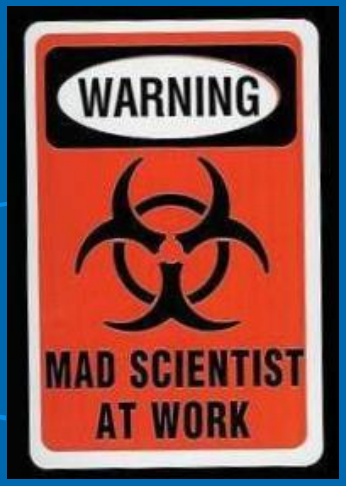
# Science by the Seat of the Pants

## Examples and Experiences

Stephen Lehmann
NOAA Scientific Support Coordinator
New England Region



# The Hunt for Submerged Oil

- The question:
  - “Can you guarentee me that this oil has not submerged?”
- The answer:
  - No, but I can demonstrate the following:
    - 1. Whether oil is abundant in the water column
    - 2. Whether oil is abundant on the bottom

Fine Print: (Lack of abundance does NOT indicate absence)

# Review

- What causes submerged oil ?
  - Oil is heavier than the receiving water…
  - Oil entrains sediment (sand)…
  - Oil encounters vertical currents…

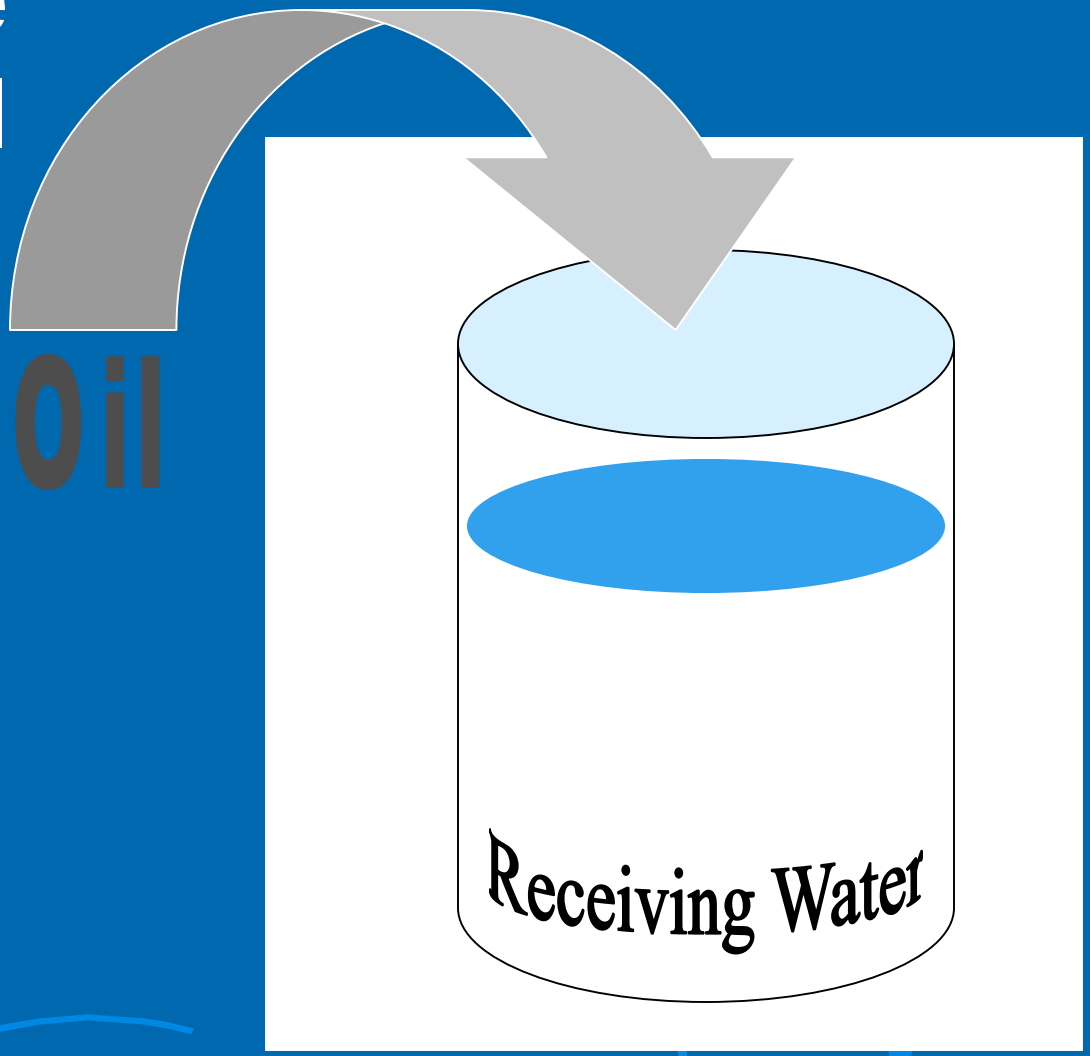
- If none of these conditions exist…

THE OIL CAN NOT SINK

Why? Sir Isaac Newton says so!

