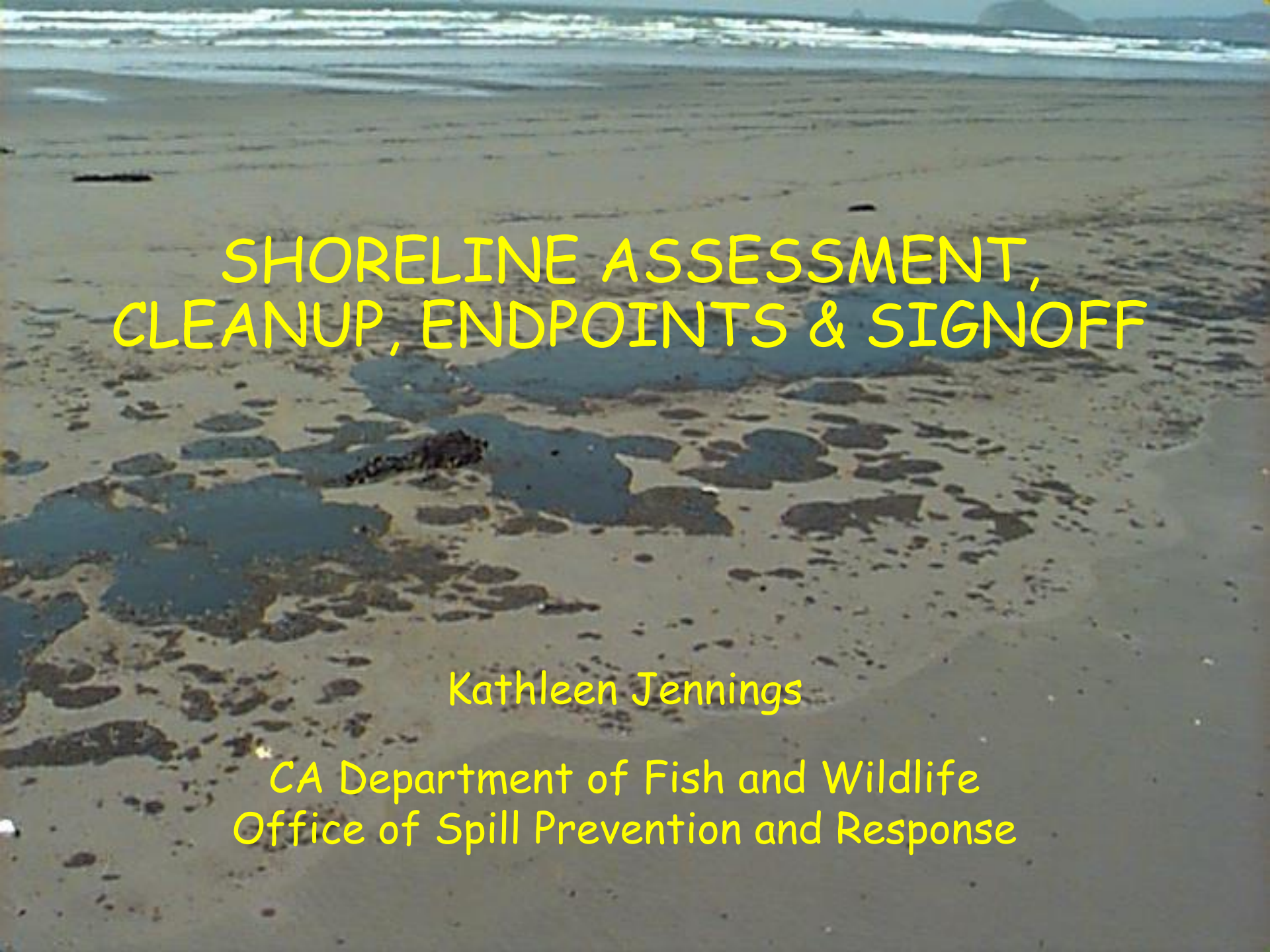


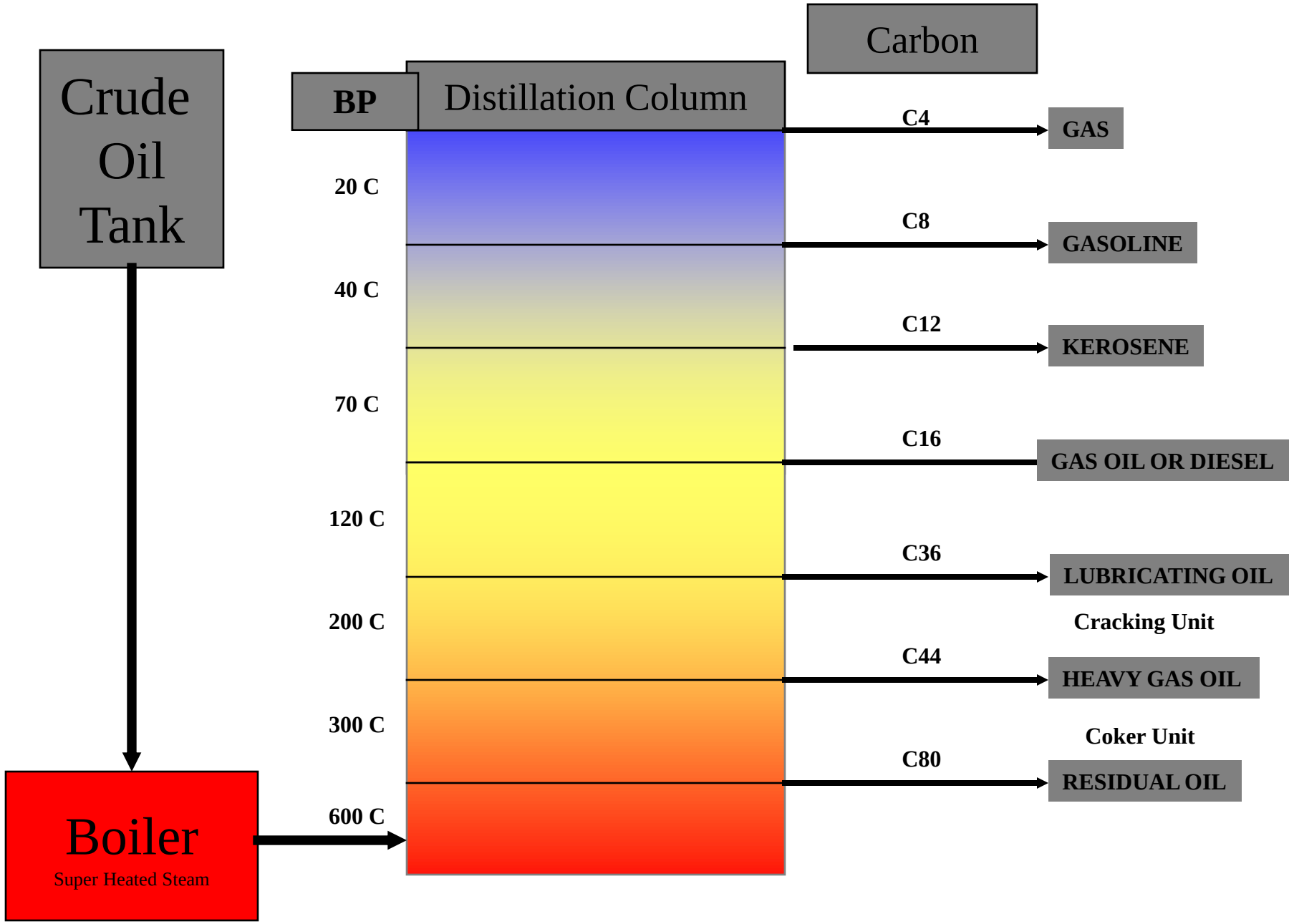
SHORELINE ASSESSMENT, CLEANUP, ENDPOINTS & SIGNOFF

Kathleen Jennings

CA Department of Fish and Wildlife
Office of Spill Prevention and Response

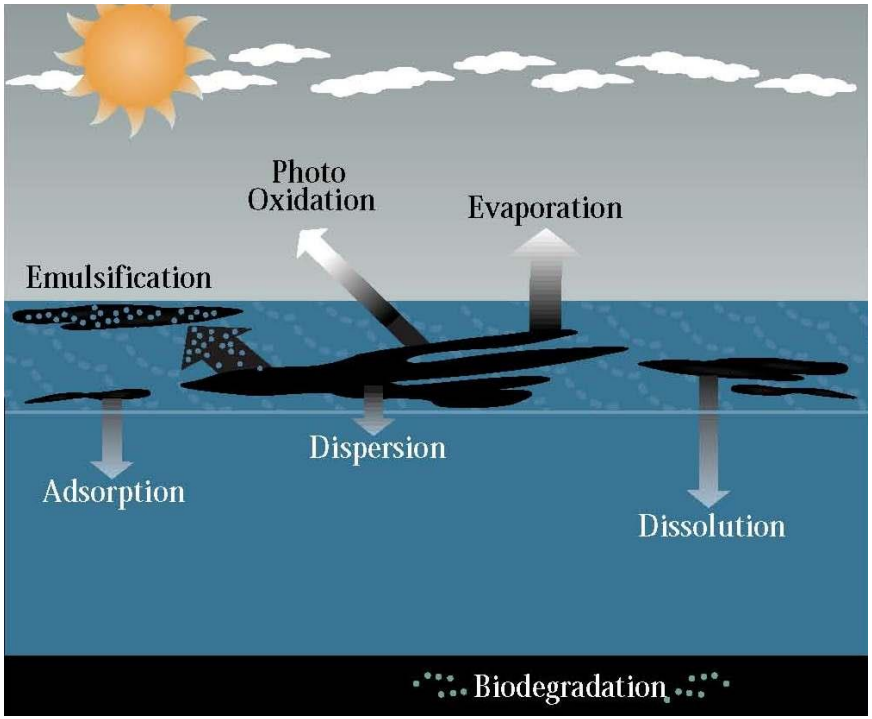
Oil Chemical Properties

- Crude oil = unprocessed oil from ground
  - Fossil fuels – from dead plant and animal remains
  - Varies in color and viscosity (water to tar)
- Crude oil is mixture of complex organic and inorganic hydrocarbons
  - Organic compounds contain only carbon and hydrogen
  - Inorganic compounds include all elements (even carbon) except hydrocarbons
- Crude oil contains 50 to 98% hydrocarbons


Crude Oil Tank
Boiler
Super Heated Steam
BP
Distillation Column
Carbon
20 C
40 C
70 C
120 C
200 C
300 C
600 C
C4
GAS
C8
GASOLINE
C12
KEROSENE
C16
GAS OIL OR DIESEL
C36
