



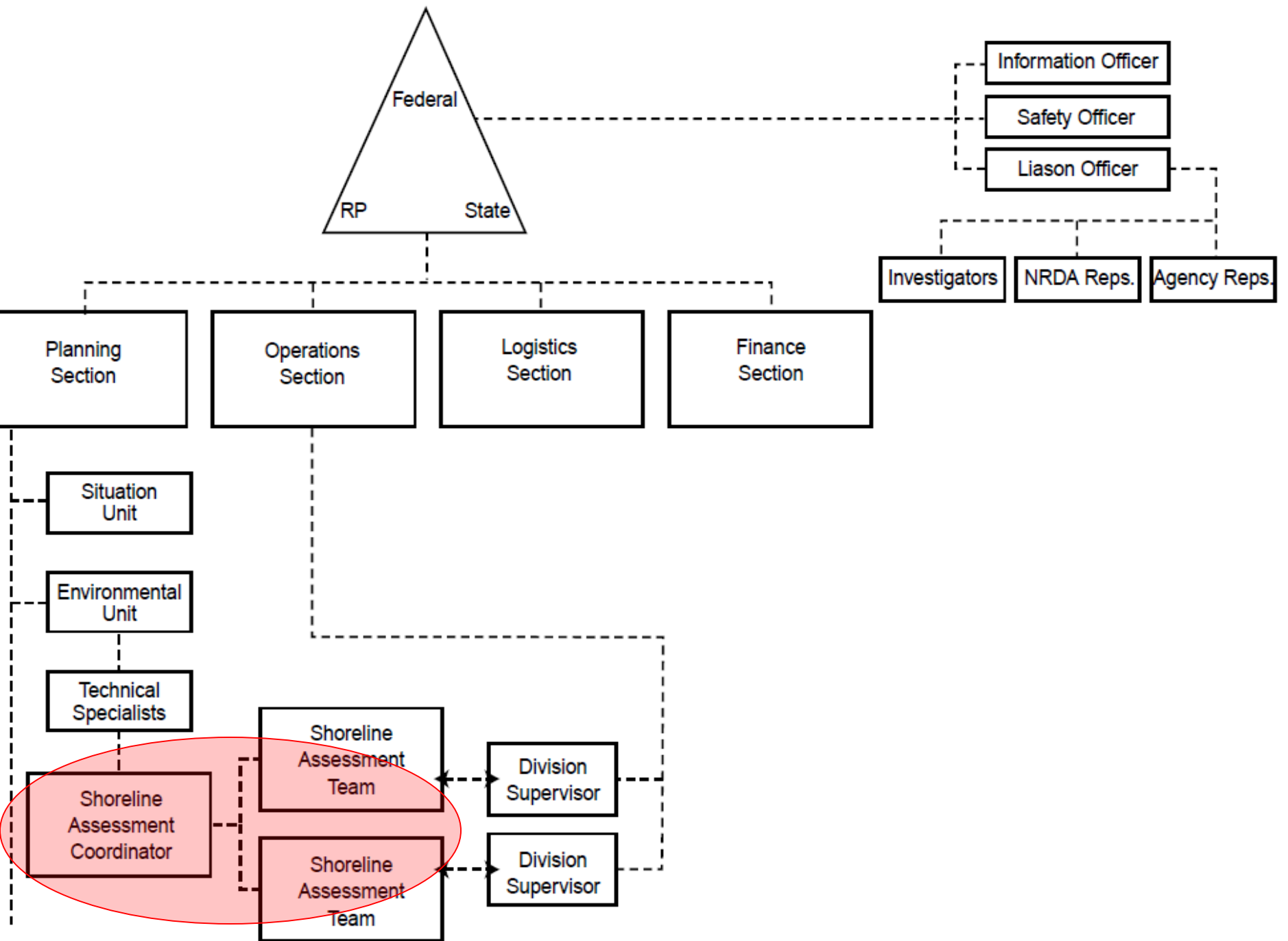
# Shoreline Cleanup Basics



# SCAT

- Shoreline
- Clean-up
- Assessment
- Team





## OBJECTIVE OF SHORELINE CLEANUP ASSESSMENT TEAM

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- When oil contaminates shoreline habitats, responders must survey the affected areas to determine the appropriate response. Though general approvals or decision tools for use of the shoreline cleanup methods may be developed during planning stages, **responders must base specific cleanup recommendations on field data** on the shoreline habitats, types and degree of shoreline contamination, and spill-specific physical processes.



