CHAPTER 14
HAZARDS, HAZARDOUS WASTE, AND PUBLIC HEALTH

This chapter describes hazards, hazardous waste, and public health issues in the study area and potential changes that could occur due to implementation of the alternatives. The issues considered in this analysis include exposures to chemical contaminants through ingestion of fish and waterfowl with high selenium concentrations, mosquito-borne diseases, waterborne pathogens, potential exposures to hazardous wastes, and risks from hantavirus pulmonary syndrome and valley fever.

STUDY AREA

The study area is defined as the geographical area within which the large majority of potential impacts are expected. The study area for hazards, hazardous waste, and public health issues is related to construction and operations and maintenance activities that would occur within the Sea Bed or along the shoreline. This area is shown as the "Salton Sea" in Figure 1-1.

REGULATORY REQUIREMENTS

This section describes the regulatory requirements related to hazards, hazardous waste, and public health issues.

Hazards and Hazardous Waste

Hazards and hazardous materials are generally characterized by chemical and physical properties that cause a substance to be considered hazardous including toxicity, ignitability, corrosivity, and reactivity. Within typical construction sites, materials that could be considered hazardous include fuels, motor oil, grease and other lubricants, solvents, soldering and welding equipment, and glues. Also, excavation may expose buried hazardous materials resulting from prior use of the site or adjacent property.

Federal and State laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to human health or the environment. The Federal Emergency Planning and Community Right-to-Know Act of 1986 imposes hazardous materials planning requirements to help protect local communities in the event of accidental release.

The U.S. Environmental Protection Agency (USEPA) regulates the management of hazardous materials and wastes. The primary federal hazardous materials and waste laws are contained in Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the Toxic Substances Control Act (TSCA). These laws apply to hazardous waste management, soil and groundwater contamination, and the controlled use and disposal of regulated chemicals. In California, USEPA has delegated most of the regulatory responsibilities to the State.

The U.S. Department of Transportation regulates hazardous materials transportation between states. State agencies with primary responsibility for enforcing federal and State regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol and the California Department of Transportation. Together, these agencies regulate container types and license hazardous waste haulers for hazardous waste transportation on public roads.

California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under RCRA and the California Hazardous Waste Control Law.

Public Health

Federal, State, and local agencies have adopted public health regulations related to contaminants and vector-borne diseases. The federal agencies include the same agencies described above. These agencies also have adopted regulations related to water and air quality characteristics that affect public health, as described in Chapters 6 and 10, respectively.

State agencies involved in enforcing public health and safety laws and regulations in the study area include:

- CalEPA Office of Environmental Health Hazard Assessment (OEHHA);
- California Department of Health Services;
- State Water Resources Control Board (SWRCB);
- Colorado River Basin Regional Water Quality Control Board (CRBRWQCB);
- California Integrated Waste Management Board; and
- California Occupational Safety and Health Administration (Cal/OSHA).

Riverside County Community Health Agency is responsible for public health in the county through the Department of Environmental Health and Department of Public Health. Imperial County Department of Health Services is responsible for public health issues in the county, including monitoring and controlling mosquitoes that is implemented by the Division of Environmental Health Services. The Coachella Valley Mosquito and Vector Control District is responsible for monitoring and controlling mosquitoes in Riverside County.

HISTORICAL PERSPECTIVE

Within the study area, constituents associated with agricultural operations, Department of Defense activities, and selenium from Colorado River water supplies have been considered when evaluating hazards, hazardous wastes, and public health. Historically, materials that cause hazards have been used or accumulated in the study area at times when these materials were not considered to be hazardous. In the past few decades, regulatory agencies have developed an understanding about the risks and adopted regulations to manage these materials. The regulations have reduced the extent and frequency of accumulation of additional material and the risk of exposure.

DATA SOURCES

For the purposes of this Draft Programmatic Environmental Impact Report (PEIR), human health risks associated with consumption of fish and waterfowl with selenium are based on several data sources, including fish tissue selenium concentration values for samples collected in April 2005 (DWR, 2005b), exposure point concentrations for selenium in whole fish and duck diets modeled for the alternatives (Appendix F), fish tissue data from historical sampling at the Salton Sea (Moreau et al., in press, a and b), historical data for selenium in tissues of waterfowl from the Salton Sea (Setmire et al., 1993; Skorupa, 1998), toxicity values from the Integrated Risk Information System (IRIS) database, and default exposure values from USEPA guidance documents (USEPA, 1989, 1991, 2000, 2002a, 2002b).

Information concerning the presence and current disposition of hazardous wastes was obtained from government databases listed in Table 14-1. Additionally, searches for keywords pertaining to releases of contaminants near the Salton Sea were performed on the web sites of the U.S. Department of the Interior,

Bureau of Land Management (BLM), U.S. Department of the Interior, Bureau of Reclamation (Reclamation), CRBRWQCB, and DTSC. When possible, the databases were queried using Imperial, Riverside, and San Diego counties as the desired locations. The query results were sorted based on the proximity to the Salton Sea. Only results from communities located near the shoreline were considered.

Table 14-1
Online Databases Used to Search for Hazardous Materials Records

Database	Government Dept.	Type	Description	Link to Source Page
EnviroStor	DTSC	State	Site cleanup, site mitigation, and brownfields reuse programs	http://www.envirostor.dtsc.ca.gov/public/
CERCLIS	USEPA	Federal	National Priorities List sites and progress	http://www.epa.gov/superfund/sites/cursites/
Geotracker	SWRCB	State	Environmental information for Leaking Underground Storage Tanks; Underground Storage Tanks; Spills, Leaks, Investigations, and Cleanups; and land disposal sites in California	https://geotracker.swrcb.ca.gov/
Resource Conservation and Recovery Act Information System	USEPA	Federal	Hazardous waste handlers	http://www.epa.gov/enviro/html/rcris/rcris_query_java.html
Solid Waste Information System	California Integrated Waste Management Board	State	Solid waste facilities	http://www.ciwmb.ca.gov/SWIS/
TRI	USEPA	Federal	Toxic releases reported by state	http://www.epa.gov/tri/tridata/state_data_files.htm
Formerly Used Defense Sites (FUDS)	USACE	Federal	Defense Environmental Restoration Program – FUDS Inventory and public Geographic Information System	https://www.denix.osd.mil/denix/Public/Library/FUDS/fuds-list.html http://hq.environmental.usace.army.mil/programs/fuds/fuds.html

Information about ordnance and explosive wastes or other hazardous materials concerns at the Salton Sea Test Base (SSTB) was obtained from the Southwest Division Naval Facilities Engineering Command (NAVFAC), Central Records storage and discussions with the NAVFAC SSTB Remedial Project Manager (Swartz, 2005).

DATA LIMITATIONS

The accuracy of the assessment of health risks associated with exposures to chemical contaminants from consumption of fish and waterfowl from the Salton Sea is limited, as described in Appendix G. The records search for information on hazardous materials focused on known and readily accessible databases; no site visits or other records searches were conducted for this analysis.

EXISTING CONDITIONS

This section describes existing hazardous conditions and public health in the Salton Sea and along the shoreline.

Hazards and Hazardous Wastes and Materials

Industries, military installations, and other entities use many types of hazardous materials, ranging from fuels and solvents to radioactive materials. Numerous fuels, chemicals, and other hazardous materials are also transported via roadways and railways. Additionally, substantial areas adjacent to the Salton Sea are used for agricultural purposes.

