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Del Monte Corporation (Oahu Plantation)

Oahu, Hawaii
CERCLIS #HID980637631

■ Site Exposure Potential

Del Monte Corporation's Oahu Plantation covers 2,400 hectares on the coastal plain of the Island of Oahu. The site is near an unnamed stream that flows into Poliwai Gulch, then to Waikele Stream, which flows another 13 km to the West Loch of Pearl Harbor (Figure 1; EPA 1993). The site has been used for pineapple cultivation since the 1940s. Fumigants were used to control nematode infestation; the active chemical being ethylene dibromide (EDB). In 1980 the Hawaii Department of Health sampled a plantation well during a groundwater program designed to determine whether fumigants had contaminated

drinking water wells on Oahu. Analyses identified two fumigants: EDB and 1,2-dibromo-3-chloropropane (DBCP). Two sources of contamination were located on the site (Figure 2): an area used to store drums of fumigants from the 1940s to 1975 (Source Area 1), and an area where 1,870 l of EDB were spilled in 1977 (Source Area 2). Since the discovery of groundwater contamination, Del Monte has removed 16,300 metric tons of soil, which was spread on a nearby field to allow the EDB and DBCP to volatilize. Despite this action, groundwater is still contaminated (EPA 1993).

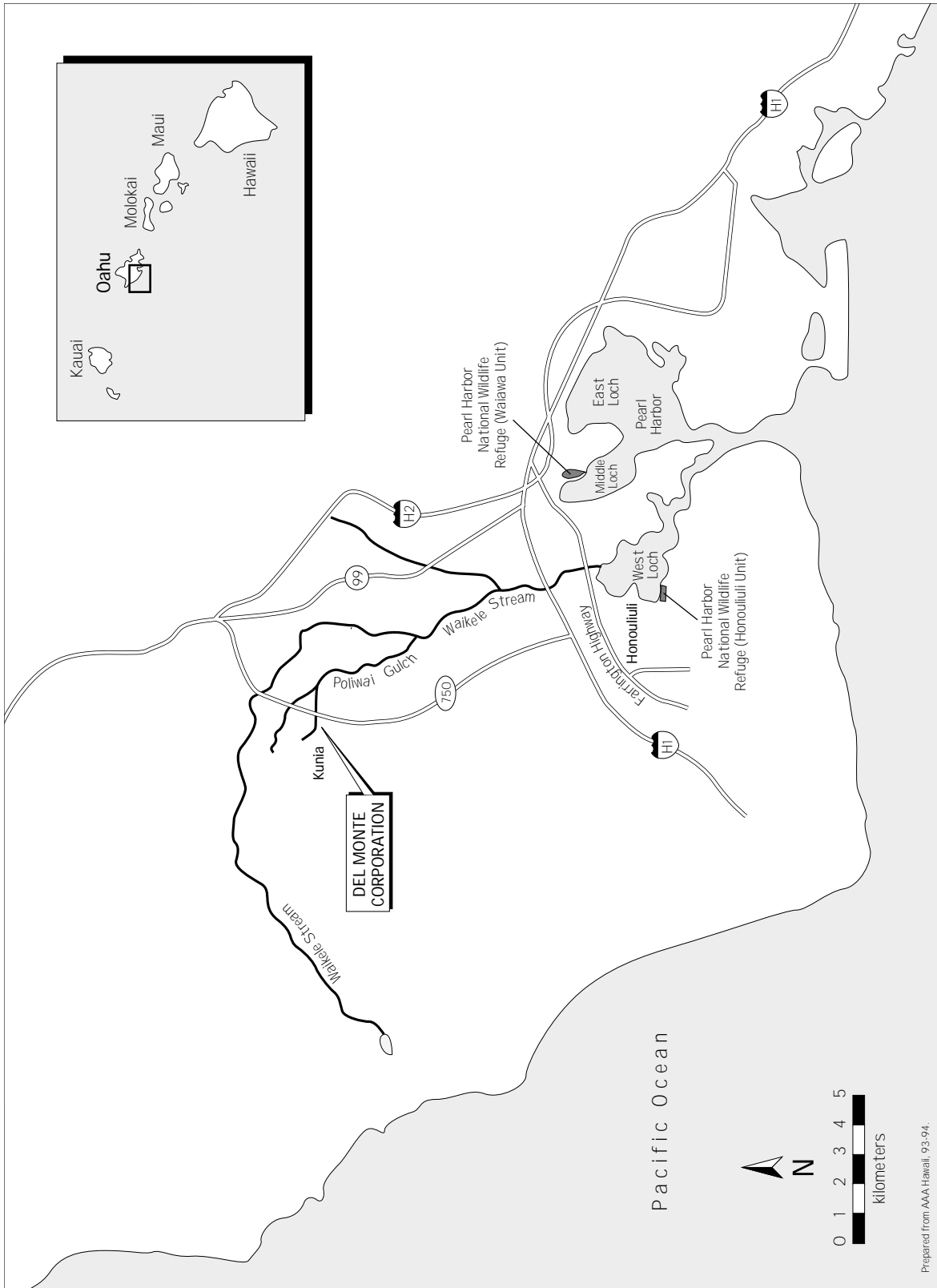


Figure 1. Location of Del Monte Oahu site.

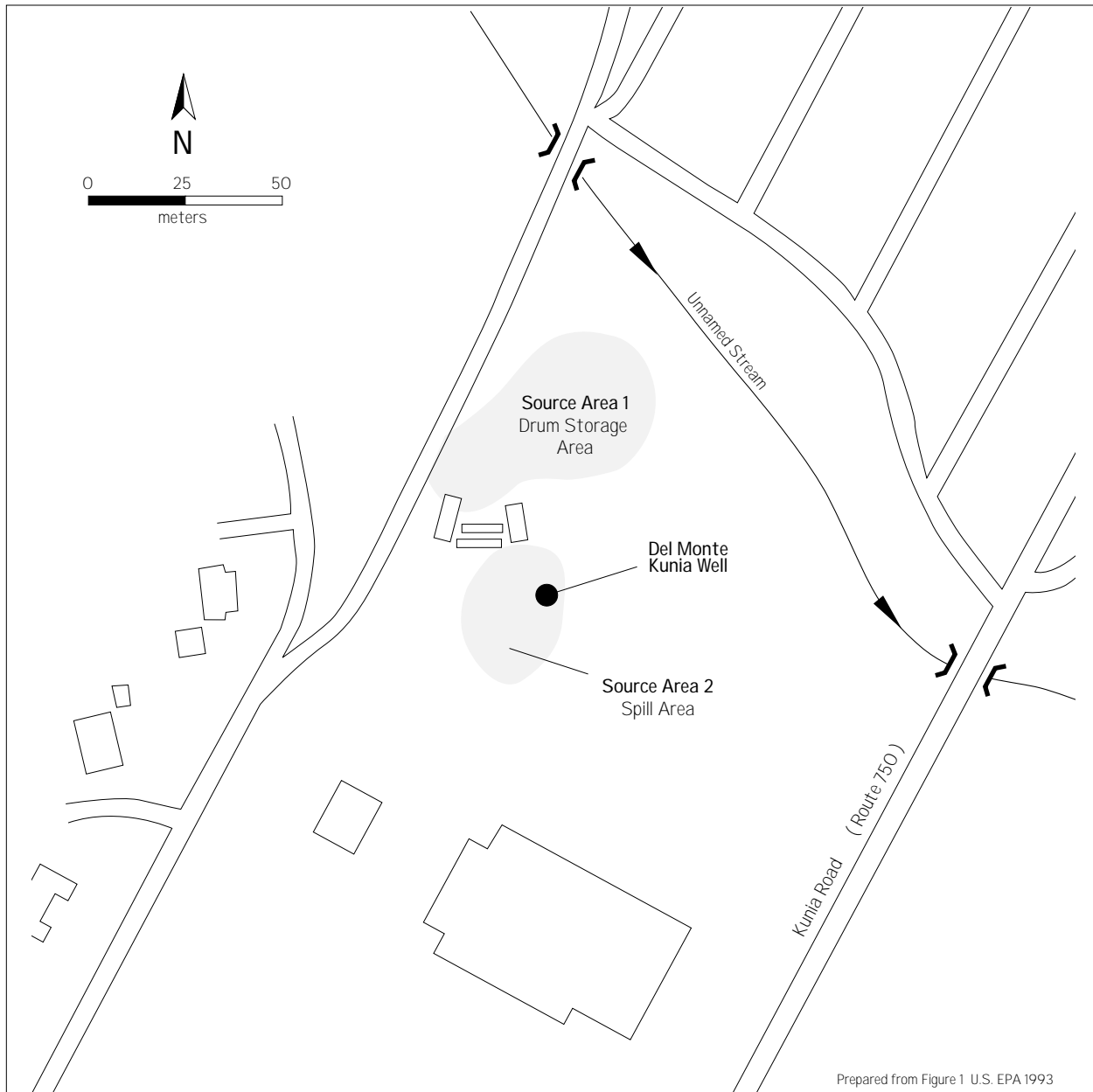


Figure 2. Del Monte Oahu site.