LUBRICATING OIL
Cracking Unit
C44
HEAVY GAS OIL
Coker Unit
C80
RESIDUAL OIL

Oil Weathering

- Evaporation (< 5 days)
- Dispersion (< 5 days)
- Dissolution (< 5 days)
- Emulsification (onset can be delayed for days but process rapid)
- Adsorption (≥ 5 days)
- Photo-oxidation (weeks)
- Biodegradation (weeks, months, years)




10 30'96

Shoreline Assessment is...

SCAT is …

Shoreline Cleanup Assessment Technique

-team conducts Shoreline Assessment Process

A systematic approach that uses standard terminology to collect data on shoreline oiling conditions and supports decision-making for shoreline cleanup.

Shoreline Assessment is not...

Wildlife Response

Natural Resource Damage Assessment

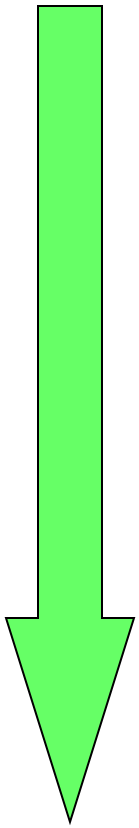
Shoreline Assessment Process...

- Looking for shoreline impacts and making cleanup recommendations
- Must not slow the pace of Operations
- Part of the response (not Natural Resource Damage Assessment)
- Continues past initial assessment to verify cleanup effectiveness and conduct final signoffs (First on shoreline, Last off)

SCAT Team

- SCAT Team is multi-agency; including trained representatives from all interested parties *who have authority to make decisions*
- SCAT Team consists of:
  - Federal representative (usually NOAA SSC or Coast Guard)
  - State representative (OSPR)
  - Responsible party representative
  - Landowner or other stakeholder

Shoreline Assessment Process...



1. ***Reconnaissance survey***
2. ***Segment shoreline and assign teams***
3. ***Conduct shoreline surveys***
4. ***Submit reports & sketches to Planning***
5. Develop cleanup guidelines/endpoints
6. Monitor effectiveness of cleanup
7. Post-cleanup inspections
8. Final sign-off of cleanup activities