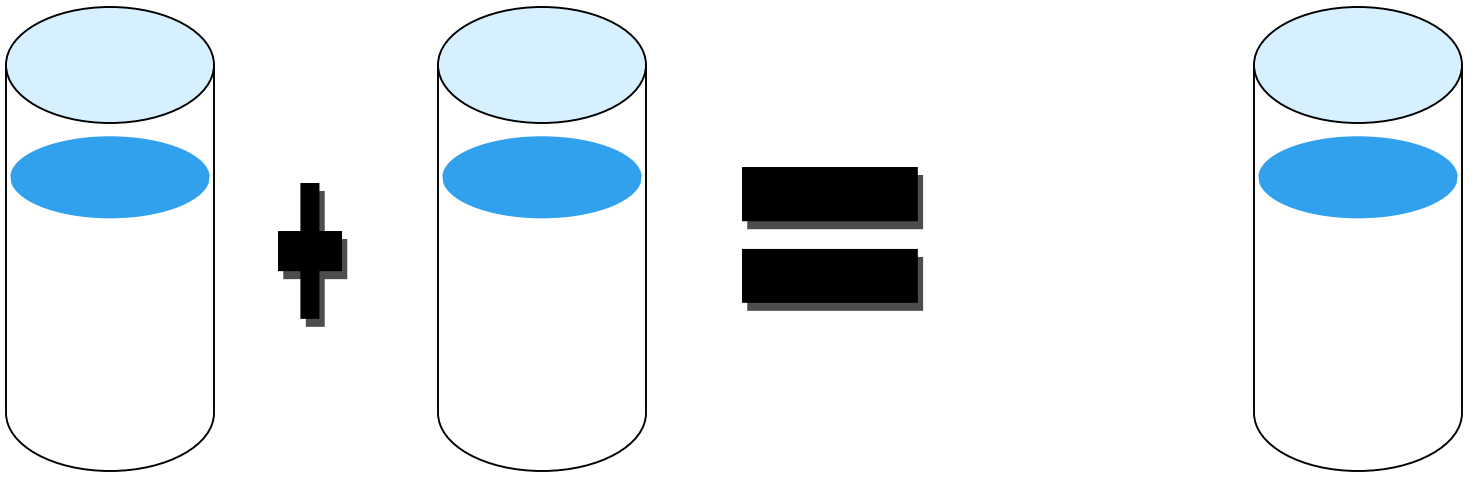
# Keep it simple

**Can you prove that the oil will floats?**



# How dense is this oil?

**Now, cut the density of the test water in half.