# 3.0 Affected Environment

## 3.1 Introduction

This section describes the existing environment of CCAFS, Florida, and Vandenberg AFB, California, and their respective regions of influence (ROIs). This information serves as a baseline from which to identify and evaluate potential environmental impacts that could result from implementing the Proposed Action. The baseline conditions assumed for the purposes of this analysis are the existing conditions at CCAFS and Vandenberg AFB. These conditions include the Proposed Action of the 1998 FEIS. The two families of lift vehicles addressed in the 1998 FEIS are identified by their proper names in this FSEIS. “Concept A” is referred to as the Atlas V system and “Concept B” is referred to as the Delta IV system.

Although this FSEIS focuses on the biophysical environment, the following nonbiophysical elements (influencing factors) in the region and local communities are also addressed: local community, land use and aesthetics, transportation, and utilities. In addition, this section describes the storage, usage, disposal, and management of hazardous materials/wastes as well as pollution prevention and the Installation Restoration Program (IRP) status. This section contains a description of health and safety practices at each installation, and the pertinent natural resources of geology and soils, water resources, air quality, noise, orbital debris, biological resources, and cultural resources. Information on low-income and minority populations in the area used for the environmental justice analysis concludes the section.

The ROI to be evaluated for the two installations is defined for each resource area potentially affected by the Proposed Action and the No-Action Alternative. The ROI determines the geographical area to be addressed as the affected environment. Although the installation boundary constitutes the ROI limit for many resources, potential impacts associated with certain issues (e.g., noise, potential noise impacts to threatened and endangered species, air quality, utility systems, health and safety procedures, and water resources) transcend these limits. Within each resource discussion, separate ROIs for the Atlas V and the Delta IV systems are provided, where applicable.

In many instances, the affected environment for the Proposed Action has not changed substantively since the 1998 FEIS. This section presents only information that is new or has been updated subsequent to the 1998 FEIS. As a result, much of the data in the 1998 FEIS remains valid and is incorporated by reference into this FSEIS.

## 3.2 Community Setting

Community setting was described in the 1998 FEIS. There have been no substantive changes in this area since that document was written. For information on community setting at CCAFS or at Vandenberg AFB, refer to the 1998 FEIS.

# 3.3 Land Use and Aesthetics

Land use and aesthetics were described in the 1998 FEIS. There have been no substantive changes in this area since that document was written. For information on land use and aesthetics refer to the 1998 FEIS.

# 3.4 Transportation

The existing transportation network has not changed substantively since the preparation of the 1998 FEIS. For more information on transportation and traffic, refer to the 1998 FEIS.

# 3.5 Utilities

The utility systems addressed in this FSEIS include the facilities and infrastructure used for potable water supply, wastewater collection and treatment, solid waste disposal, and electricity. The area of analysis consists of all or portions of the service areas of each utility provider that serves the project site, other installation facilities, and incorporated and unincorporated areas of the applicable county. Utility usage was determined from records of purveyors, historic consumption patterns, and systemwide average annual growth rates.

Aside from water supply, the existing utility network and usage patterns have not changed substantively since the preparation of the 1998 FEIS. During preparation of the 1998 FEIS, a maximum per-launch water usage of 59,000 gallons was estimated to be necessary for the Atlas V launches. These values were based on the requirements of similar launch vehicles. More definitive design data now indicate a maximum need for 600,000 gallons per launch, of which 300,000 gallons would be captured in the launch exhaust duct. This corrected amount of water usage would be required both for the No-Action Alternative, as well as the Proposed Action launches. For information on utilities, refer to the 1998 FEIS.

# 3.6 Hazardous Materials and Hazardous Waste Management

This section describes the environmental setting for hazardous materials and hazardous waste management. The content has been edited and revised from the 1998 FEIS; consequently, it has been reproduced in this FSEIS for clarification.

## 3.6.1 Cape Canaveral Air Force Station

The ROI for CCAFS includes primarily the areas around SLC-41 and SLC-37, but also includes any industrial and office sites to be used by the EELV program launch contractor.

### 3.6.1.1 Hazardous Materials Management

Numerous types of hazardous materials are used to support the various missions and general maintenance operations at CCAFS. Categories of hazardous materials used in support of current lift vehicle system activities include petroleum products, oils, lubricants (POL), volatile organic compounds (VOC), corrosives, refrigerants, adhesives, sealants, epoxies, and propellants. Example quantities from current programs are provided in Section 3.6 of the 1998 FEIS.

The LVCs have developed their own hazardous materials management plans for the EELV program. Under the provisions of CCAFS leases, EELV program contractors are responsible for implementing these plans. Recent agreements reached with EELV contractors place increased responsibility for hazardous materials and waste management on the LVCs.

#### 3.6.1.2 Hazardous Waste Management

Hazardous waste management, including explosive ordnance disposal (EOD) at CCAFS is regulated under the Resource Conservation and Recovery Act (RCRA) (Title 40 Code of Federal Regulations [CFR] 260-280) and the Florida Administrative Code (FAC) 62-730. It is the responsibility of each contractor to manage and dispose of all hazardous waste generated from its operations in accordance with all local, state, and federal regulations.

All hazardous waste is labeled with the U.S. Environmental Protection Agency (EPA) identification number for each contractor, under which it is transported, treated, and disposed of. All individuals or organizations generating hazardous waste at CCAFS are responsible for administering all applicable regulations and plans regarding hazardous waste.

Individual contractors and organizations maintain their own hazardous waste satellite accumulation points (SAP) and 90-day hazardous waste accumulation areas, in accordance with applicable RCRA regulations. There is no limit to the volume of hazardous waste that can be stored at a 90-day hazardous waste accumulation area, but wastes must be taken to the permitted storage facility or disposed of offsite within 90 days.

The contractor is responsible for the collection and transport of hazardous wastes (including propellant waste) from the SAPs to a 90-day hazardous accumulation area, then to an offsite permitted treatment, storage, and disposal facility (TSDF). The contractor is responsible for ensuring that the management and disposal of all hazardous wastes would be conducted in accordance with all applicable federal, state, and local regulations. The CCAFS TSDF is not available for storage of any EELV program wastes.

The contractor will coordinate all environmental emergency response actions at the leased EELV premises.

#### 3.6.1.3 Pollution Prevention

Contractors are responsible for developing and implementing their own Pollution Prevention Management Plans (PPMPs) to comply with all state, federal, and local regulations. As specified under lease agreements and contracts, the contractors are under contract to reduce, where possible, the use of Class II Ozone-Depleting Substance (ODS) and Environmental Planning and Community Right-to-Know Act (EPCRA) 313 chemicals. The only anticipated use for Class II ODSs is the use of refrigerants in the HVAC system of the EELV program buildings, as well as in spray-on foam insulation repairs to the launch vehicle. Class 1 ODSs will not be used in the EELV program, as defined by contract.

