

**What Are the
Human
Health Implications
of Exposed Salton
Sea Sediments?**

John A. Lowe
CH2M HILL
Sacramento, California

Presented at the
Salton Sea Symposium
January 13, 1994
Indian Wells, California

Conclusions

Conditions for producing dust storms observed at Owens and Mono Lake may not be present at the Salton Sea.

Dust emissions from Salton Sea sediments appear to be minimal compared to other sources (agricultural fields and unpaved roads).

Surrounding soils, if undisturbed, have limited potential to suspend dust.

Concentrations of pesticides and most metals resemble background – exposures and risks would not be increased from Salton Sea sediment dust.

Selenium could be elevated in sediments; however, concentrations in air are not likely to pose a health risk.

Summary

Winds blowing across the exposed sediments surrounding the Salton Sea can potentially generate concentrations of airborne dusts. Contaminants of concern in the dust potentially associated with adverse health effects in humans include alkali salts (such as sodium chloride or sodium sulfate), silt and clay particles, inorganic elements and pesticide residues. The purpose of this paper is to provide an understanding of the public health perspectives and local air quality issues surrounding exposed sediments surrounding the Salton Sea.

Concerns with dust emissions at the Salton Sea are based on observed dust storms at Mono and Owens Lakes. The dust storms at these lakes are associated with resuspension mechanisms that occur specifically at dry salt lakes. The probable mechanism of particulate emissions from the Salton Sea is different than observed at dry salt lakes and is associated with resuspension of the silts in exposed sediments. Impacts associated with dust storms observed at dry salt lakes, such as Mono and Owens Lakes, are not likely to provide an indication of the potential magnitude or impacts associated with exposed sediments at the Salton Sea.

Exposed sediments at the Salton Sea would be significant sources of suspended dust to the extent that large portions of the surface is disturbed, largely by operating motor vehicles over them. Based on the available research addressing soil parameters and wind erosion, undisturbed exposed sediments from the Salton Sea would have a lower likelihood of being a significant source of suspended dust than at Mono and Owens Lakes.

Concentrations of trace contaminants (pesticides and inorganic elements) in newly exposed sediments resembling regional background levels are unlikely to pose significant public health impacts. However, concentrations of selenium are noticeably elevated from background, with concentrations ranging from 0.4 to 7.1 mg/kg. The concentration of selenium in air associated with increased health risks in humans is 11 $\mu\text{g}/\text{m}^3$ or greater. A worst case scenario for concentrations of selenium in air associated with dust emissions from exposed sediments is approximately 0.0033 $\mu\text{g}/\text{m}^3$. Therefore, selenium in Salton Sea sediments is not likely to be associated with adverse health effects.

What Are the Public Health Issues?

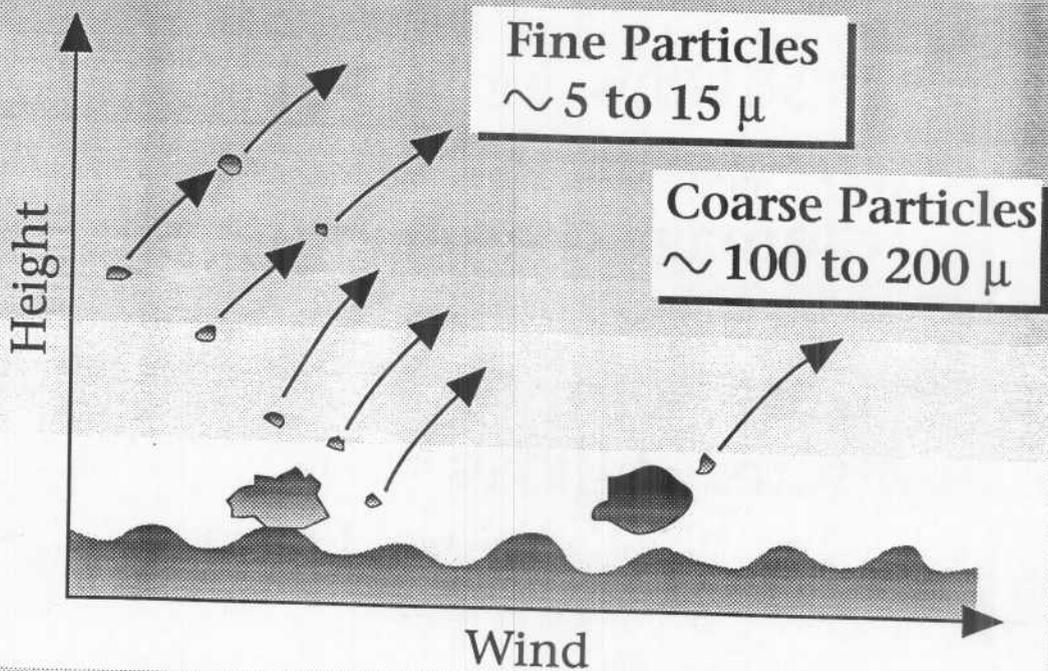
- ▶ Sediments exposed from declining water level
- ▶ Contaminants in the sediments (pesticides, metals)
- ▶ Windblown dust originating from sediments
- ▶ Potential human exposure to contaminants and fine dust particles