**



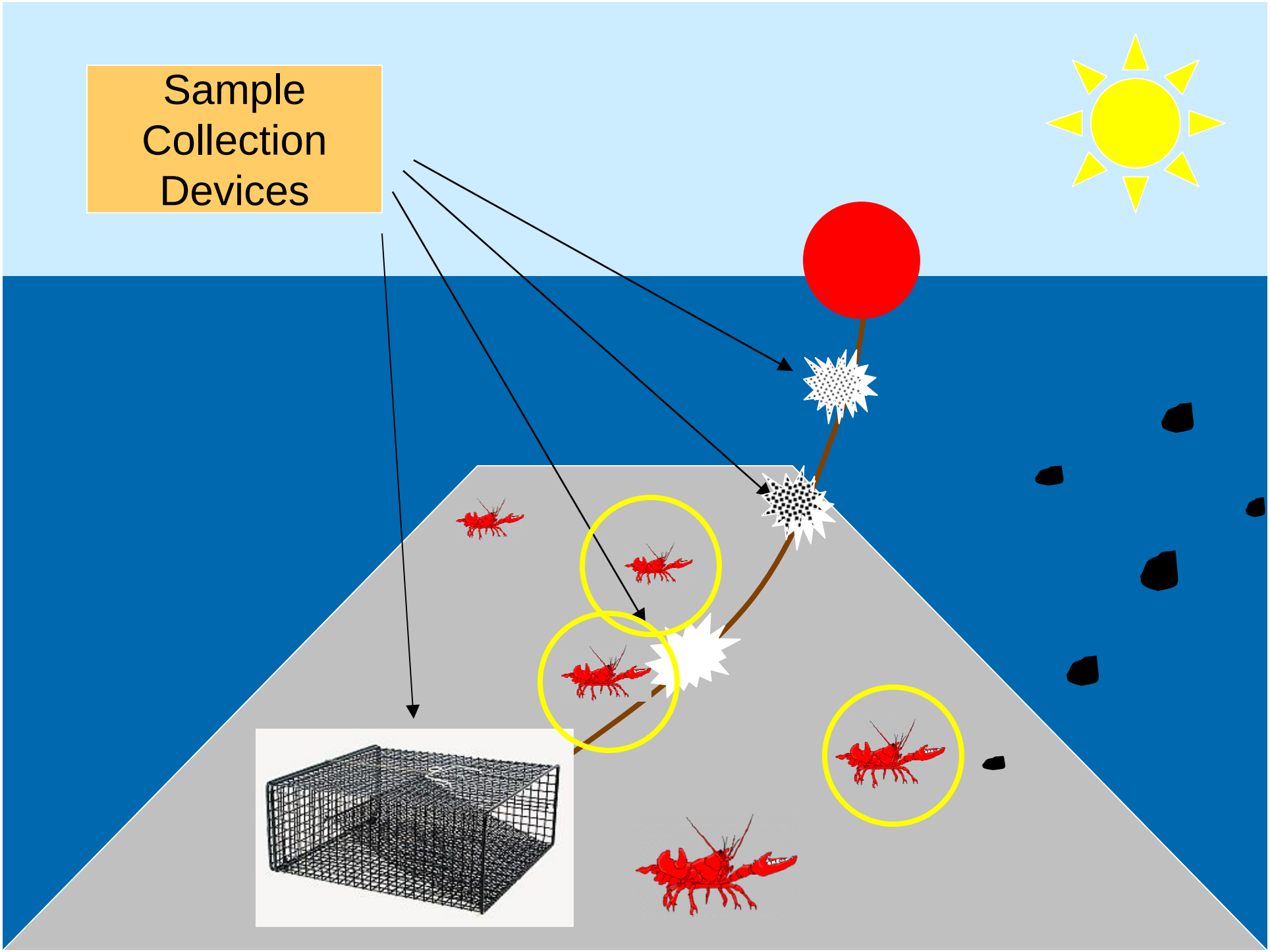
Fresh Water
SG = 1.00

Sea Water
SG = 1.04

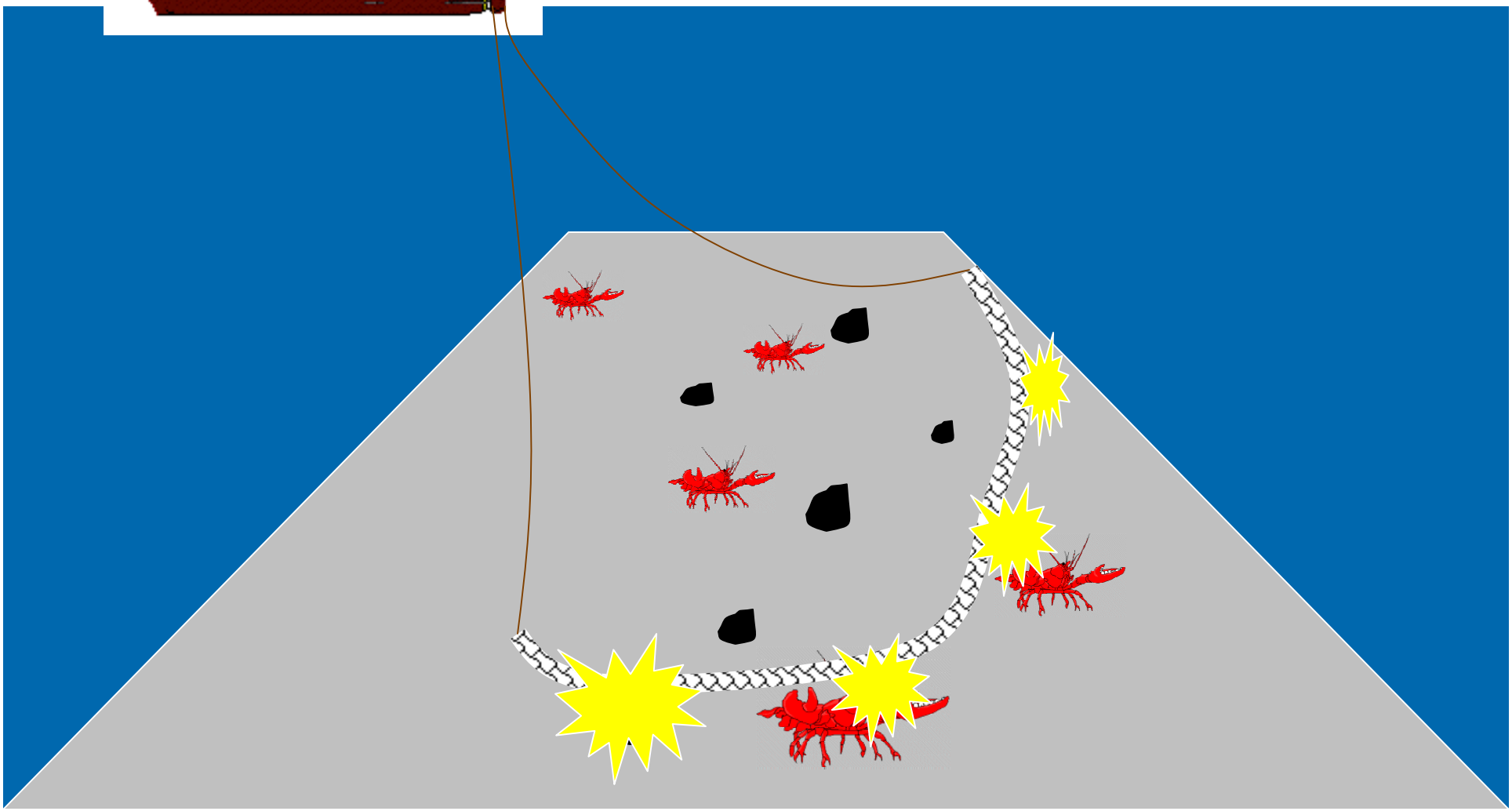
Test Water
SG = 1.02

# Finding the Oil

