levels of exposure to TACs can be established. There are many different types of TACs, with varying degrees of toxicity. Sources of TAC's include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, an motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage and death.

Diesel exhaust is a TAC of growing concern in the Bay Area. The California Air Resources Board in 1998 identified diesel engine particulate matter as a TAC. The exhaust from diesel engines contains hundreds of different gaseous and particulate components, many of which are toxic. Many of these compounds adhere to the particles, and because diesel particles are so small, they

penetrate deep into the lungs. Diesel engine particulate has been identified as a human carcinogen. Mobile sources, such as trucks, buses, automobiles, trains, ships and farm equipment are by far the largest source of diesel emissions. Studies show that diesel particulate matter concentrations are much higher near heavily traveled highways and intersections.

Other Air Quality Issues

Other air quality issues of concern in the Bay Area include nuisance impacts of odors and dust. Objectionable odors may be associated with a variety of pollutants. Common sources of odors include wastewater treatment plants, landfills, composting facilities, refineries and chemical plants. Similarly, nuisance dust may be generated by a variety of sources including quarries, agriculture, grading and construction. Odors rarely have direct health impacts, but they can be very unpleasant and can lead to anger and concern over possible health effects among the public.

The BAAQMD has enacted an odorous substances control program as part of its effort to control the use and emission of odorous substances within the Bay Area. This program places general limitations on odorous substances and provides the District with authority to respond to public complaints about offensive odors. The regulation is intended to help the public identify and control offensive odors that are not otherwise controlled by other federal or State air quality laws.

Sensitive Receptors and Pollution Sources

The Bay Area Air Quality Management District defines sensitive receptors as facilities where sensitive receptor population groups (children, the elderly, the acutely ill and the chronically ill) are likely to be located. These land uses include schools, retirement homes, convalescent homes, hospitals and medical clinics. Such sensitive receptors are spread through most parts of Corte Madera.

The Bay Area Air Quality Management District maintains inventories of stationary sources of both criteria pollutants and TACs. The BAAQMD inventory lists no major emitting facilities for criteria pollutants in Corte Madera**.**

The BAAQMD maintains inventories of sources of toxic air contaminants. The current inventory identifies numerous dry cleaners as sources of TACs spread over the commercial areas of Corte Madera. None of the sources of TACs in Corte Madera are considered as facilities with health risks requiring public notification under the Air Toxics Hot Spots Program.

Emerging Air Quality Issues

The following is a discussion of emerging air quality issues that may not have been previously addressed by general plan policies and programs.

Diesel Exhaust Land Use Issues

In 1998, after a 10-year scientific assessment process, the Air Resources Board identified particulate matter from diesel-fueled engines as a toxic air contaminant (TAC). The state of California has begun a program of identifying and reducing risks associated with particulate matter emissions from diesel-fueled vehicles. The plan consists of new regulatory standards for all new on road, off-road and stationary diesel-fueled engines and vehicles, new retrofit requirements for existing on-road, off-road and stationary diesel-fueled engines and vehicles, and new diesel fuel regulations to reduce the sulfur content of diesel fuel as required by advanced diesel emission control systems. Diesel exhaust has been found to be the most dangerous and ubiquitous TAC in the Bay Area. BAAQMD CEQA guidance provides:

> *Particular attention should be paid to projects that might result in sensitive receptors being exposed to high levels of diesel exhaust. This applies both to situations where a new or modified source of emissions is proposed near existing receptors and to new receptors locating near an existing source. Facilities that may have substantial diesel exhaust emissions include:*
>
> - *Truck Stop*
> - *Warehouse/distribution center*
> - *High volume transit center*
> - *High volume highway*
> - *High volume arterial/highway with high level of diesel traffic.*

The need to separate residential uses from sources of diesel can be in conflict with the need to locate housing near bus service. The design, layout and orientation of high-density housing needs to minimize exposure of residents to diesel exhaust.

Wood Smoke

Wood smoke has long been identified as a significant source of pollutants in urban and suburban areas. Wood smoke contributes to particulate matter and carbon monoxide concentrations, reduces visibility and contains numerous Toxic Air Contaminants. Present controls on this source include the adoption of emission standards for wood stoves and fireplace inserts.
Interest in wood smoke is likely to increase with the recent adoption of a $PM_{2.5}$, (particulate matter less than 2.5 microns in diameter) national standard. The monitoring of this pollutant and determination of the attainment status of the region are several years off due to the lack of a monitoring system.

"Smart" Growth

The Bay Area Air Quality Management District (together with five other regional agencies) have recently embarked on a program to encourage compact, in-fill development near public transit. The program promotes high-density development with transit orientation, considered "smart growth" as a means of combating the increasing use of automobiles in the region.

Relevance to General Plan

There are currently no federal, State or local air quality-related constraints on cities in the Bay Area. While the Bay Area has currently undergone a "conformity lapse", this is likely to be a temporary imposition of the federal sanctions provided for in the federal Clean Air Act and is directed at regional transportation agencies rather than cities.

The Bay Area Air Quality Management District has developed guidelines and thresholds of significance for local plans that will affect the CEQA documentation for the Corte Madera General Plan update. These guidelines recommend that general plans support the regional air quality plan by implementing those strategies that cities can implement.

The BAAQMD has developed thresholds of significance specifically for local plans, including city general plans and presumably housing elements. Inconsistency with the most recently adopted Clean Air Plan (CAP) is considered a significant impact. According to the BAAQMD, the following criteria must be satisfied for a local plan to be determined to be consistent with the CAP and not have a significant air quality impact:

- The local plan should be consistent with the CAP population and Vehicle Miles Traveled (VMT) assumptions. This is demonstrated if the population growth over the planning period will not exceed the values included in the current CAP, and

- The local plan demonstrates reasonable efforts to implement the Transportation Control Measures (TCMs) included in the CAP that identify cities as implementing agencies.

It is this second criterion that can be met by adoption of appropriate goals and policies in the General Plan.

7.3 Biological Resources

Biological Setting

The Town of Corte Madera is situated adjacent to the San Francisco Bay east of the hillsides and ridges at the foot of Mount Tamalpais. The transition from San Francisco Bay tidal wetlands and marshes to upland habitats like oak woodlands presents opportunities for the establishment of many ecological niches in this region. Discussion of the ecology and the biological setting of the Town of Corte Madera is divided into the following four sections:

- Wetland Vegetation and Wildlife
- Terrestrial Vegetation and Wildlife
- Threatened and Endangered Species
- Regulatory Setting

The San Francisco Bay tidal marshes and areas of undeveloped Bay frontage like those in the Town of Corte Madera take on greater regional significance as a result of the continued loss of such habitats to development elsewhere in the Bay. Specific state, federal and local laws have been enacted to regulate development activities in such ecologically valuable areas. The specific laws and the agencies that enforce them are discussed in detail below. The laws reflect the value that society has placed upon the natural environment. The Town of Corte Madera includes habitats and natural environments that support biological resources valuable to this society and to the citizens of Corte Madera. The vegetation and wildlife that occur within the Town Limits are summarized below.