#### 3.6.1.4 Installation Restoration Program

The IRP efforts at CCAFS have been conducted in parallel with the program at Patrick AFB, and in close coordination with EPA, the Florida Department of Environmental Protection (FDEP), and NASA. CCAFS is not a National Priorities List (NPL) site. The IRP sites are remediated under RCRA regulations in lieu of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The government is undertaking IRP environmental response actions at the two CCAFS EELV program launch sites. This section provides an update to the 1998 FEIS. The following discussion focuses on EELV program activities at CCAFS that have the potential to affect the ongoing investigations of IRP and area of concern (AOC) sites.

#### 3.6.1.4.1 Atlas V System

IRP Site DP-24 [Solid Waste Management Unit (SWMU) C047] is located at SLC-41. Hydrazine, diesel fuel, halogenated solvents, paints, thinners, trace metals, and waste oils may have been disposed of at this site from past Air Force operations. A RCRA Facility Investigation (RFI) has been conducted at this site.

In October 1996, an estimated 150,000 tons of polychlorinated biphenyl (PCB)-contaminated soils were identified at SLC-41. Approximately 25 percent of the contaminated soil was identified as containing PCB concentrations exceeding the Toxic Substances Control Act-regulated level of 50 ppm. The State of Florida regulates cleanup for industrial sites with contamination levels greater than 3 ppm. Removal of the contaminated soil was completed in August 1999 to a negotiated risk-based cleanup level of 18 ppm.

#### 3.6.1.4.2 Delta IV System

IRP Site C-L37 (SWMU 56) is located at SLC-37. Hydrazine, diesel fuel, RP-1, hydrocarbons, PCBs, solvents, and waste oils may have been disposed of in several areas of this site. The site underwent an RFI under the IRP to determine whether the soil and groundwater at the site are contaminated. NASA investigated this site in accordance with a Memorandum of Agreement (MOA) with the 45 Space Wing (SW). PCBs have been identified in the surface soil at the site. Air Force Space Command (AFSPC) and NASA have determined the areas for which each agency will be responsible. The PCB-contaminated soil was remediated during 1998 and is expected to cause no further conflicts with launch program activities.

## 3.6.2 Vandenberg AFB

The ROI for Vandenberg AFB includes the areas around SLC-3W and SLC-6, and areas adjacent to current facility locations.

### 3.6.2.1 Hazardous Materials Management

Numerous types of hazardous materials are used to support the various missions and general maintenance operations at Vandenberg AFB. Categories of hazardous materials used during current lift vehicle system activities include lift vehicle and satellite fields, POLs, VOC, corrosives, refrigerants, adhesives, sealants, epoxies, and propellants. Example quantities from current programs are provided in the 1998 FEIS, Section 3.6. Vandenberg AFB requires all contractors using hazardous materials to submit a hazardous materials contingency plan prior to working on the base. Recent agreements reached with EELV contractors place increased responsibility for hazardous materials and waste management on the LVCs.

Spills of hazardous materials are covered under the Hazardous Materials Emergency Response Plan. This plan ensures that adequate and appropriate guidance, policies, and protocols regarding hazardous material incidents and associated emergency response are available to all installation personnel.

#### 3.6.2.2 Hazardous Waste Management

Hazardous wastes at Vandenberg AFB are regulated by RCRA (Title 40 CFR 260-280) and the California Environmental Protection Agency Department of Toxic Substances Control (DTSC), under the California Health and Safety Code, Title 22, Division 20, Chapter 6.5, Sections 25100 through 25159, and the California Administrative Code, Sections 25100 through 67188. These regulations require that hazardous wastes be handled, stored, transported, disposed of, or recycled.

The lift vehicle contractors' Hazardous Waste Management Plan (HWMP) implements the regulations and outlines the procedures for disposing of hazardous waste. All hazardous waste generated is labeled with the EPA identification number for each contractor under which it is transported, treated, and disposed of. All individuals or organizations at Vandenberg AFB are responsible for administering all applicable regulations and plans regarding hazardous waste, and for complying with applicable regulations regarding the temporary accumulation of waste at the process site. The contractor is responsible for the maintenance of hazardous waste SAPs and 90-day storage areas, in accordance with local, state, and federal regulations.

#### 3.6.2.3 Pollution Prevention

Under the current EELV launch service contracts, LMC and Boeing are responsible for developing and implementing their own PPMP to comply with all local, state, and federal regulations. As specified under lease agreements and under EELV contract requirements, the contractors have developed a HWMP to outline strategies to minimize the use of Class II ODSs and EPCRA 313 chemicals. No Class I ODSs will be used in the EELV program.

#### 3.6.2.4 Installation Restoration Program

Vandenberg AFB is not listed on the NPL. The IRP sites at Vandenberg AFB are being addressed in a manner generally consistent with the CERCLA process.

This section provides an update to the 1998 FEIS IRP discussion for locations near the EELV program launch sites. This material is relevant to both the No-Action Alternative and the Proposed Action because construction schedules must be coordinated with IRP actions.

##### 3.6.2.4.1 Atlas V System

IRP Site 6 (SLC-3W) is located at the northwestern end of Alden Road at SLC-3W. Hazardous substances that may have been released include RP-1 unsymmetrical dimethylhydrazine (UDMH), component flushing solvents [trichloroethylene (TCE), methylene chloride, and isopropyl alcohol], diesel fuel, waste oil, trace metals in deluge water, and paint residue in sandblast grit. In 1990, initial soil sampling was conducted at the site; followup sampling was conducted in 1992. Based on the sampling results, IRP Site 6 was recommended for no further response action planned (NFRAP) because all residual contaminants were found to be below levels that would pose an unacceptable risk to human health and the environment. Regulatory concurrence has been obtained on the NFRAP for IRP Site 6. Any future environmental response actions will be conducted under the environmental compliance programs, because construction activities analyzed in the 1998 FEIS could change exposure pathways.

IRP Site 7 (Bear Creek Pond) is located west of Old Surf Road, just south of Bear Creek Pond. The pond area is the farthest downgradient portion of Bear Creek prior to Coast

Road. At SLC-3E and SLC-3W, deluge water was released to Bear Creek Canyon. Contaminants of concern include hydrazine, solvents, lubricating oil, metals, and TCE. A Phase II remedial investigation (RI) Work Plan was completed for the site in 1996 to fill gaps identified in the Phase I data. Phase II RI field sampling and analyses have been conducted.