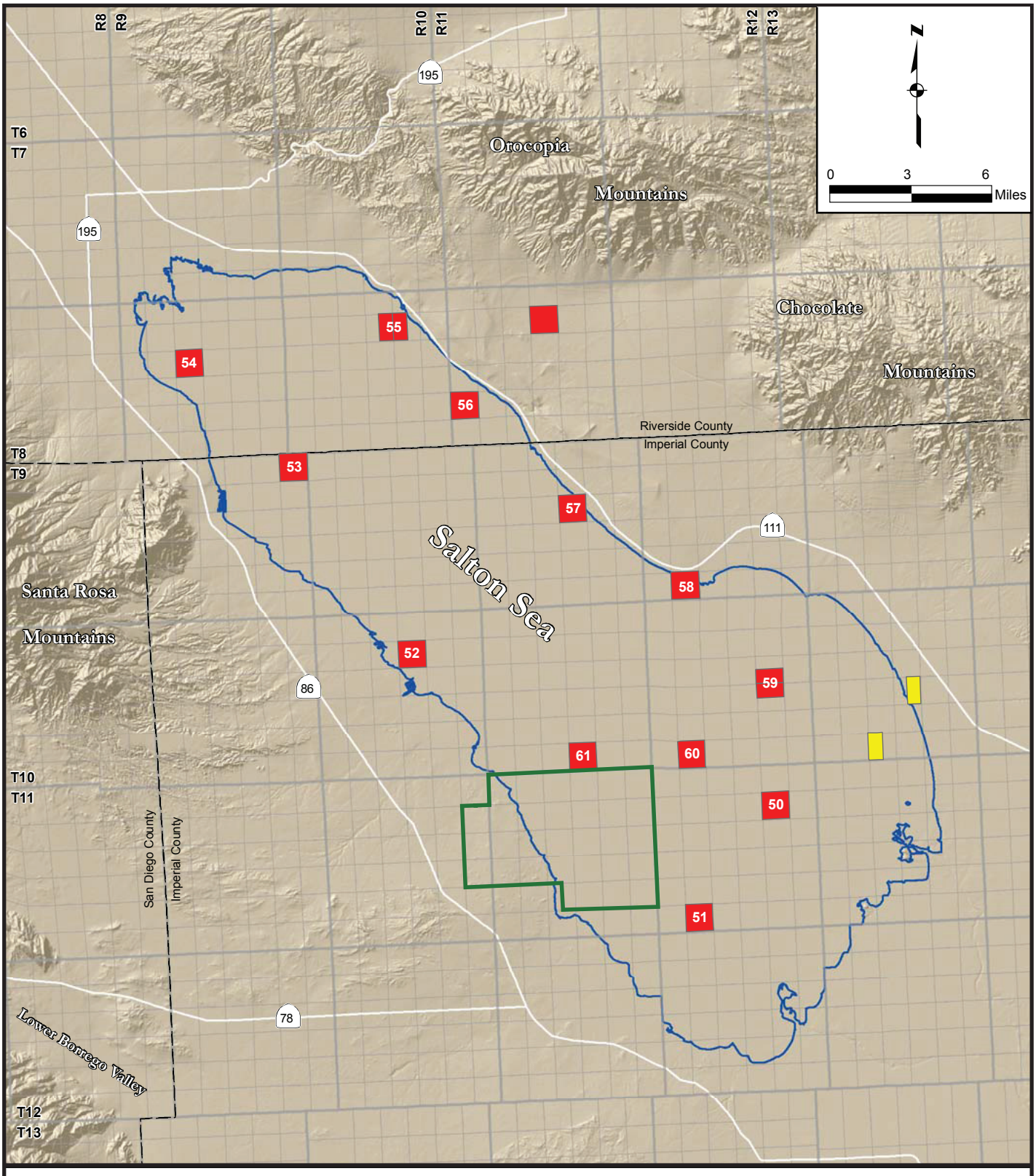
Above-ground petroleum storage tanks and pesticide storage facilities are present in many locations near the Salton Sea shoreline, and may increase the risk of human exposure to potentially hazardous materials. Additionally, storage tanks may leak and petroleum products could move into the soil or seep into the tributaries of the Salton Sea.

The most likely locations for hazardous wastes near the Salton Sea are the former SSTB and numerous Salton Sea bombing targets used by the U.S. Department of Defense and other federal organizations, as summarized in Figure 14-1 and Table 14-2. Other non-military sites with known or potential hazardous wastes were identified in Imperial and Riverside counties during the records search. However, these facilities are not located near the Salton Sea, have not been documented as areas with releases of hazardous wastes, or have been cleaned up and closed.

Salton Sea Test Base

The SSTB, shown in Figure 14-1, was established in 1942 as the Naval Air Facility, Salton Sea. It began as a seaplane base and was used for training and bombing operations. Over the years, the SSTB was expanded and used for testing, research, and training maneuvers by the military and other tenants, including the Atomic Energy Commission (AEC) and the Sandia Corporation (subdivision of Los Alamos Scientific Laboratory). Base activities included air-to-ground rocket and propellant development work, testing of jet-assist take-off equipment, missile testing, high-altitude bombing experiments involving aeroballistic tests of inert atomic weapon units over water, parachute tests of the Project Mercury space capsule, U.S. Navy and U.S. Marine Corps Seal exercises, and in 1990/1991 live-fire training for Operation Desert Shield/Desert Storm in preparation for the Gulf War (USACE, 1996).

In 1945, jurisdiction of the site was transferred from the U.S. Navy to the U.S. Army for use by Los Alamos Laboratory. The Manhattan Engineering District became responsible for over 3,200 acres of the Salton Sea Seaplane Base in 1946 for use as a bombing range. In 1948, the AEC became responsible for the entire SSTB facility. The U.S. Navy accepted transfer of the SSTB property from the AEC in 1963; however, the AEC may have retained rights to some submerged property (over 20,000 acres). Until 1985, the AEC provided security surveillance and control of portions of property. Property transfers continued in the mid-1970s, and the current boundary of the SSTB encompasses 20,731 acres. The SSTB subsequently was closed under the Base Realignment and Closure program for further evaluation under the Installation Restoration Program. The U.S. Navy, Southwest Division, transferred ownership of the SSTB to the BLM in September 2000. While the property is under BLM jurisdiction, the U.S. Navy is responsible for evaluation and cleanup of residual site contamination (U.S. Navy, 2000). BLM plans to manage the property for wildlife habitat and recreational opportunities, depending on the results of ongoing and future environmental reviews.



LEGEND

- Bombing Target
- Presumed Bombing Target
- Salton Sea Test Range

FIGURE 14-1
SALTON SEA SITES POTENTIALLY CONTAMINATED BY HAZARDOUS WASTE

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Table 14-2
Description of Potentially Hazardous Waste Sites Identified from Database Search

Database	Government Dept	Location	Potential Hazards Site?	Document Date	Type	Site Information	Notes
EnviroStor	DTSC	Salton Sea, Imperial County	Yes	2005	State	ID:13970003 – SSTB 7,945 acres Southwest portion of the Salton Sea Branch: OMF-Southern California DTSC Region: 3 Status: 11/08/2000 – Certified Lead: CRBRWQCB Type: Closed Military Base National Priorities List: Not Listed Project Manager: Unknown Standard Industrial Code: 97 - National Security/International Affairs Assembly District: 80 Senate District: 40	Documentation from 1997 states that there are no potential or confirmed hazardous wastes at the site. Unexploded ordnance is main concern. Given past use of this area for bomb testing, a risk of unexploded ordnance may exist but has not been confirmed.
CERCLIS	USEPA	Salton City, Imperial County	Yes	2005	Federal	Site Name: SSTB Street: Hwy 86 National Priorities List Status: Not listed Status: Fed Facility Preliminary Assessment Review Start Needed USEPA ID: CA0000362350 USEPA Region: 09 Federal Facility Flag: Federal Facility	No additional information available in database.
Formerly Used Defense Sites (FUDS)	USACE	Imperial County, S11, T11S, R12E	Yes	1991	Federal	Salton Sea Bomb Target (9)(#50)	Practice bomb target. 11th Naval District discontinued use in 1945. Department of the Interior owned.
FUDS	USACE	Imperial County, S32, T11S, R12E	Yes	1991	Federal	Salton Sea Bomb Target (10)(#51)	Practice bomb target. 11th Naval District discontinued use in 1945. Department of the Interior owned.