Origins of Public Health Concerns

- ▶ Pesticides and metals
in agricultural
drainage (Kesterson)
- ▶ Dust storms
from salt lakes
(Aral Sea, Owens Lake)

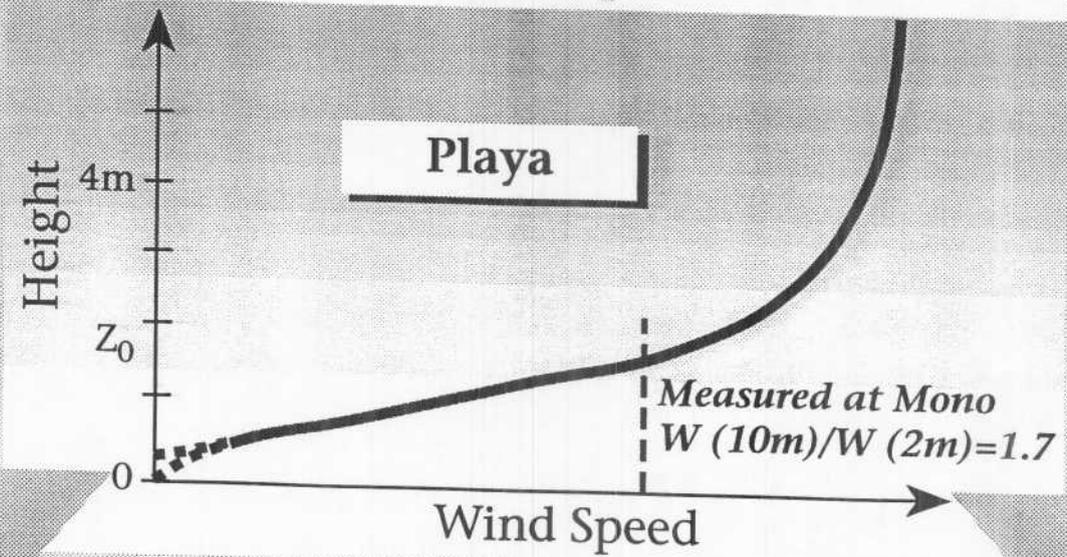
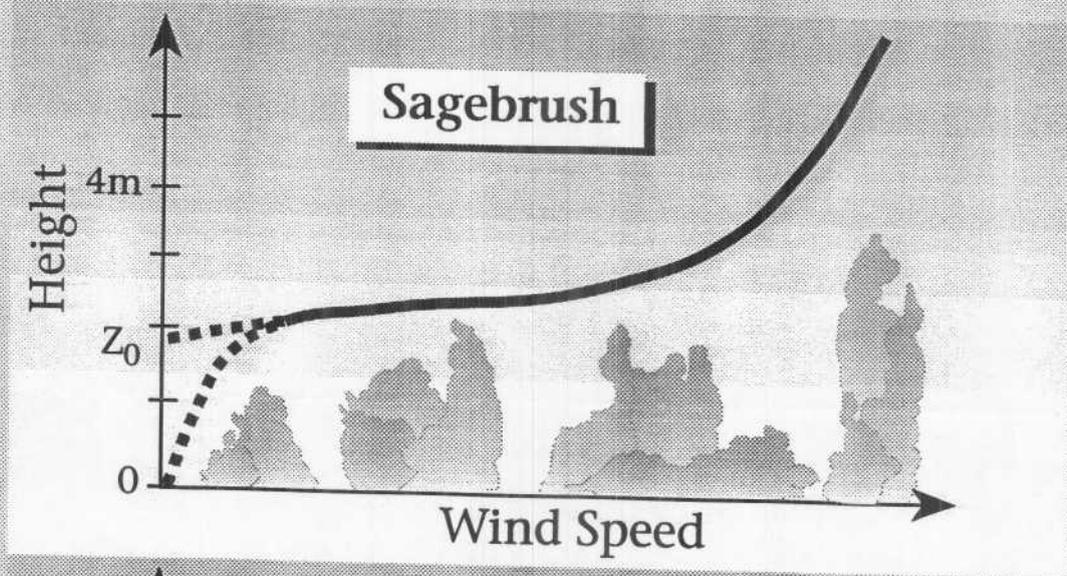
Saltation Process