The San Francisco Bay is part of the Pacific Flyway, the route taken by migrating waterfowl twice each year. The marshes and mudflats of the San Francisco Bay in Corte Madera provide important feeding and roosting habitat for these migrating birds. In the fall, migrating waterfowl and shorebirds by the hundreds of thousands arrive from the north to rest and feed before resuming their flights southward to Mexico and Central and South America. In the spring, waves of shorebirds are seen once again as they return. In addition, the freshwater runoff in local streams creates a mix of freshwater and saline water that supports invertebrates and fish. The gradient between freshwater and saline Bay waters provides very specialized niches for fish during specific life stages. In addition, the tidal marsh habitat and adjacent upland habitats support specialized plant communities, including several unique species known to occur in only a few places in the state.

Wetland Vegetation and Wildlife

The vast majority of the wetland habitat identified in the Town of Corte Madera occurs east of Highway 101, adjacent to the San Francisco Bay. Wetland habitats in the Town of Corte Madera include open waters such as the San Francisco Bay, the San Clemente Creek, the Corte Madera

Channel, and various creeks and seasonal streams. Mudflats, tidal marshes and seasonally inundated freshwater wetlands also occur.

Tidal marsh habitats are those areas inundated with twice-daily tidal flows. Vegetation in tidal areas include pickleweed (*Salicornia sp*.) and cord grass (*Spartina sp*.). An important component of tidal marsh habitat includes uplands associated with the manmade levees, which provide refuge for birds and mammals during high tide and storm events. Vegetation on the levees includes marsh gumplant (*Grindelia sp*.), sweet fennel (*foeniculum vulgare*) and a number of non-native plants. Tidal marsh habitats support a variety of birds and mammals including several special status species discussed below. Northern harriers and other birds of prey forage in tidal marshes. Song sparrows, clapper rails and other bird species nest in tidal marshes. Small mammals such as the salt marsh harvest mouse also live in tidal marshes. Black-tailed jackrabbits (*Lepus californicus*) live in the adjacent levee vegetation as well as garter snakes (*Thamnopis sp*.); and the Norway rat (*Rattus norvegicus*) is anticipated to occur in the tidal marshes.

Brackish marshes are those in which tidal waters and fresh waters mix. Brackish marshes support alkali bulrushes (*Scirpus robustus*), cattails (*Typha sp*.) and alkali heath (*Frankenia salina*), depending on the ratio of fresh water to tidal waters. Birds such as the mallard (*Anas platyrhyncos*), pintail (*Anas acuta*) and great blue heron (*Ardea herodias*) forage and roost in brackish marshes.

Freshwater wetlands may include cattails and riparian plants including willow trees, sedges, rushes and sedge meadows. These wetlands occur adjacent to open water habitats, along streams and stormwater or flood control channels, or they can occur in low-lying areas that are seasonally inundated. Herons and egrets forage in freshwater wetlands. Muskrats (Ondatra zibethica) occur in freshwater wetlands that include open water components.

Subtidal mudflats are specialized wetlands that support thousands of shorebirds. The shorebirds prey on invertebrates and arthropods present in the mud.

Corte Madera State Ecological Reserve

This reserve is the largest contiguous piece of wetland habitat in Corte Madera. It covers approximately 200 acres between the San Clemente Creek and the Greenbrae Boardwalk. The reserve is bordered to the east by the existing railroad levee that runs parallel to Highway 101. The reserve can best be viewed from the California Department of Fish and Game (CDFG) parking lot adjacent to the Madera Bay Park. The reserve is under the ownership and management of the CDFG.

Golden Gate Bridge, Highway and Transportation District Site

The Golden Gate Bridge, Highway and Transportation District (GGBHTD) is the previous owner of much of the Corte Madera State Ecological Reserve described above. When mitigation was required for the GGBHTD's dredging and filling activities associated with the operations of the Larkspur Ferry, the Ecological Reserve was created and deeded to the CDFG. However, a 72-acre parcel within the Reserve has continued to be used as a site for the deposition of dredge materials.

Shorebird Marsh

Shorebird Marsh is under ownership of the Town of Corte Madera. A Town Wetlands Advisory Committee was created to oversee management of the marsh. Shorebird Marsh is hydrologically connected to the Corte Madera State Ecological Reserve. Located just north of the Village Shopping Center, this marsh can best be seen from the existing parking area north of the Village Shopping Center and east of Highway 101.

Humber Marsh

Humber Marsh is approximately 4.1 acres in size and is located north of the Shorebird Marsh. This marsh is not subject to tidal action since it is bordered by levees that prevent tidal waters from entering the site. However, the tidal marsh substrate remains at the site and marsh plants and habitats are present.

Triangular Marsh

A privately-owned parcel of approximately 27 acres occurs to the west of Paradise Drive. The triangular-shaped parcel supports tidal mudflats and tidal marsh habitat types.

Additional Wetland Sites

In addition to the wetland sites identified above, areas that would meet the legal definition of wetlands occur adjacent to flood control channels and other areas where freshwater runs off from the urban areas. A number of potential wetland sites occur west of Highway 101, including along shoreline locations at the Town's various lagoons. It is likely that a number of wetlands of a small size occur in isolated locations without hydrologic connections to subsurface flows.

Triangular Marsh, looking north to San Francisco Bay.

Terrestrial Vegetation and Wildlife

The western portions of the Town support oak-bay woodland and annual grasslands, coastal scrub and coast redwood. The terrestrial habitats occur along the ridgelines and slopes and in the canyons. The primary ridges are the Corte Madera Ridge, Meadowsweet Ridge, Chapman Hill, Christmas Tree Hill and the Tiburon Peninsula Ridge.

Oak-bay woodland is the dominant terrestrial habitat type and includes live oak (*Quercus agrifolia*) and the California bay (*Umbellularia California*). The Pacific Madrone and coast redwood also occur in the terrestrial habitats within the Town boundaries

Many of the ridges support grasslands that have not been extensively studied. However, grasses likely to occur include rattle snake grass (*Briza sp.*), wild barley (*Hordeum sp.*) and rip-gut brome (*Bromus tectorum*). Abundant grasslands are found in the Ring Mountain Preserve, 72 acres of which occur within the Town of Corte Madera. The preserve is underlain by specialized soils, including serpentine. This soil type is known to support rare plants such as the Marin dwarf flax (*Hesperolinon congestum*), which is uniquely adapted to the chemical nature of the soil. Coastal scrub habitat occurs along ridges and hillsides and includes shrub species such as Coyote brush (*Baccaris pilularis*), bush monkey flower (*Diplacus aurantiacus*) and Toyon (*Heteromeles arbutifolia*). The scrub habitat is distributed in dense concentrations along ridges, hillsides and other dry areas. This habitat type is often colonized by non-native species such as French broom (*Cytisus monspessulanus*) and Pampas grass (*Cortaderia selloana*).