EDB and DBCP could migrate off-site via groundwater and, possibly, surface runoff, although neither pathway has been investigated. Groundwater that may be affected by the site occurs in two aquifers: a shallow, perched aquifer encountered between 6 and 9 m below ground

surface, and the Waipahu basal aquifer approximately 250 m bgs. The two aquifers are hydraulically connected. Both source areas on the site are also within 60 m of an unnamed stream, which flows approximately 1 km east to Poliwai Gulch.

NOAA Trust Resources

Habitats of primary concern to NOAA are surface water and associated bottom substrates of lower Waikele Stream, one of five principal streams draining into Pearl Harbor. NOAA trust species that use lower Waikele Stream are listed in Table 1. Principal streams in the area drain agricultural and newly urbanized lands before passing through highly urbanized areas near Pearl Harbor, where they remain brackish for short distances upstream (Grovhoug 1991). Pearl Harbor, a natural coastal plain estuary, is one of the largest estuaries in Hawaii, containing nearly 21 km² of surface water area and 58 km of linear

shoreline. The harbor drains approximately 285 km² of total area. Some of the species listed in Table 1 spend portions of their life histories in habitats of the West Loch of Pearl Harbor.

Poliwai Gulch and central Waikele Stream near the site are intermittent and typically dry during most months of the year and are considered unlikely to provide any habitat to NOAA trust resources (Environmental Technologies International [ETI] 1993; Devick personal communication 1994). Permanent water flow does not appear in Waikele Stream until groundwater springs emerge near the Oahu Sugar Company property, about 10 km downstream from the site (referred to here as lower Waikele Stream).

Table 1. Major species that use surface water associated with Waikele Stream downstream of the Del Monte site.

Species		Habitat			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage	Comm. Fishery	Recr. Fishery
AMPHIDROMOUS SPECIES						
'O' opu 'akupa	<i>Eleotris sandwicensis</i>	◆	◆	◆		
'O' opu naniha	<i>Stenogobius hawaiiensis</i>	◆	◆	◆		
'O' opu nakea	<i>Awaous guamensis</i>	◆	◆	◆		
MARINE/ESTUARINE SPECIES ¹						
Bristle-nosed catfish ²	<i>Ancistrus</i> spp.	◆	◆	◆		
Black-tail snapper ²	<i>Lutjanus fulvus</i>	◆	◆	◆		◆
Striped mullet ²	<i>Mugil cephalus</i>	◆	◆	◆	◆	◆
Goby ²	<i>Mugilogobius</i> spp.	◆	◆	◆		
Silvery tilapia ²	<i>Tilapia melanotheron</i>	◆	◆	◆		◆
INVERTEBRATE SPECIES						
Asiatic clam ²	<i>Corbicula fluminea</i>					
Tahitian prawn ²	<i>Macrobrachium lar</i>	◆	◆	◆		◆
1: Species occur in the West Loch of Pearl Harbor and use only the lower portions of Waikele Stream						
2: Species is not indigenous to Hawaii.						

Downstream from the Farrington Highway bridge (Figure 1), a concrete channel lines the stream course for about 250 m. There is a 1-m concrete barrier formed by a USGS gauging station weir at the upstream head of the channel, approximately 1 km upstream from the West Loch of Pearl Harbor. This barrier is the upstream limit of tidal influence in Waikele Stream. Riparian vegetation along a 2-km stretch of Waikele Stream that extends north from the Farrington Highway consists mostly of thick stands of California grass (*Brachiaria mutica*). Mangroves line the lower estuary downstream from the terminus of the concrete channel (ETI 1993).

The Waikele Stream drainage basin appears to be dominated by introduced fish at lower elevations (ETI 1993; Devick personal communication 1994). Lower portions of Waikele Stream are influenced by water withdrawals and channelization, which may account for the predominance of introduced fish species. Tilapia, bristle-nosed catfish, and three species of topminnow constitute most of the fish numbers and biomass below 213 m elevation (ETI 1993). These species are not NOAA trust resources. Elevation at the site is approximately 260 m (U.S. Geological Survey 1983).