Table 14-2
Description of Potentially Hazardous Waste Sites Identified from Database Search

Database	Government Dept	Location	Potential Hazards Site?	Document Date	Type	Site Information	Notes
FUDS	USACE	Imperial County, S10, T10S, R10E, shifted to S3, T9S, R10E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 11)(#52)	High-altitude and dive-bombing target. "No restoration required other than target removal."
FUDS	USACE	Imperial County, S1, T92, R11E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 12)(#53)	High-altitude and dive-bombing target. Eliminated from Imperial Irrigation District permit in 1946.
FUDS	USACE	Riverside County, S16, T8S, R9E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 13)(#54)	High-altitude and dive-bombing target. No details available.
FUDS	USACE	Riverside County, E1/2 S10, W1/2 S11, T8S, R10E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 14)(#55)	High-altitude and dive-bombing target. No details available.
FUDS	USACE	Riverside County, S30, T8S, R11E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 15)(#56)	High-altitude and dive-bombing target. No other details available.
FUDS	USACE	Imperial County, S15, T9S, R11E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 16)(#57)	High-altitude and dive-bombing target. Eliminated from Imperial Irrigation District permit in 1946. "No restoration required other than target removal."
FUDS	USACE	Imperial County, S32, T9S, R12E, shifted from S6, T10S, R12E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 17)(#58)	High-altitude and dive-bombing target. Discontinued in 1946. Department of the Interior owned. "No restoration required other than target removal."

Table 14-2
Description of Potentially Hazardous Waste Sites Identified from Database Search

Database	Government Dept	Location	Potential Hazards Site?	Document Date	Type	Site Information	Notes
FUDS	USACE	Imperial County, S1/2 S14, N 1/2 S23; T10S, R12E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 18)(#59)	Low-level practice bombs. Discontinued in 1946. Department of the Interior owned. "No restoration required other than target removal."
FUDS	USACE	Imperial County, S32, T10S, 12E	Yes	1991	Federal	Salton Sea Bomb Target (Fixed Bomb Target 19)(#60)	Low-level practice bombs. Discontinued in 1946. Department of the Interior owned. "No restoration required other than target removal."
FUDS	USACE	Imperial County, S34, T10S, R11E	Yes	1991	Federal	Salton Sea Skip Bomb Target (Skip Bomb Target 20)(#61)	Low-level practice bombs. Discontinued in 1946. Department of the Interior owned. "No restoration required other than target removal."
FUDS	USACE	Riverside County, W1/2 S11, E1/2 S10, T8S, R10E	Yes	1991	Federal	Salton Sea Bomb Targets	Pile-supported bomb targets on Salton Sea.
FUDS	USACE	Imperial County, S11, T11S, R12E	Yes	1991	Federal	Proposed Salton Sea Bomb Target	Potential floating practice bomb target. Department of the Interior owned. Authority granted for use in 1944.
FUDS	USACE	Riverside County, S32, T11S, R12E	Yes	1991	Federal	Proposed Salton Sea Bomb Target	Potential floating practice bomb target. Department of the Interior owned. Authority granted for use in 1944.
FUDS	USACE	Riverside County, S10, T8S, R11E	Yes	1991	Federal	Salton Sea Bomb Target site (Land target due east of Site #55)	N1/2 of N1/2 of S10 is privately owned. Remainder is Department of the Interior owned.
FUDS	USACE	Imperial County, E1/2 S22, T10S, R13E	Yes	1991	Federal	Presumed bombing site	No additional information available. Probably used as a safety area.

Table 14-2
Description of Potentially Hazardous Waste Sites Identified from Database Search

Database	Government Dept	Location	Potential Hazards Site?	Document Date	Type	Site Information	Notes
FUDS	USACE	Imperial County, W1/2 S33, T10S, R13E	Yes	1991	Federal	Presumed bombing site	Used as a safety area for floating target located E1/2 S32.
EnviroStor	Department of Toxic Substances Control	Niland, Imperial County	No	2003	State	Chocolate Mountain Aerial Gunnery Range	Identified contaminants include paint sludge, unspecified solvents, waste oil, and oil mixtures. Remedial action plan is active.
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)	USEPA	Imperial County	No	2005	Federal	Site Name: Torres Martinez National Priorities List Status: Not listed Non-National Priorities List Status: Removal Only Site (No Site Assessment Work Needed) USEPA ID: CA0001894328 USEPA Region: 09 Federal Facility Flag: Not listed	No other records available.
CERCLIS	USEPA	Riverside County	No	2005	Federal	No results found for cities near Salton Sea	
Geotracker	SWRCB	Imperial and Riverside Counties	No	2005	State	Some underground storage tank leaks recorded in Niland, Salton City, Desert Shores, North Shore, and Oasis	No longer in operation. Documentation indicates sites have been properly assessed and closed.
Resource Conservation and Recovery Act Information System	USEPA	Imperial County	No	2005	Federal	AT&T Company	No available information other than Handler Identification. Site may no longer be in operation.
Solid Waste Information System (SWIS)	California Integrated Waste Management Board (CIWMB)	Imperial County	No	2005	State	Salton City Solid Waste Site	Drainage and erosion control are areas of concern, but no violations recorded.
SWIS	CIWMB	Imperial County	No	2005	State	Salton City Solid Waste Transfer Station	No violations; no enforcement actions.

Table 14-2
Description of Potentially Hazardous Waste Sites Identified from Database Search

Database	Government Dept	Location	Potential Hazards Site?	Document Date	Type	Site Information	Notes
SWIS	CIWMB	Imperial County	No	2005	State	Sludge Burial Area, Naval Air Facility (closed)	Unpermitted; no inspections; no violations.
SWIS	CIWMB	Riverside County	No	2005	State	Mecca Landfill	No violations; no enforcement actions.
SWIS	CIWMB	Riverside County	No	2005	State	Mecca Landfill II	No violations.
Toxics Release Inventory (TRI)	USEPA	Imperial County	No	1996-2002	Federal	No results found for cities near Salton Sea	
TRI	USEPA	Riverside County	No	1996-2002	Federal	No results found for cities near Salton Sea	

Although the SSTB is no longer active and many of the facilities have been removed, concerns remain about the presence of unexploded ordnance and environmental contamination. While Munitions and Explosives of Concern is the main hazardous waste concern, other contaminants could have affected soil or subsurface water at the base. Numerous gasoline or other fuel underground storage tanks were used to support vehicles and operations (Bechtel,1995). Solvents were most likely used in equipment maintenance and cleaning operations. Perchlorate was often a component of rocket propellant and was used in jet-assist take-off propellant. The site also had transformers with polychlorinated biphenyl (PCB), asbestos insulation, and landfill wastes. According to the Archives Search Report (USACE, 1996), a small arms range for skeet shooting was located about 0.5 miles west of the Salton Sea shoreline at SSTB. Lead shot from shotgun firing probably remains in soil at this location. This site was tested for metals contamination during a 1994 Site Investigation (Bechtel, 1994). Ingestion of lead pellets can cause health issues in wildlife.

Ordnance and Explosives on Non-Inundated Areas

According to the NAVFAC SSTB Remedial Project Manager (Swartz, 2005) the primary concern for the former SSTB is the potential presence of explosives. The Archives Search Report (USACE, 1996) concluded that there was a possibility of finding air-dropped practice bombs and U.S. Marine Corps training ordnance and explosives throughout the 7,240 acres that were surveyed, and that "there are no areas considered uncontaminated at this time." Furthermore, the report recommended expanded site inspection at sites 10LA and 10LB, which were formerly used for atomic shape target testing, located about 4,000 feet and 12,000 feet, respectively, from the shoreline of the Salton Sea.

From July 1996 to March 1997, a 100 percent visual surface survey was conducted to identify ordnance and explosives throughout the 7,240 land acres of the SSTB. Their specific task was to locate, identify and dispose of all ordnance and explosives located on the surface, as well as complete clearance to the depth necessary to remove all unexploded ordnance located in a 150-acre area designated by the contracting officer. Due to limitations of sampling technology, the Salton Sea shoreline was only inspected remotely, and the inundated portion of the site was not included in the investigation. No unexploded ordnance was identified in the mudflats area (CMS, 1998). All scrap encountered during the visual survey was removed, and specific locations were investigated for ordnance below the surface. The depth of recovered unexploded ordnance ranged from 0.5 to 2 feet below ground surface. It is unknown how much of the ordnance and explosives removed by CMS Environmental had been previously identified by the Archives Search Report (USACE, 1996).

Following the site survey and clearance operation, the U.S. Navy conducted an analysis of risks related to residual ordnance and explosives at the SSTB (U.S. Navy, 1999). The risk analysis calculated average ordnance densities of 0.175 items/acre within the 7,200 acre area comprising the Beach Flats/Near Water Area (300 acres), 81 mm Mortar Area (1,100 acres), and Remaining Area (5,800 acres). The risk analysis considered these average ordnance densities equivalent to an expected rate of encounter with ordnance of one exposure for every 28,000 visitors to SSTB (U.S. Navy, 1999). The reason for limiting the survey to this area was not apparent in the referenced information.