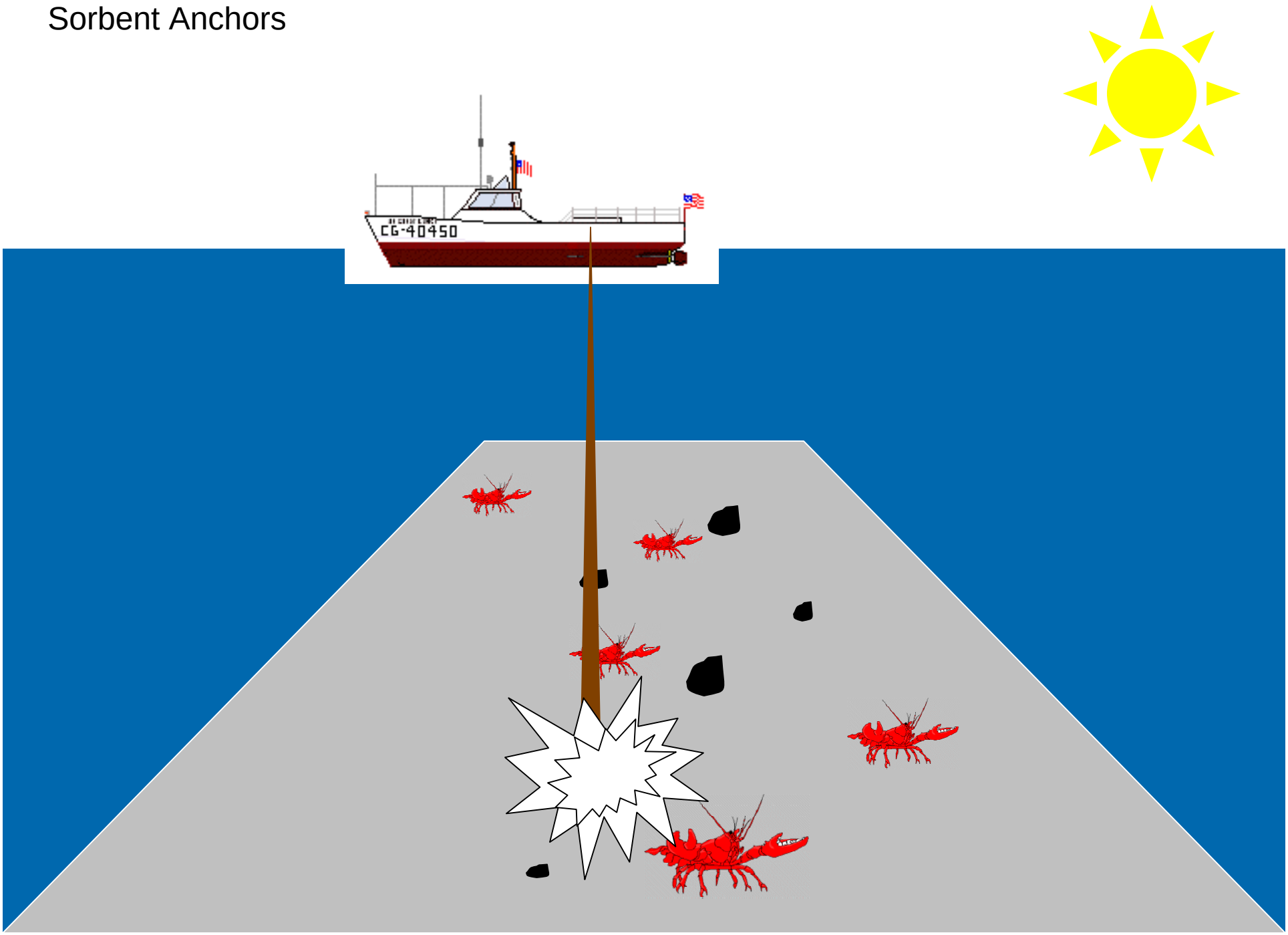
- Spacial Data
  - Data collected over a given area
- Point Data
  - Data collected in a specific place
- Temporal Data
  - Data collected over time