Two AOCs associated with the SLC-3W area were identified during the preliminary assessment/site investigation (SI). AOC-66 is located at Building 765, a missile/space research facility with a substation and a transformer with detectable levels of PCBs. AOC-91, a 55-gallon waste oil drum, was associated with the Water Pump House, Building 78. The drum has been removed under a compliance removal action.

***Adjacent Facilities.*** Building 7525, the Booster Assembly Building (BAB), is associated with AOC-143. In the past, a mixture of TCE and water was released to grade. Currently, the building includes a paint spray booth, a hydraulic pumping station, and facilities for the use of solvents, photoprocessing chemicals, and freon.

#### 3.6.2.4.2 Delta IV System

There are no IRP sites located at SLC-6. AOC-89, however, is associated with Buildings 390A, 390M, 390T, and 391 within the SLC-6 area. Building 390 is actually composed of several structures labeled as 390A through 390T. Building 390A was constructed as a mobile service tower (MST) for the Manned Orbital program in 1969. Both past and present hydraulic leaks have been noted at this facility. Building 390M, which is a blast deflector made of concrete, is located west of Building 390A. Both photochemical waste and industrial wastewater releases have occurred within this facility. Building 390T was constructed in 1968 as a contaminated fuel holding area. Although no spills have been documented at this facility, it fits the definition of a potential SWMU under RCRA. Currently, this AOC is being investigated further to determine whether remediation will be required.

## 3.7 Health and Safety

The risk management framework for health and safety has not changed substantially since the preparation of the 1998 FEIS. The section below provides additional information relevant to health and safety procedures associated with the Proposed Action.

### 3.7.1 Management of Risks due to Rocket Propellant and Motor Exhaust Constituents Exposures

The exposure criteria used in Eastern and Western Range Safety Programs are used to fulfill toxic hazard and risk management requirements and policies. The objective of these programs is to maximize range operability without compromising public and worker safety. The Headquarters AFSPC Surgeon General (HQ AFSPC/SG) has recommended exposure criteria for some of the current solid- and liquid-rocket propellants and their combustion by-products. HQ AFSPC/SG has also recommended that the Eastern and Western Ranges use a risk-management based approach for developing toxic launch commit criteria (LCC) consistent with current human toxic exposure criteria and coordinated with Local Emergency Planning Committees and local agencies, as needed. In an effort to comply with this recommendation, the Eastern and Western Range Safety offices developed a toxic risk-management based approach designed to maintain an $E_c$ less than or equal to $30x10^{-6}$ with an individual risk of $1x10^{-6}$ over the varying population densities. This approach takes into account probability of catastrophic failure, concentration, direction, dwell time, and emergency preparedness procedures. This risk level presents no greater risk to the general public for launch and flight of launch vehicles and payloads than that imposed by overflight of conventional aircraft.

For credible potential toxic emissions, tiered levels are established to fulfill Air Force requirements under AFOSH Standard 48-8, Controlling Exposures to Hazardous Materials, and Local Emergency Planning Committee (LEPC) requirements under Executive Order 12856 on Federal Compliance with Right-to-Know laws, Environmental Planning and Community Right-to-Know Act, and Technical Guidance for Hazards Analysis: Emergency Planning for Extremely Hazardous Substances, (USEPA, FEMA, DOT 1987).

Both Vandenberg AFB and CCAFS have safety procedures in place, which are described below, to protect the public and sensitive receptors from potential launch impacts.

### 3.7.2 Western Range Safety Program

The Western Range has a three-tiered, three-zone deterministic approach plus a probabilistic approach to protecting against harmful toxic exposures of HCl. The Western Range implements safety measures that are designed to protect mission essential (ME) and non mission essential (NME) persons. Before launch, the Rocket Exhaust Effluent Diffusion Model (REEDM) is used to locate toxic zones.

There are three zones for assessing an individual's proximity to toxic combustion products, including those that could result from a launch failure. Zone 1 is an area where airborne concentrations of any toxic product are equal to or exceed Tier 1 levels but are less than Tier 2 levels. Zone 2 is an area where airborne concentrations of any toxic product are equal to or exceed Tier 2 levels but are less than Tier 3 levels. Zone 3 is an area where airborne concentrations of any toxic product range from a low defined by Tier 3 to an unknown high. The Tier Levels are described in the text below and in Table 3.7.1-1.

Prior to launch, REEDM is run to ensure that any ME persons within a Zone 2 (having predicted HCl concentrations exceeding the Tier 2 level [see 30 SWI 91-106, 1998]) are aware of being in a Zone 2, have personnel protection equipment, and have a pre-determined route of departure. If ME personnel do not meet these requirements, then they are relocated out of the zone. Any NME persons on-base are also moved, if feasible. If they cannot be moved, or if they are off-base and not subject to being moved, then their locations and exposure are taken into account in the risk assessment procedure.

The Western Range toxic risk-assessment-based recommendation to launch or not to launch is based on the results of the Launch Area Toxic Risk Analysis (LATRA) program (i.e., risk assessment program) that evaluates the risk to people, regardless of whether they are mission essential or NME. Among other criteria in determining whether to launch, LATRA accounts for: (1) whether people are sheltered or unsheltered; (2) whether they are healthy or sensitive individuals; and (3) the probability of a catastrophic launch failure.

### 3.7.3 Eastern Range Safety Program

The Eastern Range has a risk-management based three-tiered approach for public safety. For off-base public safety, the Eastern Range uses a risk-management-based approach that keeps the risk the same over varying population densities. For on-base CCAFS worker safety, the Eastern Range uses a sheltering program or area evacuation to ensure safety of its work force and visitors. The calculated risks are determined by modeling potential exposures as short-term, acute hazards. If the calculated risks (corresponding to Tier 2 toxic exposure levels) exceed the same risk levels used successfully over the years to protect the general public, then Safety will recommend to the Launch Decision Authority a launch delay until the risks are reduced.

Generally for any toxic commodity, the first tier represents the goal for not exceeding the SPEGL (Short-term Public Emergency Guidance Level) within an individual's breathing zone. The first tier, established for a planned credible event, identifies an action level that would require communication to execute protective actions. The second tier represents the Level of Concern (LOC), a requirement established in coordination with the Local Emergency Planning Commission and the U.S. Air Force/Surgeon General (USAF/SG). For the Eastern Range, LOCs are defined as the maximum acceptable outdoors concentration, which is a function of off-base population density and coordinated risk management. For on-base applications, the LOC is the maximum indoor concentration acceptable per USAF/SG and is a function of shelter air exchange rate, forecasted outdoor plume-dwell time, and forecasted outdoor plume concentration. A third tier exists (which is only for on-base application) as the maximum outdoors capping concentration, regardless of sheltering capability, to prevent fatality to any unanticipated worker not sheltered. The end goal for this process is to manage risk, a function of occurrence probability and resulting consequence, to be in accordance with the risk level requirements presented in EWR 127-1.

