

Travis Air Force Base

Fairfield, California
Region 9
CA5570024575

Site Exposure Potential

Travis Air Force Base (AFB) occupies approximately 2,000 hectares in Solano County, 5 km east of Fairfield, California (Figure 1). The base was established in 1943 for the transport and servicing of tactical aircraft, becoming the largest West Coast port facility during the Korean and Viet Nam conflicts. Currently, it provides global strategic airlift support and is one of the largest operating bases for the Military Airlift Command (Weston 1990).

Waste materials have been generated on the base as part of aircraft and vehicle maintenance and repair, fuel handling, fire protection training, and through use of pesticides and herbicides. Wastes included oil, contaminated fuels, hydraulic fluids, solvents, paint thinners, cyanide, pesticides, and sewage sludge.

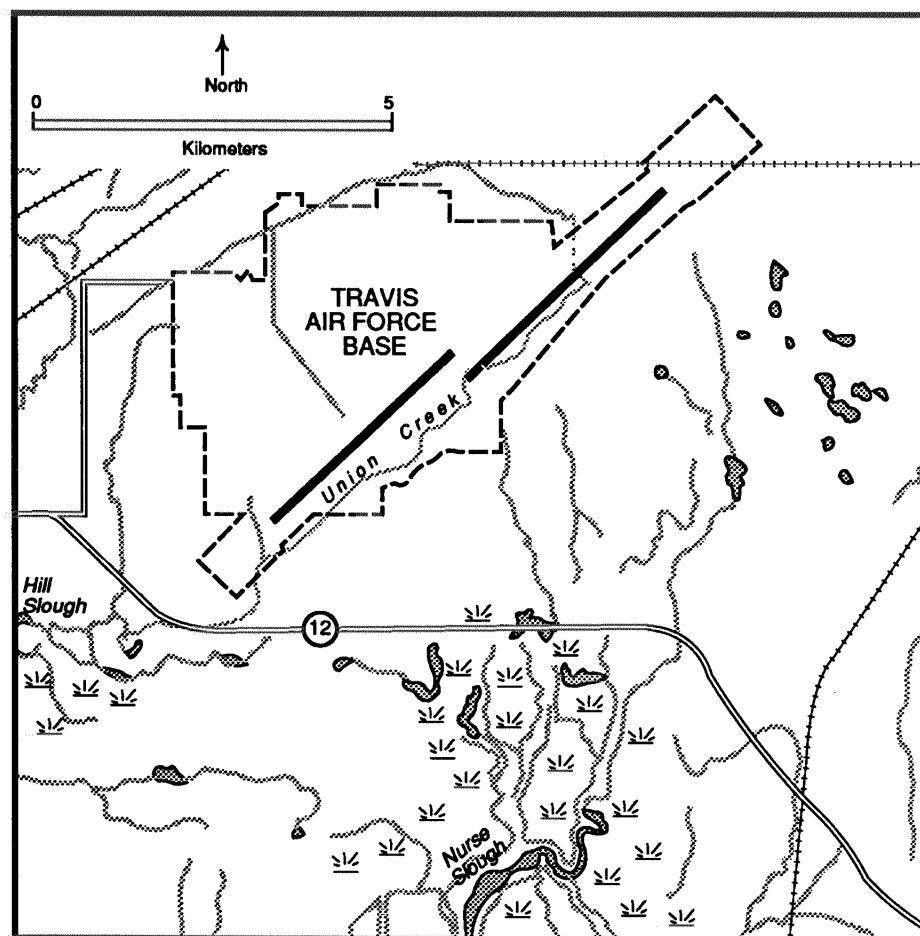


Figure 1.
Travis Air Force
Base, Fairfield,
California.

Travis Air Force Base

Site Exposure Potential, *cont.*

Wastes were burned, disposed in landfills or pits located on-site, or discharged to the sewage or storm drain system (Weston 1990).

The base is located in the Suisun-Fairfield Basin on the western edge of the Sacramento Valley. Natural surface drainages on the site are highly modified due to extensive channelization. Union Creek flows across the base as part of the storm sewer system and enters Hill Slough 1.8 km beyond the base boundary (Figure 1). This slough is part of the Suisun Marsh, a major wetland adjoining the San Francisco Bay estuary. Local groundwater exists in semi-confined conditions and aquifers are characterized by alluvial sediment with low permeability and pockets of sand and gravel. Groundwater in the local aquifer flows southward towards the Suisun Marsh.

Based on site characteristics and historical practices, surface water transport and groundwater discharge are the primary pathways of contamination to the aquatic environment.

Site-Related Contamination

Surface and subsurface soil, groundwater, surface water, and sediment samples were collected from more than 17 areas at Travis AFB as part of the Installation Restoration Program (Weston 1990). The samples were analyzed for a broad range of hazardous substances and all matrices were found to be contaminated with trace elements and other inorganic compounds, volatile organic compounds, and total petroleum hydrocarbons (Table 1; Weston 1990).

Concentrations of cadmium, chromium, lead, mercury, silver, and zinc, were highly elevated in groundwater and surface water and greatly exceeded applicable ambient water quality criteria (EPA 1986). Most of these samples were collected from the storm sewer zone representing a large area in the central portion of the base.

Silver, cadmium, lead, and zinc were greatly elevated above background levels in soils (Lindsay 1979). Most trace elements were found in high concentrations in storm sewer sediment on the base. In addition, barium occurred in extremely high concentrations in sediment.

Travis Air Force Base

Site-Related Contamination, cont.

Table 1. Maximum concentrations of contaminants in surface water, groundwater, soil, and sediment at the site, with applicable screening levels.

Trichloroethylene and associated volatile organic compounds were measured in high concentrations in groundwater, surface water, and soils. Total petroleum hydrocarbon (TPH) concentrations were extremely high in samples from surface water, groundwater, soil, and sediment.

