

# Adapting to Rising Tides



## Contaminated Lands Vulnerability and Risk Profile

There are eight types of contaminated lands sites identified in the ART project area: Federal Superfund Sites (2); Site Cleanup Program Sites (303); Leaking Underground Storage Tanks (USTs) (405); Military Leaking USTs (43); Military Cleanup Sites (96); Department of Toxic Substances Control (DTSC) sites (112); closed landfills (15); and active landfills (6). There is some overlap across these types of sites, and agencies may share oversight responsibilities over individual sites. While contaminated lands are found across the project area, some, such as Site Cleanup Program and DTSC sites, are concentrated in former industrial areas such as Emeryville, West Oakland, and Downtown Oakland. Many of the closed landfills are located directly along the shoreline or even make up part of the shoreline, having been placed in the Bay as fill over the last century, and some of them are now used as parks.

## Key Issues

Contaminated lands pose a threat to public health and the environment due to their potential to release hazardous substances in the event of a climate impact. Such a release could occur through groundwater migration, surface water flow, soil exposure and release to the air (vaporization). Different types of contaminated lands are vulnerable to sea level rise in different ways. Sites contaminated with solvents, for example, are sensitive to rising groundwater because solvents can go into solution in groundwater and spread underground or cause air quality problems in buildings constructed on top of the site. Sites with PCBs, on the other hand, may be more sensitive to storm event flooding because PCBs bind to sediment, which could be eroded and carried to the Bay during flood events, adding to already high levels there. Some sites can be cleaned up through the removal of contaminated soil, while others, due to technical challenges, additional environmental risks, or funding issues, are more likely to be remediated in place, where, depending on the remediation and climate impact, could still pose a risk to human health and the environment in the event of a climate impact.

Vulnerabilities	Consequences
<p><b>Timing</b></p> <ul style="list-style-type: none"><li>• At mid-century, the majority of contaminated land sites will not be affected by sea level rise. Strong storms, however, may cause flooding or erosion for some sites.</li><li>• By end-of-century, more than 10% of contaminated lands sites will be exposed to the high tide, and one third to one half may be exposed to storm events.</li></ul> <p><b>Physical and Functional Qualities</b></p> <ul style="list-style-type: none"><li>• Landfill caps and liners may not be watertight, which could allow floodwaters or rising groundwater to migrate into buried waste and create contaminated leachate. If not properly designed or maintained, landfill coverings could also erode and expose buried contaminants.</li><li>• Saltwater intrusion could corrode underground storage tanks before they are remediated or removed.</li><li>• Sites that are not suitable for removal of contaminants will need to be remediated in place, and are therefore vulnerable to storm event flooding and rising groundwater.</li><li>• Sediment bound contaminants are vulnerable to erosion, which could transport them into the Bay, while water soluble contaminants are vulnerable to flooding and rising groundwater, which could result in such contaminants going into solution and spreading.</li></ul>	<p><b>Scale</b></p> <ul style="list-style-type: none"><li>• Adjoining properties and neighborhoods</li><li>• Bay-wide</li></ul> <p><b>People</b></p> <ul style="list-style-type: none"><li>• Many of the contaminants in the ART project area are harmful to human health and, if released, could cause problems for those who come into contact with contaminated floodwaters.</li><li>• Contaminants such as solvents that can go into solution pose health problems in buildings constructed on top of contaminated sites.</li><li>• Contaminants such as PCBs bio-accumulate and can cause health problems for humans who eat fish that have consumed them.</li></ul> <p><b>Ecosystem Services</b></p> <ul style="list-style-type: none"><li>• PCBs, a common contaminant, are harmful to wildlife and are already present in the Bay at levels above water quality standards; if released from sites, PCB levels - and that of other pollutants - would increase.</li><li>• Many sites are contaminated with petroleum products, which, if released into the Bay and shoreline, would have adverse impacts on habitats and ecosystem functions.</li></ul>

## **Vulnerabilities**

### **Information**

- There is no single database with coordinated information on all of the contaminated lands sites - instead, different agencies and databases track and organize the sites differently, making it difficult for the public to track and understand the location and condition of contaminated lands sites.

### **Management Control**

- Most contaminated lands are privately owned, meaning that cleanup depends in part on being able to locate property owners, and owners having the necessary funds to undertake cleanup. Where owners cannot be found or do not have sufficient funds, the cleanup process may be delayed, and public funds must be used.
- Several different agencies are involved in identifying, investigating, and overseeing cleanup of contaminated lands; this can help keep sites from slipping through the cracks, but could potentially create challenges in coordinating information and action in the face of sea level rise.