For HCl, the Eastern Range uses a first-tier SPEGL of 1ppm ceiling. The off-base second-tier LOC is 15 ppm for high-density populations, 20 ppm for medium density populations, and 25 ppm for low-density populations. For uncoordinated or high probability operations, the off-base LOC for HCl is 10ppm. For on-base-shelter interior LOC, the HCl requirement is 10 ppm. The third tier for HCl is 50 ppm, which is a level one-half the level determined to be Immediately Dangerous to Life and Health (IDLH).

Therefore, launch commit criteria are based on a function of range, bearing, and concentration for on- and off-base critical receptors. In addition, calculation of criteria for on-base risk also accounts for the dwell time of the plume in the vicinity of the on-base critical receptors.

The Eastern Range risk-assessment-based recommendation to launch or not to launch due to the potential hazard of public exposure to toxic commodities is based on the results of the Launch Area Toxic Risk Analysis (LATRA) program (i.e., risk assessment program) that evaluates the risk to the populous. Among other criteria in determining whether to launch, LATRA accounts for: (1) whether people are sheltered or unsheltered; (2) whether they are healthy or sensitive individuals; and (3) the probability of a catastrophic launch failure. Table 3.7.1-1 presents Tier 1, Tier 2, and Tier 3 HQ AFSPC/SG recommended exposure criteria for HCl, anhydrous hydrazine ($N_2H_4$), UDMH, Aerozine-50 (A-50), MMH, and $NO_2$ endorsed by HQ AFSPC/SG. It is important to note that the exposure criteria do not take

**TABLE 3.7.1-1**
HQ AFSPC/SG-Recommended and Endorsed Exposure Criteria for Constituents in Rocket Propellant or Motor Exhaust

| | Tier 1[a] | Tier 2[b] | Tier 3[c] |
|---|---|---|---|
| HCl[f] | 2 ppm (60 min)[d]<br>10 ppm [e] | 10 ppm[e] | 50 ppm[e] |
| $N_2H_4$[g] | NR | 2 ppm (60 min)[d] | 40 ppm[e] |
| UDMH[g] | NR | 5 ppm[e] | 25 ppm[e] |
| A-50[g] | NR | 5 ppm[e] | 25 ppm[e] |
| MMH[g] | NR | 0.52 ppm (60 min)[d] | 25 ppm[e] |
| $NO_2$[f] | 0.2 ppm (60 min)[d]<br>2 ppm[e] | 2 ppm (60 min)[d]<br>4 ppm[e] | 20 ppm (30 min)[d] |
| $HNO_3$[f] | 0.3 ppm[e] | 2.5 ppm (60 min)[d]<br>4 ppm[e] | 25 ppm (30 min)[d] |

[a]Tier 1 – This exposure level and above is defined as the discomfort or mild-effect level. There is little risk to the average person. This exposure poses no hazard to normal and healthy individuals. Sensitive individuals (i.e., asthmatics and bronchitics) may experience some adverse effects, which are reversible. Tier 1 represents exposure guidelines for sensitive members of the general public (off-base) who may involuntarily and unknowingly be exposed. Recommended action, if this tier is exceeded, is similar to a Stage 3 air pollution alert: Notify the public of the release through an advertised announcement particular to an event or a published annual notice that sensitive populations should be advised that there is a possibility of exposure to the effluent and advise of mitigating precautions.

[b]Tier 2 – This exposure level and above is defined as the disability or serious-effect level. All effects are reversible. There are no serious impacts on personnel's ability to complete the mission identified. There is some risk to an average individual. Military and employees voluntarily accept exposure up to Tier 2 concentrations. The consent implies knowledge of the exposure concentrations and the consequences of possible exposure. Tier 2.represents personnel who have knowledge of the event and understand the possibility and consequences of possible exposure (on-base personnel). Personnel are advised to seek immediate protection (shelter in place) or evacuate for concentrations exceeding the Tier 2 limit.

[c]Tier 3 – This exposure level and above is defined as a life-threatening-effect level. Irreversible harm may occur with possible impact on a person's ability to complete the mission. Personnel in an area (event personnel) where Tier 3 exposure may occur have given informed consent and are trained regarding the possible life-threatening situations. Exposures up to Tier 3 concentrations permit an individual to seek shelter or don respiratory protection. Concentrations predicted in excess of Tier 3 concentrations require immediate evacuation to prevent exposure.

[d]Time-weighted average exposure concentration. The time period indicated in parentheses is the time over which the concentration measurements will be measured and averaged.

[e]Ceiling limit. A peak concentration that must not be exceeded during the exposure period.

[f]Exposure criteria recommended by HQ AFSPC/SG.

[g]Exposure criteria recommended by AL/OE and endorsed by HQ AFSPC/SG.

A-50 = Aerozine-50 (50 percent by weight unsymmetrical dimethylhydrazine and anhydrous hydrazine).
HCl = hydrochloric acid.
HNO3 = nitric acid.
HQ AFSPC/SG = Headquarters Air Force Space Command/Surgeon General.
min = minutes.
MMH = monomethyl hydrazine.
NR = no recommendation.
N2H4 = anhydrous hydrazine.
NO2 = nitrogen dioxide.
ppm = parts per million.
UDMH = unsymmetrical dimethylhydrazine.

into account the use of risk mitigating procedures and, therefore, do not accurately depict toxic launch commit criteria used on the two federal ranges. Probabilistic procedures are integral to the risk management approach used on the federal ranges to develop toxic on-base and off-base LCC; therefore, Table 3.7.1-1 should be used only as guidance, and not to evaluate launch availability from the federal ranges.

Tier 1 levels serve as the maximum concentration goal to reach the breathing zone of the public and unprotected workers. Tier 1 levels, typically SPEGLs, are established by Air Force Office of Safety and Health (AFOSH) Standard 48-8 as recommended by the National Academy of Science's Committee on Toxicology and subsequent Air Force Surgeon General guidance. At Vandenberg AFB, all the tier levels are established via 30 SW Instruction 91-106, Toxic Hazard Assessments.

Tier 2 levels are LOCs established by LEPC at CCAFS for potential public exposures. These levels may vary at CCAFS, based on probability of occurrence, potential severity, and readiness of range and local civilian emergency-management authorities to execute emergency response protocols. For potential worker exposures, these levels may be considerably elevated based on worker readiness for sheltering and pre-clearing and air-tightness of the operational shelters.

Tier 3 levels are applicable only for on-base worker scenarios, because these levels exceed any acceptable off-base criteria. The Tier 3 level caps the maximum on-base concentration. This level limits the risk to any unforeseen unprotected worker and certainly exceeds protection factors of on-base shelters.