## PURPOSE OF SCAT

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- Assessment of the need for shoreline cleanup
- Selection of the most appropriate cleanup method
- Determination of priorities
- Documentation of the spatial oil distribution over time
- Internally consistent historical record of shoreline oil distribution for use by other scientific surveys of impacts (i.e. NRDA)



## WHAT IS SCAT?

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- A **SYSTEMATIC** approach that uses **STANDARD** terminology to collect data on shoreline oiling conditions and support decision making for shoreline cleanup;
- **FLEXIBLE** in terms of scale of the survey and detail of the data sets collected; and
- **MULTI-AGENCY**, with **TRAINED** representatives from all interested parties who have authority to make decisions



# The SCAT process uses eight steps:

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1. Conduct reconnaissance survey
2. Segment the shoreline
3. Assign teams and conduct shoreline surveys
4. Develop cleanup guidelines and endpoints
5. Submit reports and sketches to Planning Section
6. Monitor effectiveness of cleanup
7. Post cleanup inspections
8. Do final evaluation of cleanup activities



# What Makes a Team

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- RP
- Fed
- State
- Landowner or other stakeholder
- “Calibrate” team
  - agree on how the oiling descriptors will be applied





# Team responsibilities

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- Collect data using a collaborative consensus-building approach
- Evaluate oiling conditions
- Factor in shoreline types
- Identify sensitive resources
- Determine need for cleanup
- Recommend cleanup methods and endpoints
- Place constraints on cleanup if necessary, due to ecological, economic, or cultural concerns



# SCAT ROLES, RESPONSIBILITIES

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- Coordinator
- Leader
- Member
- Database Manager



# Coordinator

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- Conducts aerial reconnaissance survey, as appropriate, to scope the shoreline oiling issues
- Develops a survey and reporting schedule to produce survey results in time for incorporation into the Incident Action Plan
- Receives reports from field teams and synthesizes them into a daily summary that is accessible to the field teams if problems arise
- Helps the team reach consensus and reports dissenting opinions when consensus is not reached
- Briefs the response management team on issues raised by the SCAT, particularly where cleanup methods must be modified to increase effectiveness or decrease impacts
- Continues to lead evaluation of targeted cleanup endpoints and modifies them as necessary





# Coordinator

- Serves as the primary point of contact for all SCAT activities, both at the Incident Command Post and in the field
- Ensure that all SCAT field teams are present and accounted for
- Ensures that teams use proper terminology and apply guidelines uniformly
- Ensures that all teams have the necessary representation and all members have the necessary training and equipment
- Develops daily assignments for each team and gives a daily safety brief
- Coordinates with other members of the response effort with concerns on shoreline assessment to optimize data sharing, including NRDA team
- Integrates cleanup concerns of the various resource agencies and managers into the decision-making process
- Arranges for equipment and transportation for the SCAT Teams



# Leader

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- Is usually the most experienced person on the team
- Ensures that documentation and equipment for SCAT teams (maps, photography equipment, gear, communications, etc.) is adequate and assembled prior to deployment
- Reviews each SCAT segment assigned to teams prior to deployment for issues such as access sites (vehicle, boat, helicopter), problematic terrain (eg: streams, cliffs), special safety considerations, communications, limitations, etc.
- Manages the team while it conducts field surveys
- Ensures that all SCAT team members are properly equipped
- Acts as the team Safety Officer
- Makes sure that the forms and sketches are 100% completed in the field



# Leader

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- Guides the team toward consensus on cleanup recommendations, priorities, special constraints, etc., and notes dissenting opinions
- Briefs the SCAT Coordinator and other SCAT Leaders on field survey results
- Reports on cleanup issues and any other spill specific issues identified by the team that need to be addressed
- Recommends modifications to cleanup methods and target cleanup endpoints
- Can serve as Deputy SCAT Coordinator
- Assists with field documentation of observed oiling conditions and/or record photo/waypoint details
- May request additional expertise to address specific sites or needs, i.e. anthropologist, geomorphologist, state historic preservation officer (SHPO), response clean-up experts, etc.





# Member

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- Assist in data collection on oiling conditions and special considerations
- May include experts in resource sensitivity and priorities for response considerations
- Recommend site-specific constraints or precautions to be followed during cleanup
- Determine need for cleanup, considering cleanup guidelines and endpoints, site safety, and sensitive resources
- Recommend cleanup methods, priorities, and endpoints considering cleanup guidelines, site safety, and sensitive resources
- Assists with field documentation of observed oiling conditions and/or record photo/waypoint details
- Responsible for personal safety



