3.4 AIR QUALITY

This section describes existing air quality in the Bay Area Air Basin, processes affecting air quality, and the regulatory framework under which air pollutant emissions are controlled. Potential effects of treatment methods on local and regional air quality and odors are evaluated, and mitigation measures are identified for potentially significant impacts.

3.4.1 Environmental Setting

Regional Air Quality

The Bay Area has relatively good air quality despite its extensive urbanized area, vehicles, and industrial sources. The Bay Area's coastal location and favorable meteorology help to keep its pollution levels low most of the time (California Air Resources Board [CARB] 2001). The climate in the Bay Area varies, ranging from mild year-round temperatures along the coast, to warmer temperatures with greater seasonal fluctuation in the inland counties. The coastal and Estuary shoreline areas, which experience steady ocean breezes, tend to have the best air quality. The highest ozone levels and concentrations of other pollutants typically are recorded in inland areas, such as Livermore, Concord, Los Gatos, and Gilroy. However, when there are no ocean breezes and temperatures are hot, the levels of ozone and other pollutants along the Estuary shoreline can exceed the standards. According to the CARB, air quality has been improving steadily over the past decade, with steadily declining total volatile organic compounds (VOC) and nitrogen oxides (NOx) emissions over time (CARB 2001). However, these reductions have not been enough to prevent exceedances of State and Federal air quality standards under all meteorological conditions. In addition, the Bay Area serves as a significant source of emissions that are carried out of the area when the onshore winds blow. These emissions and resulting pollution can spread far downwind of the Bay Area: to the San Joaquin and Sacramento Valleys, the Monterey Bay area, northern Sonoma County, and even as far away as San Luis Obispo County and the Sierra foothills.

The ambient air quality in a given area depends on the quantities of pollutants emitted within the area, transport of pollutants to and from surrounding areas, local and regional meteorological conditions, as well as the surrounding topography of the air basin. Air quality is described by the concentration of various pollutants in the atmosphere. Units of concentration are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$).

The Bay Area Air Quality Management District (BAAQMD) identifies seven categories of air pollutants that are of concern in the Bay Area. These include particulate matter (monitored as small diameter particles called $PM_{10)}$, organic compounds, nitrogen oxides (NOx), sulfur dioxide/oxides (SO_2/SOx), carbon monoxide (CO), hydrogen sulfide (H_2S), and photochemical smog (ground level ozone – O_3). These are referred to as "criteria pollutants".

The BAAQMD monitors criteria pollutants continuously at stations located throughout the Bay Area. A summary of air pollutant levels measured in the Bay Area over the past five years is shown in **Table 3.4-1**. Federal and State health-based ambient air quality standards are also in the table.

The Federal Clean Air Act establishes National Ambient Air Quality Standards (NAAQS) for each of these contaminants. If an area does not meet the NAAQS over a set period of time (three years), the United States Environmental Protection Agency (EPA) designates it as a "nonattainment" area for that particular pollutant.

Table 3.4-1. State and National Standards for Selected Criteria Pollutants, and Measured Air Pollutant Concentrations in the San Francisco Bay Area

Pollutant (unit of measure)	***Average Time***	***State Standard***	***National Standard***	***Maximum Levels Measured and Days Exceeding Standards* (State/National Standards)***				
				1995	***1996***	***1997***	***1998***	***1999***
Ozone (O_3) (ppm)	1-Hour	0.09	0.12	**0.15** 28 / 11	**0.14** 34 / 8	**0.11** 8 / 0	**0.15** 29 / 8	**0.16** 20 / 3
	8-Hour	--	0.08	**0.12** -- / 18	**0.11** -- / 14	**0.08** -- / 0	**0.11** -- / 16	**0.12** -- / 9
Carbon Monoxide (CO) (ppm)	8-Hour	9.0	9	5.4 0 / 0	6.5 0 / 0	5.8 0 / 0	6.0 0 / 0	5.9 0 / 0
Nitrogen Dioxide (NO_2) (ppm)	1-Hour	0.25	?	0.12 0 / --	0.11 0 / --	0.12 0 / --	0.10 0 / --	0.13 0 / --
	Annual	--	0.053	N/A	N/A	N/A	N/A	0.026
Small Particulate Matter (PM_{10}) ($\mu g/m^3$)	24-Hour	50	150	N/A 42 / 0	N/A 18 / 0	N/A 24 / 0	N/A 30 / 0	**114** 72 / 0
	Annual	30	50	22	22	24	23	25
Fine Particulate Matter ($PM_{2.5}$) ($\mu g/m^3$)	24-Hour	50 $\mu g/m^3$	65 $\mu g/m^3$	N/A	N/A	N/A	N/A	N/A
	Annual	50 $\mu g/m^3$	15 $\mu g/m^3$	N/A	N/A	N/A	N/A	N/A