Sample
Collection
Devices

# Sorbent Chain Drag



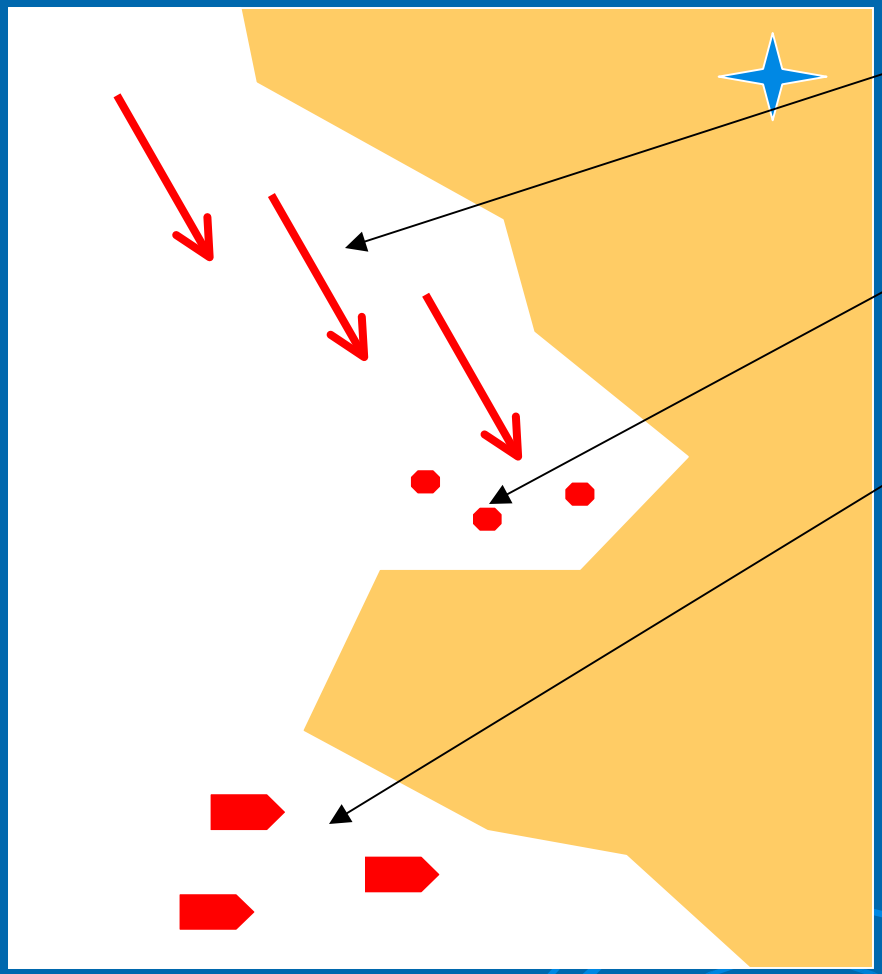
# Sorbent Anchors



# Monitoring Plan

- Traps/Drags/Bombs deployed at X locations
- Devices are checked at Y interval
- Degree of oiling is observed and recorded
- If oil is observed, Z action is taken
  - More traps (increases resolution)
  - More frequent monitoring (defines time of greatest impact,

# Monitoring Types



- Sorbent Drag
  - Spacial Data
- Sorbent Anchors
  - Point Data
- Sorbent Traps
  - Temporal Data

# Case Study

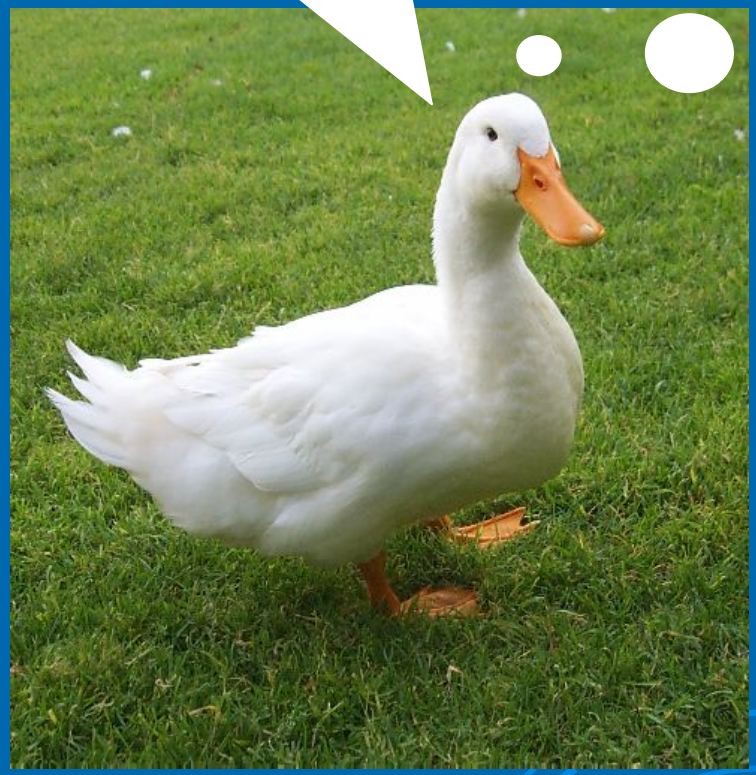
- Little Lake, LA
- Crude oil
- “Fragmented” marsh
- Poor access

# Protecting Wildlife

- The Question
  - Will the oil on the vegetation contaminate waterfowl (or other animals) who use it?
  - Is there anyway to minimize contamination?
- The Answer
  - I don’t know, but I think I can measure the “stickiness” of the oil, draw conclusions from that and design a solution.

# The “Sorbent Duck”

I don’t THINK so !



# Sorbent Duck

- Cut sorbent boom or “bilge pillow” attached to 50 ft. of line.
- The design is simple, inexpensive, made from available resources and fast.
- Method is repeatable and easy to explain.

# Sorbent Duck in Practice

Before

After

# Broadcast Barrier

- Which material will work best ?
- Must:
  - Broadcast
  - Stick on the oil
  - Be biodegradable
  - Provide good coverage
  - Be approved