A variety of plants and wildlife occur in the Town of Corte Madera. Plants and animals likely to occur in the Town and vicinity are included in **Table 7.3.1** (listed at the end of this Section)**.** The number and variety of species represented in the table is due to the variety and distribution of suitable wetland and upland habitat types that occur within the Town limits and the adjacent areas. In some cases, the plants and wildlife are unique specifically to the Corte Madera region and the Mount Tamalpias watershed. Species that are unique to the region are considered locally rare and are protected under the California Environmental Quality Act or the California Endangered Species Act. Both acts are described below under the heading titled Regulatory Setting.

Threatened and Endangered Species

Threatened and endangered species are determined by the state and federal Endangered Species Acts, discussed below. Collectively these species are referred to as "special status" species. Special status species known to occur within the Town of Corte Madera boundary are discussed briefly below.

Special status species that may occur in the Town of Corte Madera are included in **Table 7.3.2**. Many of the species in the table are known to occur in specific habitat types within the Town boundaries, in particular the tidal marsh habitats adjacent to the Bay. Current distribution and population status for special status species is determined on a case-by-case basis during planning for a specific project, as required by State, federal and local regulations.

Table 7.3.2: Special Status Species with Potential to Occur within the Town of Corte Madera

Common and Scientific Name	*Status* * (Federal/State)	*California Distribution*	*Habitats*
PLANTS:			
Northcoast bird's-beak *Cordylanthus maritimus ssp. palustrus*	--/-- 1B	Along the coast of California from Humboldt down to Marin counties	Coastal salt marsh
Marin western flax *Hesperolinon congestum*	T/T	Known only from Marin, San Francisco and San Mateo Counties	Chaparral, valley and foothill grassland in serpentine barrens and in serpentine grassland and chaparral
White rayed pentachaeta *Pentachaeta bellidifloraa*	E/E	San Francisco Bay Area	Valley and foothill grassland; open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock
North coast semaphore grass *Pleuropogon hooverianus*	--/C	Along the coast to the north and south of the greater San Francisco Bay Area	Broadleaved upland forest, meadows and seeps, north coast coniferous forest; in wet, grassy, usually shady areas; sometimes freshwater marsh; associated with forest environments
Marin knotweed *Polygonum marinense*	--/-- 2	Endemic to coastal salt marshes of Marin County	Found in high coastal marsh habitats
BIRDS:			
American Peregrine falcon *Falco peregrinus anatum*	--/E	Coast of southern and central California; inland north coastal mountains, Klamath and Cascade ranges, the Sierra Nevada, Channel Islands	Wetlands, woodlands and other forested habitats, cities, agricultural areas and coastal habitats
Salt marsh common yellowthroat *Geothlypis trichas sinuosa*	--/SSC	San Francisco Bay south to San Diego	Tidal salt, brackish and freshwater marshes
California black rail *Laterallus jamaicensisCoturniculatus*	SC/T	Permanent resident in the San Francisco Bay and eastward through the Delta into Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside and Imperial Counties	Primarily found in tidal salt marshes associated with heavy growth of pickle weed; may also occur in brackish marshes or freshwater marshes at low elevations.
California brown pelican *Pelecanus occidentalis californicus*	E/E	Pelicans nest from the Channel Islands of Southern California southward along the Baja California Coast (along several islands of the coast) and in the Gulf of California to coastal southern Mexico	Marine; Islands, bays, coastal ponds and sloughs; piers and jetties

Common and Scientific Name	*Status* * (Federal/State)	*California Distribution*	*Habitats*
FISH:			
Tidewater goby *Eucylclogobius newberryi*	E/--	Brackish water habitats along the California Coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River.	Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.
Winter-run chinook salmon *Oncorhynchus tshawytscha*	E/E	Pacific Ocean, Northern San Francisco and San Pablo bays	Open water, freshwater streams and estuaries
Longfin smelt *Spirinchus thaleichthys*	--/SSC	Widely distributed in estuaries along the Pacific Coast from the Delta to Prince William Sound, Alaska	Sloughs, edges of rivers and bays, tidal channels
INVERTEBRATES:			
Myrtle's silverspot butterfly *Speyeria zerene myrtleae*	E/--	Northern Marin County	Coastal dunes, scrub and grassland
MAMMALS:			
Salt marsh harvest mouse *Reithrodontomys raviventris*	E/E	San Francisco, San Pablo and Suisun Bays	Salt marshes with a dense plant cover of pickle weed and fat hen; adjacent to an upland site
Harbor seal *Phoca vitulina*	Marine Mammal Protection Act	Temperate and subarctic waters of the North Atlantic and North Pacific oceans. In the North Pacific Ocean, harbor seals can be found from Alaska south along the coast of North America to Cedros Island off the west coast of Baja California and along the Asiatic coast to China	Tidal salt marshes, protected tidal rocks and reefs

*Status Explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
C = Category 1 candidate for federal listing. Species for which USFWS has on file enough substantial information on biological vulnerability and threat to support proposals to list them.
SC = species of concern; formerly Category 2 candidate for federal listing.
PE = proposed for listing as endangered.
PT = proposed for listing as threatened.
-- = no listing status.

State

E = listed as endangered under the California Endangered Species Act.
R = listed as rare under the California Endangered Species Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.
T = listed as threatened under the California Endangered Species Act.
CP = fully protected under the California Fish and Game Code.
SSC = species of special concern.
-- = no listing status.

California Native Plant Society (Skinner and Pavlik 1994)

1B = List 1B species: rare, threatened or endangered in California and elsewhere.
2 = List 2 species: rare, threatened or endangered in California, more common elsewhere.
3 = Plants for which more information is needed
4 = List 4 species: plants of limited distribution, a watch list.

Salt Marsh Harvest Mouse. The Corte Madera Ecological Preserve is considered to be critical habitat for the salt marsh harvest mouse (SMHM), a State- and federally-listed endangered species (USFWS 1984). The species is expected to occur in tidal marsh habitats, particularly within the transition zone between salt marsh and levees that provide refuge for these small mammals during high tide or storm events.

California Clapper Rail. California clapper rails are State- and federally-listed as endangered species. Tidal marsh habitats, particularly the Corte Madera State Ecological Preserve, support suitable habitat for the species.

California Black Rail. This species is known to use the Corte Madera Ecological Reserve, particularly during the winter season. The black rail is listed as threatened under the California Endangered Species Act.