Shoreline Assessment Process

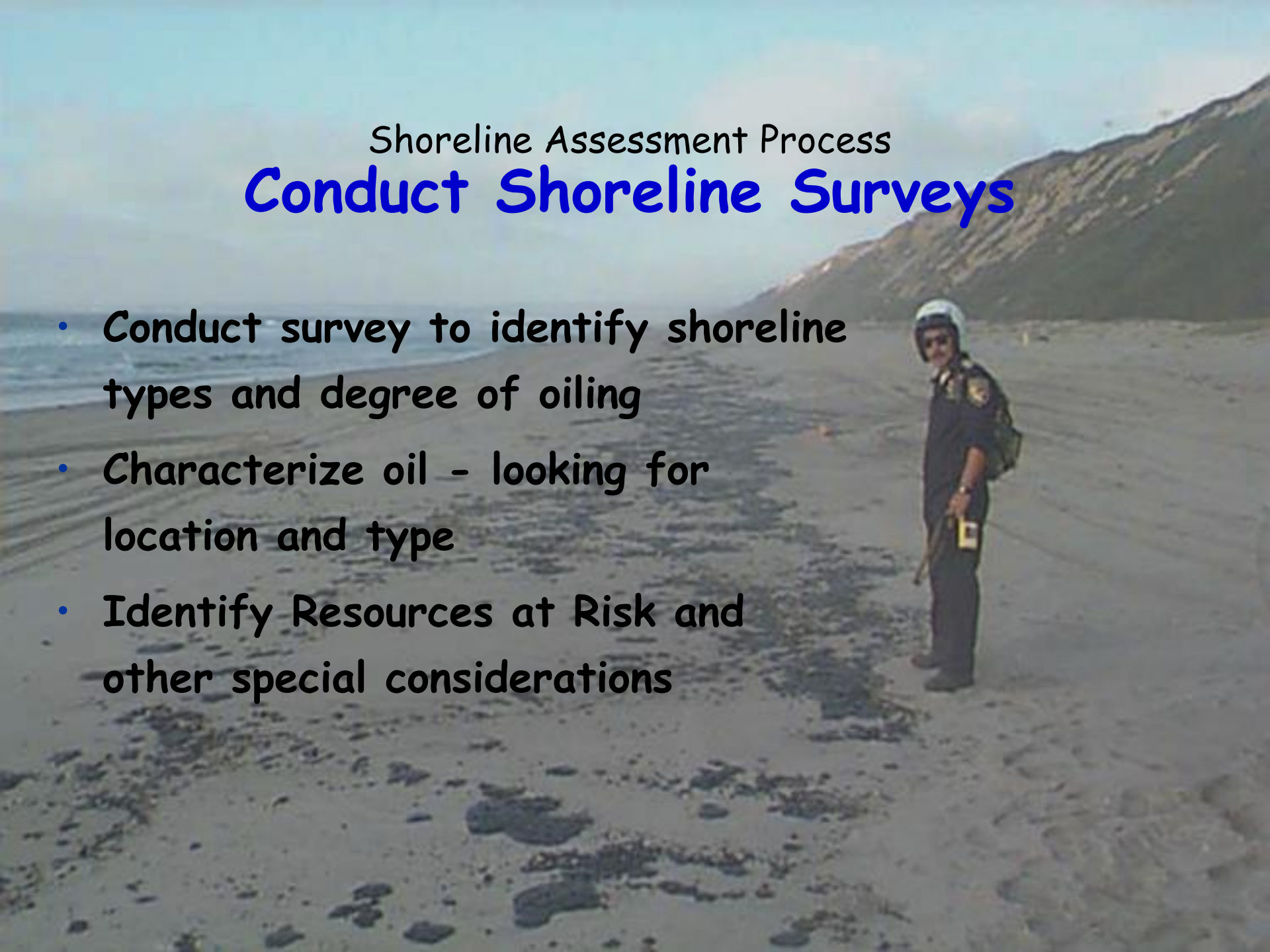
Reconnaissance Survey

- Begins with an aerial reconnaissance survey of entire impact area
- Provides overall view of area
- GPS, photo, and video documentation
- Aerial survey observations will help determine objectives and plan for SCAT

Shoreline Assessment Process

Shoreline Segmenting & Team Assignment

- Impact area divided into segments based on shoreline type, oil conditions, operational specifics
- SCAT teams assigned to segments



Shoreline Assessment Process

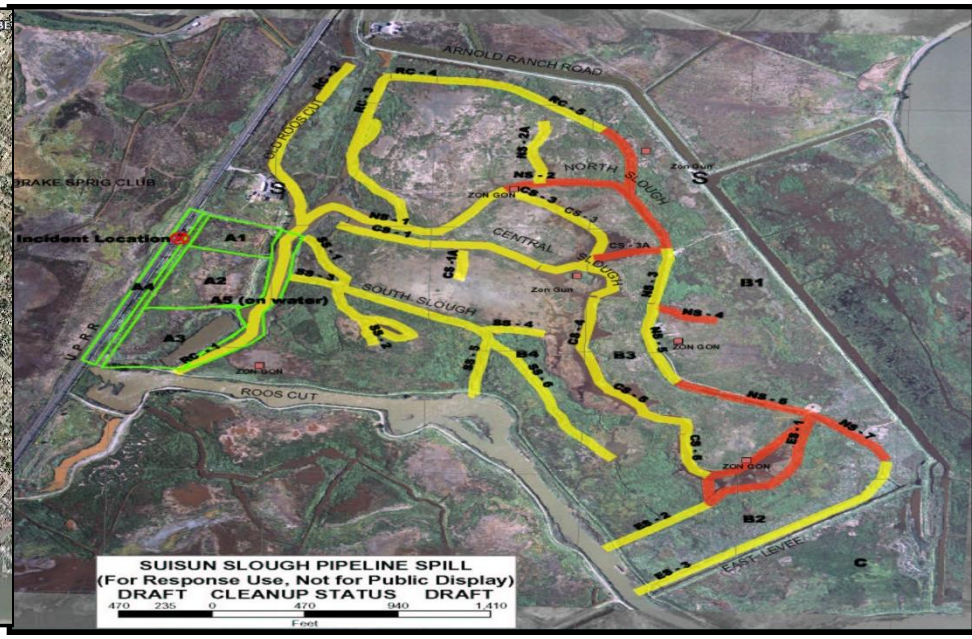
Conduct Shoreline Surveys

- Conduct survey to identify shoreline types and degree of oiling
- Characterize oil - looking for location and type
- Identify Resources at Risk and other special considerations