Subsequently, the U.S. Navy evaluated three alternatives for unexploded ordnance risk management: No Further Action (Alternative 1), Risk Management Actions – Primary Alternative (Alternative 2), and 2-Foot Clearance – Secondary Alternative (Alternative 3). These alternatives were evaluated within the context of the intended land use which was described as natural and cultural resource management. Of these three alternatives, the U.S. Navy selected Alternative 2, which involves minimizing access to the property, preventing unauthorized disturbance of soils, providing public education and signage, and periodic reviews of the effectiveness of the alternative, along with public and agency notification in the event of proposed land use changes. The U.S. Navy would implement Alternative 3, which involves removing metal objects to a depth of at least 2 feet below the ground surface, in the event that future land

use changes require the removal of unexploded ordnance (U.S. Navy, 1999). Munitions and explosives of concern maintenance is ongoing (U.S. Navy, 2000).

Salton Sea Bombing Targets in the Inundated Areas

Up to 18 target sites across the Salton Sea were used for practice bombing by the U.S. Navy during World War II. These sites are described in Table 14-3, and their general locations are shown in Figure 14-1. From 1941 to 1944, the Eleventh Naval District acquired authorization by permits from the Department of the Interior, Imperial Irrigation District, or other property owners to use designated areas of the Salton Sea as practice bombing targets. Most of the permits were for use of an entire section (640 acres) of property. Permits for many Salton Sea bomb targets were discontinued in 1945 and 1946. Limited documentation is available concerning disposal of the bomb targets and steps taken to return the sites to their original condition.

Most of the bombing targets were floating targets consisting of radar-rigged, wooden pyramid structures for high-altitude bombing and dive-bombing practice (USACE, 1996). One was a skip bomb target with a screened raft-radar for low-level practice bombing. A few targets shifted location over time due to the effects of weather and wind. Other sites were designated as safety areas near bomb targets to provide a buffer. Some sites were listed as "potential or proposed," and may not have been used for bombing practice. Typically, practice bombs were not live, but contained a small charge to aid in "spotting" the bomb hit. Spotting charges that did not detonate could still be intact in the ordnance and constitute a hazard, although it is likely that any ordnance remaining for the past 65 years has been affected by the corrosive environment of the relatively shallow salt waters of the Salton Sea (USACE FUDS database; see Table 14-1 for website link).

Unexploded ordnance and munitions may lie on or within the floor of the Salton Sea over the 12,200 acre area where the bombing targets previously existed. This area includes two targets (sites 10MA and 10MB) used by the AEC and Strategic Air Command. Items likely to be found at those sites include WW-II era practice bombs, atomic shape bombs, or small explosive components and/or spotting charges. Ordnance in the Salton Sea may be the result of drops from U.S. Army planes aiming for site 10LA (land target), Navy planes aiming for skip bombing target G, U.S. Navy planes aiming for another water target, or accidental drops (USACE, 1996).

A salvage operation using divers was conducted in 1960 at the water target areas within the SSTB used for bomb practice with atomic weapon test units (DTSC EnviroStor database; USACE 1996). The salvage operation removed 10,000 pounds of material that was returned to Albuquerque for identification. In 1961, U.S. Navy divers conducted an extensive underwater search, recovering a practice bomb as well as an atomic bomb shape. Any residual materials that were not removed by these salvaged operations are most likely buried deep in mud, below 35 feet of water (USACE, 1996). No records were obtained indicating that ordnance clearance and decontamination occurred at the bomb target sites outside the SSTB. The U.S. Army Corps of Engineers report (USACE, 1996) on the sites recommended further assessment of Ordnance and Explosive Waste for these sites. Historical records specify "no restoration required other than target removal" for the practice bomb targets (USACE FUDS database). However, it is unclear whether these recommendations were based only on considerations for removal of visual evidence of the bomb targets or whether they also accounted for clearance of practice bombs from the Sea Bed.

Radioactivity

Experiments using non-explosive atomic bomb weapon test units were carried out in 1944 as part of the Manhattan Project to determine the best shape for the weapon. Test units were made of cast steel or aluminum, and filled with concrete or lead, although a limited number of test units were also reported to have contained depleted uranium ballast (USACE, 1996).

The Environmental Test Program, conducted by Sandia Corporation evaluated the possible effects of long term storage of atomic weapons in natural environments. Tests conducted at SSTB were performed in the desert at an undisclosed location, and monitored from a surveillance building. Test units contained components of depleted uranium (i.e., depleted with respect to proportions of the uranium-235 isotope), but no fissionable materials, such as enriched uranium or plutonium. This project was completed in 1959. Test units were disassembled for testing and inspection, possibly at Building 4070, also known as "Dog Site" (Bechtel, 1995).

The Archives Search Report (USACE, 1996) reported anecdotal information that during the 1950s, an Air Force bomber accidentally dropped a "flyaround" unit containing 120 pounds of uranium into the Salton Sea. The unit was not intended to be dropped, and no report of its recovery was found during preparation of this report. Its exact location remains unknown. The source for this information appears to be a newspaper article titled, "*Radiation, waste in Salton Sea?*" in the November 1, 1992 edition of the Imperial Valley Press. The original source for this information could not be determined from the records search.

Other Sources of Contamination on the Salton Sea Test Base

Other potential concerns at the SSTB are largely the result of secondary contamination. The Base Realignment and Closure Cleanup Plan (U.S. Navy, 1995) indicates that the shoreline disposal area, which was a suspected dumping area for domestic trash and construction debris, poses potentially significant risks from PCB Arochlor-1254 present in the soil. Elevated chromium concentrations have also been measured in the sediment. The Base Realignment and Closure Cleanup Plan recommended further evaluation of the site to confirm the existence or absence of contamination. The U.S. Navy (1999) subsequently indicated that the 24 Installation and Restoration Program sites at SSTB have been sufficiently addressed and closed with respect to hazardous materials.

Another concern was a landfill located on the SSTB near State Highway 86. Correspondence between the BLM and U.S. Navy in late 1995 discusses the threat to surface and groundwater because of the landfill and the requirement to submit a technical report to the CRBRWQCB. The report was to include a delineation of the horizontal and vertical extent of the waste. It is not clear from the available information whether the report was completed or if the CRBRWQCB required site cleanup or mitigation.

In 1995, the locations of 33 underground storage tanks were confirmed as part of the U.S. Navy Underground Storage Tank Mitigation Program. All but 15 of the tanks were recommended for no further action. The remaining tanks were handled as part of the Underground Storage Tank Mitigation Program. Ten tanks were removed from SSTB, six of which required the removal of contaminated soil and groundwater for treatment. The use of bioremediation to clean the contaminated soil at some sites was effective. According to a SSTB Fact Sheet on Underground Storage Tank mitigation (U.S. Navy, no date), completion of the project was expected in July 1997.

The transfer of the SSTB from the U.S. Navy to BLM included provisions for environmental remediation of the lands by the U.S. Navy to address issues involving unexploded ordnance and other potentially hazardous materials. A preliminary assessment and site inspection were conducted in 1993 to locate and assess levels of contamination. Landfills, leach fields and septic tanks, aeroballistic targets, maintenance facilities and shops, oiled roads, and the small arms range were evaluated. Based on this evaluation, sediment/soil sampling and analyses were recommended for a number of sites (U.S. Navy, 1993). A removal site evaluation report was completed in June 1997 and approved by DTSC in July 1997. Sample results and evaluation indicated that no further action was required on the base for chemical contamination (Calsites, DTSC database; see Table 14-1 for website link).

Other Sites

The Salton City and Mecca landfills receive municipal solid waste and have no recorded violations or evidence of hazardous environmental contamination (SWIS, CIWMB; see Table 14-1 for website links). These sites are about ten and four miles, respectively, from the Salton Sea shoreline.

Leaking underground storage tanks containing gasoline or diesel fuel have, in the past (1980s and 1990s), been detected in Niland, Salton City, Desert Shores, North Shore, and Oasis. However, according to the State Water Resources Control Board (SWRCB) database, these sites have been cleaned and closed.