# Bench Scale Test

# Field Testing

# Sampling

# Implementation

# When is a beach clean?

- Home Heating Oil
- No sheening
- No visible oil
- 4 months until tourists

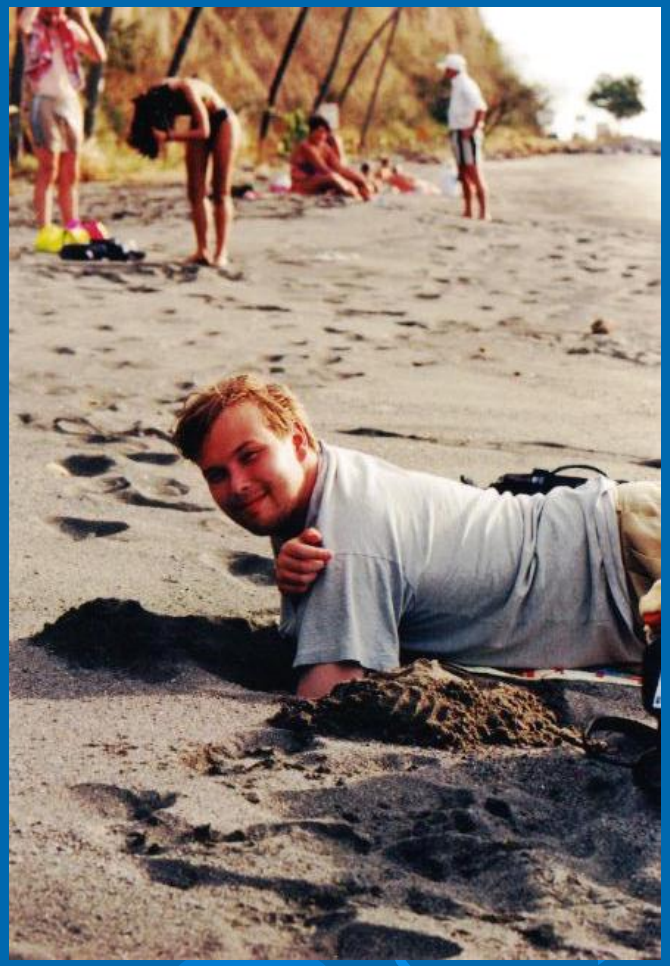
# Species at Risk

- The Question
  - How do we ensure that the beaches will not impact the users ?
- The Answer
  - We need to determine the pathway of exposure, the offending element and eliminate it.
- The problem
  - You can't see it
  - You can't feel it
  - But…you can smell it!
- So…how do we determine "clean" ?

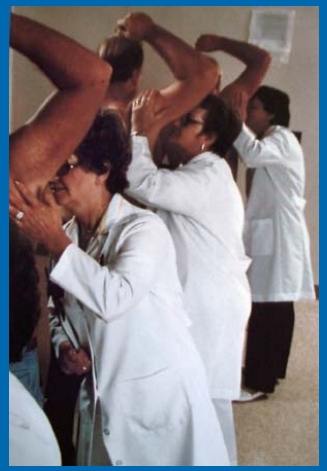
# Determining “Clean”

- If odor is the agreed pathway of “injury” to the resource users, then how is “clean” determined?

Smell It !



# Sensory Analysis



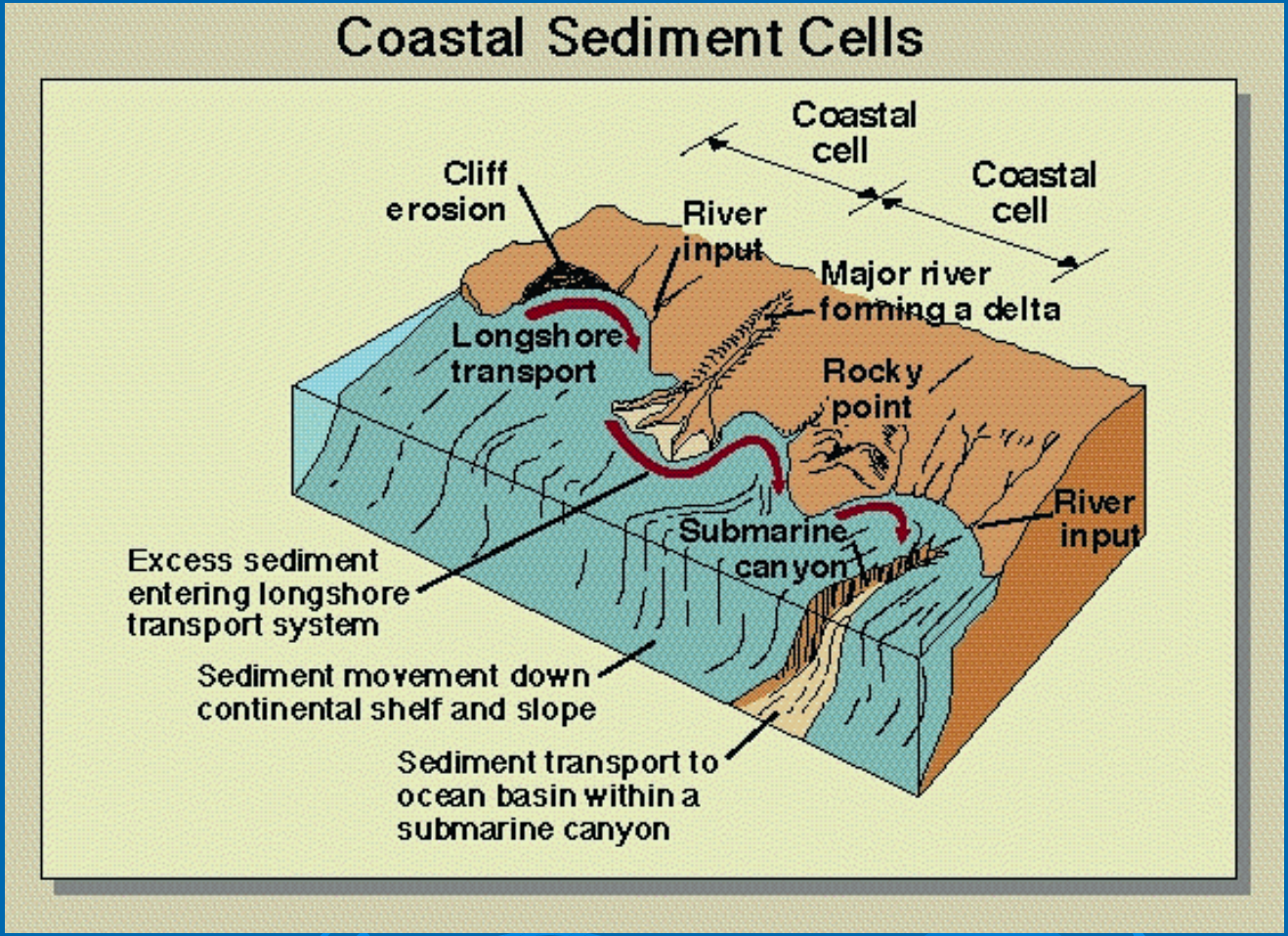
- Sensory Panel Design
- Analysis Methodology
- “Pass - Fail” Levels
- Sampling Collection Plan
- USE CONTROL SAMPLES