Harbor Seal. Although not listed under either the state or federal Endangered Species Act, the harbor seal is protected under the Marine Mammal Protection Act. Mudflats in the San Francisco Bay are used by this species for haul-outs during low tide. The seals require a secure location to rest and dry out their bodies in order to maintain the health of their skin and fur. Seals haul out year-round but are most abundant during the summer months. Corte Madera Ecological Preserve is included in a list of 12 documented seal haul-out locations in the San Francisco Bay. The Reserve is not considered a significant pupping area for harbor seals.

Marin Knotweed. A small occurrence of Marin knotweed is present along Corte Madera Creek, north of the Town limits. However, this species is endemic to the area, meaning that it is known only from this part of California. Therefore, although it is not listed as threatened or endangered, this plant species would be protected under the California Environmental Quality Act.

Northcoast Bird's-beak. This plant occurs in tidal marsh habitat and is often associated with pickleweed (*Salicornia sp*.). It is known from fewer than 40 occurrences, nearly half of which are presumed to be extirpated, meaning that they no longer exist. This plant would be protected under CEQA.

Additional special status species that may occur in the Corte Madera area include:

- American Peregrine Falcon (*Falco peregrinus anatum*)
- California Brown Pelican (*Pelecanus occidentalis californicus*)
- Winter-run Chinook Salmon (*Oncorhynchus tshawytscha*)
- Myrtle's Silverspot Butterfly (*Speyeria zerene myrtleae*)

Among these species, the American peregrine falcon and California brown pelican are expected to occur in the project area on a transient basis. Suitable habitat is not present in Corte Madera for the Myrtle's silverspot butterfly. Winter-run chinook salmon may occur on a seasonal basis in tidal stream channels such as the Corte Madera Creek or San Clemente Creek.

Regulatory Setting

Federal, State and local regulations have been enacted to require consideration and protection of ecological habitats and the species they support. A brief discussion of the specific regulations that apply to the habitats and species likely to occur in the Town of Corte Madera is included below.

Endangered Species Act of 1973 (16USC 1531 et seq.)

The Endangered Species Act protects threatened and endangered species by prohibiting federal actions that would jeopardize the continued existence of such species or that would result in the destruction or adverse modification of any critical habitat of such species. Section 7 of the Act requires that consultation regarding protection of such species be conducted with the USFWS prior to project implementation.

During the project planning process, the USFWS evaluates the potential impacts of all aspects of the proposed action on threatened or endangered species. Impacts are disclosed in a Biological Assessment, which is submitted to the USFWS. The USFWS summarizes its findings in a Biological Opinion that includes a determination of whether an action would jeopardize the continued existence of a threatened or endangered species or would modify critical habitat.

California Endangered Species Act of 1984 (Fish and Game Code Section 2050 et seq.)

The California Endangered Species Act provides for the recognition and protection of rare, threatened and endangered species of plants and animals. The Act requires state agencies to consult with the California Department of Fish and Game (CDFG) to ensure that State-authorized or funded actions do not jeopardize the continued existence of a listed species. The Act prohibits the taking (collecting, killing or injury) of listed species without authorization by the CDFG. The extent of taking authorized by the CDFG is established as "incidental take" and is accompanied by a mitigation requirement intended to offset the effect of the loss of the individual of the species.

Migratory Bird Treaty Act (16 USC 703 et seq.)

The specific birds covered in this act are identified in agreements between the U.S. and the countries of Great Britain, Mexico and Japan. The treaty protects migratory birds by limiting the hunting, capturing, selling, purchasing, transporting, importing, exporting, killing or possession of these birds or their nests or eggs.

Coastal Zone Management Act. (16 USC 1456 et seq.)

The Coastal Zone Management Act (CZMA) established national policy to preserve, protect, develop, and where possible, restore or enhance the nation's coastal zone. The coastal zone includes the territorial sea and inland bays. If a proposed project affects water use in the coastal

zone, the activity must be consistent with the State's coastal zone management program to the maximum extent possible. This applies to actions taken by a federal entity or to actions that require a federal permit. The reauthorization amendments of the CZMA, passed in 1990, indicate that any federal action regardless of its location, would be subject to the CZMA. Since the Town of Corte Madera is located adjacent to the San Francisco Bay, nearly any project action proposed in the Town that requires a federal permit would be subject to the CZMA.

The Fish and Wildlife Coordination Act of 1958 (16 USC 661et seq.)

This Act requires that whenever any body of water is proposed or authorized to be impounded, diverted or otherwise controlled or modified, the lead federal agency must consult with the U.S. Fish and Wildlife Service (USFWS), the state agency responsible for fish and wildlife management, and the National Marine Fisheries Service. Section 662(b) of the Act requires the lead federal agency to consider the USFWS and other agencies' recommendations. The recommendations may include proposed measures to mitigate or compensate for potential damages to wildlife and fisheries associated with a modification of a waterway.

Marine Mammal Protection Act (P.L. 92-522; amended by P.L. 98-364, approved July 17, 1984.)

This Act prohibits the taking or importing of marine mammals or marine mammal products except under special permit conditions. The term "take" is broadly defined to include harassing or attempting to harass marine mammals. The term "marine mammal" includes all seals, sea lions and other mammals that primarily occur in marine environments.

Executive Order 11990 Protection of Wetlands (42 FR 26961, 25 May 1977)

This executive order requires federal agencies to provide leadership and take action to minimize destruction, loss or degradation of wetlands, and to preserve and enhance the natural qualities of these lands. Federal agencies are required to avoid undertaking or providing support for new construction located in wetlands unless 1) no practicable alternative exists; and, 2) all practical measures have been taken to minimize harm to wetlands.

Estuary Protection Act (16 USC 1221 et seq.)

Consideration of estuaries and their natural resources and importance must be included in the planning for the use or development of water and land resources. Compliance with this Act may be achieved through coordination with the Department of the Interior under the Fish and Wildlife Coordination Act and the National Environmental Policy Act.

California Coastal Act of 1976 (PRC Section 3000 et seq.)

Under the authorization of this Act, the Coastal Zone Management Plan (CZMP) was developed and has been approved by the U.S. Department of Commerce. All federal actions that affect the coast must be determined to be as consistent as practicable with this plan.

California Wetlands Policy

The California Resources Agency and its various departments do not authorize or approve projects that fill or otherwise harm or destroy coastal, estuarine or inland wetlands. Exceptions may be granted if all of the following conditions are met:

- The project is water-dependent
- No other feasible alternative is available
- The public trust is not adversely affected
- Adequate compensation is proposed as part of the project.

Clean Water Act (33 USC 1251 et seq.)