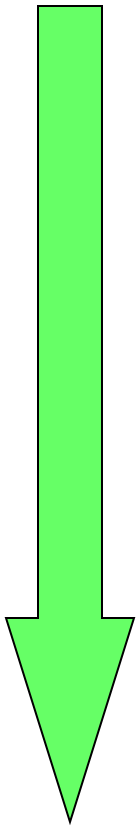
Shoreline Assessment Process

Submit Reports & Sketches to Planning

- All shoreline survey report material provided to Planning Section, specifically Situation and Documentation Units



Shoreline Assessment Process...



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Shoreline Assessment Process

Develop Cleanup Guidelines

- Select cleanup methods which minimize adverse environmental impact
- Minimize exposure hazards for human health
- Trade-off issues include sensitivity, degree and timing of use, wildlife, potential for re-oiling
- Speed recovery of impacted areas
- Reduce threat of additional or prolonged natural resource impacts

Shoreline Cleanup Techniques

"Do no more harm than good"

Often, the best cleanup strategy is not the one that removes the most oil, but removes oil that poses a greater threat of injury than cleanup activity.

- Natural Recovery (No action)
- Passive Removal
- Manual Removal
- Chemical Removal
- Mechanical Removal

NATURAL RECOVERY = NO ACTION

- High Energy
- Worker Safety
- Sensitive Habitat
- Lightly Oiled

PASSIVE REMOVAL