The Chocolate Mountain Aerial Gunnery Range east of the Salton Sea is under remediation for contamination from solvents, paint sludge, and waste oil (DTSC EnviroStor database; see Table 14-1 for website link). However, this site is about five miles from the Salton Sea shoreline and is not considered in this analysis.

Other sites noted during database searches either included sites that have been cleaned and closed, or are not located near the Salton Sea.

Public Health

The public health issues considered in this analysis include risk of selenium exposure due to consumption of fish and waterfowl, mosquito vectors, potential for air and dust-borne diseases, and exposure to waterborne bacteria and pathogens.

Noncancer Health Risks from Selenium Exposures through Fish and Waterfowl Consumption

The CRBRWQCB Water Quality Control Plan (2002) states that chemical pollutants have been identified in sources upstream from the Salton Sea that threaten beneficial uses. Fish and waterfowl consumption by humans is a possible exposure pathway for public health risks associated with the Salton Sea. Selenium is known to be present in the Salton Sea, and a State health advisory has been issued for human consumption of fish from the Salton Sea. Thus, considerations of existing and potential human health risks associated with exposures to selenium from consumption of fish and exposures to selenium from consumption of waterfowl from the Salton Sea are important for characterizing existing public health conditions.

Human exposure to excess selenium can result in acute or chronic toxic effects. Short term oral exposure to high levels of selenium can cause nausea, vomiting, and diarrhea. Chronic oral exposure can result in a disease known as selenosis; symptoms include hair loss, nail brittleness, and neurological abnormalities. However, selenium also is an essential nutrient, and selenium deficiency can be a greater threat to human health than selenium poisoning (Frost and Ingvold, 1975; Stadtman, 1977). Selenate or selenite supplements can prevent or reverse dietary deficiencies (Eisler, 2000). Minor increases in dietary exposure above dietary needs can exert toxic effects in some individuals but not others.

Several health risk assessments and health advisories related to selenium exposure from the consumption of sport fish have been developed for the Salton Sea. The results of these risk assessments are summarized in Table 14-3. A recent study by Moreau et al. (in press, a) evaluated health risks from selenium concentrations in tilapia fillets from the Salton Sea. The study used a mean selenium concentration of 1.67 milligram/kilogram (mg/kg) wet weight (0.0000267 ounces/pound), based on measured concentrations in 24 tilapia samples collected in 1998 at three locations in the Salton Sea Basin (Red Hill Marina, Bombay Beach, and the State Recreational Area headquarters), combined with a background daily selenium intake from other sources of 0.0016 mg selenium/kg unit body weight (0.0000000256 ounces/pound). The risk-based analysis indicated that a 70 kg (154 pounds) adult could consume as much as 1,190 grams/week (41 ounces/week) (or 23 eight-ounce meals/month) and a 30 kg (66 pound) child could consume as much as 430 grams/week (15 ounces/week) (or 16 four-ounce

meals/month) with no expected adverse health effects. If the daily selenium intake from other sources was considered zero, adults and children could safely consume 28 and 24 meals/month of tilapia fillets, respectively. Using the maximum measured selenium concentration of 2.06 mg/kg (0.000033 ounces/pound) in tilapia fillets, the safe weekly consumption rate was estimated at 810 grams (28.5 ounces), or 15 meals/month, for an adult or 350 grams (12.3 ounces), or 13 meals/month, for a child. A companion study by Moreau et al. (in press, b) reported average selenium concentrations of 2.9, 2.8, and 2.2 mg/kg wet weight (0.000046, 0.000045, and 0.000035 ounces/pound) in bairdiella, orangemouth corvina, and sargo, respectively, from the Salton Sea. Safe weekly consumptions rates for these species were estimated at 571, 602, and 754 grams/week (20, 22, and 27 ounces/week), respectively, or 9 to 12 meals/month, even when selenium intake from other sources was included. A similar study by Costa-Pierce et al. (2000) indicated that selenium exposure through the consumption of Salton Sea fish should be limited to 910 to 1,330 grams/week (32 to 49 ounces/week) for a 70 kg (154 pound) adult, or 17 to 25 eight-ounce meals/month. These findings are comparable to those of Moreau et al. (in press, a and b).

Table 14-3
Comparisons of Estimated Safe Fish Consumption Rates and Advisories for the Salton Sea Based on Selenium Concentrations in Fish Tissues

Description	Maximum Safe Consumption Rate		Reference
	grams/week	Meals/month	
Adult consumption of tilapia muscle tissue	810-1,190	15-23	Moreau et al. (in press)
Adult consumption of bairdiella, corvina, and sargo muscle tissue	571-754	11-14	Moreau et al. (in press, b)
Adult consumption of tilapia muscle tissue	910-1,330	17-25	Costa-Pierce et al. (2000)
Adult consumption of Salton Sea fish (tilapia, croaker, sargo, orangemouth corvina) muscle tissue	57	1*	OEHHA (2004)
Adult consumption of tilapia muscle tissue	720-1,960	13-34	See Appendix F of this PEIR

* Advisory limits stated as no more than 4 ounces (114 g) per 2-week period, which is equivalent to one meal (8 ounces) per month.

Health risks estimated for the present evaluation (DWR, 2005b) generally are comparable to those determined by Moreau et al. (in press, a and b) and by Costa-Pierce et al. (2000). Current USEPA (2000) guidelines for selenium exposure via fish consumption allow 16-eight ounce (227 grams) meals/month for an average 70 kg (154 pound) adult consuming fish with an average wet-weight selenium concentration greater than 1.5 to 2.9 mg/kg (0.000024 to 0.000046 ounces/pound). These guidelines are comparable to the safe consumption rates estimated for recent conditions and by the studies of Moreau et al. and Costa-Pierce et al. These maximum safe consumption rates are about one order of magnitude higher (i.e., less restrictive) than the present advisory limits issued by OEHHA.

The OEHHA Web site (http://www.oehha.ca.gov/fish/so_cal/saltonsea.html) was updated on September 19, 2004, with the following advisory:

> "Because of elevated selenium levels, no one should eat more than four ounces [114 grams] of croaker, orangemouth corvina, sargo, or tilapia taken from the Salton Sea in any two-week period."

This advisory was originally issued in 1986, and it was based on a tissue threshold of 2 mg/kg wet weight (0.000032 ounces/pound) from a study conducted in Australia that was not risk-based (Dalton and Bird,

2003). It was also applied to Kesterson Reservoir (Fan et al., 1988), and it has been used as a screening level in a number of California areas. Further details on the derivation of this number are unavailable.

As part of the studies for preparation of the PEIR, it was calculated that based on estimated selenium concentrations in duck muscle tissues under Existing Conditions, adults could safely consume from 23 to more than 60 meals/month from different habitats within the Salton Sea, as described in Appendix G. Children who consume more than about 10 meals/month may be exposed to health risks above target levels (DWR, 2005b).

Mosquito Vectors

Another potential public health hazard is the risk of disease transmitted by vectors. Mosquitoes are the primary insect vector of concern in the area because they are known carriers of human and animal diseases. The most important diseases associated with mosquitoes are the West Nile virus and the Saint Louis encephalitis virus. West Nile virus is spread by mosquitoes which feed on the blood of infected birds and can transmit the virus to humans. While most people infected with West Nile virus exhibit mild or no symptoms, severe infections can lead to encephalitis and can be fatal. Several deaths in Riverside County during 2005 have been attributed to West Nile virus (CDC, 2005). Mosquito and vector control agencies within the study region regularly monitor for West Nile virus in dead birds and sentinel birds. A public health concern near the Salton Sea is that temporary fresh or brackish water duck ponds, created by duck hunting clubs, will promote breeding and propagation of mosquitoes that carry West Nile virus.

The Saint Louis encephalitis virus is closely related to West Nile virus. Saint Louis encephalitis virus infections typically are asymptomatic, although rare but severe cases can affect the central nervous system. The Saint Louis encephalitis virus occurs seasonally in Southern California, typically during May through November, which may coincide with the reappearance of migratory birds. A number of cases of Saint Louis encephalitis infections have been reported near the Salton Sea (near Mecca). A Saint Louis encephalitis monitoring program has existed within the Coachella Valley since the mid-1980s.