# Database manager

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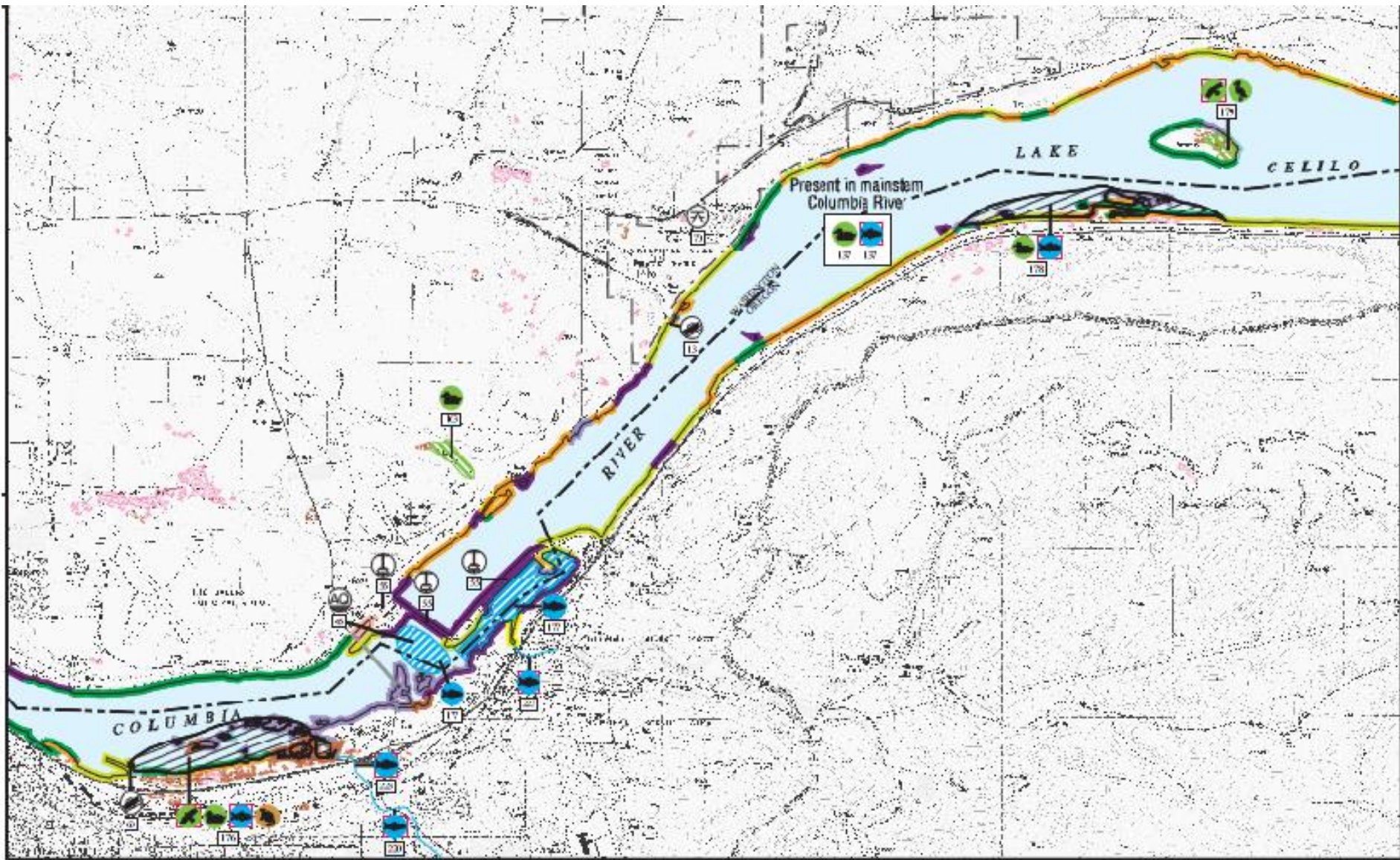
- Modify existing SCAT data entry forms as needed (working with SCAT Coordinator)
- Review daily SCAT forms for completeness and consistency
- Enter or supervise the entry of daily SCAT data
- Conduct data QA/QC; identify common data problems and train SCAT members how to prevent future problems
- Generate daily summary reports, maps, and data summaries
- Maintain an archive of all SCAT data, forms, photographs, GPS data, etc.
- Provide access to all SCAT data entry forms and field manuals
- Prepared to work odd and extended hours
- Be aware of health and safety issues for particular work site

# Step 1: Conduct reconnaissance survey

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- Objectives
  - Obtain overall perspective on shoreline types and degree of contamination for a gross overview
  - Determine areal extent of oiling on the shoreline
  - Identify logistical constraints to shoreline access for both shoreline assessment and cleanup teams
- Coordinator
- Methods
  - Review Area Plans, ESIs
  - Overflights

























13 1000'

121 000'

# SHORELINE HABITATS

	1A	EXPOSED ROCKY SHORES
	1B	EXPOSED, SOLID MAN-MADE STRUCTURES
	2A	EXPOSED WAVE-CUT PLATFORMS IN BEDROCK
	3A	FINE- TO MEDIUM-GRAINED SAND BEACHES
	3B	SCARPS AND STEEP SLOPES IN SAND
	4	COARSE-GRAINED SAND BEACHES
	5	MIXED SAND AND GRAVEL BEACHES
	6A	GRAVEL BEACHES
	6B	RIPRAP
	7	EXPOSED TIDAL FLATS
	8A	SHELTERED ROCKY SHORES
	8B	SHELTERED, SOLID MAN-MADE STRUCTURES
	8C	SHELTERED RIPRAP
	9A	SHELTERED TIDAL FLATS
	9B	SHELTERED, VEGETATED LOW BANKS
		10A SALT- AND BRACKISH-WATER MARSHES
		10B FRESHWATER MARSHES
		10C SWAMPS
		10D SCRUB / SHRUB WETLANDS