Notes: ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
* Values reported in bold exceed ambient air quality standard
N/A = Not Applicable
Source: CARB, 2000

The San Francisco Bay Area Air Basin had been designated as a Federal "nonattainment" area for ozone due to violations of the Federal standard (See **Table 3.4-1**). Ground-level ozone, which is not emitted directly into the atmosphere, is the principal component of smog. It is caused by the photochemical reaction of ozone precursors (reactive organic gases and nitrogen oxides). Ozone levels are highest in the San Francisco Bay Area during days in late spring through summer when meteorological conditions are favorable for the photochemical reactions to occur (clear warm days and light winds). The Bay Area co-lead agencies (BAAQMD, Metropolitan Transportation Commission, and Association of Bay Area Governments) prepared and submitted the 1999 San Francisco Bay Area Ozone Attainment Plan or ozone State Implementation Plan (SIP) to the CARB. This plan was submitted to EPA in 1999 and revised in 2001, but final approval of the plan has not been made.

As can be seen in **Table 3.4-1**, The Bay Area Air Basin is in Federal attainment for all other "criteria pollutants," but is a "maintenance" area for carbon monoxide (requiring controls on emissions of CO – see Applicable Federal Air Quality Regulations, below).

The California Clean Air Act of 1988, amended, outlines a program for areas in the State to attain the CAAQS by the earliest practical date. The California Clean Air Act set more stringent air quality standards, California Ambient Air Quality Standards (CAAS), for all of the pollutants covered

under national standards, and additionally regulates levels of vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. If an area does not meet the CAAQS, it is designated as a State nonattainment area.

As shown in **Table 3.4-1**, the Bay Area is a serious nonattainment area for ozone (since the area cannot forecast attainment of the State ozone standard in the foreseeable future). It is also a State nonattainment area for PM_{10}. Inhalable particulates or PM_{10} refers to a wide variety of solid or liquid particulates in the atmosphere that have a diameter of 10 micrometers (μm) or less. These include dust and smoke, the two sources of air pollution most applicable to the *Spartina* Control Project. PM_{10} is both a local and regional air quality problem. The Bay Area has met the CAAQS for all other air pollutants.

The CARB requires regions that do not meet the CAAQS for ozone to submit clean air plans that describe plans to attain the standard. The BAAQMD has prepared the Bay Area Clean Air Plan to address the California Clean Air Act. This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources to achieve a region-wide reduction of ozone precursor pollutants. Air quality plans are developed on a triennial basis, with the latest plan developed in 2000 (i.e., 2000 CAP). The primary objective of the 2000 CAP is to reduce ozone precursor pollutants through the implementation of all feasible control measures.

Federal Air Quality Conformity Requirements

Under Section 176(c) of the 1990 Clean Air Act Amendments, the "conformity" provisions for Federal projects are outlined. Federal actions are required to conform to the requirements of a SIP and must not jeopardize efforts for a region to achieve the NAAQS. Section 176 (c) also assigns primary oversight responsibility for conformity assurance to the Federal agency undertaking the project, not the EPA, State, or local agency. For there to be conformity, federally supported or funded activities must not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other SIP milestone aimed at bringing the region into attainment.