The Coachella Valley Mosquito and Vector Control District routinely conducts mosquito abatement activities in the marshes and other water bodies in the vicinity of the Salton Sea located within Riverside County. The Imperial County Department of Health Services conducts mosquito abatement activities in areas within Imperial County. They do not conduct mosquito abatement in the Salton Sea itself, because most mosquitoes do not breed in its highly saline waters (Bonkrude, 2006).

Air and Dust-Borne Diseases

Two public health risks, valley fever (or coccidiomycosis) and hantavirus pulmonary syndrome, are airborne diseases. Valley fever is spread by the spores of a fungus that occur in a dry, dusty climate, which is common in the southwestern United States and parts of Mexico. Symptoms of flu-like illnesses occur in about 40 percent of the cases. Chronic pulmonary infection can occur with infections, and the mortality is high in human immunodeficiency virus (HIV) infected persons with diffuse lung disease. Risk groups include construction and agricultural workers who engage in activities that disturb soils in areas with this disease, including California and Arizona (CDC, 2005). A four-year epidemic of valley fever was attributed to a drought in California's Central Valley, and increased frequencies also followed the 1994 earthquake centered in Northridge, California. There is no vaccine for valley fever, but it is treatable with a variety of oral and injectable anti-fungal agents. Hantavirus is a rare, but occasionally fatal, respiratory disease associated with a dustborne virus (Sir Nombre virus) transmitted to humans by breathing dust contaminated with the feces or saliva of wild rodents, especially the deer mouse, in dry land habitats of the southwestern United States. The Coachella Valley Mosquito and Vector Control District maintains a wild rodent surveillance program with permanent stations at Whitewater Canyon Road and the Palm Springs Tramway. Blood samples from rodents trapped at these sites are monitored routinely for hantavirus.

Waterborne Bacteria and Pathogens

Beneficial uses for the Salton Sea, identified in the Water Quality Control Plan (CRBRWQCB, 2002a), include water contact recreation (REC-1), which is defined as swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, use of natural hot springs, and similar activities, as described in Chapter 6. The CRBRWQCB has adopted maximum allowable limits for fecal indicator bacteria, including fecal coliforms, *E. coli*, and enterococcus, which are considered indicators for the presence of fecal-derived pathogenic bacteria and virus; and are used to indicate a potential for causing illness such as gastroenteritis in humans.

The Salton Sea does not receive direct inputs from wastewater treatment plants that would represent point sources for bacteria. However, treated effluent from wastewater treatment plants in the Imperial Valley and Mexicali are discharged to the New River. Both anthropogenic and natural non-point sources also contribute to bacterial levels in the Salton Sea. Anthropogenic sources can include runoff from cattle feed lots and urban runoff. Bird droppings also can contribute to fecal indicator bacteria concentrations (Grant et al., 2001). Water in the New River upstream from the Salton Sea occasionally contains fecal coliform and *E. coli* bacteria concentrations that exceed the allowable limits (CRBRWQCB, 2003).

The Total Maximum Daily Load (TMDL) and Implementation Plan for bacteria in the New River was completed in 2002 (CRBRWQCB, 2002a), and identified total allowable concentrations of fecal coliform and *E. coli* bacteria for sources discharging to the New River. CRBRWQCB expected that bacterial related impairments to water quality within the New River would be reduced when the maximum allowable bacterial concentrations in sources were achieved.

In 1995, Imperial County petitioned the Agency for Toxic Substances and Disease Registry (ATSDR) to evaluate water quality in the New River. Water quality data collected from 1969 to 1994 were analyzed. With respect to human health risks, the report (ATSDR, 1996) indicated that there was a potential threat due to direct contact with pathogens in the New River. In addition, several pesticides and PCBs were detected at concentrations that would not result in carcinogenic affects because the river is not a drinking water supply. The report also indicated that fish in the New River were contaminated with metals, pesticides, PCBs, and volatile organic carbon compounds at concentrations that could result in a theoretical increased risk of cancer. However, there was a higher risk due to pathogens. The report indicated that fish from the Salton Sea had lower tissue concentrations of some contaminants and would not result in a public health risk due to these constituents. Due to higher salinity, the report also found that pathogenic hazard was less in the Salton Sea than in the New River.

Gas Releases from Water Surface

As described in Chapter 6, ammonia and hydrogen sulfide is periodically released from the water. There has been antidotal observations that methane also is released from the water surface, especially near the mudpots and geothermal areas near the southern Sea Bed. These releases of gas can be harmful to workers and recreationists on boats. Disturbance of the Sea Bed soils also could cause releases of these gases.

ENVIRONMENTAL IMPACTS

Analysis Methodology

The analysis of risk associated with hazardous materials was related to potential for disturbance and subsequent exposure to existing materials and the potential for new materials to be introduced into the study area through implementation of the alternatives. The potential for disturbance also is related to potential impacts of air and dust-borne diseases.

The analysis of risk of mosquito vectors was related to management of open water.

Health risks from exposures to selenium via consumption of fish and waterfowl from the Salton Sea were estimated by calculating the maximum fish and duck tissue consumption rates considered protective of human health based on selenium concentrations in tissue and numerical toxicity values specific to total selenium (i.e., all forms combined). This assessment followed the USEPA guidance for conducting human health risk evaluations. The complete health risk assessment is included in Appendix G. Health risks were estimated by calculating the maximum fish and waterfowl consumption rates considered protective of human health. Because actual consumption rates are unknown, assessments and advisories determine a safe exposure or dose based on selenium concentrations in edible tissue and numerical toxicity values specific to total selenium (i.e., all forms combined). It was assumed that recreational fishing occurs in the area and that some area residents have fished regularly in the Salton Sea for 30 years. Abundance of fish was assumed to be adequate to support this activity. USEPA default exposure parameters were used for body weight, exposure duration, and averaging time. These assumptions are conservative and may result in overestimation of potential human health effects.

Numerous assumptions are required to develop toxicity values from dose-response data. For selenium, the oral reference dose is based on the no observed acute effects level for clinical selenosis in a human epidemiological study; an uncertainty factor of three has been applied by USEPA to the oral reference dose as a protective safety measure. Confidence in the reference dose is listed as "high." Assumptions used to develop toxicity values may result in over- or underestimation of human health effects. Additional factors that contribute to the uncertainty of the risk estimates include the following: (1) risks were estimated only from exposures to selenium, and other possible contaminants were not included; (2) contributions of selenium from other possible sources (e.g., drinking water, inhalation) were not considered; and (3) risks assume complete absorption and lifetime exposure. These assumptions could contribute to over- or underestimating risks.

Based upon the ATSDR report (1996) and the indications that pathogens, metals (except selenium), and organic material do not constitute a public health risk based on consumption of fish in the Salton Sea. It is not anticipated that these conditions would change under any of the alternatives, and may become less likely as TMDLs and Mexicali wastewater management improvements are implemented under all alternatives. Therefore, selenium is the only constituent of concern related to human health risks for organisms that use the Salton Sea. None of the alternatives would affect the tributaries except at the confluences with the Sea Bed. Therefore, the analysis did not consider human health risks associated with fish and wildlife that use the tributaries because the conditions would not change due to the alternatives.

Significance Criteria

The following significance criteria were based on CEQA and air quality regulatory agency guidance and used to determine if changes as compared to Existing Conditions and the No Action Alternative would:

- Create a significant hazard to the public or the environment through the routine transport, storage, use, or disposal of hazardous materials; or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; or be located on a site which is included on a list of hazardous materials sites compiled by the federal or State government, or as a result could create a significant hazard to the public or the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school;
- Be located within an airport land use plan or within 2 miles of a public use or private use airport or airstrip and result in a safety hazard for people residing or working in the area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; and

- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires

Additional significance criteria were included in the PEIR:

- Create sufficient vector habitat to pose a threat to public health; and
- Increase concentrations of potentially harmful substances in sport fish and waterfowl that could result in a substantial new human health risk or new or more severe consumption advisories.