# SENSITIVE BIOLOGICAL RESOURCES



**BIRD**



**DIVING BIRD**



**GULL / TERN**



**PASSERINE**



**RAPTOR**



**SHOREBIRD**



**WADING BIRD**



**WATERFOWL**



**NESTING SITE**



**MARINE MAMMAL**



**PINNIPED**



**HAUL-OUT SITE**



**TERRESTRIAL MAMMAL**



**SMALL MAMMAL**



**UNGULATE**



**INVERTEBRATE**



**BIVALVE**



**CRAB**



**FISH**



**FISH**



**ANADROMOUS STREAM**



**REPTILE / AMPHIBIAN**



**TURTLE**



**HABITAT**



**FLOATING OR SUBMERGED  
AQUATIC VEGETATION**



**MULTIPLE ELEMENTS**



**THREATENED / ENDANGERED**



**RAR NUMBER**

# HUMAN-USE FEATURES



AQUACULTURE / HATCHERY



BOAT RAMP



COAST GUARD



FERRY



LOCK AND DAM



MARINA



NATIONAL FOREST



PARK



RECREATIONAL FISHING



SUBSISTENCE FISHING



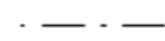
WATER INTAKE



WILDLIFE REFUGE



HUMAN-USE NUMBER



MANAGEMENT AREA



BRIDGE





## Step 2: Segment the Shoreline

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- Objective:
  - Divide the shoreline into units, called segments, for recording and tracking survey data and making cleanup recommendations.
- Coordinator
- Methods
  - Use detailed maps (topos)
  - Mark segments based on similarity of geomorphology, degree of oiling, etc
  - Use incident common naming convention (Ops)