### 3.7.4 Composite Materials

Both the Atlas V and the Delta IV vehicles use large amounts of composite materials for numerous components on each vehicle. These materials could, when involved in a launch failure, cause health and safety concerns to the general public. Although these materials are not new to the aerospace industry, sufficient data do not exist concerning the volatile organic compounds that could be produced following a launch failure and their ensuing reactivity with burning solid rocket propellant. The existing literature on the hazards of composite materials mainly deal with aircraft accidents, emergency response, and handling/processing of the materials. To date, data do not exist regarding composite materials used on the Atlas V and Delta IV vehicles and their reactivity with burning solid rocket propellant following a catastrophic launch abort. The Eastern and Western Range safety offices have sent letters to the Atlas V and Delta IV contractors requesting composite material data in an effort to perform a risk assessment of vehicles following a catastrophic launch abort. Technical clarifications and interchanges have taken place between the two Range Safety offices and the EELV contractors regarding composite material data.

## 3.8 Geology and Soils

Geology and soils were described in the 1998 FEIS.

There have been no substantive changes in these areas since that document was written. For more information on geology and soils, refer to the 1998 FEIS.

# 3.9 Water Resources

Water resources were described in the 1998 FEIS. Aside from the increased Atlas V launch pad deluge and washdown water usage (refer to Section 2.1.3.1.3 in the FSEIS for further details), there have been no other substantive changes in this area since that document was written. For more information regarding water resources, refer to the 1998 FEIS.

# 3.10 Air Quality (Lower Atmosphere)

This section describes the air quality environment from ground level to an altitude of 3,000 feet above sea level that could be affected by the Proposed Action or the No-Action Alternative. This section includes only those data that have been updated since publication of the 1998 FEIS.

## 3.10.1 Federal Regulatory Framework

Air quality for both CCAFS and Vandenberg AFB is regulated by the federal government under Title 40 CFR 50 [National Ambient Air Quality Standards (NAAQS)]; Title 40 CFR 51 (Implementation Plans); Title 40 CFR 61 and 63 (National Emission Standards for Hazardous Air Pollutants [NESHAPs]); Title 40 CFR 70 (Operating Permits); and Title 40 CFR 82 (Protection of Stratospheric Ozone). Only those changes in the regulatory framework that are substantive changes or new information from the description contained in the 1998 FEIS are noted below.

The EPA published new national ambient air quality standards for ozone and particulate matter in the *Federal Register* on July 18, 1997. In May 1999, the Federal Appeals Court nullified the new particulate standard on the basis that the EPA's process of issuing the air pollution rules amounted to "an unconstitutional delegation of legislative power." The court did not vacate the EPA's ozone rule altogether, but said the standard "cannot be enforced" (Associated Press, May 14, 1999). EPA is expected to appeal the ruling.

## 3.10.2 Cape Canaveral Air Force Station

### 3.10.2.1 Regional Air Quality

Existing air quality is defined as "in attainment" or "nonattainment" with ambient air quality standards, depending on whether monitored air concentrations exceed the applicable air quality standards presented in the 1998 FEIS. The FDEP operates and maintains monitoring stations throughout Florida. Based on these data, the FDEP classifies areas of the state that are in attainment or nonattainment with the Florida Ambient Air Quality Standards (FAAQS). In Florida, regional air quality is assessed at the county level. CCAFS is in Brevard County, which has been designated by both the EPA and FDEP to be in attainment for all criteria pollutants. Table 3.10-1 lists the FDEP monitoring stations in the vicinity of CCAFS.

Table 3.10-2 shows recent monitored air concentrations around the region. In 1998, the concentrations of particulate matter equal to or less than 10 microns in diameter ($PM_{10}$) were higher than typical historical figures because of the extensive wildfires within the Florida Everglades.

**TABLE 3.10-1**
Air Monitoring Locations Near Cape Canaveral Air Force Station

| Station | Location | Pollutants Monitored |
|---|---|---|
| **Brevard County** | | |
| Merritt Island | 2575 N. Courtenay Parkway, Merritt Island | $PM_{10}$ |
| Cocoa Beach | 400 South 4th Street | $O_3$ |
| Titusville | Tico Airport, Off U.S. 1 | $PM_{10}$ |
| Titusville | 611 Singleton Avenue | $PM_{10}$ |
| Palm Bay | 525 Pepper Street | $O_3$ |
| **Orange County** | | |
| Winter Park | Morris Boulevard | $SO_2$, CO, $PM_{10}$, $NO_2$, $O_3$, lead |

$PM_{10}$ = particulate matter equal to or less than 10 microns in diameter.
$O_3$ = ozone.
$O_2$ = sulfur dioxide.
CO = carbon monoxide.
$NO_2$ = nitrogen dioxide.

**TABLE 3.10-2**
Ambient Air Concentrations near Cape Canaveral Air Force Station

| Pollutant ($\mu g/m^3$) | Station | 1996[a] | 1997[b] | 1998[c] |
|---|---|---|---|---|
| **Ozone** | | | | |
| 1-hour highest | Cocoa Beach, Brevard Co. | 180 | 190 | 294 |
| | Palm Bay, Brevard Co. | 180 | 180 | 220 |
| 1-hour 2nd highest | Cocoa Beach, Brevard Co. | 170 | 170 | 218 |
| | Palm Bay, Brevard Co. | 170 | 170 | 170 |
| **CO** | | | | |
| 1-hour highest | Winter Park, Orange Co. | 4,600 | 4,600 | 4,500 |
| 1-hour 2nd highest | Winter Park, Orange Co. | 4,600 | 4,600 | 4,100 |
| 8-hour highest | Winter Park, Orange Co. | 2,300 | 3,400 | 2,900 |
| 8-hour 2nd highest | Winter Park, Orange Co. | 2,300 | 3,400 | 2,700 |
| **$NO_x$** | | | | |
| Annual | Winter Park, Orange Co. | 24 | 24 | 21 |
| **$SO_2$** | | | | |
| 3-hour highest | Winter Park, Orange Co | 126 | 75 | 76 |
| 3-hour 2nd highest | Winter Park, Orange Co. | 75 | 56 | 71 |
| 24-hour highest | Winter Park, Orange Co. | 31 | 18 | 21 |
| 24-hour 2nd highest | Winter Park, Orange Co. | 30 | 18 | 18 |
| Annual | Winter Park, Orange Co. | 4 | 4 | 5 |
| **$PM_{10}$** | | | | |
| 24-hour highest | Merritt Island, Brevard Co. | 74 | 33 | NA |
| | Titusville Airport, Brevard Co. | 72 | 32 | 157 |
| | Titusville Singleton, Brevard Co. | 76 | 42 | 162 |