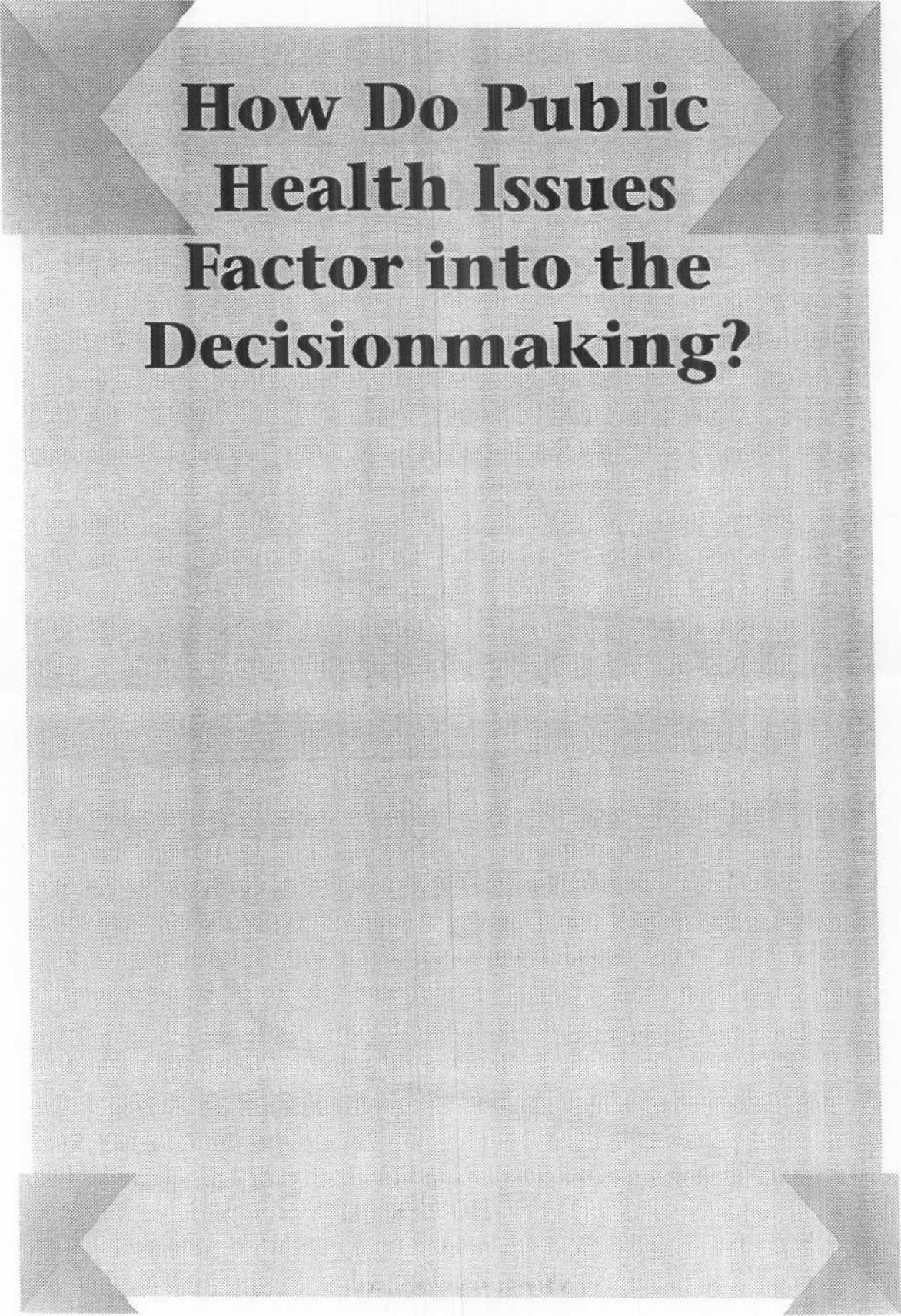
Saltating Particles



(after Gillette, 1980)

The Effect of Surface Roughness on Wind Shear





**How Do Public
Health Issues
Factor into the
Decisionmaking?**

Analysis of Public Health Issues

- ▶ Comparisons with Owens Lake and Mono Lake, California
- ▶ Evaluation of conditions favoring dust suspension
- ▶ Ranking of Salton Sea sediments as a source of airborne dust
- ▶ Evaluation of concentrations of metals and pesticides in Salton Sea sediments

Public Health Issues and Decisionmaking

- Understanding how the issues are studied
- Judging whether an action could threaten public health
- Ranking actions in terms of risks to public health
- Knowing what questions to ask
- Knowing what issues to address