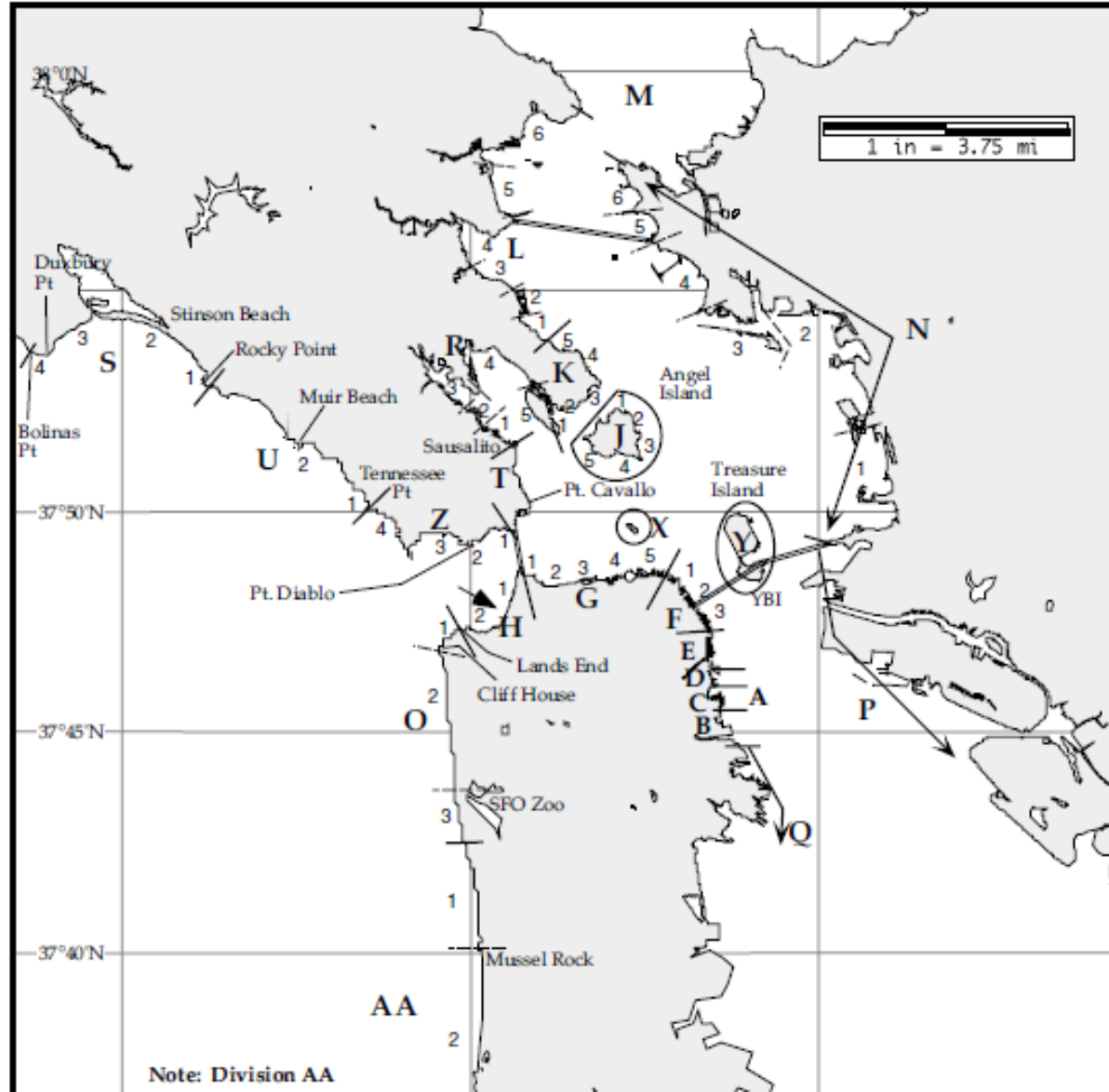
# CAPE MOHICAN Incident

Shoreline Division & Segment Map  
prepared by NOAA

Date/Time: 04 NOV 96, 1300

USE ONLY AS A GENERAL REFERENCE

Graphics do not show precise amounts or locations of oil







## Step 3a: Team Assignments/Logistics

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- Objective
  - Determine areas to be surveyed and logistical and team assignments.
- Coordinator
- Methods
  - Identify
  - Assemble
  - Organize
  - “Calibrate”

# Step 3b: Develop spill-specific cleanup guidelines and endpoints

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- Objective
  - Guide Operations in conducting a specific *cleanup method* to minimize adverse environmental impact.
  - Provide Ops with environmental and safety constraints on conducting cleanup activities in a *specific habitat*.
  - Identify resource-specific constraints on cleanup activities.
- Coordinator, Federal, state, major landowners, and Team Leaders
- Methods
  - Varied, segment specific, complex, POLITICAL
  - If your lucky they are already spelled out in an Area Plan



# Step 4: Shoreline Survey

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- Objective
  - Collect data on shoreline types, oiling conditions, and ecological and human-use resources for specific segments.
  - Reach agreement on cleanup recommendations for specific segments.
  - Confirm that recommendations are effective and beneficial to the environment
- SCAT Team
- Methods
  - Documentation
  - Discuss and agree
  - Report



Photo of three people on a rocky shore. One person is kneeling in a hole dug in the rocky shore while the other two people observe.

# Shoreline Assessment Job Aid

**National Oceanic and Atmospheric Administration • NOAA Ocean Service  
Office of Response and Restoration • Emergency Response Division**