**TABLE 3.10-2**
Ambient Air Concentrations near Cape Canaveral Air Force Station

| Pollutant ($\mu g/m^3$) | Station | 1996[a] | 1997[b] | 1998[c] |
|---|---|---|---|---|
| 24-hour 2nd highest | Merritt Island, Brevard Co. | 40 | 33 | NA |
| | Titusville Airport, Brevard Co. | 42 | 31 | 64 |
| | Titusville Singleton, Brevard Co. | 44 | 38 | 148 |
| Annual | Merritt Island, Brevard Co. | 18 | 18 | NA |
| | Titusville Airport, Brevard Co. | 16 | 17 | 21 |
| | Titusville Singleton, Brevard Co. | 18 | 19 | 24 |

[a]1996 ALLSUM Report, Florida Department of Environmental Protection (1997).
[b]1997 ALLSUM Report, Florida Department of Environmental Protection (1998).
[c]1998 ALLSUM Report, Florida Department of Environmental Protection (1999).
[d]Arithmetic Mean.
NA = Not available.
$\mu g/m^3$ = micrograms per cubic meter.

### 3.10.2.2 Air Emissions

The most recent emission inventories (1996 through 1998) for CCAFS and Brevard County are included in Table 3.10-3.

**TABLE 3.10-3**
Cape Canaveral Air Force Station and Brevard County Emissions (tons/year)

| | VOC | $NO_x$ | CO | $SO_2$ | $PM_{10}$ |
|---|---|---|---|---|---|
| CCAFS 1997 Air Emissions Inventory Report[a] (stationary source emissions only) | 64.6 | 402.8 | 155.6 | 33.3 | 70.0 |
| 1995 Brevard County Point-Source Emissions | 107 | 11,514 | 991 | 26,492 | 340 |
| 1995 Brevard County Area-Source Emissions | 24,876 | 14,608 | 133,752 | 1,032 | 34,750 |
| 1995 Brevard County Total Emissions | 24,983 | 26,122 | 134,743 | 27,524 | 35,090 |

Source: USAF 45th CES/CEV, 1999.
VOC = volatile organic compounds.
$NO_x$ = nitrogen oxides.
CO = carbon monoxide.
$SO_2$ = sulfur dioxide.
$PM_{10}$ = particulate matter equal to or less than 10 microns in diameter.

## 3.10.3 Vandenberg AFB

This section describes the site-specific air quality issues for Vandenberg AFB that have been updated since the 1998 FEIS.

### 3.10.3.1 Regional Air Quality

In California, air quality is assessed on a county and a regional basis. Santa Barbara County is under the jurisdiction of the South Central Coast Air Basin (SCCAB). The SCCAB includes the Counties of San Luis Obispo, Santa Barbara, and Ventura. Table 3.10-4 shows ambient concentrations of the criteria pollutants as measured by monitoring stations located at Vandenberg AFB.

**TABLE 3.10-4**
Ambient Air Concentrations at Vandenberg AFB

| Pollutant ($\mu g/m^3$) | 1996 | 1997 | 1998 |
|---|---|---|---|
| **Ozone** | | | |
| 1-hour highest | 190 | 177 | 157 |
| 1-hour 2nd highest | 186 | 167 | 151 |
| **CO** | | | |
| 1-hour highest | 1,603 | 1,259 | 1,145 |
| 1-hour 2nd highest | 1,030 | 1,145 | 1,030 |
| 8-hour highest | 801 | 572 | 1,030 |
| 8-hour 2nd highest | 687 | 572 | 801 |
| **$NO_x$** | | | |
| 1-hour highest | 58 | 58 | 43 |
| 1-hour 2nd highest | 43 | 51 | 43 |
| Annual | 6 | 6 | 6 |
| **$SO_2$** | | | |
| 3-hour highest | 8 | 10 | 8 |
| 3-hour 2nd highest | 8 | 8 | 8 |
| 24-hour highest | 3 | 5 | 3 |
| 24-hour 2nd highest | 3 | 5 | 3 |
| Annual | 3 | 3 | 3 |
| **$PM_{10}$** | | | |
| 24-hour highest | 61 | 49 | 32 |
| 24-hour 2nd highest | 36 | 46 | 31 |
| Annual | 18 | 21 | 18 |

$\mu g/m^3$ = micrograms per cubic meter.
CO = carbon monoxide.
$NO_x$ = nitrogen oxides.
$SO_2$= sulfur dioxide.
$PM_{10}$ = particulate matter equal to or less than 10 microns in diameter.
Source: U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Monitoring Values Reports, http://www.epa.gov/airsdata/monvals.htm

The California Air Resources Board (CARB) classifies areas of the state that are in attainment or nonattainment of the California Ambient Air Quality Standards (CAAQS).

Both the EPA and CARB have designated the SCCAB as being in attainment of the NAAQS and CAAQS for $SO_2$, nitrogen dioxide ($NO_2$), and carbon monoxide (CO). Vandenberg AFB has been designated by the EPA to be in attainment with the federal $PM_{10}$ standard but has been designated by CARB to be in nonattainment with the more stringent California standard for $PM_{10}$. The EPA has classified Santa Barbara County as being in serious non-attainment for the federal ozone standard.

Federal conformity rules require that all federal actions conform to an approved State Implementation Plan (SIP) or Federal Implementation plan (FIP). Conformity means that an action will not: (1) cause a new violation of the NAAQS; (2) contribute to any frequency or severity of existing NAAQS; and (3) delay the timely attainment of the NAAQS. A detailed description of the conformity rule is described in Appendix J of the 1998 FEIS. Conformity only applies to areas that are not in attainment with the federal standards. Because SCCAB is classified as a serious nonattainment area for the federal ozone NAAQS, conformity must be considered for $NO_x$ and VOC emissions, which are ozone precursors. A general conformity determination would be required if total EELV emissions exceed 50 tons per year of $NO_x$ or VOC, and / or the Proposed Action results in more than 10 percent of the County emissions inventory. Conformity does not have to be considered for $PM_{10}$ because the area is in attainment with the federal $PM_{10}$ NAAQS (even though the area is in non-attainment for the more stringent state $PM_{10}$ standard).

### 3.10.3.2 Air Emissions

The most recent emission inventories for Vandenberg AFB and Santa Barbara County are included in Table 3.10-5.