# The Orange:

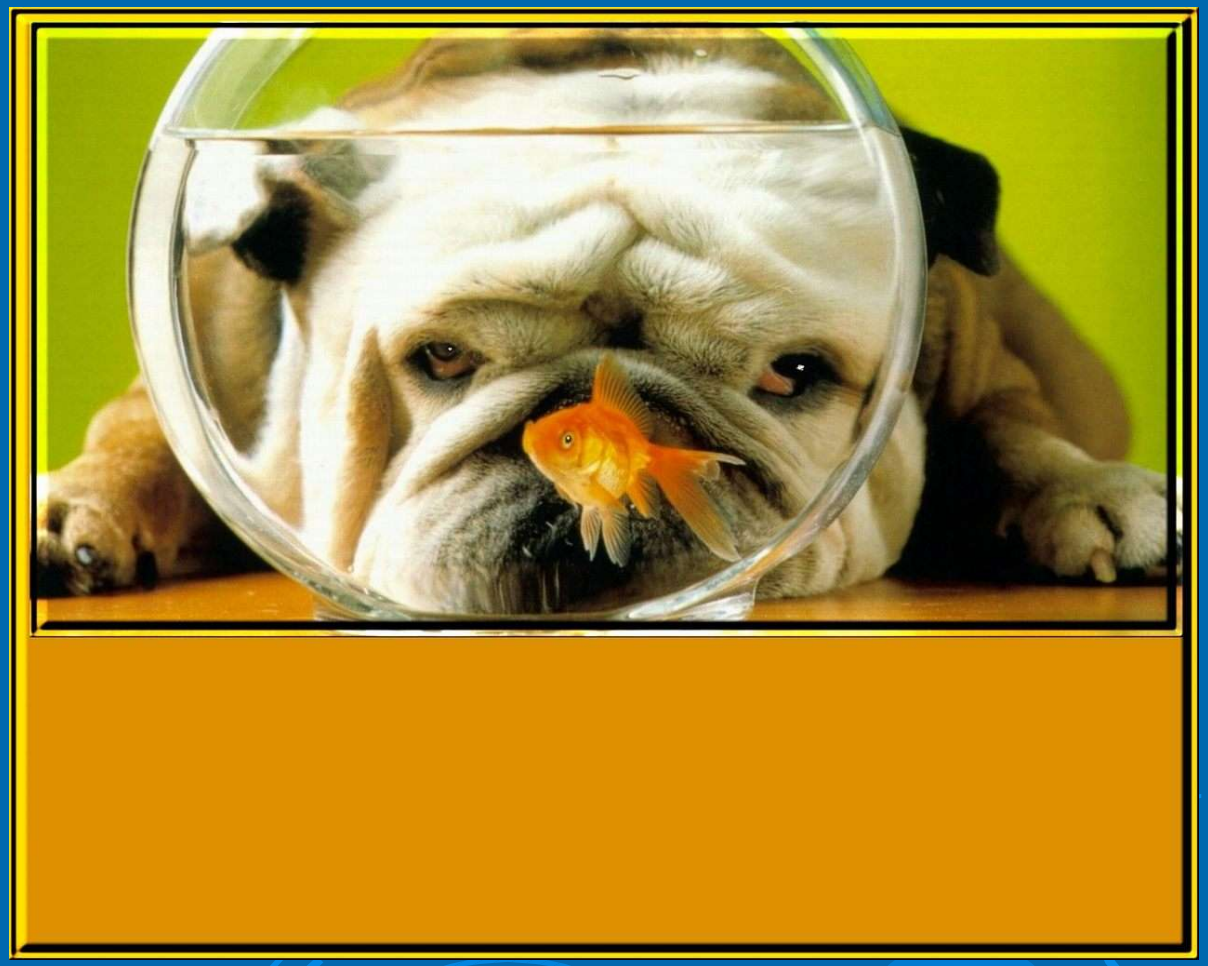
## It not just for breakfast anymore !

- Measure current velocity
- Measure current direction
- Measure erosion rate
- Identify natural collection areas

