

## *Assessment of Kachemak Bay Benthic Habitats and Contaminant Status*

### *Is Kachemak Bay Contaminated?*

### *NOAA's National Status and Trends Bioeffects Program is Finding Out*

NOAA's National Status and Trends Program (NS&T) helps local communities determine the condition of vital coastal resources like Kachemak Bay and detect changes in the environmental quality of those resources over time.

#### *Kachemak Bay:*

#### *The Threat of Contamination*

The ecosystem of Kachemak Bay harbors a rich diversity of marine life that support the regional economy, recreational fishing, and subsistence gathering. But human activities can contaminate the ecosystem with chemical compounds and heavy metals that can be toxic to humans and animals.

#### *Detecting Problems So We Can Do*

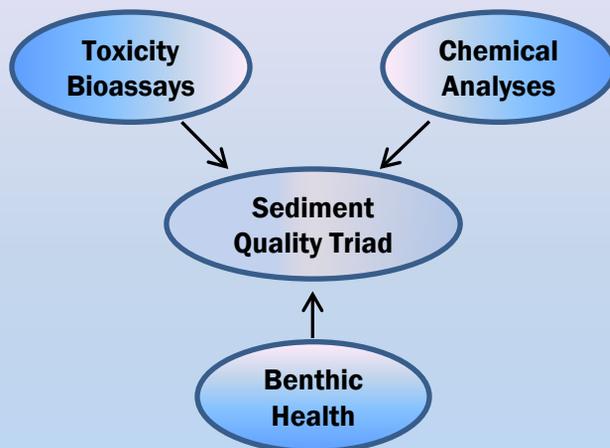
#### *Something About Them*

National Status and Trends' survey of contamination in Kachemak Bay is a vital tool that will help our partners identify emerging concerns and provide a "baseline" for the future so that contamination trends can be detected and managed.

#### *How do we do it?*

We used three types of tests to measure contamination and its effects on Kachemak Bay:

- Is the marine community thriving (Benthic Health)? In this analysis, scientists examine the animals living on the bottom of the bay. These animals are crucial components of the food chain, supporting higher-order animals.
- Chemical Analyses - Does the sediment contain measurable contamination?
- Toxicity Bioassay - Are the animals negatively affected by the contamination? Scientists measure contamination to see if there are any effects on marine animals who live in the sediment. We test animals that live in the sediment to measure if and how much, it affects their survival and growth.



#### *Where might contaminants come from in the future?*

- Nonpoint sources: Run-off that picks up contamination from cars, marinas, and other diffuse sources.
- Natural erosion: the movement of soil and sediment into the water carries minerals and other chemicals.
- Point sources: Sewage discharge, oils spills and ship wrecks
- Air pollution: Chemicals from diffuse sources blown in by wind currents



*Non-point sources*



*Air Pollution*



*Natural Erosion*



*Spills and Wrecks*



**Two types of the many chemicals we tested for:**

Polycyclic Aromatic Hydrocarbons, or PAHs and Tributyltin.

PAHs are chemicals that come from many sources, both natural and man-made, including fossil fuels like oil and coal, soot from burning fuel, wood, and plastic, as well as the natural breakdown of organic material like algae and leaves. They are toxic at high concentrations and some cause cancer. They are one of the primary sources of concern from oil spills, run-off, and coal-burning factories.

Tributyltin is a “pesticide” formerly added to anti-fouling paint for boats to discourage the growth of barnacles and other organisms. It is extremely toxic to mollusks (clams and snails) and retards growth in shellfish and crustaceans (crabs and shrimp), among other effects

**A Report Card for Kachemak Bay Today:**

**The Bay is clean**

- No evidence of residual oil from past major spills
- Relatively low levels of PAHs, PCBs, and pesticides
- Some elevated concentrations of heavy metals and other trace elements, probably from glacial runoff (ground up rocks are the source of metals)

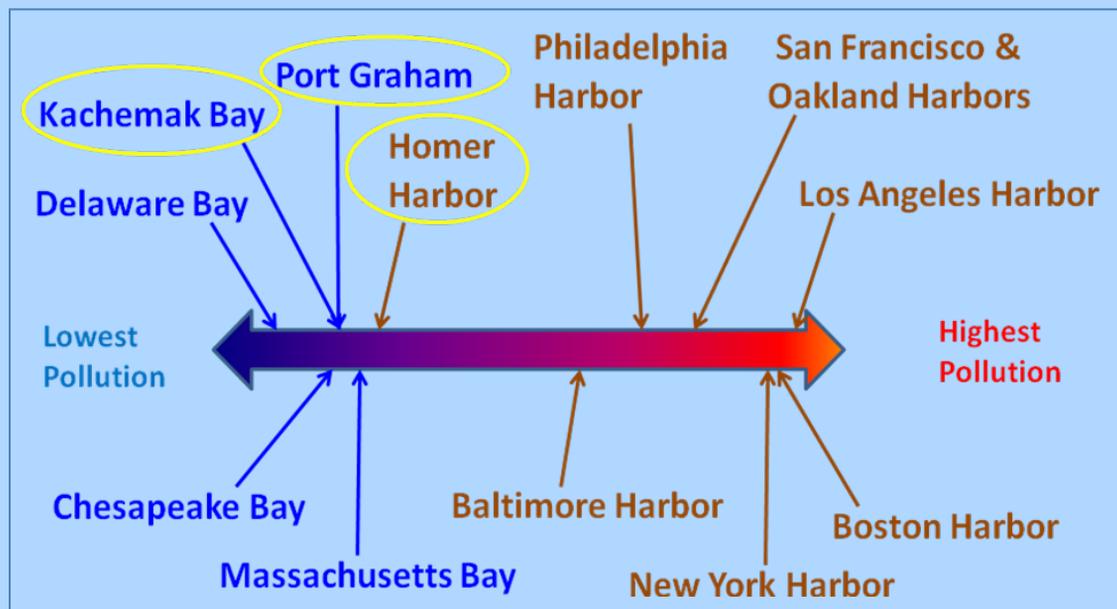
**Homer Harbor shows some elevated contamination**

- Higher levels of PAHs from fuel spills and vessel exhaust than the open bay
- Tributyltin levels may be affecting sensitive species

**Kachemak Bay is a healthy home for marine species**

- Abundant and diverse animal populations overall
- Lower abundance and diversity at eastern end of Bay near Fox River input that is a natural stress from glacial meltwater

**How clean is Kachemak Bay compared to other coastal waters?**



*Distribution of pollutant levels in Kachemak Bay, Port Graham, and Homer Harbor relative to open water reaches of other bays, and large ports around the United States. The brown type indicates enclosed, harbor systems while the blue type indicates open water systems.*