**TABLE 3.10-5**
Vandenberg AFB and Santa Barbara County Emissions (tons/year)

| | VOC | $NO_x$ | CO | $SO_2$ | $PM_{10}$ |
|---|---|---|---|---|---|
| 1995 Vandenberg AFB Stationary Sources (Emissions Questionnaire) | 4.2 | 21.3 | 1.2 | 7.7 | 2.1 |
| 1996 Santa Barbara County Annual Emissions[(a)] | 44,460 | 16,589 | 103,369 | 865 | 13,553 |

[a] Source: Santa Barbara County, 1998.
VOC = volatile organic compound.
$NO_X$ = nitrogen oxides.
CO = carbon monoxide.
$SO_2$ = sulfur dioxide.
$PM_{10}$ = particulate matter equal to or less than 10 microns in diameter.

# 3.11 Air Quality (Upper Atmosphere)

This section describes the air quality environment in the atmosphere above an altitude of 3,000 feet above sea level. This information summarizes and updates the information contained in the 1998 FEIS.

## 3.11.1 Troposphere

The atmospheric layer above 3,000 feet is generally referred to as the free troposphere. Within the free troposphere, the air temperature decreases with increasing height. This layer is subject to considerable vertical mixing resulting from various atmospheric processes, including daily solar heating and large-scale weather systems. Because of this mixing, dispersion and removal of most particulate and water-soluble emissions from lift vehicles takes place over a period of less than 1 week, even if released near the top of the troposphere. Emissions in the free troposphere are less likely to contribute to local, ground-level concentrations, but rather would be subject to regional- and global-scale transport and dispersion.

The ROI for the free troposphere is essentially the same for CCAFS and Vandenberg AFB, regardless of the lift vehicle used. Emissions directly into the free troposphere are not subject to any specific regulatory requirements.

### 3.11.2 Stratosphere

The layer above the troposphere is called the stratosphere. The lower boundary of the stratosphere lies between altitudes of 32,800 feet and 49,000 feet above the Earth's surface at a temperature inversion known as the tropopause. The tropopause is highest at the equator and lowest at the poles. In the stratosphere, the air temperature increases with increasing altitude. This temperature profile promotes a very stable structure subject to little vertical mixing. As a result, emissions released into the stratosphere can remain for long periods of time. For example, stratospheric debris from volcanic eruptions has been observed to stay within the stratosphere for several years after an eruption. The stratosphere extends upward to approximately 164,000 feet (with an atmospheric pressure of about 1 millibar).

Although containing less than 20 percent of the atmosphere's mass the composition of the stratosphere strongly influences the attenuation of solar radiation reaching the Earth's surface. The ozone layer that absorbs most of the biologically damaging ultraviolet sunlight (UV-B) is located within the stratosphere. Because of this layer's protective aspects, there is widespread concern about reductions in stratospheric ozone as a result of human-made ODS that enter the stratosphere. ODS include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halon, methyl bromide, carbon tetrachloride, and methyl chloroform. Class I and class II ODS are listed in section 602 of the Clear Air Act Amendments of 1990. Although released on the ground, most ODS are not water-soluble and have no natural removal mechanism. Therefore, these ODS accumulate (with residence times of fifty to hundreds of years) and become generally evenly mixed throughout the troposphere. The ODS then diffuse into the stratosphere where they react over time with ultraviolet light and split into halogen (chlorine or bromine) molecule and an organic radical. The atomic chlorine or bromine acts as a catalyst in a series of reactions to convert ozone ($O_3$) to diatomic oxygen ($O_2$). Because there is no loss of chlorine during the ozone destruction reactions, a single chlorine molecule can lead to the destruction of many ozone molecules.

The loss of the stratospheric ozone results in an increased UV-B flux to the surface of the earth. Higher UV-B fluxes could result in increased damage to the eyes (cataracts), the immune system, and the skin (resulting in sunburn, premature aging, and skin cancer). Increased UV-B may place additional stress on aquatic and terrestrial ecosystems by damaging ultraviolet (UV) sensitive species like phytoplankton and other coastal sea life and plants. Also, high UV-B may result in quicker degradation of synthetic polymers (such as plastics), resulting in more frequent replacement (UNEP, 1998).

In response to the threat of ODS to the stratospheric layer, the international community adopted the Montreal Protocol (and subsequent amendments) to phase out the production of ODS. The EPA implements ODS regulations through Title VI of the Clean Air Act as Amended in 1990 (CAA). However, because of the long residence times of CFC, ODS will continue to contribute more than 100,000 tons of chlorine annually into the stratosphere over the next century (Brady, et al., 1994). Because the stratosphere exchanges mass with the troposphere (albeit at a relatively low rate), the residence time of chlorine containing compounds such as HCl in the stratosphere is on the order of a few years.

No Class I ODS will be utilized in the EELV program; the use of Class II ODS will be minimized or eliminated.

Solid rocket-propelled lift vehicles inject chlorine compounds ($Cl_2$, HCl, and ClO), nitrogen compounds (NO and $N_2$), and aluminum oxide ($Al_2O_3$) particles directly into the stratosphere. Unlike CFCs, rocket exhaust products have stratospheric lifetimes on the order of a few years, depending on the altitude. However, the rocket combustion products can build up over time if there is a sufficient launch rate. The annual amount of chlorine deposited to the stratosphere from lift vehicles globally is generally very small (less than 1 percent), compared to the chlorine release by CFCs globally. As a side note, HCl is water-soluble, so that HCl emitted in the free troposphere would be washed out within a few weeks and would not accumulate as CFCs do.

At the nozzle of a solid rocket motor, most of the chlorine is in the form of HCl. HCl does not directly destroy ozone, but rather is a “reservoir” species for chlorine. However, the effect of the afterburn as the plume cools can convert a substantial amount of HCl (21 to 65 percent, depending on altitude) to free chlorine (Cl and $Cl_2$) that is immediately available for destroying ozone (Brady and Martin, 1995). This sudden release of chlorine can result in a local depletion of ozone in the daytime when sunlight is available (a “hole”) along the vehicle path. The size and duration of the hole depends on the amount of chlorine deposited and the rate of plume dissipation. Exhaust plume chemistry modeling by Brady and Martin (1995) indicated that this free chlorine is the dominant ozone destruction pathway immediately after the passage of an SRM lift vehicle. The conversion of HCl to $Cl_2$ was verified by stratospheric aircraft measurements by Ross, et al. (1997), and Burke and Zittel (1998).

Besides the chlorine, aerosols from SRMs could also assist in the destruction of ozone by: (1) providing a surface by which two ozone molecules may interact; and (2) providing a surface by which chlorine is freed from a reservoir species like HCl (Brady, et al., 1995). The nitrogen compounds also come into play by interacting with reservoir chlorine compounds to free chlorine. These effects are likely to have more impact in the far field, when the plume has cooled and dispersed.