In 1993, the U.S. EPA issued conformity regulations that addressed all non-transportation Federal actions (General Conformity). These regulations apply to a wide range of Federal actions or approvals that would cause emissions of criteria air pollutants above specified levels to occur in locations designated as nonattainment or maintenance areas. Specifically since the Bay Area is nonattainment (moderate) for ozone and is a CO maintenance area, projects with Federal involvement are subject to the General Conformity regulations if they generate emissions of ozone precursor pollutants (i.e., reactive organic compounds and nitrogen oxides) or carbon monoxide in excess of 100 tons per year or the emissions are more than 10 percent of the nonattainment or maintenance area's emission inventory for the pollutant(s) of concern. Projects that are subject to the General Conformity regulations are required to mitigate or fully offset the emissions caused by the action, including both direct and indirect (e.g., traffic) emissions that the Federal agency has some control over. The BAAQMD adopted and incorporated the Transportation and General Conformity regulations into its SIP in 1994.

3.4.2 Analysis of Potential Effects

The primary air quality issues associated with the presence, spread, and treatment of non-native cordgrasses are the potential for dust and smoke emissions from ground treatment methods and

the potential for chemical drift from aerial application of herbicide. Impacts on air quality are summarized in **Table 3.4-2** and mitigation measures are summarized in **Table 3.4-3**.

Significance Criteria

The significance of a pollutant emission is determined by comparing the resulting pollutant concentration to an appropriate State or Federal ambient air quality standard. The standards represent the allowable pollutant concentrations designed to ensure that the public health and welfare are protected, while including a reasonable margin of safety to protect the more sensitive individuals in the population. The BAAQMD has also developed CEQA guidelines that establish significance thresholds for evaluating new projects and plans and provide guidance for evaluating air quality impacts of projects and plans (BAAQMD 1999).

Projects impacts would be considered significant if the would:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). A significant impact on regional air quality is defined in this analysis as an increase in emissions of an ozone precursor or PM_{10} exceeding the BAAQMD recommended thresholds of significance. The latest guidelines issued by the BAAQMD for the evaluation of project air quality impacts consider emission increases significant if they exceed 80 pounds per day (or 15 tons/year) for ozone precursors or PM_{10}. Any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.
- Expose sensitive receptors to substantial pollutant concentrations;
- Expose the public to significant levels of toxic air contaminants, defined as follows: (1) the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in one million or (2) ground-level concentrations of non-carcinogenic toxic air contaminants would result in a hazard Index greater than 1 for the MEI; and/or
- Create objectionable odors affecting a substantial number of people.

ALTERNATIVE 1: Proposed Action/Proposed Project - Regional Eradication Using All Available Control Methods

All methods would involve relatively small emissions of criteria air pollutants through either direct or indirect sources. Direct sources may include emissions from equipment such as mowers, boats, or helicopters. Emissions from indirect sources would include vehicles used for transporting materials and workers and worker vehicle trips to the work sites.

IMPACT AQ-1: Dust Emissions

Dust contains small particulate matter (PM_{10}), for which the BAAQMD has established significance thresholds of 80 pounds per day. Treatment of infested sites using manual or mechanical and ground-based chemical methods will require accessing the sites on foot or by vehicles. This is expected to cause disturbance to soils during access to the treatment sites. However, the majority of the work would be done in wet or moist soil or mud, thereby minimizing

the likelihood of dust generation. The primary source of airborne dust generated by the project would be travel on unpaved access roads to the treatment sites. Dust generation is expected to be localized, and not result in emissions that affect off-site receptors, or exceed the BAAQMD significance thresholds. Therefore, the impact would be less than significant. Mitigation AQ-1 will be implemented at treatment sites to further reduce this impact.

MITIGATION AQ-1: Apply dust control measures where treatment methods may produce visible dust clouds and where sensitive receptors (i.e., houses, schools, hospitals) are located within 500 feet of the treatment site. The following dust control measures should be included in the site-specific work plans:

- Suspend activities when winds are too great to prevent visible dust clouds from affecting sensitive receptors.
- Limit traffic speeds on any dirt access roads to 15 miles per hour.