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical and biological integrity of the nations's waters. Specific sections of the Act control the discharge of pollutants and wastes into aquatic and marine environment. Section 404 (b)(1) of the CWA, as amended in 1977, requires that the U.S. Army Corps of Engineers evaluate the impact of the discharge of dredged or fill materials into the waters of the United States. Subpart A, Section 230.1(c) of Section 404 (b)(1) guidelines states the following: "Fundamental to these guidelines is the precept that dredged or fill materials should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge would not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting ecosystems of concern."

Porter-Cologne Water Quality Control Act of 1966 (California Water Code Sec. 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15)

The Porter-Cologne Act is the primary State regulation that addresses water quality. The requirements of the Act are implemented by the State Water Resources Control Board (SWRCB) at the state level and at the local level by the Regional Water Quality Control Board (RWCQB). The RWQCB carries out planning, permitting and enforcement activities related to water quality in California. The Act provides for waste discharge requirements and a permitting system for discharges to land or water. Certification is required by the RWQCB for activities that can affect water quality.

Under the Clean Water Act's National Pollution Discharge Elimination System (NPDES), a Phase II ruling on December 8, 1999 requires Municipal storm water permits to be updated. The changes to the existing requirements are due to be published in March of 2003. At that time, municipalities will apply for permits under the new requirements. The Phase II rule will likely give more

responsibility to local jurisdictions for the monitoring of construction projects under the NPDES provisions. It is likely that the Town of Corte Madera would be included in a Marin County permit application. However, it is worth noting that in the near future, local actions which require Stormwater Pollution Prevention Plans are likely to include projects as small as one acre in size. In addition, the RWQCB is likely to begin new local programs that create a general permit that allows for a notification process for projects that would have limited impacts such as replacement of culverts or flood control modifications. Currently these activities require submittal of an application for a Water Quality Certification.

McAteer-Petris Act/San Francisco Bay Plan

The McAteer-Petris Act established the Bay Conservation Development Commission (BCDC) as the agency responsible for maintaining and carrying out the provisions of the Act and the Bay Plan. The Bay Plan is the primary plan governing development in San Francisco Bay; it is a comprehensive and enforceable plan for conservation of water of the Bay and the development of its shoreline. The Act directs BCDC to exercise its authority to issue or deny permit applications for placing of Bay fill. The agency has jurisdiction over all tidal areas of the San Francisco Bay and the Sacramento River, including projects within 100 feet of the shoreline.

The Bay Plan shows the development of a proposed 60- to 100-acre Corte Madera Shoreline Park and the preservation of Triangular Marsh as a tidal marsh.

BCDC is currently updating portions of the Bay Plan to include current information regarding plants and wildlife. The Bay Plan is the guiding policy document for the BCDC, and the updated versions are likely to emphasize the protection of species protected under State and Federal Endangered Species Acts. Coordination with state and federal agencies is underway and is likely to result in policy guidelines and new requirements regarding state-wide efforts to protect species. It is likely that the open water habitats in the Corte Madera area will be designated as Essential Fish Habitat in the BCDC Bay Plan, and as such, potential impacts to these areas will require analysis during the permit process. An emphasis on the functions and values of inland wetlands is also likely to be included in the new Bay Plan and would result in greater analysis of potential impacts to the Corte Madera wetland habitats that occur east of the Highway 101 freeway.

Table 7.3.1: Plant And Animal Species Likely To Occur In Corte Madera

Plants:	
Green-wattle acacia	*Acacia decurrens*
Black acacia	*Acacia decurrens* var. *mollis*
Napa false indigo	*Amorpha Californica var. napensis*
Pimpernel	*Anagallis sp.*
Mt. Tamalpais manzanita	*Arctostaphylos hookeri ssp. Montana*
Tamalpais manzanita	*Arctostaphylos pungens*
Marin manzanita	*Arctostaphylos virgata*
Mugwort	*Artemisia douglasiana*
Wild oats	*Avena fatua*
Coyote bush	*Baccharis pilularis* ssp. *consanguinea*
Small ground cone	*Boschniakia hookeri*
Rattlesnake grass	*Briza sp.*
Ripgut	*Bromus diandrus.*
Cheat grass	*Bromus tectorum*
Tiburon mariposa	*Calochortus tiburonensis*
Sedges	*Carex sp.*
Tiburon paintbrush	*Castilleja affinis* ssp. *neglecta*
San Francisco Bay spine flower	*Chorizanthe cuspidate* var. *cuspidate*
Mt. Tamalpais thistle	*Cirsium hydrophilum var. vaseyi*
Monterey cypress	*Cupressus macrocarpa*
French broom	*Cytisus monspessulanus*
Northcoast bird's-beak	*Cordylanthus maritimus* ssp. *Palustris*
Pampas grass	*Cortaderia selloana*
Filbert	Corylus cornuta
Bush monkeyflower	*Diplacus aurantiacus*
Saltgrass	*Distichlis spicata*
California oatgrass	*Danthonia californica*
Shooting star	*Dodecatheon sp.*
Wild rye	*Elymus sp.*
Creeping wild rye	*Elymus triticoides*
Alkali heath	Frankenia salina

Fescues	*Festuca myuros*
Filaree	Erodium cicutarium
Fissidens moss	Fissidens pauperculus
	Frankenia sp.
Marin checker lilly	*Fritillaria affinis var. tristulis*
Anis	Foeniculum vulgare
Gumplant	Grindelia humilis
Diablo rock rose	Helianthela castana
Tiburon tarweed	*Hemizonia multiculis* ssp. *vernal*
Marin western flax	*Hesperolinon congestum*
Toyon	*Heteromeles arbutifolia*
Velvet grass	*Holcus lanatus*
Santa cruz tarweed	*Holocarpha macradenia*
Wild barley	Hordeum sp.
Thin-lobed horkelia	Horkelia tenuiloba
Cats-ear	*Hypochoeris glabra*
Jaumea	*Jaumea sp.*
Toad rush	*Juncus bufonius*
Pointed rush	Juncus oxymeris
Spreading rush	*Juncus patens*
Slender rush	*Juncus tenuis* var. *congestus*
Tamalpais lessingia	*Lessingia micradenia var. micradenia*
Sea-lavender	Limonium sp.
Italian ryegrass	Lolium multiflorum
Trefoil	Lotus sp.
Wood rush	Luzula subsessillis
Melic	*Melica sp.*
Santa cruz microseris	*Microseris decipiens*
Marin county navarretia	*Navarretia rosulata*
San Francisco owl's clover	*Orthocarpus floribundus*
White rayed pentachaeta	*Pentachaeta bellidifloraa*
Gairdner's yampah	*Perideridia gairdner subsp. gairdner*
Hairless popcorn-flower	*Plagiobothrys glaber*