Molina, et al. (1997) and Hanning-Lee, et al. (1996) have addressed the role of $Al_2O_3$ from lift vehicles in stratospheric ozone depletion in experiments. Molina, et al. (1997) reported that $Al_2O_3$ deposition at mid-latitudes could affect ozone concentrations. However, Jackman, et al. (1998) calculated that at current launch rates the global impact from $Al_2O_3$ would be less than from lift vehicle chlorine emissions.

Several studies have examined the impacts to stratospheric ozone of nitrogen oxides ($NO_{X}$) generated by lift vehicles with and without SRMs (Denison, et al., 1994; Zittel, 1995; and Brady, et al., 1997). These studies have found that chlorine compounds dominate the chemistry of ozone depletion.

Pergament, et al. (1977), conducted in-situ measurements of ozone taken after a launch. This study found that 700 seconds after the passage of a Titan III, the ozone concentration at 18 kilometers was approximately 40 percent of the ambient value. Although the ozone depletion at a given point along the trajectory may be significant, if the trajectory is not vertical, only a small portion of the ozone in the column of atmosphere above the launch site may be reduced. Also, effects like the scattering of UV by plume aerosols and the shearing from differences in the winds at different altitudes may help mitigate the short-term impact from a launch. From stratospheric aircraft measurements, Ross, et al. (1997a) reported ozone concentrations dropped to near zero at daytime, in the wake of a Titan IV lift vehicle with SRMs. They correlated this with elevated chlorine concentrations in the lift vehicle plume. A second study by Ross, et al (1997b) showed elevated chlorine levels but no significant ozone depletion at 18.9 km here following a twilight Titan IV launch.

Prather, et al. (1990), conducted a study of the Space Shuttle's impacts on the stratosphere using two- and three-dimensional models of stratospheric chemistry on a time scale of one day to one month after a launch. Based on their results, and on the fact that the trajectory of the shuttle was not vertical, the authors concluded that no local columnar hole could occur in the ozone above the launch site. The authors supported their position by citing that the total ozone mapping spectrometer (TOMS) should be able to detect a significant hole and that no such hole had been observed (McPeters, et al., 1991). Others (Syage, et al. 1995; Ross, 1992) have since argued that TOMS is not well suited for detecting an ozone hole because of the TOMS spatial resolution, the displacement of the plume over time, and because of spectral interference from other plume species, such as $Al_2O_3$.

Modeling results reported by Syage, et al. (1995) suggest that a Titan IV launch could result in short-term columnar ozone losses of 20 to 50 percent approximately 3 hours after launch. However, the location and magnitude of a hole would depend on the particular wind and cloud patterns at the time of launch.

McKenzie, et al. (1997) attempted to measure a potential ozone hole using a ground-based imaging spectrometer to measure the UV spectrum before, during, and after a space shuttle launch. There was no evidence of a significant increase in UV radiation from the reduction in the columnar ozone. The measurements were complicated by the presence of clouds and by possible UV scattering by the plume of aerosol particles. At best, the results were inconclusive and indicate the extreme difficulty in conducting this type of study.

Perturbations in the trace gas composition of the stratosphere could potentially affect how the stratosphere absorbs and scatters solar radiation. Therefore, the loss of ozone could have an impact on climate. With less ozone present, more UV passes through the stratosphere, resulting in cooler stratospheric temperatures. Aerosol particles would also scatter solar radiation, thus potentially affecting the thermal balance in the stratosphere.

## 3.12 Noise

The affected noise environment was described in the 1998 FEIS. There have been no substantive changes in this area since that document was written. New background information on underwater sonic booms is in Appendix O.

## 3.13 Orbital Debris

Orbital Debris is described in the 1998 FEIS. There have been no substantive changes in this area since that document was written. For information on orbital debris, please refer to the 1998 FEIS.

## 3.14 Biological Resources

Biological Resources were described in the 1998 FEIS. Although there have been no substantive changes in this area, there are some existing conditions that have changed since that document was written. This section presents updates to the affected environment information.

At CCAFS, the National Marine Fisheries Service (NMFS) designated the water adjacent to portions of the east coast of Florida as critical habitat for the northern right whale, *Eubalaena glacialis*, on June 3, 1994 (50 CFR Part 226). These portions include the southern coast of Georgia (31°15' N) to just south of Cape Canaveral, at approximately Sebastian Inlet, Florida, (28°00' N), to a distance offshore of 5 nautical miles at the Cape. The NMFS also instituted a Take Reduction Plan for the northern right whale and three other whale species on February 16, 1999, to reduce the mortality and serious injury by U.S. commercial fishing operations in the waters specified in the earlier designated critical habitat area (50 CFR Part 229). This more recent plan addresses fisheries activities exclusively, and would not affect the activities of the launch program. However, the designation of critical habitat is a more broad ruling that affects any activity funded, authorized, or carried out by a federal agency that may affect areas required for the continued existence of the whales.

At Vandenberg AFB, the following updated information is provided for wildlife. A request, under Section 101(a)(5)(A) of the Marine Mammal Protection Act of 1972, as amended, for a letter of authorization for the incidental take of marine mammals during programmatic operations at Vandenberg AFB was submitted to NMFS in September 1997. The request was accepted, and is effective from March 1, 1999, until December 31, 2003 (1998 FEIS, Appendix H). The request states that Vandenberg AFB is allowed incidental take for up to 20 space launches per year for the next 5 years. The authorization is for Delta II, Taurus, Atlas, Titan IV, Titan II, and LMC lift vehicles.

The recently federally listed California red-legged frog has been added to the Section 7 consultation for current launch programs. Furthermore, the peregrine falcon was changed to state-listed endangered species, and beach west of SLC-3 at Vandenberg AFB has been designated critical snowy plover habitat, by the U.S. Fish and Wildlife Service (USFWS) (Federal Register, December 7, 1999).

## 3.15 Commercial Fisheries/Managed Species

A total of 206 fish species and invertebrate species is managed by the South Atlantic Fishery Management Council (FMC) and the Pacific FMC in waters off CCAFS and Vandenberg AFB. These species have significant commercial fisheries value associated with them. The Air Force has initiated formal consultation with NMFS and supporting technical information on potential impacts to essential fish habitats (EFH) and managed species is being prepared. A summary of the assessment of the potential effects of the EELV Program on these managed species is presented in Appendix P.

## 3.16 Cultural Resources

Cultural resources were described in the 1998 FEIS. There have been no substantive changes in this area since that document was written. For information on cultural resources at CCAFS or at Vandenberg AFB, refer to the 1998 FEIS.

## 3.17 Environmental Justice

Environmental justice was described in the 1998 FEIS. There have been no substantive changes in this area since that document was written. For information on environmental justice at CCAFS or at Vandenberg AFB, refer to the 1998 FEIS.