



Subtidal and Fish Habitats

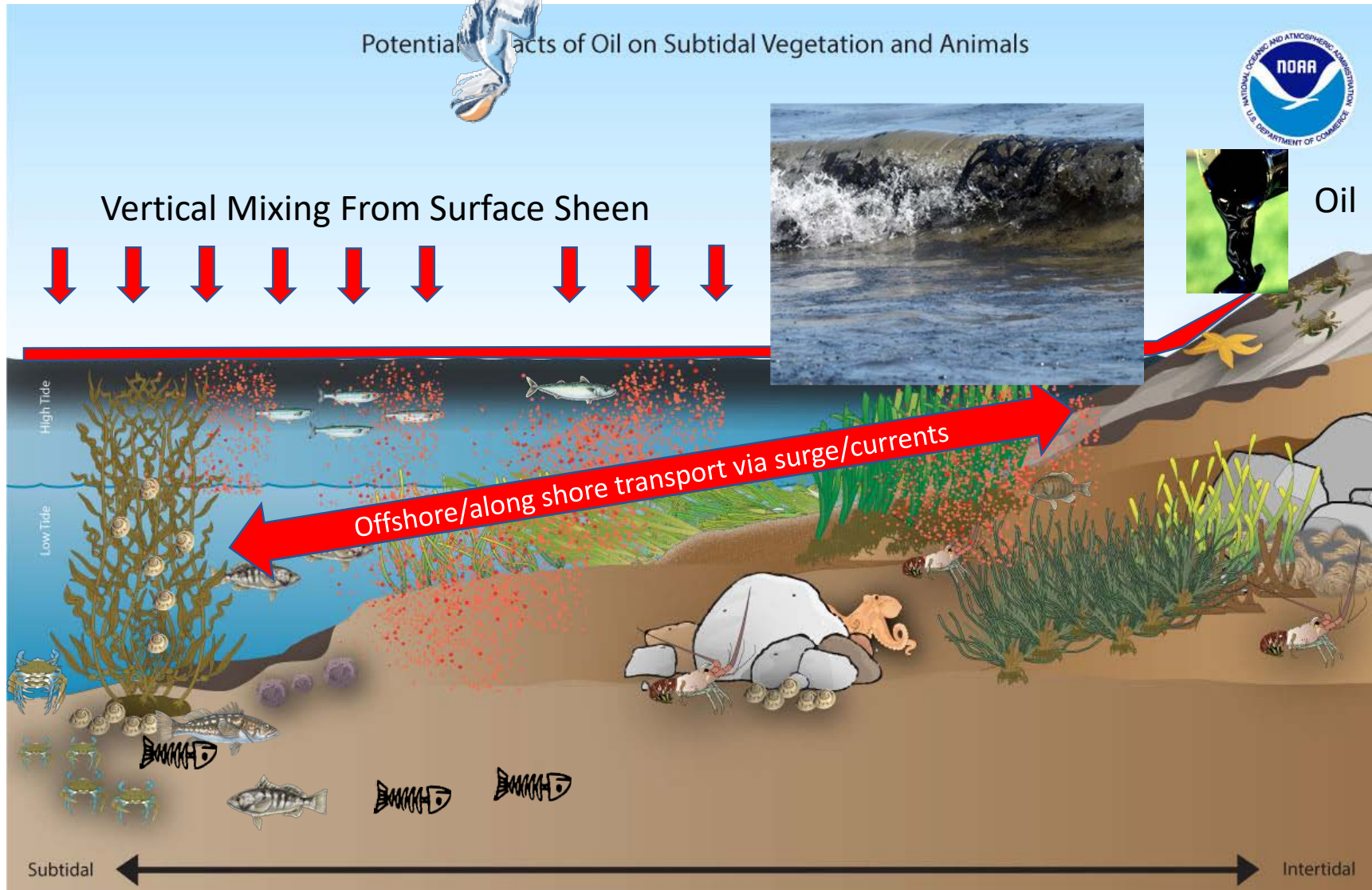
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NOAA/NMFS/Restoration Center

Outline

- Overview of injury to subtidal habitats
- Summary of injury assessment
- Description of restoration projects



What happened in the subtidal



Exposure

Detection of oiling



*Oil on
leaves*



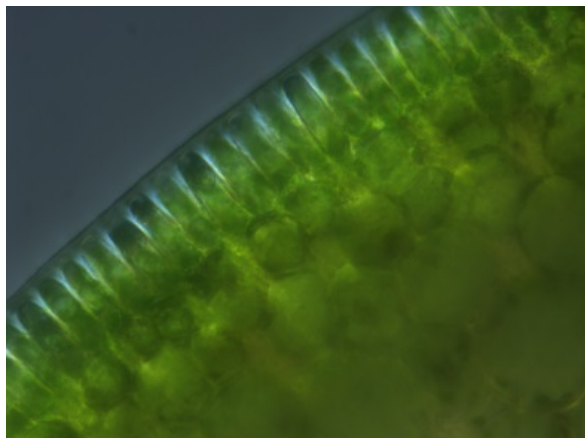
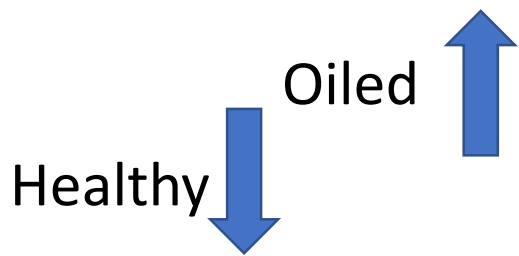
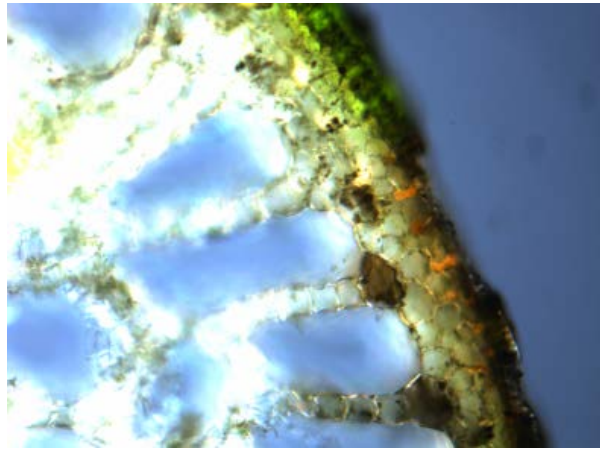
*Oil on
lobster
mouth*