Plantain	*Plantago sp.*
North coast semaphore grass	*Pleuropogon hooverianus*
Marin knotweed	*Polygonum marinense*
Beardgrass	*Polypogon*
Firethorn	*Pyracantha*
California coast live oak	*Quercus agrifolia*
Talmapais oak	Quercus parvula *var*. tamalpaisensis
Wild rose	*Rosa sp.*
Blackberry	*Rubus sp.*
Pickleweed	*Salicornia virginica*
Willows	*Salix spp.*
Alkali bulrush	*Scirpus robustus*
Coast redwood	*Sequoia sempervirens*
Point Reyes checkerbloom	*Sidalcea calycosa ssp. rhizomata*
Marin checkermallow	*Sidalcea hickmanii* ssp. *viridis*
Blue-eyed grass	*Sisyvinchium sp.*
Cordgrass	*Spartina foliosa*
Santa Cruz microseris	*Stebbinsoseris decipiens*
Foothill stipa	Stipa lepida
Purple stipa	Stipa pulchra
Mt. Tamalpais jewel-flower	Streptanthus glandulosus ssp. pulchellu
Tiburon jewelflower	*Streptanthus niger*
Tamalpais streptanthus	*Streptanthus patrachopus*
Poison oak	*Toxicodendron diversilobum*
Showy Indian clover	*Trifolium amoenum*
Arrow-grass	*Triglochin sp.*
Broad-leaved cattail	*Typha latfolia*
Cattail	*Typha sp.*
California bay	*Umbellularia Californica*
Gumweed	*Grindelia sp.*
Sweet fennel	*Foeniculum volgare*
Pacific madrone	*Arbutus menziesii*
Eucalyptus	*Eucalyptus sp.*

Amphibians:

California red-legged frog	Rana aurora draytoni
Foothill yellow-legged frog	Rana boylii

Birds:

Tricolored blackbird	*Agelaius tricolor*
Pintail	*Anas acuta*
Cinnamon teal	*Anas cyanoptera*
Mallard	*Anas platyrhynchos*
Great blue heronf	*Ardea herodias*
Short-eared owl	*Asio flammeus*
Great-horned owl	*Bubo virginiarus*
Red-tailed hawk	*Buteo jamaicensis*
Sandpiper	*Calidris sp.*
Western sandpiper	*Calidris mauri*
Anna's hummingbird	*Calypte anna*
Great egret	*Casmerodius albus*
Willet	*Catoptrophorus semipalmatus*
Killder	*Charadrius vociferus*
Northern harrier	*Circus cyaneus*
Common raven	*Covrus corax*
Stellar's jay	*Cyanocitta stelleri*
White-tailed kite	*Elanus leucurus*
Western flycatcher	*Empidonax difficilis*
American peregrine falcon	*Falco peregrinus anatum*
Coot	*Fulica Americana*
Salt marsh common yellowthroat	*Geothlypis trichas sinuosa*
Gull	*Larus sp.*
California black rail	*Laterallus jamaicensis coturniculatus*
Acorn woodpecker	*Melanerpes formicivorous*
Song sparrow	*Melospiza melodia*
San Pablo song sparrow	*Melospiza melodia samuelis*

California brown pelican	*Pelecanus occidentalis californicus*
Plover	*Pluvialis*
Sora	*Porzana carolina*
Screech owl	*Otus asio*
Ruddy duck	*Oxyura jamaicensis*
Red-necked phalarope	*Phalaropus lobatus*
Virginia rail	*Rallus limicola*
California clapper rail	*Rallus longirostris obsoletus*
American avocet	*Recurvirostra Americana*
Northern spotted owl	*Strix occidentalis caurina*
Western meadowlark	*Sturnella neglecta*
Western kingbird	*Tyrannus verticalis*
Barn owl	*Tyto alba*

Fish:

Yellow fin goby	*Acanthogobius flavimanus*
Green sturgeon	*Acipenser medirostris*
White sturgeon	*Acipenser transmontanus*
Anchovy	*Anchoa sp.*
Top smelt	*Atherinops affinis*
Pacific sanddab	*Citharichthys sordidus*
Herring	*Clupea sp.*
Pacific herring	*Clupea pallasii*
Prickly sculpin	*Cottus asper*
Shiner perch	*Cymatogaster aggregata*
Tidewater goby	*Eucylclogobius newberryi*
Mosquito fish	*Gambusia affinis*
Longjaw mudsucker	*Gillichthys mirabilis*
Tule perch	*Hysterocarpus traskiii*
Pacific lamprey	*Lampetra tridentata*
Bay goby	*Lepidogobius lepidus*
Staghorn sculpin	*Leptocottus armatus*
Rainwater killifish	*Lucania parva*

Striped bass	*Morone saxatilis*
Brown smoothhound	*Mustelus henlei*
Bat ray	*Myliobatis Californica*
Coho salmon	*Oncorhynchus kisutch*
Winter-run chinook salmon	*Oncorhynchus tshawytscha*
English sole	*Parophrys vetulus*
Starry flounder	*Platichthys stellatus*
Plainfin midshipman	*Porichthys notatus*
Longfin smelt	*Spirinchus thaleichthys*
Leopard shark	*Triakis semifasciata*

Invertebrates:

Opler's longhorn moth	*Adella oplerella*
Beach hopper	*Alloniscus sp.*
Annelid worm	*Annelid*
Horse mussels	*Atrina zelandica*
Marin blind harvestman	*Calicina diminua*
Dungeness Crab	*Cancer magister*
Bay shrimp	*Crangon nigricauda*
Shore crab	*Hemigrapsus sp.*
Mud snail	*Lymnaea glabra*
Macoma clam	*Macoma nasuta*
Softshell clam	*Mya arenaria*
Tiburon blind harvestman	*Sitalcina tiburona*
Myrtle's silverspot butterfly	*Speyeria zerene myrtleae*
Clam	*Tridacna sp.*

Mammals:

Striped skunk	*Mephitis mephitis*
Meadow mouse	*Microtus sp.*
California vole	*Microtus californicus*
Black-tailed jack rabbit	*Lepus californicus*
Columbian black-tailed deer	*Odocoileus hemionus columbionus*

Muskrat	*Ondatra zibethicag*
Deer mouse	*Peromyscus sp.*
Norway rat	*Rattus norvegicus*
Western harvest mouse	*Reithrodontomys megalotis*
Salt marsh harvest mouse	*Reithrodontomys raviventris*
Grey squirrel	*Sciurus griesius*
Shrew	*Sorex sp.*
Pocket gopher	*Thomomys botae*
Grey fox	*Urocyon cinereoargentus*

Reptiles:

Northwestern pond turtle	*Clemmys marmorata marmorata*
Garter snake	*Thamnopis*

7.4 Cultural, Archaeological and Historical Resources

Numerous prehistoric archaeological sites have been identified near former or existing marsh boundaries, watercourses, the base of foothills, and near vegetation throughout the Bay Area, including Corte Madera. The California Archaeological Inventory has identified eight recorded prehistoric archaeological sites within the Town of Corte Madera and two adjacent archaeological sites within the Ring Mountain Preserve. Areas that have not been part of a project environment review (this includes ninety percent of the Town) have never been studied, so there is potentially a high probability of unrecognized prehistoric and historic cultural resources within Corte Madera.