IMPACT AQ-2: Smoke and Ash Emissions

Treatment methods and activities using burning are a potential source of PM_{10} emissions involving smoke and ash from prescribed burns. The emissions would vary depending on the amount and type of activity, target plant and soil conditions, and meteorological conditions. This impact would be potentially significant. However, burning is subject to BAAQMD Regulation 5 – *Open Burning,* and approval of the County Agricultural Commissioner to minimize the impact to both local and regional air quality. Under this regulation, prescribed burns are allowable under Section 5-401.1 on permissive burn days. The fire must be set or allowed by the Agricultural Commissioner of the County. Prior notification to the BAAQMD is required. Prescribed burns conducted in accordance with this regulation would result in less than significant impacts to air quality. Mitigation AQ-2 would reduce this impact to less than significant. Temporary incidences of odors from prescribed burns may be detected and would be less than significant.

MITIGATION AQ-2: For prescribed burns, notify the BAAQMD and the Agriculture Commissioner prior to initiating the burn, and/or obtain a burn permit.

IMPACT AQ-3: Herbicide Effects on Air Quality

Aerial application of herbicides and surfactants could result in chemical drift to populated areas. The potential for chemical drift is highly dependent on the proximity to populated areas, wind flow, equipment used, and height application is conducted above ground. Chemical drift to areas within one-half mile of a treatment site would be a potentially significant impact. Ground–based application of herbicide is not expected to result in air quality impacts since the application would occur only within the targeted areas, and because glyphosate and the proposed surfactants have very low volatility.

While there are no established BAAQMD significance thresholds for herbicides that would be sprayed during implementation of the Control Program, aerial application of herbicides has the potential to cause chemical drift that could expose the public to the herbicide downwind from application areas. Populated areas may detect slight odors and proximity to populated areas, droplet size, and wind conditions are the primary factors that affect drift of herbicide, and detection or exposure of the public. Although there is no evidence that glyphosate could cause human health risks (see Section 3.6, *Human Health and Safety*), impacts such as skin or eye irritation or respiratory

problems (similar to those that result from smog) could occur if drift affected populated areas. For these reasons, the impact would be potentially significant.

Although aerial application of herbicide would not involve use of workers or equipment on the ground, emissions of criteria air pollutants would occur from the uses of helicopters that burn fuel. These emissions would be well below significance thresholds established by the BAAQMD, and therefore have a less than significant impact on air quality because the helicopters would be used for a short period of time and in a manner consistent with its intended use.

MITIGATION AQ-3: For areas targeted for aerial application of herbicides that are within 0.5 mile of sensitive receptors (i.e., houses, schools, hospitals), prepare and implement an herbicide drift management plan to reduce the possibility of chemical drift into populated areas. The plan shall include the following elements:

1. **Coordination.** Coordinate aerial applications with the County Agricultural Commissioner.
2. **Sensitive Receptors.** Identify nearby sensitive areas (e.g., houses, schools, hospitals) or areas that have non-target vegetation that could be affected by the herbicide and provide advanced notification.
3. **Equipment Use.** Identify the type of equipment (e.g., nozzle types) and application techniques (i.e., nozzle angle and airspeed) to be used in order to reduce the amount of small droplets that could drift into adjacent areas (smaller droplets are subject to greater drift). Consult with herbicide manufacturer for proper application instructions and warnings.
4. **Meteorological Conditions.** Avoid spraying when winds exceed 10 miles per hour, consistent with California supplemental labeling. Herbicide applications should not be conducted when surface-based inversions are present (usually in fall and winter early mornings or late evenings). The site-specific work plan should identify how meteorological conditions would be obtained (e.g., National Weather Service).
5. **Buffer Zones.** Establish buffer zones to avoid affecting sensitive receptors. The buffer zones are established based on wind conditions, droplet size, application height above ground, as well as proximity to sensitive receptors.
6. **Restriction on Public Access.** Ensure that the public will not be present in the treatment area during treatment activities, and for a period (of up to 12 hours) after application of the herbicide. The re-entry period should be identified in the site-specific work plan.
7. **Alternate Spray Method.** Consider ground application near buffer zones and areas adjacent to sensitive receptors when prevailing conditions would increase potential for drift. Application of herbicide shall be temporarily terminated if conditions change and present drift potential at sensitive receptor sites.