Application of Significance Criteria

Significance criteria have been applied to the alternatives considered in the PEIR. The following list summarizes the overall methodology in the application of the criteria to the alternatives:

- **Creation of Significant Hazard through Transport, Storage, Use, Exposure, or Disposal of Hazardous Materials –** The primary risks associated with the alternatives would be related to materials used in the construction or operations and maintenance. The risks could be related to chemicals, fuel, oil and grease, or exposure of buried or inundated hazardous materials including unexploded ordnances.
- **Hazardous Emissions or Handling of Hazardous Materials within one-quarter mile of a School –** No schools are located within or immediately adjacent to the Sea Bed or the shoreline. Therefore, this criterion was not considered in the analysis.
- **Hazardous Emissions or Handling of Hazardous Materials within two miles of an Airport –** The are no public use airports within two miles of the shoreline. There may be private airstrips used by agricultural users within two miles of the shoreline. However, those locations were not identified during this analysis and should be considered during project-level analyses. Therefore, this criterion was not considered in the analysis.
- **Impairment of the Implementation of an Adopted Emergency Response or Evacuation Plan –** The facilities considered in the alternatives would be located in the Sea Bed or along the shoreline. These locations would not interfere with emergency response or evacuation plans. Methods to reduce traffic impacts due to transport of construction materials are described in Chapter 20 and should consider coordination with emergency evacuation plans. Therefore, this criterion was not considered in this chapter.
- **Exposure to wildfires –** The facilities considered in the alternatives would be located in the Sea Bed or along the shoreline and in general would not result in use of explosives or construction methods that would cause wildfires. The potential for the increased need for fire department responses during construction and operations and maintenance are described in Chapter 19. Therefore, this criterion was not considered in this chapter.
- **Increase Human Health Risk due to Exposure of Vectors or Diseases –** The potential for increasing the risk associated with vectors or disease is considered for each alternative.
- **Increase Human Health Risk due to Increased Selenium in Fish and Waterfowl Food –** The potential for increasing the risk associated with consumption of selenium in fish and waterfowl tissue is considered for each alternative.

Summary of Assumptions

The assumptions related to the descriptions of the alternatives are described in Chapter 3. The specific assumptions related to the analysis of hazards, hazardous materials, and public health are summarized in Table 14-4.

Table 14-4
Summary of Assumptions for Hazards, Hazardous Materials, and Public Health Issues

Assumptions Common to All Alternatives	
1. All components of each alternative would function as intended. Construction activities would employ standard Best Management Practices and other reasonable care to prevent accidents, spills of potentially hazardous materials, or other avoidable risks to the public; plans for all component construction activities would be coordinated with the U.S. Navy prior to the start of construction; and ordnance/munitions surveys and clearance operations would be performed prior to any construction activities or public access to areas that have not previously been cleared by the U.S. Navy/Department of Defense. 2. Existing vector monitoring and control programs will continue in the future.	
Assumptions Specific to the Alternatives	
No Action Alternative and Alternatives 1, 2, 3, 4, 5, 6, 7, and 8	No additional assumptions were made.

Summary of Impact Assessment

The impacts shown in Table 14-5 assume implementation of the Next Steps to reduce the adverse impacts.

No Action Alternative

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basins, Air Quality Management, Pupfish Channels, and Salton Sea. The construction activities would be identical under the No Action Alternative-CEQA Conditions and the No Action Alternative-Variability Conditions. Therefore, impacts related to disturbance would be the same for both conditions.

Hazardous Materials and Wastes

The main hazards considered in this analysis included exposure of hazardous materials during construction and operations and maintenance to unexploded ordnance. The risk of exposure during excavation of the Sea Bed and shoreline soils is related to the extent of the activities. Under the No Action Alternative, about 35,800 acres of land would be disturbed including 5,050,000 cubic yards of Sea Bed soils that would be used during construction.

Other than the potential presence of ordnance and explosive waste, no documented hazardous waste occurs near the Salton Sea that would represent a significant risk to public health under the No Action Alternative. This assessment is based on the U.S. Navy's (U.S. Navy, 1999) position that all of the Installation and Restoration Program sites at SSTB have been adequately investigated and closed with respect to hazardous waste. Specific details of materials in the inundated Sea Bed and along the shoreline cannot be confirmed until detailed site investigations are completed as part of the project-level analyses. The potential for risk would be associated with the amount of disturbance in the soils.

Specific use of hazardous materials during construction and operations and maintenance would be evaluated in project-level analyses. However, it is assumed that use, storage, transport, and disposal of such materials would be in accordance with regulatory requirements.

Table 14-5
Summary of Benefit and Impact Assessments to the Hazards, Hazardous Waste and Public Health

Alternative	Basis of Comparison	Changes by Phase				Comments	Next Steps
		I	II	III	IV		
Criterion: Increased exposure to hazardous materials.							
No Action Alternative	Existing Conditions	L	L	L	L	During construction, there would be an elevated risk associated with exposure to ordnance due to the disturbance of the Sea Bed. Risks also would occur due to handling of materials during construction and operations and maintenance.	Coordinate with U.S. Navy to confirm removal of ordnance prior to disturbance of the Sea Bed. Training could be provided to workers to reduce risk of handling and transporting hazardous materials. Life-support equipment may need to be available for all workers when in boats on the water.
	No Action Alternative	NA	NA	NA	NA		
Alternatives 1 - 8	Existing Conditions	L	L	L	L	Risks related to the disturbance of the Sea Bed material during construction, as represented by the volume of materials excavated and dredged in the Sea Bed.	Same as No Action Alternative.
	No Action Alternative	L	L	L	L		
Criterion: Increased risk of consumption of fish and wildlife tissue with high selenium concentrations.							
No Action Alternative	Existing Conditions	B	B	B	B	Maximum safe consumption rates would be greater than current advisory levels.	Continued coordination with regulatory agencies and monitoring of fish and wildlife tissue.
	No Action Alternative	NA	NA	NA	NA		
Alternatives 1 - 8	Existing Conditions	B	B	B	B	Similar to No Action Alternative.	Same as No Action Alternative.
	No Action Alternative	B	B	B	B		
Criterion: Increased risk due to exposure to vectors or disease.							
No Action Alternative	Existing Conditions	L	L	L	L	Salinity concentrations in excess of 40,000 mg/L would minimize the potential for mosquito habitat within the Salton Sea. During construction, there would be an elevated risk associated with exposure to air-borne diseases due to disturbance of the Sea Bed.	Continued coordination with mosquito abatement agencies. Monitoring programs and worker training to reduce exposure to vectors and disease as soils are disturbed.
	No Action Alternative	NA	NA	NA	NA		

Table 14-5
Summary of Benefit and Impact Assessments to the Hazards, Hazardous Waste and Public Health

Alternative	Basis of Comparison	Changes by Phase				Comments	Next Steps
		I	II	III	IV		
Alternatives 1 - 8	Existing Conditions	L	L	L	L	Risk for mosquito-borne disease similar to No Action Alternative.	Same as No Action Alternative.
	No Action Alternative	L	L	L	L	During construction, there would be an elevated risk associated with exposure to air-borne diseases due to disturbance of the Sea Bed.	

Legend for Types of Benefits or Impacts in Each Phase:
S = Significant Impact
O = No Impact
L = Less Than Significant
B = Beneficial Impact
NA = Not Analyzed

The effectiveness of previous clearance activities for removing ordnance and explosive waste from the Salton Sea is uncertain. It is possible, but not documented, that remnant unexploded munitions remain buried in bottom sediments or shoreline areas of the Salton Sea, especially in areas near historically used bomb targets associated with the SSTB. The U.S. Navy is the lead federal agency for the ordnance program at SSTB, and its goal is "full and continued protection of human health and the environment in a manner supporting the intended land use" (U.S. Navy, 1999).

Public Health

The public health issues considered in the analysis of the No Action Alternative are related to consumption of fish and wildlife tissue with high selenium concentrations and increased risk of mosquitoes and disease. Results from the screening-level human health risk assessments of fish and duck tissue consumption (i.e., maximum safe consumption rates) are discussed in Appendix G. The safe consumption rates of fish from the estuary habitats under the No Action Alternative are comparable to consumption rates under recent conditions, and indicate minimal risks to humans from selenium exposures under the No Action Alternative.