Absorbent….oil pulled into material

sorbent boom, pads (diapers), sweep

Adsorbent….oil adheres to surface

oil snare (pom-pom), others

Absorbent...oil pulled into material

Adsorbent... oil adheres to surface

MANUAL REMOVAL

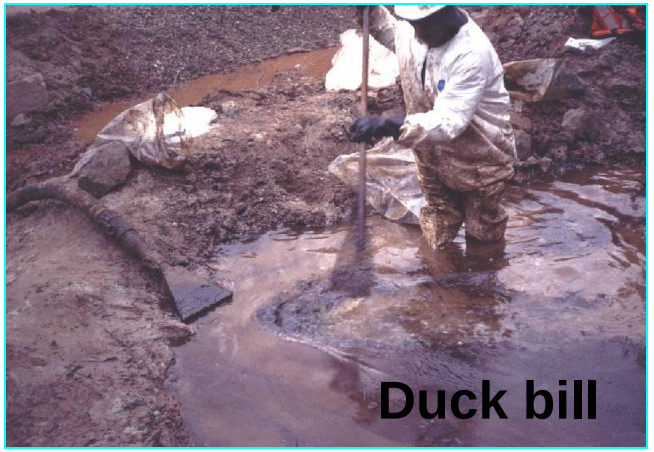
Vegetation Cutting

Riprap Wiping, Brushing,Scraping

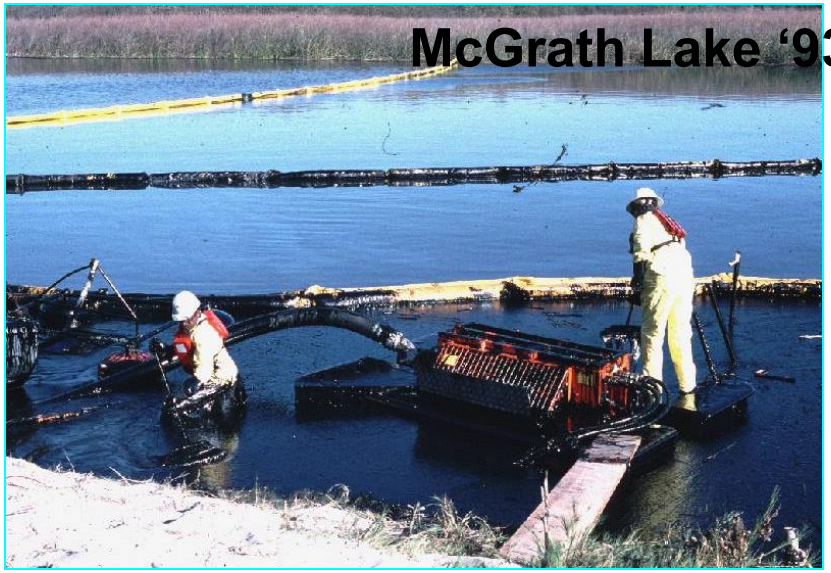
CHEMICAL REMOVAL

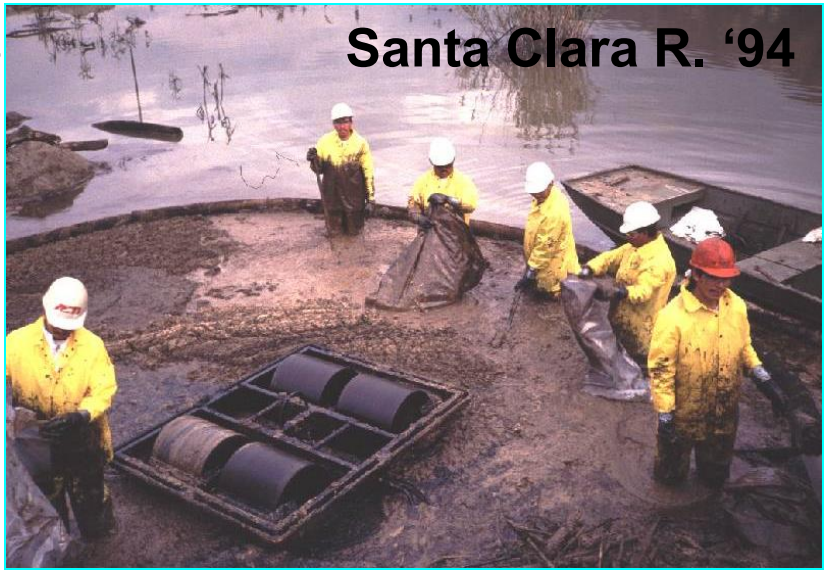
MECHANICAL REMOVAL

Vacuuming

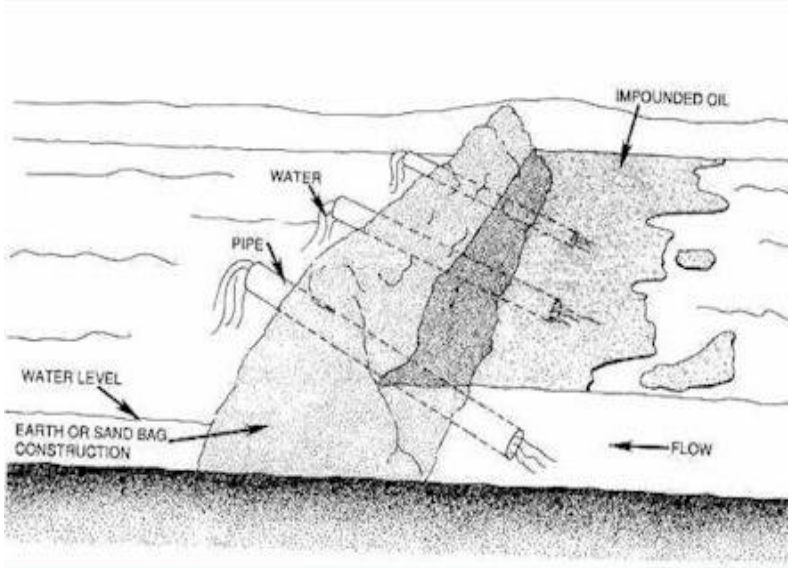


Skimming





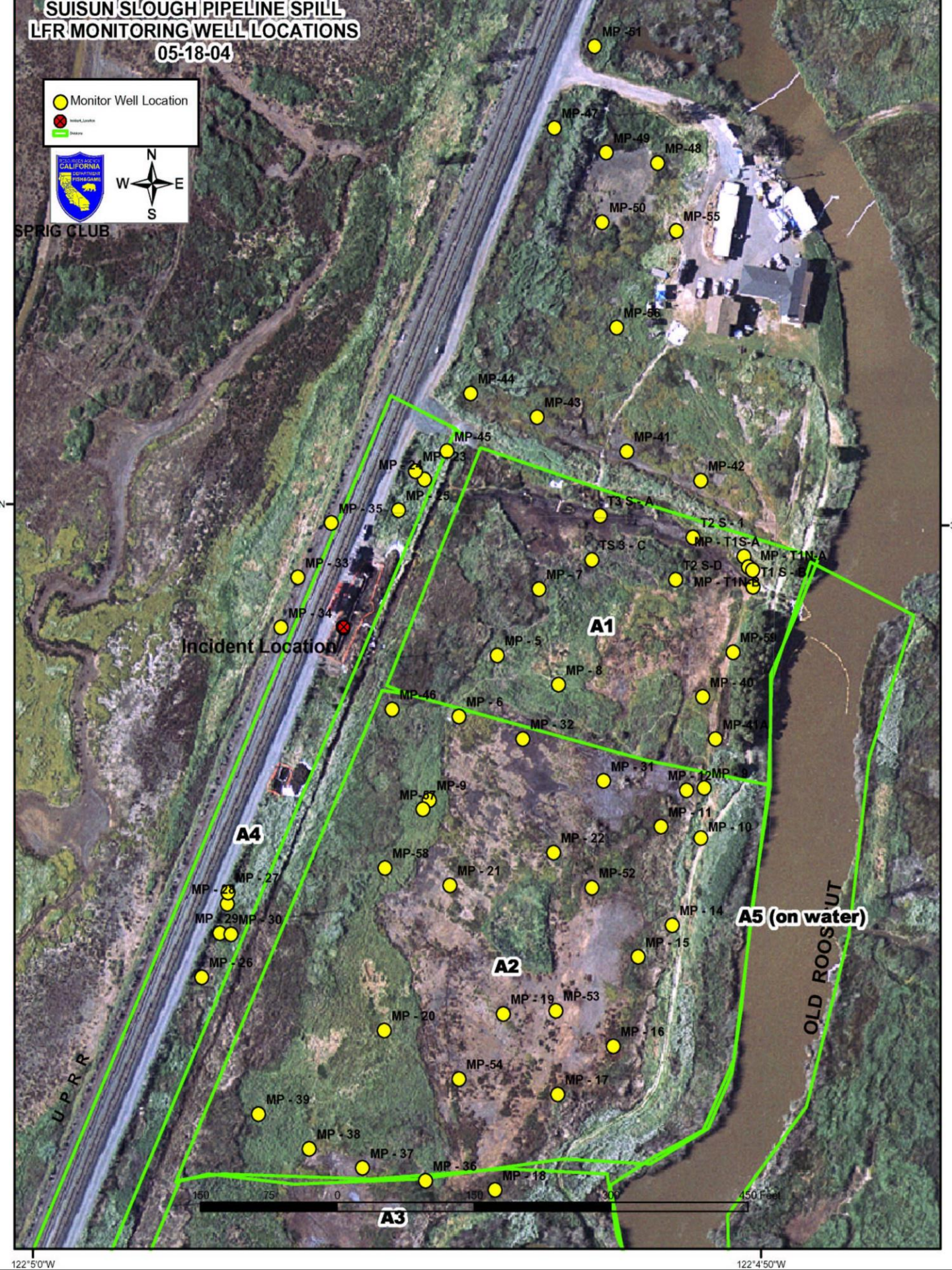
Flushing and Damming



Trenching

Bioremediation (Multi-Method)

- Bioremediation is enhancement of a natural biodegradation process by the addition of nutrients, bacteria, or other chemical additives
- Addition of fertilizer (in nutrient-limited areas) may moderately accelerate oil biodegradation
- Relatively slow process (weeks to months)
- Polishing tool, not a primary cleanup tool


SUISUN SLOUGH PIPELINE SPILL
LFR MONITORING WELL LOCATIONS
05-18-04
Monitor Well Location
N
W
E
S
SPRIG CLUB
MP -51
MP-47
MP-49
MP-48
MP-50
MP-55
MP-56
MP-44
MP-43
MP-45
MP-41
MP-42
MP - 24