The earliest archaeological sites in the San Francisco Bay region date from approximately 7000 B.P. Though populations were sparse at the time, their numbers were increasing throughout California. By 4000 B.P., greater populations occupied areas near bayshore and marsh habitats. Archaeological sites dating between 1700 – 1500 B.P. display an increasing complexity in artifact style. The Coast Miwok occupied the area now known as Corte Madera. Local prehistoric site findings include shell midden, petroglyphs, bedrock mortar, and other evidence of occupation.

The Native American cultural tradition was disrupted by the Spanish Mission System, which led to a 95 percent reduction in population between 1770 and 1790. Indigenous populations within Corte Madera would most likely have been incorporated into the missions established in San Rafael, San Francisco, or Sonoma. The earliest European explorer to the Bay Area was Sir Francis Drake in 1579; however, it wasn't until the California Gold Rush of 1849 that resulted in the development of San Francisco as a home for people from around the world. Development of the Town from the mid-1850s to present is further addressed in Section 2.1 of this Background Report.

There are no resources in Corte Madera listed on the National Register of Historic Places, the California Inventory of Historic Resources, or California Historic Landmarks. However, under State guidelines (State Office of Historic Preservation), any building constructed more than 45 years ago could possibly be identified as a historic structure. According to the State Office of Historic Preservation's Historic Property Data File for Marin County, several historic properties within Corte Madera are listed in State and federal inventories. Several of these identified historic resources are located within the Old Corte Madera Square area, including Holy Innocents Church, Moore's Hall, and Parkside Hotel.

7.5 Noise Environment

Overview of Noise Environment in Corte Madera

The ambient noise environment in Corte Madera is defined primarily by traffic on Highway 101, which runs north-south through town. At locations removed from Highway 101, the ambient noise environment tends to be defined by local traffic and typical neighborhood noise sources. No significant noise-producing commercial or industrial activities were identified within the Town of Corte Madera. The only concentration of such areas within the Town of Corte Madera is in proximity to Highway 101, which tends to mask noise generated by these sources. To assist in the understanding of this noise discussion, a list of accoustical terminology is included at the end of this section.

Purpose of the Noise Element

The Noise Element of the Town of Corte Madera General Plan provides a basis for comprehensive local policies to control and abate environmental noise and to protect the citizens of Corte Madera from excessive noise exposure. The fundamental goals of the Noise Element are as follows:

- To provide sufficient information concerning the community noise environment so that noise may be effectively considered in the land use planning process.

- To develop strategies for abating excessive noise exposure through cost-effective mitigation measures in combination with appropriate zoning to avoid incompatible land uses.

- To protect those existing regions of the planning area whose noise environments are deemed acceptable and also those locations throughout the community deemed "noise sensitive".

- To protect existing noise-producing commercial and industrial uses in the Town of Corte Madera from encroachment by noise-sensitive land uses.

Fundamentals of Noise

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and hence are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of A-weighted levels.

Examples of A-weighted sound levels of some common noise sources:

Soft whisper at 2 feet	30 decibels
Background noise in a residence	40 decibels
Open office background noise	50 decibels
Normal conversation at 5-10 feet	60 decibels
Commercial jet aircraft interior	70 decibels
Locomotive at 300 feet	80 decibels
Bulldozer at 50 feet	90 decibels

Community noise is commonly described in terms of the “ambient” noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (Leq), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The Leq is the foundation of the composite noise descriptor, Ldn, and shows very good correlation with community response to noise.

The Day-Night Average Level (Ldn) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.)

hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because Ldn represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Noise in the community has often been cited as being a health problem, not in terms of actual physiological damages such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities such as sleep, speech, recreation and tasks demanding concentration or coordination. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases, the acceptability of the environment for people decreases. This decrease in acceptability and the threat to public well-being are the bases for land use planning policies preventing exposures to excessive community noise levels.

To control noise from fixed sources which have developed from processes other than zoning or land use planning, many jurisdictions have adopted community noise control ordinances. Such ordinances are intended to abate noise nuisances and to control noise from existing sources. They may also be used as performance standards to judge the creation of a potential nuisance, or potential encroachment of sensitive uses upon noise-producing facilities. Community noise control ordinances are generally designed to resolve noise problems on a short-term basis (usually by means of hourly noise level criteria), rather than on the basis of 24-hour or annual cumulative noise exposures.

In addition to the A-weighted noise level, other factors should be considered in establishing criteria for noise sensitive land uses. For example, sounds with noticeable tonal content such as whistles, horns, droning or high-pitched sounds may be more annoying than the A-weighted sound level alone suggests. Many noise standards apply a penalty, or correction, of 5 dBA to such sounds. The effects of unusual tonal content are generally more of a concern at nighttime, when residents may notice the sound in contrast to low levels of background noise.

In very quiet environments, the introduction of virtually any change in local activities will cause an increase in noise levels. A change in noise level and the loss of "peace and quiet" is the inevitable result of land use or activity changes in such areas. Audibility of a new noise source and/or increases in noise levels within recognized acceptable limits are not usually considered to be significant noise impacts, but these concerns should be addressed and considered in the planning and environmental review processes.

Noise Mitigation Options

Any noise problem may be considered as being composed of three basic elements: the noise source, a transmission path, and a receiver. The appropriate acoustical treatment for a given project should consider the nature of the noise source and the sensitivity of the receiver. The problem should be defined in terms of appropriate criteria (Ldn, Leq, or Lmax), the location of the

sensitive receiver (inside or outside), and when the problem occurs (daytime or nighttime). Noise control techniques should then be selected to provide an acceptable noise environment for the receiving property while remaining consistent with local aesthetic standards and practical structural and economic limits. Fundamental noise control techniques include the use of setback areas, physical noise barriers, incoroporation of site design techniques (including placement of uses and structures), building design, through acoustical design of building facades, and placement of site vegetation.

EXISTING NOISE ENVIRONMENT

Overview

The major noise source in Corte Madera is Highway 101, with noise generated by traffic on local streets and within neighborhood parks considered secondary. There are no significant sources of railroad, aircraft or industrial noise within the Town of Corte Madera.