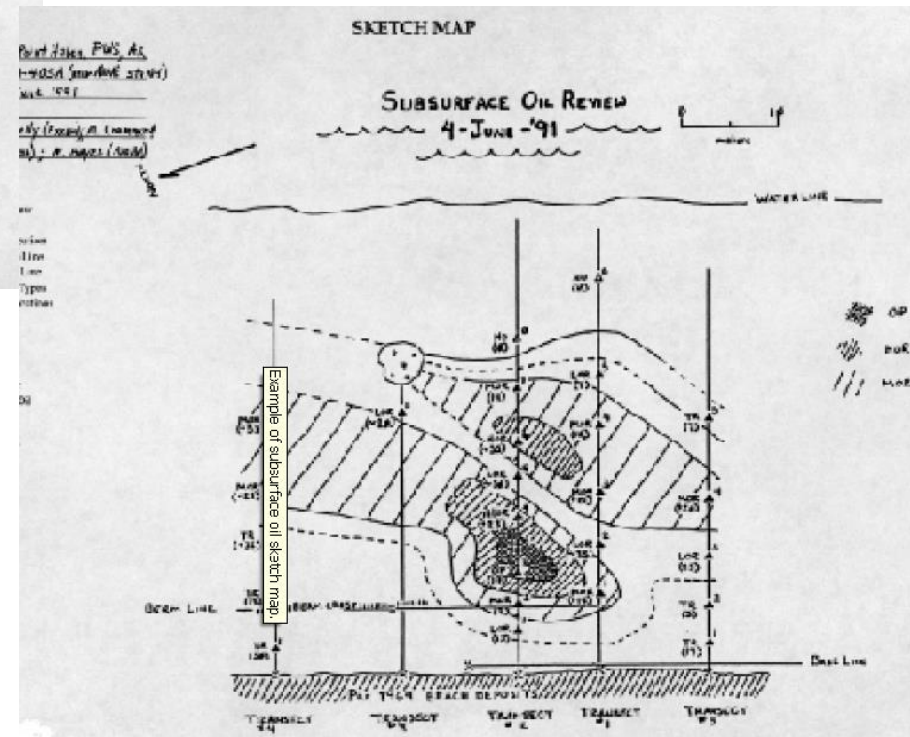
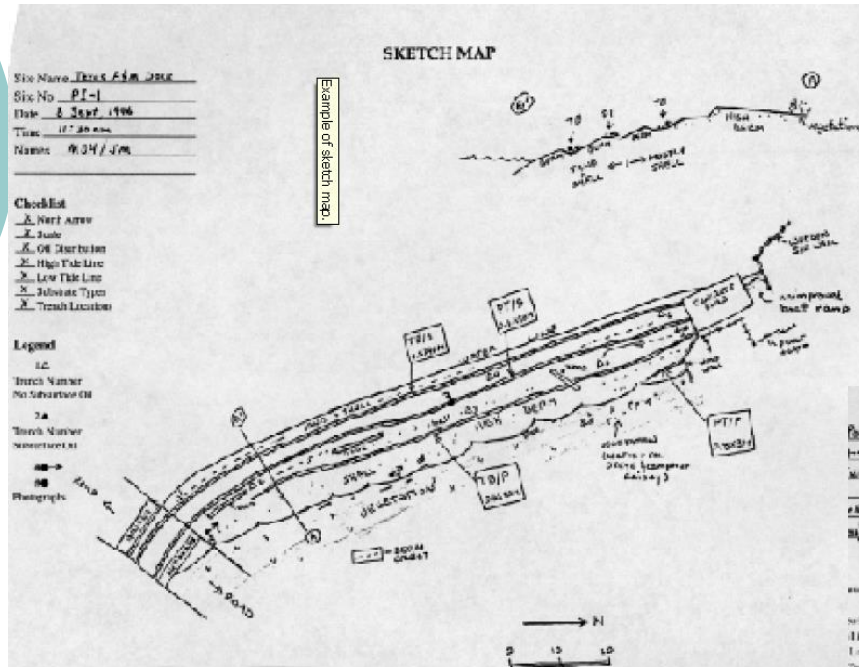
# Forms

Spill Page \_\_\_ of \_\_\_

<b>1. GENERAL INFORMATION</b>		Date (dd/mm/yy)	Time (24h standard/daylight)	Tide Height																
Segment ID:				L/M/H																
Segment Name:			hrs to hrs	H/M/L																
Survey By: Foot / Boat / Helicopter / Overlook / _____			Sun / Clouds / Fog / Rain / Snow / Windy																	
<b>2. SURVEY TEAM</b> No. ___		Name	Organization	Phone Number																
<b>3. SEGMENT</b>		Total Length ___ m/yd	Length Surveyed ___ m/yd	Differential GPS Yes/No																
Start GPS: LAT _____ deg. _____ min		LONG _____ deg. _____ min																		
End GPS: LAT _____ deg. _____ min		LONG _____ deg. _____ min																		
<b>4. SHORELINE TYPE</b> Select only ONE Primary (P) and ANY Secondary (S) types present																				
Rocky Cliffs				Riprap																
Exposed Man-made Structures				Exposed Tidal Flats																
Wave-cut Platforms				Sheltered Rocky Shores																
Fine-Medium grained Sand Beaches				Sheltered Man-made Structures																
Coarse-grained Sand Beaches				Sheltered Tidal Flats																
Mixed Sand and Gravel Beaches				Wetlands																
Gravel Beaches				Other _____																
<b>5. OPERATIONAL FEATURES</b>		Oiled Debris? Yes / No	Type _____	Amount _____ bags																
Direct backshore access? Yes / No Access restrictions _____																				
Alongshore access from next segment? Yes / No Suitable backshore staging? Yes / No																				
<b>6. SURFACE OILING CONDITIONS</b> Begin with "A" in the lowest tidal zone																				
Zone ID	Tidal Zone				Oil Cover			Oil Thickness					Oil Character							
	LI	MI	UI	SU	Length m / ft	Width m / ft	Distr. %	PO	CV	CT	ST	FL	FR	MS	TB	TC	SR	AP	No	
<b>7. SUBSURFACE OILING CONDITIONS</b> Use letter of Zone location plus Number of trench, e.g., "A1"																				
Trench No.	Tidal Zone				Trench Depth cm / in	Oiled Interval cm-cm/in-in	Subsurface Oil Character					Water Table cm / in	Sheen Color B.R.S.N	Clean Below? Yes/No						
	LI	MI	UI	SU			OP	PP	OR	OF	TR				No					
<b>8. COMMENTS</b> Cleanup Recommendations; Ecological/Recreational/Cultural Issues/Wildlife Obs.																				
Sketch: Yes / No Photos: Yes / No (Roll# _____ Frames _____) Video Tape: Yes / No (Tape# _____)																				



# Maps







# Step 5: Submit Reports to Planning Section

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- Objective
  - Provide data needed to support shoreline cleanup decisions and operations.
- Team Leader
- Methods
  - Check all data for accuracy, completeness, and legibility
  - Summarize cleanup recommendations by segment
  - Debrief Coordinator

# Step 6: Cleanup Eval/Effectiveness Monitoring

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- Objective
  - Evaluate field data routinely to monitor progress of cleanup activities and assess the need for modifying cleanup methods or endpoints.
- Coordinator, Federal and State agency representatives, major landowners, and Team Leaders
- Methods
  - Field check cleanup activities
  - Is it working for Ops? If not, change it.
  - Innovative cleanup methods to test?
  - Modify cleanup endpoints?