MP - 23
MP - 25
MP - 35
T3 S - A
T2 S - 1
MP - T1S-A
TS 3 - C
MP - T1N-A
T2 S-D
T1 S - B
MP - 33
MP - 7
MP - T1N-B
MP - 34
Incident Location
A1
MP - 5
MP-59
MP - 8
MP - 40
MP-46
MP - 6
MP - 32
MP-41A
MP - 31
MP - 12
MP - 9
MP-57
MP-9
MP - 11
MP - 10
A4
MP - 22
MP-58
MP - 21
MP-52
MP - 27
MP - 28
MP - 14
A5 (on water)
MP - 29
MP - 30
MP - 15
MP - 26
A2
MP - 19
MP-53
MP - 20
MP - 16
MP-54
MP - 17
MP - 39
MP - 38
MP - 37
MP - 36
MP - 18
UPRR
OLD ROOSEVELT
150 75 0 150 300 450 Feet
A3
122°5'0"W
122°4'50"W


Drake Sprig
Duck Club
A6
A1
Release
Location
A4
A2
Old
Roos
Cut
South Channel
Railroad
A5 (on water)
A3

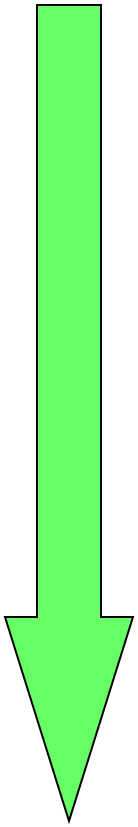
Shoreline Assessment Process

Develop Cleanup Endpoints

- Spill-specific, predetermined criteria for termination of active cleanup
- Can be quantitative (e.g., <500 mg/kg TPH in sediments) or qualitative (e.g., does not rub off on contact)
- Minimize adverse impacts to human health and the environment
- Speed recovery of impacted areas
- Reduce threat of additional or prolonged natural resource impacts

Other Cleanup Considerations

Shoreline Assessment Process...