Roadways

The Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) with the Calveno vehicle noise emission curves was used to predict traffic noise levels within the Corte Madera Town Limits. The FHWA Model is the traffic noise prediction model currently preferred by the Federal Highway Administration, the State of California Department of Transportation (Caltrans), and most Town and county governments, for use in traffic noise assessment. Although the FHWA Model is in the process of being updated by a more sophisticated traffic noise prediction model, the use of RD-77-108 is considered acceptable for the development of General Plan traffic noise predictions.

The FHWA Model input data for the Town of Corte Madera roadways is provided in **Table 7.5.1**. The distances from the centerlines of the major roadways to the 60 and 65 dB Ldn contours are also summarized in Table 7.5.1. Many roadways are not contained in Table 7.5.1, however these roadways are not major traffic arterials within the Town of Corte Madera. In the absence of existing traffic data for these minor roadways in the Town of Corte Madera, the distance to the 60 dB Ldn traffic noise contours for these roadways can be estimated using **Figure 7.5.1**.

Table 7.5.1
Highway Traffic Noise Prediction Model Data Inputs and Distances to 60 and 65 dB Ldn Contours, Existing (2002) Noise Conditions

					Truck Usage				Distance to Ldn Contours, feet	
Segment	Roadway Name	Segment Description	ADT	Day %	Night %	Med.	Hvy.	Speed	60 dB Ldn	65 dB Ldn
1	Fifer Avenue	Between Tamal Vista Blvd and Nellen Ave.	11604	84	16	2	1	35	115	54
2	Nellen Avenue	S. of Fifer Ave.	403	84	16	2	1	35	12	6
3	Highway 101	S. of Industrial	13986	84	16	2	1	65	364	169
4		N. of Tamalpais Dr.	5653	84	16	2	1	65	199	92
5	Madera Boulevard	N. of Mohawk Ave.	8757	84	16	2	1	35	96	44
6	Tamalpais Drive	E. of Eastman Ave.	18536	84	16	2	1	35	158	73
7		W. of Hwy 101 SB Off Ramp	24924	84	16	2	1	35	192	89
8		Between Hwy 101 NB Off Ramp and San Clemente Dr.	29333	84	16	2	1	35	214	99
9	San Clemente Drive	Between Tamalpais Dr. and Paradise Dr.	21357	84	16	2	1	35	173	80
10	Paradise Drive	W. of El Camino Dr.	14706	84	16	2	1	35	135	63

Source: *Annual Average Daily Truck Traffic on the California State Highway System*, Caltrans, April 2000, Bollard & Brennan, Inc. and kdANDERSON Transportation Consultants.

Insert picture

Non-Transportation Noise Sources

The production of noise is a result of many processes and activities, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by Federal and State employee health and safety regulations (OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses.

From a land use planning perspective, fixed-source noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise-sensitive areas, and to prevent encroachment of noise-sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in proximity to noise-producing facilities include mitigation measures to ensure compliance with those noise performance standards.

Descriptions of some general types existing fixed noise sources in the Town of Corte Madera are provided below. These uses are intended to be representative of the relative noise generation of such uses, and are intended to identify specific noise sources which should be considered in the review of development proposals. Site specific noise analyses should be performed where noise sensitive land uses are proposed in proximity to these (or similar) noise sources, or where similar sources are proposed to be located near noise-sensitive land uses.

General Service Commercial & Light Industrial Uses:

Noise sources associated with service commercial uses such as automotive and truck repair facilities, tire installation centers, car washes, loading docks, corporation yards, etc., are found mainly within relatively close proximity to Highway 101 within the Town. The noise emissions of these types of uses are dependant on many factors, and are therefore, difficult to quantify precisely. Nonetheless, noise generated by the these uses contributes to the ambient noise environment in the immediate vicinity of these uses, and should be considered where either new noise-sensitive uses are proposed nearby or where similar uses are proposed in existing residential areas.

Parks and School Playing Fields:

There are existing parks and school playgrounds within the Town limits. These uses are effectively spread throughout the Town. Noise generated by these uses depends on the age and number of people utilizing the respective facilities at a given time, and the types of activities they are engaged in. School playing field activities tend to generate more noise than those of neighborhood parks, as the intensity of school playground usage tends to be much higher. At a distance of 100 feet from an elementary school playground being used by 100 students, average and maximum noise levels of 60 and 75 dB, respectively, can be expected. At organized events such as high-school football games with large crowds and public address systems, the noise

generation is often significantly higher. As with service commercial uses, the noise generation of parks and school playing fields is variable.

Airports

There are no airports or helipads within the general vicinity of the Town of Corte Madera. As a result, the existing ambient noise environment of the Town of Corte Madera is not significantly influenced by aircraft noise.

Community Noise Survey

To quantify existing noise levels in the quieter parts of the Town of Corte Madera, a community noise survey was performed at three locations in Town which are removed from major noise sources. The three locations consisted of the Town, San Clemente and Granada Parks. These three locations were monitored during two short term periods during daytime hours and one during nighttime hours. A fourth location, the Market Place, denoted as Site "A", was monitored continuously for a 24-hour period. The community noise survey noise measurement locations are shown on **Figure 7.5.1**. The results of the community noise survey are provided in **Table 7.5.2**.

The results show particularly increased noise levels during the afternoon period at Town Park (a Lmax reading of 69 decibels with an afternoon Leq reading of 54 decibels). This increased noise reading stems from the heavy use of the park in the afternoon period, and compares to lower afternoon Leq readings of 48 and 43 decibels, respectively, at San Clemente and Granada Parks. Nightime noise levels at Town Park dropped to a 43 Leq decibel level. The Market Place readings reflect relatively high and constant noise from Highway 101 vehicular traffic, with a daytime Leq of 80 decibels (with a maximum reading of 86 decibels), and with nightime noise levels dropping only slightly (to a 75 Leq level).

Table 7.5.2
Community Noise Measurement Survey Results

Site	Location	Dates	Time Period	Leq	Lmax	Estimated Ldn	Sources
1	San Clemente Park	2-12-02	Afternoon	48	58	42	Traffic
		2-12-02	Nighttime	44	53		
		2-13-02	Morning	45	56		
2	Granada Park	2-12-02	Afternoon	43	59	37	Traffic
		2-12-02	Nighttime	39	46		
		2-13-02	Morning	41	51		
3	Town Park	2-12-02	Afternoon	54	69	44	Traffic
		2-12-02	Nighttime	43	49		
		2-13-02	Morning	53	62		
A	The Market Place	2-12/13-02	Daytime	80	86	82.2	Hwy 101 Traffic
			Nighttime	75	84		

Source: Bollard & Brennan, Inc.; conducted February 12-13, 2002

Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given area consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of noise.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, defined as ten times the logarithm of the ratio of the sound pressure squared over the reference pressure squared.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic acoustic signal, expressed in cycles per second or Hertz.

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Noise Unwanted sound.