There are three known species of amphidromous endemic finfish, 'o'opu (*Awaous guamensis*, *Eleotris sandwicensis*, and *Stenogobius hawaiiensis*), in lower portions of Waikele Stream. Amphidromous fish species are considered a NOAA trust resource. The amphidromous 'o'opu have an unique life history: they spend

their entire adult life in freshwater streams and migrate downstream to spawn in freshwater close to estuaries or the ocean. Upon hatching, eggs drift out to the ocean as planktonic larvae. Returning post-larvae ascend freshwater streams. Some species (*A. guamensis*) are capable of climbing waterfalls and areas of rapids in streams (ETI 1993; Devick personal communication 1994). The first large rainstorm in the fall months is believed to trigger a downstream spawning run. However, post-larvae have been found throughout the year in different streams, indicating that spawning may occur at different times throughout the year (ETI 1993).

E. sandwicensis and *S. hawaiiensis* have been found only in low-elevation areas and were restricted to the Waikele estuary and the lowest elevations of Waikele Stream. In contrast, *A. guamensis* was found throughout the hydraulically accessible portions of Waikele Stream. None of the native endemic 'o'opu in Waikele Stream are listed as Federal threatened or endangered species (ETI 1993).

There is limited fishing in the Waikele Stream drainage basin although local subsistence fishers periodically harvest Tahitian prawn and Asiatic clam. Recreational capturing of finfish is not considered likely to target any specific species (Devick personal communication 1994).

■ Site Related Contamination

Twenty soil borings were drilled and over 400 groundwater samples were collected at the two sources on the site and surrounding areas during preliminary site investigations between 1981 and 1991 by Del Monte and the Hawaii Department of Health. The primary contaminants that pose a threat to NOAA trust resources are EDB and DBCP, which have been observed in soil borings at Sources 1 and 2, the perched groundwater table beneath the sources, and the Kunia Well within the Waipahu basal aquifer. There have been no investigations in the unnamed stream near the sources (EPA 1993).

The highest concentrations of DBCP were observed in soil borings of Source Area 1. A maximum concentration of 3,000 mg/kg was reported; concentrations between 1.9 and 320 mg/kg were detected in four of five borings collected at this source. Maximum concentrations were measured in 0 to 60-cm samples nearest the former fumigant transfer device. High concentrations (up to 1.9 mg/kg) were measured in samples approximately 20 m from the unnamed stream, although a soil sample collected next to the stream contained measurable concentrations of only .001 mg/kg. EDB was also observed at Source Area 1; maximum concentrations observed within four of five borings collected at this source ranged from 5 mg/kg to 120 mg/kg. EDB was measured at 5 mg/kg approximately 20 m from the unknown stream, but was not detected in samples collected next to the stream (EPA 1993).

At Source Area 2, EDB was observed at the highest concentrations; maximum soil concentrations from seven of eight borings collected at this source ranged from 0.08 to 65 mg/kg. DBCP was observed at considerably lower concentrations at Source Area 2; concentrations within the same borings did not exceed 0.25 mg/kg (EPA 1993).

EDB and DBCP were observed in the shallow perched and the deeper Waipahu basal aquifers beneath both sources. In the perched aquifer, EDB was reported at the highest concentrations, ranging from 8 to 240,000 µg/l, while DBCP was reported at concentrations ranging from 0.14 to 17,000 µg/l. Much lower concentrations have been observed in the deeper Waipahu aquifer. Between 1981 and 1991, over 400 groundwater samples were collected from the deep aquifer. Concentrations generally ranged from undetected to 300 µg/l for EDB, and undetected to 11 µg/l for DBCP. The distribution of EDB and DBCP indicates that the two sources are the primary contributors to groundwater contamination as opposed to the surrounding pineapple fields. However, the extent of contaminated groundwater migration toward the unnamed stream has not been determined (EPA 1993).

Summary

EDB and DBCP were disposed or spilled at two sources at this site, approximately 60 m from a tributary of the Waikele Stream, the lower reaches of which provide habitat for NOAA trust resources. Elevated concentrations of EDB and DBCP were detected in soil borings and the shallow, perched groundwater which likely flows to the tributary. However, no groundwater discharge locations have been identified. Neither potential transport pathways from the sources to the tributary nor contamination in the tributary streams have been investigated. The downstream extent of contamination has not been determined. NOAA is concerned that these contaminants could migrate to the Waikele Stream watershed at concentrations of concern, and perhaps as far downstream as Pearl Harbor.

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References

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