Under the No Action Alternative, the salinity of the Salton Sea would remain higher than 20,000 mg/L. Few mosquito species can survive in waters with salinity higher than 20,000 mg/L. However, some species, including larvae of the *Culex tarsalis* mosquito, which can be a vector for West Nile virus, are euryhaline (Patrick and Bradley, 2000) and can survive in higher salinity habitats. The receding shoreline would likely reduce the acreage of brackish marsh, which would reduce the amount of habitat suitable for mosquito populations. However, mosquitoes may occur in Pupfish Channels that would contain less saline water. The desert pupfish may eat the mosquitoes or other abatement measures may be required.

Mosquitoes also could breed in the Sedimentation/Distribution Basins that would contain less saline water. Mosquitofish could be used to reduce mosquito populations in the basins.

Earth-moving operations would disturb soils that may contain coccidiomycosis spores, thereby increasing the potential for public health risks associated with valley fever. These risks would be greatest for construction workers and any members of the public within the immediate vicinity that are exposed to dust during the disturbance of 35,800 acres of land and use of 5,050,000 cubic yards of Sea Bed material. Disturbance also could cause release of ammonia, hydrogen sulfide, and methane.

There also could be a risk of injury to workers and recreationists due to unstable soils as the water recedes and the presence of extremely hot water near geothermal areas, as described in Chapter 9.

Under the No Action Alternative, the levels of waterborne bacteria in the Salton Sea are expected to decline due to implementation of the pathogen TMDL and enforcement of source allocations on the New River (CRBRWQCB, 2002a).

Alternative 1 – Saline Habitat Complex I

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basins, Air Quality Management, Pupfish Channels, Saline Habitat Complex, and Brine Sink.

Conditions under Alternative 1 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be higher than under No Action Alternative because about 136,700 acres of land in the Sea Bed would be disturbed and about 77,140,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative.

Alternative 2 – Saline Habitat Complex II

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basins, Air Quality Management, Saline Habitat Complex, Shoreline Waterway, Saltwater Conveyance, and Brine Sink.

Conditions under Alternative 2 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be higher than under No Action Alternative because about 206,400 acres of land in the Sea Bed would be disturbed and about 136,530,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative.

Alternative 3 – Concentric Rings

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basins, Air Quality Management, First and Second rings, and Brine Sink.

Conditions under Alternative 3 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be higher than under No Action Alternative because about 155,450 acres of land in the Sea Bed would be disturbed and about 18,810,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative. However, because the acreage of lower saline water would be less under Alternative 3 as compared to the No Action Alternative, the risks would be less.

Alternative 4 – Concentric Lakes

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basins; First, Second, Third, and Fourth lakes; and Brine Sink.

Conditions under Alternative 4 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be higher than under No Action Alternative because about 96,950 acres of land in the Sea Bed would be disturbed and about 154,215,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative. However, because the acreage of lower saline water would be less under Alternative 4 as compared to the No Action Alternative, the risks would be less.

Alternative 5 – North Sea

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basins, Air Quality Management, Saline Habitat Complex, Shoreline Waterway, Saltwater Conveyance, Marine Sea, Marine Sea Recirculation Canal, and Brine Sink.

Conditions under Alternative 5 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be

higher than under No Action Alternative because about 230,450 acres of land in the Sea Bed would be disturbed and about 86,770,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative. However, because the acreage of lower saline water would be less under Alternative 5 as compared to the No Action Alternative, the risks would be less.

Alternative 6 – North Sea Combined

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basin, Air Quality Management, Pupfish Channels, Saline Habitat Complex, Shoreline Waterway, Saltwater Conveyance, Marine Sea, Marine Sea Mixing Zone, Marine Sea Recirculation Canal, and Brine Sink.

Conditions under Alternative 6 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be higher than under No Action Alternative because about 224,250 acres of land in the Sea Bed would be disturbed and about 66,970,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative. However, because the acreage of lower saline water would be less under Alternative 6 as compared to the No Action Alternative, the risks would be less.

Alternative 7 – Combined North and South Lakes

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basin, Air Quality Management using Protective Salt Flat on Exposed Playa below -255 feet msl, Exposed Playa without Air Quality Management above -255 feet msl, Saline Habitat Complex, Recreational Saltwater Lake, Recreational Estuary Lake, Marine Sea Recirculation Canal, IID Freshwater Reservoir, two Treatment Plants, and Brine Sink.

Conditions under Alternative 7 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be higher than under No Action Alternative because about 131,950 acres of land in the Sea Bed would be disturbed and about 33,522,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative. However, because the acreage of lower saline water would be less under Alternative 7 as compared to the No Action Alternative, the risks would be less.

Alternative 8 – South Sea Combined

As described in Chapter 3, this alternative would involve construction and operations and maintenance activities for the Sedimentation/Distribution Basins, Air Quality Management, Saline Habitat Complex, Shoreline Waterway, Marine Sea, Marine Sea Recirculation Canal, and Brine Sink.

Conditions under Alternative 8 related to the risk of the consumption of fish and wildlife tissue with high selenium concentrations would be similar to those described under the No Action Alternative. Risks associated with exposure to vectors, disease, unexploded ordinance, and hazardous materials would be higher than under No Action Alternative because about 209,550 acres of land in the Sea Bed would be disturbed and about 47,230,000 cubic yards of Sea Bed soils would be excavated.

Risks associated with mosquitoes would be similar to those described for the No Action Alternative. However, because the acreage of lower saline water would be less under Alternative 8 as compared to the No Action Alternative, the risks would be less.

Next Steps

During the project-level analyses and design phases, several issues could be evaluated to either reduce or avoid potential impacts, as summarized below.

To reduce the risks related to hazardous materials, site-specific, pre-construction investigations could be completed to confirm the absence of undocumented, residual hazardous wastes. Identification of Best Management Practices and communication methods would be required by federal, State, and local agencies prior to construction and operations and maintenance. The issues would include guidelines for on-site storage and use of fuels and other potentially harmful materials and training of construction personnel. Public access should be prohibited on the construction sites if hazards exist. Staging and construction areas used during construction for storing hazardous materials would need to be sited away from schools, airstrips, or other public areas.

As part of the Base Realignment and Closure program, the U.S. Navy concluded that risk management actions that included recurring reviews, minimizing public access and soil disturbances, and notification requirements should occur prior to land use changes in areas with potential ordnances. The U.S. Navy also concluded that a secondary alternative (2-Foot Clearance) would be implemented to survey and remove or detonate in place any detected ordnance in the event that future changes in land use, such as construction of major facilities or development, would require the removal of unexploded ordnance (U.S. Navy, 1999). The reference to 2-Foot Clearance was not intended to imply that ordnance removal necessarily would be limited to the surface 2-foot layer (U.S. Navy, 1999). In accordance with their memorandum of understanding with the BLM, as well as CERCLA requirements and standard procedures for managing unexploded ordnance, the U.S. Navy would continue to evaluate changes in the physical conditions of the Salton Sea shoreline, public accessibility, applicability of new technologies for detecting ordnance, and the on-going effectiveness of this response (U.S. Navy, 1999). These procedures are expected to reduce potential risks to public safety from encounters with ordnance and explosive waste. However, it is possible that some remnant ordnance is buried at depths in shoreline soils and/or the Sea Bed that exceed the sensitivity of currently available technology and would be undetectable during a clearance survey, yet still susceptible to disturbance by earth-moving equipment or placement of pilings or rock during construction.

To reduce the risk due to increased exposure to materials that could be released during soil disturbance, worker training programs and breathing apparatus would be provided. Monitoring programs could be implemented as areas are excavated to determine the potential for exposure to organisms or other constituents. Life support equipment may need to be available for all workers on boats due to potential for release of constituents from the water surface. During project-level analyses, soil conditions would be analyzed to avoid risk to workers and recreationists due to unstable soils and geothermal conditions, as described in Chapter 9.

To minimize the potential risks associated with consumption of fish and wildlife tissue with high selenium concentrations, monitoring programs could be considered in coordination with public outreach programs.

To reduce the impact of mosquitoes in the future, the Coachella Valley Mosquito and Vector Control District BioControl Facility (Indio, California) currently is researching the application of organisms, such as mosquitofish, desert pupfish, tadpole shrimp, and copepods, for biological control of vectors. The BioControl Program incorporates naturally occurring pathogenic, parasitic, and predatory organisms against vectors into existing integrated pest management and control programs.