	Water			Soil		Sediment	
	Surface Water µg/l	Ground-water µg/l	Chronic AWQC ¹ µg/l	Soil mg/kg	Average U.S. Soil ² mg/kg	Sediment mg/kg	ERL ³ mg/kg
INORGANIC SUBSTANCES							
arsenic	20	10	190	32	5	26.4	33
barium	680	2,500	NA	820	430	151,000	NA
cadmium	230	110	1.1 ⁺	13	0.06	124	5
chromium	530	260	11	60	100	1130	80
copper	260	60	12 ⁺	160	30	1240	70
lead	4,600	360	3.2 ⁺	850	10	6360	35
mercury	10	940	0.012	25	0.03	5.5	0.15
nickel	130	4,100	160 ⁺	46	40	5710	30
silver	80	70	0.12	120	0.05	24.0	1.0
thallium	780	170	40 [*]	ND	0.1	216	NA
zinc	14,000	310	110 ⁺	4400	50	23,500	120
ORGANIC COMPOUNDS							
TPH ⁴	39600000	10500000	NA	15,300	NA	74,300	NA
TCE	18	19,000	NA	290	NA	0.12	NA
t-1,2-dichloro-ethene	442	1,300	NA	ND	NA	ND	NA

- 1: Ambient water quality criteria for the protection of aquatic life, freshwater chronic criteria presented (EPA 1986).
 2: Lindsay (1979).
 3: Effective range-low; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990).
 4: Total Petroleum Hydrocarbons.
 + Hardness-dependent criteria: 100 mg/l CaCO₃ used.
 * Insufficient data to develop criteria. Value presented is the Lowest Observed Effects Level (LOEL).
 ND: Not detected at method detection limit; detection limit not reported.
 NA: Screening level not available.

NOAA Trust Habitats and Species

NOAA trust habitats in the vicinity of Travis AFB are Suisun Marsh, its associated waterways, and Suisun Bay. Several creeks intersect the base, including Union Creek, Suisun Valley Creek, Green Valley Creek, and Ledgewood Creek. Union Creek is a major drainage pathway to Suisun Marsh, an important wetlands system in San Francisco Bay that provides essential nursery habitat for several anadromous and marine species (Table 2; Rugg personal communication 1990). The Hill Slough Wildlife Area, adjacent to the base, is managed by the State of California as a wetland and provides public access for fishing and recreation.

Travis Air Force Base

NOAA Trust Habitats and Species, *cont.*

Suisun Bay, a transition zone between the saltwater ecosystem of San Francisco Bay and the freshwater ecosystems of the Sacramento and San Joaquin rivers, forms a migration corridor and nursery area for anadromous fish which spawn in the rivers. Striped bass migrate through Suisun Bay and spawn in the Sacramento River delta region. Chinook salmon, steelhead trout, white and green sturgeon, and American shad spawn in the upper reaches and tributaries of the Sacramento and San Joaquin rivers, with the largest populations found in the mainstem of the Sacramento River. Steelhead trout also spawn in Suisun Valley Creek and in Green Valley Creek.

Table 2.
Anadromous and
marine species and
habitat use in
Suisun Marsh and
associated
waterways, and
Suisun Bay in the
vicinity of the site.

Species		Habitat		
Common Name	Scientific Name	Spawning	Nursery	Adult Forage
ANADROMOUS FISH				
green sturgeon	<i>Acipenser medirostris</i>		◆	M
white sturgeon	<i>Acipenser transmontanus</i>		◆	M
American shad	<i>Alosa sapidissima</i>		◆	M
striped bass	<i>Morone saxatilis</i>		◆	M
steelhead trout	<i>Onchorhynchus gairdneri</i>	◆	◆	M
chinook salmon	<i>Onchorhynchus tshawytscha</i>		◆	M
ESTUARINE				
<u>Fish</u>				
shiner perch	<i>Cymatogaster aggregata</i>	◆	◆	◆
starry flounder	<i>Platichthys stellatus</i>		◆	◆
<u>Invertebrates</u>				
dungeness crab	<i>Cancer magister</i>		◆	◆
bay shrimp	<i>Crangon franciscorum</i>			◆
M: species is in the area as a seasonal migrant				

Extensive recreational fishing for striped bass, steelhead, salmon, and shad occurs in Suisun Bay and Suisun Marsh. Although no commercial fishery exists in Suisun Bay, commercial fishing of bay shrimp for bait may move into the lower reaches of Suisun Bay during periods of abnormally high salinity (Hergeshell personal communication 1990; Rugg personal communication 1990).

References

Hergeshell, P., Fisheries Biologist, California Department of Fish and Game, Santa Rosa, California, personal communication, July 12, 1990.

Travis Air Force Base

References, *cont.*

Lindsay, W.L. 1979. Chemical Equilibria in Soils. New York: John Wiley & Sons. 449pp.

Long, E.R., and L.G. Morgan. 1990. The potential for biological effects of sediment-sorbed contaminants tested in the National status and Trends Program. Seattle: Coastal and Estuarine Assessment Branch, NOAA. NOAA Technical Memorandum NOS OMA-52. 175 pp.+ Appendices.

Roy F. Weston. 1990. Installation Restoration Program. Stage 2. Travis Air Force Base, California. Draft Technical Report. Volume 1. Scott Air Force Base, Illinois: Headquarters Military Command, Command Civil Engineer, and U.S. Air Force, Human Systems Division, IRP Program Office, Brooks Air Force Base, Texas. 1,500 pp.

Rugg, M., Water Quality Biologist, California Department of Fish and Game, Yountville, California, personal communication, August 7, 1990.

U.S. Environmental Protection Agency. 1986. Quality Criteria for Water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-87-003.