Mitigation Measures

Implementation of the mitigation measures identified above would reduce air quality impacts of Alternative 1 to a less than significant level.

IMPACT AQ-4: Ozone Precursor Emissions

Treatment methods involving internal combustion engines are a potential source of ozone emissions. The BAAQMD has established significance thresholds for emissions of ozone precursor pollutants (reactive organic gases and nitrogen oxides) of 80 pounds per day for each

pollutant. The BAAQMD CEQA Guidelines indicate that projects with potential to exceed the established thresholds are traffic associated with subdivision developments of 320 homes, shopping centers of 44,000 square feet, or office parks of 210,000 square feet. Therefore, the combination of direct and indirect vehicular or equipment-related emissions associated with implementation of the Control Program would result in emissions less than the BAAQMD thresholds for ozone precursor pollutants. Vehicle and equipment emissions would be less than significant. Therefore, no mitigation is required for this impact.

IMPACT AQ-5: Carbon Monoxide Emissions

Treatment methods involving internal combustion engines are a potential source of CO emissions. The BAAQMD CEQA Guidelines indicate that exceedances of the CO air quality standard are not anticipated from projects that generate less than 550 pounds per day of CO, do not cause congestion at intersections, or do not increase traffic substantially (by 10 percent or more) at congested intersections. Traffic generated by implementation of any of the treatment methods would not lead to exceedances of CO air quality standards. Therefore, no mitigation is required for this impact.

ALTERNATIVE 2: Regional Eradication Using Only Non-Chemical Control Methods

Impacts

Alternative 2 is identical to Alternative 1, with the exception that chemical methods would not be used, and manual or mechanical treatment methods would be applied more frequently.

Impacts associated with this alternative would be similar to Alternative 1 except impacts associated with herbicide and surfactant application would be eliminated and replaced by increased dust and smoke from repeated mechanical treatment.

Mitigation Measures

Mitigation measures AQ-1 and 2, above, would apply to this alternative. Implementation of these Mitigation Measures would reduce residual impacts of Alternative 2 to less than significant.

ALTERNATIVE 3: No Action – Continued Limited, Regionally Uncoordinated Treatment

Impacts

Under this alternative, the proposed project would not be implemented and treatment efforts that local jurisdictions conduct would not be regionally coordinated.

The extent of localized treatment and the methods to be used are not specified, however it is likely that the localized treatment would be less widespread than with Alternative 1. Therefore, potential air quality impacts would be similar to, but generally, less than those described for Alternative 1.

Mitigation Measures

Mitigation Measures for Alternative 3 would be the same as for Alternative 1. No significant residual impacts to air quality would occur under this alternative.

Table 3.4-2: Summary of Potential Air Quality Effects

Impact	*Manual Removal (Hand pulling and manual excavation)*	*Mechanical Removal (Excavation, dredging, and shredding)*	*Pruning, Hand-mowing, and Smothering*	*Flooding (Diking, drowning, and salinity variation)*	*Burning*	*Herbicide Application*	*Beneficial Effects*
AQ-1: Dust Emissions.	All Alternatives: Dust generation is expected to be localized, and not affect off-site receptors, or exceed BAAQMD significance thresholds.	All Alternatives: Dust generation is expected to be localized, and not affect off-site receptors, or exceed BAAQMD significance thresholds.	All Alternatives: Minor erosion and dust generation potential.	All Alternatives: Dust generation is expected to be localized during construction, and not affect off-site receptors, or exceed BAAQMD thresholds.	All Alternatives: Minor dust generation is possible during burning activities.	Alternatives 1, 3: On-ground treatment would generate minor amounts of dust. Alternative 2: No impact.	N/A
AQ-2: Smoke Emissions.	All Alternatives: No smoke emissions.	All Alternatives: No smoke emissions.	All Alternatives: No smoke emissions.	All Alternatives: No smoke emissions.	All Alternatives: Potentially significant smoke emissions.	All Alternatives: No smoke emissions.	N/A
AQ-3: Herbicide Effects on Air Quality.	All Alternatives: No herbicide impacts.	All Alternatives: No herbicide impacts.	All Alternatives: No herbicide impacts.	All Alternatives: No herbicide impacts.	All Alternatives: No herbicide impacts.	Alternatives 1 & 3: Chemical drift to areas within 0.5 mile of a treatment site would be a potentially significant impact. Alternative 2: No impact.	N/A