# Step 7: Post-Cleanup Inspections

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- Objective
  - Inspect segments that Operations declares ready for sign-off before final approval.
- SCAT Team
- Methods
  - This is where documentation comes into play...
  - Ground Truth the cleanup
  - Identify additional cleanup if needed
  - Recommend segment for final inspection.
  - Recommend any longer-term monitoring

# Step 8: Final Sign off of Cleanup Activities

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- Objective
  - Approve the termination of cleanup activities at each segment.
- Sign-off Team (SOFT)—FOSC, SOSC, RPIC
- Methods
  - Ops notifies Planning that the segment has passed inspection
  - SOFT inspects the segment against the cleanup endpoint guidelines
  - A formal sign-off sheet for each segment is signed by each member



# Now back to Step 5.....

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- Shoreline Survey

# How do we make this.....

Spill Page \_\_\_ of \_\_\_

1. GENERAL INFORMATION		Date (dd/mm/yy)	Time (24h standard/daylight)	Tide Height																
Segment ID:				L/M/H																
Segment Name:			hrs to hrs	H/M/L																
Survey By: Foot / Boat / Helicopter / Overlook / _____			Sun / Clouds / Fog / Rain / Snow / Windy																	
2. SURVEY TEAM No. ___		Name	Organization	Phone Number																
3. SEGMENT		Total Length ___ m/yd	Length Surveyed ___ m/yd	Differential GPS Yes/No																
Start GPS: LAT _____ deg. _____ min		LONG _____ deg. _____ min																		
End GPS: LAT _____ deg. _____ min		LONG _____ deg. _____ min																		
4. SHORELINE TYPE		Select only ONE Primary (P) and ANY Secondary (S) types present																		
	Rocky Cliffs			Riprap																
	Exposed Man-made Structures			Exposed Tidal Flats																
	Wave-cut Platforms			Sheltered Rocky Shores																
	Fine-Medium grained Sand Beaches			Sheltered Man-made Structures																
	Coarse-grained Sand Beaches			Sheltered Tidal Flats																
	Mixed Sand and Gravel Beaches			Wetlands																
	Gravel Beaches			Other _____																
5. OPERATIONAL FEATURES		Oiled Debris? Yes / No	Type _____	Amount _____ bags																
Direct backshore access? Yes / No		Access restrictions _____																		
Alongshore access from next segment? Yes / No		Suitable backshore staging? Yes / No																		
6. SURFACE OILING CONDITIONS		Begin with "A" in the lowest tidal zone																		
Zone ID	Tidal Zone				Oil Cover			Oil Thickness					Oil Character							
	LI	MI	UI	SU	Length m / ft	Width m / ft	Distr. %	PO	CV	CT	ST	FL	FR	MS	TB	TC	SR	AP	No	
7. SUBSURFACE OILING CONDITIONS		Use letter of Zone location plus Number of trench, e.g., "A1"																		
Trench No.	Tidal Zone				Trench Depth cm / in	Oiled Interval cm-cm/in-in	Subsurface Oil Character					Water Table cm / in	Sheen Color B.R.S.N	Clean Below? Yes/No						
	LI	MI	UI	SU			OP	PP	OR	OF	TR				No					
8. COMMENTS		Cleanup Recommendations; Ecological/Recreational/Cultural Issues/Wildlife Obs.																		
Sketch: Yes / No    Photos: Yes / No (Roll# _____ Frames _____) Video Tape: Yes / No (Tape# _____)																				