# Oranges As Drogues



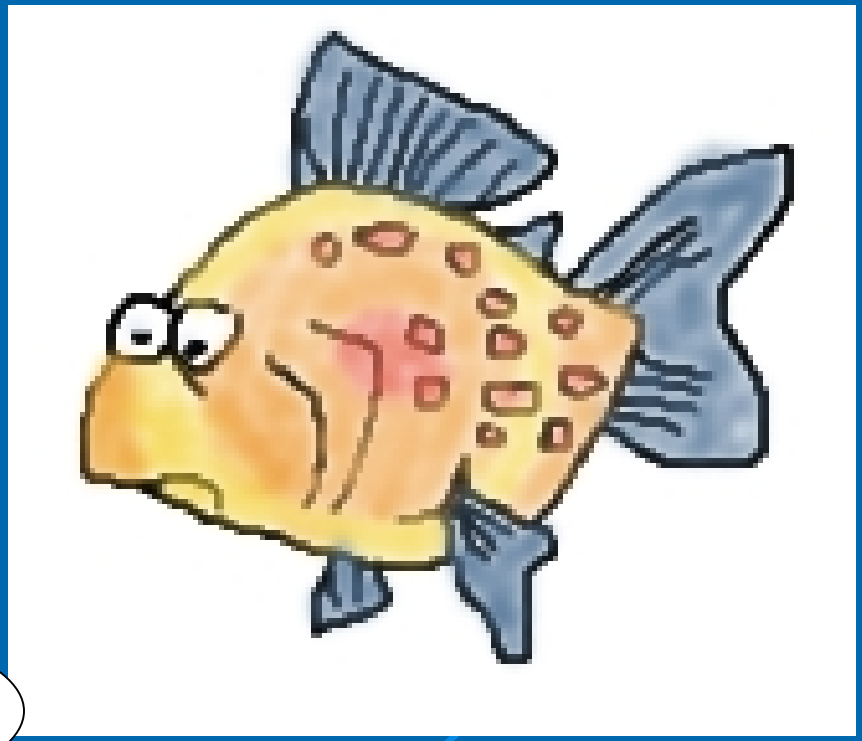
# Toxicity Testing On A Budget



# Toxicity

- A stream
- Chemical contaminants
- A previous fish kill

Is the water still lethal to fish ?



# What is needed for *LC 50, Texas Style*

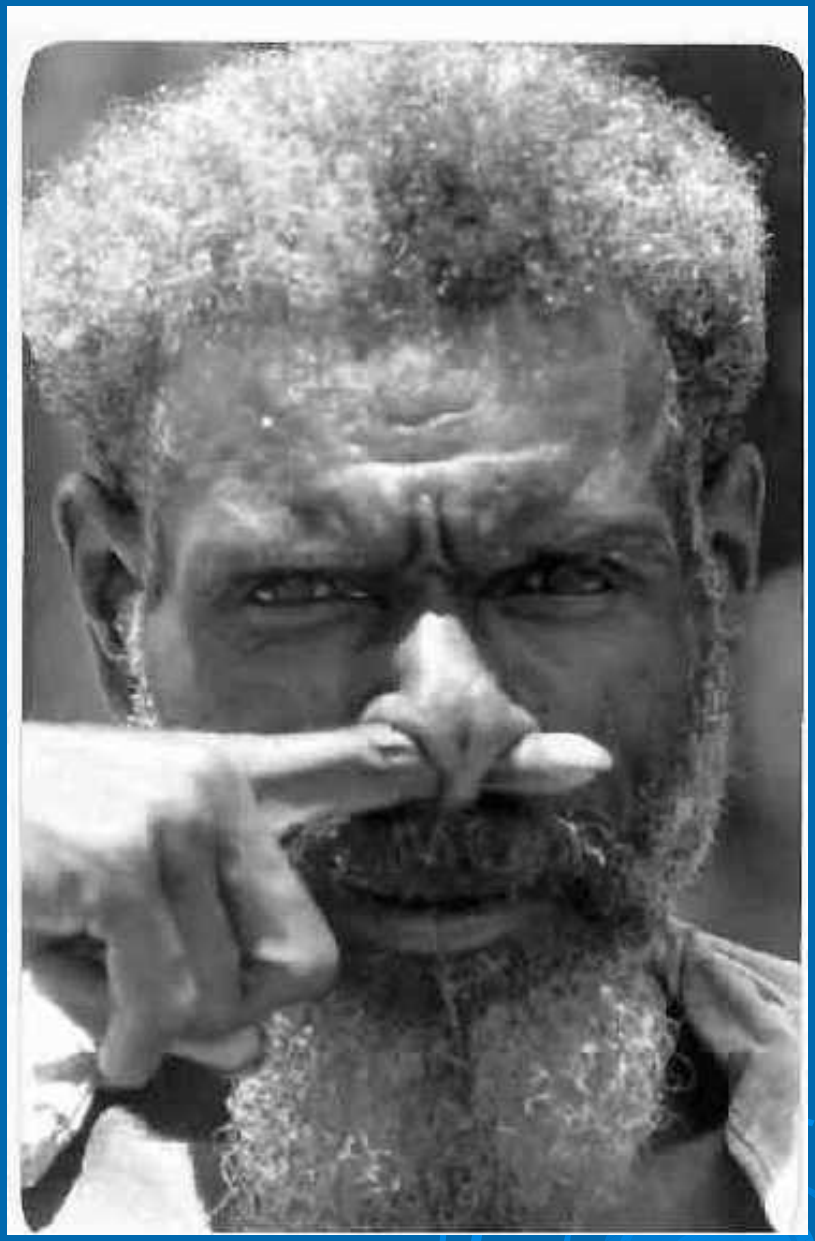
- Materials:
  - Cages, line, anchor
- Specimen:
  - Fish (what species ?)
- A Plan & Agreement (what is “success”)
- Being crazy enough to think you can sell this plan t[illegible]ees.

# Shoreline Cleaning Chemicals

- Questions

1. Will shoreline cleaners be effective ?
2. Which shoreline cleaner should be used

Develop a Plan



Got Questions ?

Thank You