Surfperch hydrocarbon metabolites in bile



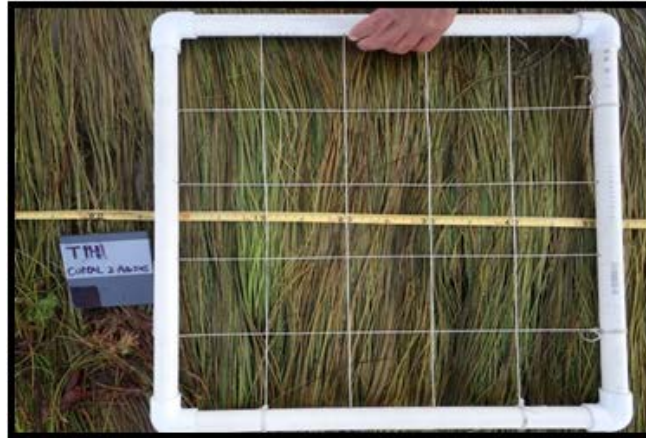
- Absorbed hydrocarbons are rapidly metabolized by fish and stored in their gall bladders to be excreted.
- Metabolites measured in fish bile can be used to indicate hydrocarbon uptake.
- Surf perch bile indicated elevated exposure to oil components occurred.

Quantifying Injury



Oiled

Control



Surfgrass Surveys



Mortality

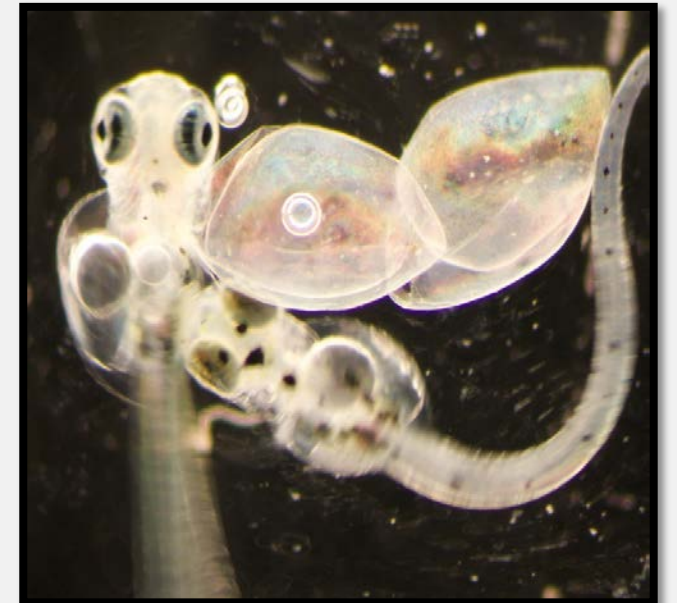
Grunion spawning and larval survival



Grunion Spawning Surveys



Grunion Egg Surveys



Hatching and Survival Rates

Mortality

Inventory of oiled and dead fish and invertebrates



Dead invertebrates



A variety of dead fish



A variety of dead crabs

Injury Summary

- An estimated 2,200 acres of benthic subtidal and fish habitat were impacted.
- An unusually high number of oiled and dead carcasses, of a variety of species, was observed.
- Grunion larvae, collected from oiled exposed beaches, had a higher rate of mortality than those from unoiled beaches.
- Surfgrass discoloration and leaf die-off, from cell damage and loss of chlorophyll, was observed.
- Surf water samples were found to exceed adverse toxicity levels.

Proposed Restoration

Abalone Restoration

Abalone inhabit kelp forests and subtidal habitats. This project aims to restore red abalone populations that will promote healthy rocky reef and kelp forest habitats.



Eelgrass Restoration

Eelgrass beds are an important habitat for a variety of fish and invertebrates. This project aims to create new eelgrass beds that would enhance the ecosystem.



Proposed Restoration

Sand-dwelling Kelp Restoration

Kelp provides habitat for fish and invertebrates and is a food source for subtidal, intertidal and beach communities. This project aims to prolong the function of an existing sand-dwelling kelp restoration project.



Ellwood Seawall Removal



The Ellwood Seawall currently constrains the natural functioning of shoreline and shallow habitats. In addition to significant benefits shoreline habitats, this project will reduce scour and turbidity to nearshore environments will increase species diversity and habitat function.

Ellwood Seawall Removal



Spill Location



Eelgrass Restoration



Abalone Restoration



Sand-Dwelling Kelp