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Shoreline Assessment Process

Monitor Effectiveness of Cleanup

- Monitor effectiveness of cleanup activities and ensure that approved methods are being used
- Modify cleanup recommendations and endpoints as needed, considering changes in timing and oil conditions
- Produce periodic summary reports and updates

How do we know when we're done?

How clean is clean enough?

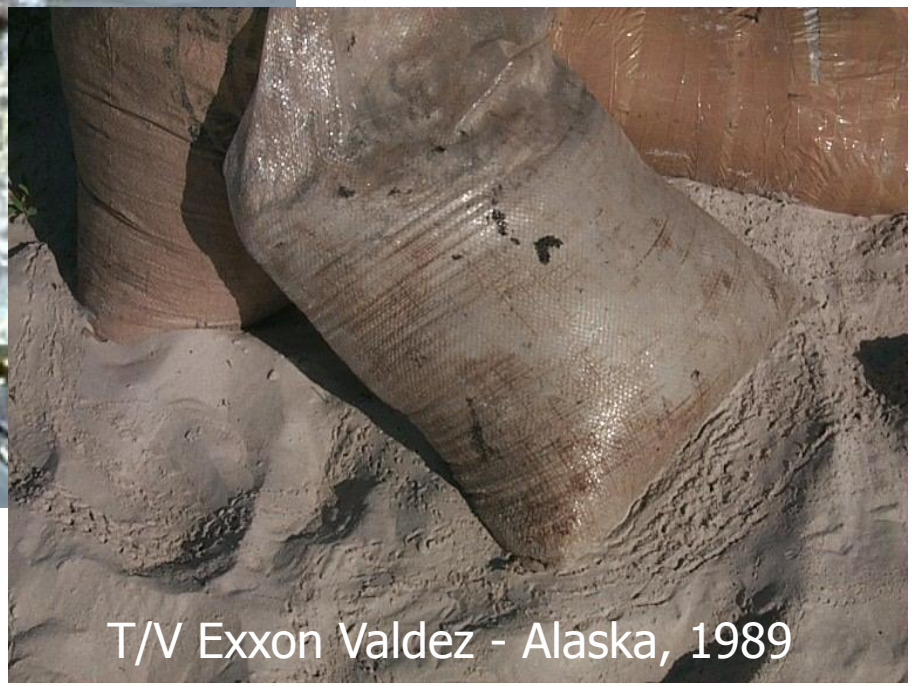
Cleanup should proceed and/or continue when:

- it reduces continuing impacts from oil
- and has a positive effect on the speed of recovery

Cleanup should cease when cleanup activities:

- become ineffective at reducing an accessible threat
- offer no additional value to the process of natural recovery
- or have a detrimental effect that could slow recovery

What if making it cleaner results in this…



… or this?

Shoreline Assessment Process

Post-cleanup Inspections

- Conduct final inspection against agreed-upon endpoints when segments are declared ready by Operations Section
- Identify any additional cleanup or long-term monitoring required
- Recommend segment for final inspection

Shoreline Assessment Process

Final Sign-off of Cleanup Activities

- Conducted by Sign-off Team (SOFT). Agencies must delegate sign-off authority to team members.
- SOFT ideally consists of same people on SCAT.
- Sites are either approved or recommended for further cleaning (if they do not meet endpoints).
- Sign-off may include continued maintenance activity and its termination criteria.

Summary and Recommendations

- Oil spilled on water often ends up on shore
- Cleanup strategy determined by shoreline type, oil type, volume, access, timing…
- Cleanup often a combination of response strategies
- Often labor intensive, takes time, increases cleanup costs
- Cleanup may cause additional environmental injury
- Little of total amount spilled may be recovered
- Develop cleanup endpoints early and implement into cleanup goals/techniques
- May generate large amounts of oily waste
- Often imperfect knowledge, only possible to use best professional judgment
- Incorporate and use resources/tools from previous spills
- Monitor and re-evaluate often
- Recognize that all working within mandates and missions of individual agencies and some degree of compromise and flexibility will be necessary

Interaction with Local Government

What we can do for you:

- Provide cooperating and responding agencies with information and recommendations for shoreline assessment, cleanup, endpoints and signoff, including dates/times for scheduled shoreline activities.

What you can do for us:

- Provide current status on oiled shorelines, or recurring oiling
- Facilitate access to shorelines under your jurisdiction for SCAT teams and cleanup crews.
- Participate in SCAT activities, including final sign-off of shoreline segments

Kathleen Jennings, CDFG-OSPR (707) 864-4938 kjenning@ospr.dfg.ca.gov