Table 3.4-2: Summary of Potential Air Quality Effects

Impact	*Manual Removal (Hand pulling and manual excavation)*	*Mechanical Removal (Excavation, dredging, and shredding)*	*Pruning, Hand-mowing, and Smothering*	*Flooding (Diking, drowning, and salinity variation)*	*Burning*	*Herbicide Application*	*Beneficial Effects*
AQ-4: Ozone Precursor Emissions.	All Alternatives: No ozone precursor emissions.	All Alternatives: Direct and indirect vehicular or equip-ment-related emis-sions would be less than BAAQMD thresholds for ozone precursor pollutants.	All Alternativess: Direct and indirect vehicular or equip-ment-related emis-sions would be less than BAAQMD thresholds for ozone precursor pollutants.	All Alternatives: Direct and indirect vehicular or equip-ment-related emis-sions would be less than BAAQMD thresholds for ozone precursor pollutants. .	All Alternatives: Direct and indirect vehicular or equip-ment-related emis-sions would be less than BAAQMD thresholds for ozone precursor pollutants.	All Alternatives 1, 3: Direct and indirect vehicular or equip-ment-related emis-sions would be less than BAAQMD thresholds for ozone precursor pollutants. Alternative 2: No impact.	N/A
AQ-5: Carbon Mon-oxide (CO) Emis-sions.	All Alternatives: Traffic generated by implementation of any of the treatment methods would not lead to exceed-ances of CO air quality standards.	All Alternatives: Traffic generated by implementation of any of the treatment methods would not lead to exceed-ances of CO air quality standards.	All Alternatives: Traffic generated by implementation of any of the treatment methods would not lead to exceed-ances of CO air quality standards.	All Alternatives: Traffic generated by implementation of any of the treatment methods would not lead to exceed-ances of CO air quality standards.	All Alternatives: Traffic generated by implementation of any of the treatment methods would not lead to exceed-ances of CO air quality standards.	All Alternatives: Traffic generated by implementation of any of the treatment methods would not lead to exceed-ances of CO air quality standards.	N/A

Table 3.4-3: Summary of Mitigation Measures for Air Quality

Mitigation	*Manual Removal (Hand pulling and manual excavation)*	*Mechanical Removal (Excavation, dredging, and shredding)*	*Pruning, Hand-mowing, and Smothering*	*Flooding (Diking, drowning, and salinity variation)*	*Burning*	*Herbicide Application*
Mitigation AQ-1: Dust emissions. Apply dust control measures where treatment methods may produce visible dust clouds and where sensitive receptors (i.e., houses, schools, hospitals) are located within 500 feet of the treatment site. The following dust control measures should be included in the site-specific work plans: Suspend activities when winds are too great to prevent visible dust clouds from affecting sensitive receptors. Limit traffic speeds on any dirt access roads to 15 miles per hour.	Not Applicable	Applicable	Applicable	Applicable	Applicable	Applicable
Mitigation AQ-2: Smoke and ash emissions. For prescribed burns, notify the BAAQMD and the Agriculture Commissioner prior to initiating the burn, and/or obtain a burn permit.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable
Mitigation AQ-3: Herbicide effects on air quality. For areas targeted for aerial application of herbicides that are within 0.5 mile of sensitive receptors (i.e., houses, schools, hospitals), prepare and implement an herbicide drift management plan to reduce the possibility of chemical drift into populated areas. The plan shall include the following elements: coordination, sensitive receptors, equipment use, meteorological conditions, buffer zones, restriction on public access, and alternative spray method.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable

Note: There may be textual differences between the measures in this summary table and the text in the section. The actual mitigation measure is in the text.