# Into this.....

1. GENERAL INFORMATION		Date (dd/mm/yy)	Time (24h standard/daylight)	Tide Height															
Segment ID: <u>SP-02</u>		<u>28/08/00</u>	<u>1400 hrs to 1600 hrs</u>	L/M/H H/M/L															
Segment Name: <u>STATE PARK BCH</u>																			
Survey By: <u>Foot</u> Boat / Helicopter / Overlook /		<u>Sun</u> Clouds / Fog / Rain / Snow / Windy																	
2. SURVEY TEAM No. <u>1</u>		Name	Organization	Phone Number															
A. <u>SMITH</u>		<u>STATE DNR</u>																	
B. <u>JONES</u>		<u>STATE PARKS</u>																	
C. <u>HILL</u>		<u>NOAA</u>																	
D. <u>ADAMS</u>		<u>USCG</u>																	
3. SEGMENT		Total Length <u>750</u> (m)/yd	Length Surveyed <u>750</u> (m)/yd	Differential GPS Yes/ <u>No</u>															
Start GPS: LAT _____ deg. _____ min		LONG _____ deg. _____ min																	
End GPS: LAT _____ deg. _____ min		LONG _____ deg. _____ min																	
4. SHORELINE TYPE		Select only ONE Primary (P) and ANY Secondary (S) types present																	
	Rocky Cliffs		Riprap																
	Exposed Man-made Structures		Exposed Tidal Flats																
	Wave-cut Platforms		Sheltered Rocky Shores																
<u>P</u>	Fine-Medium grained Sand Beaches		Sheltered Man-made Structures																
	Coarse-grained Sand Beaches		Sheltered Tidal Flats																
	Mixed Sand and Gravel Beaches		Wetlands																
	Gravel Beaches		Other _____																
5. OPERATIONAL FEATURES		Oiled Debris? <u>Yes</u> No	Type <u>WRACK</u>	Amount <u>10</u> bags															
Direct backshore access? <u>Yes</u> No		Access restrictions <u>NONE, PARKING LOT NEARBY</u>																	
Alongshore access from next segment? <u>Yes</u> No		Suitable backshore staging? <u>Yes</u> No																	
6. SURFACE OILING CONDITIONS		Begin with "A" in the lowest tidal zone																	
Zone ID	Tidal Zone				Oil Cover			Oil Thickness				Oil Character							
	LI	MI	UI	SU	Length (m)/ft	Width (m)/ft	Distr. %	PO	CV	CT	ST	FL	FR	MS	TB	TC	SR	AP	No
<u>A</u>		<u>✓</u>			<u>250</u>	<u>2</u>	<u>20</u>		<u>✓</u>					<u>✓</u>					
<u>B</u>			<u>✓</u>		<u>750</u>	<u>1</u>	<u>50</u>		<u>✓</u>					<u>✓</u>					
7. SUBSURFACE OILING CONDITIONS		Use letter of Zone location plus Number of trench, e.g., "A1"																	
Trench No.	Tidal Zone				Trench Depth (cm)/in	Oiled Interval (cm-cm)/in-in	Subsurface Oil Character					Water Table (cm)/in	Sheen Color B,R,S,N	Clean Below? Yes/No					
	LI	MI	UI	SU			OP	PP	OR	OF	TR				No				
<u>A1</u>		<u>✓</u>			<u>20</u>	<u>0-7</u>			<u>✓</u>			<u>20</u>	<u>S</u>	<u>Y</u>					
<u>B1</u>			<u>✓</u>		<u>30</u>	<u>0-10</u>			<u>✓</u>			<u>30</u>	<u>S</u>	<u>Y</u>					
<u>B2</u>			<u>✓</u>		<u>30</u>	<u>5-10</u>			<u>✓</u>			<u>30</u>	<u>R</u>	<u>Y</u>					
8. COMMENTS		Cleanup Recommendations; Ecological/Recreational/Cultural Issues/Wildlife Obs.																	
<p><u>MANUAL REMOVAL ONLY - TO MINIMIZE SEDIMENT REMOVAL.</u></p> <p><u>V. HIGH PRIORITY - STATE PARK AND HIGH RECREATIONAL USE.</u></p> <p><u>SAW TWO PLOVERS WITH OIL SPOTS ON BREAST, NEAR PIWR.</u></p>																			
Sketch: Yes <u>No</u> Photos: <u>Yes</u> / No (Roll# <u>1-1</u> Frames <u>7-9</u> ) Video Tape: Yes / <u>No</u> (Tape# _____)																			

# But first, lets pack...SURVEY GEAR

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- Maps or charts of the survey area
- Clipboards and rubber bands
- Pencils, erasers, waterproof markers
- Field forms (code sheets, shoreline form, sketch sheets, photo logs)
- Field estimation charts (sand size, gravel size, percent cover)
- Field notebooks (waterproof)
- Segment map sheets
- Base sketch maps, if available
- Shovels
- Camera (35 mm) and color print film (ASA 64 and 100); extra batteries
- Videocamera and video tapes, if required; extra batteries
- Photo scale (15 cm)
- Tape measure (30 m) and ruler
- Range finder
- Hand-held GPS
- Compass, preferably Brunton
- Field pack
- Communication device (e.g., radio or cellular phone)
- First-aid kit



Photo of three people on a rocky shore. One person is kneeling in a hole dug in the rocky shore while the other two people observe.

# Shoreline Assessment Job Aid

**National Oceanic and Atmospheric Administration • NOAA Ocean Service  
Office of Response and Restoration • Emergency Response Division**



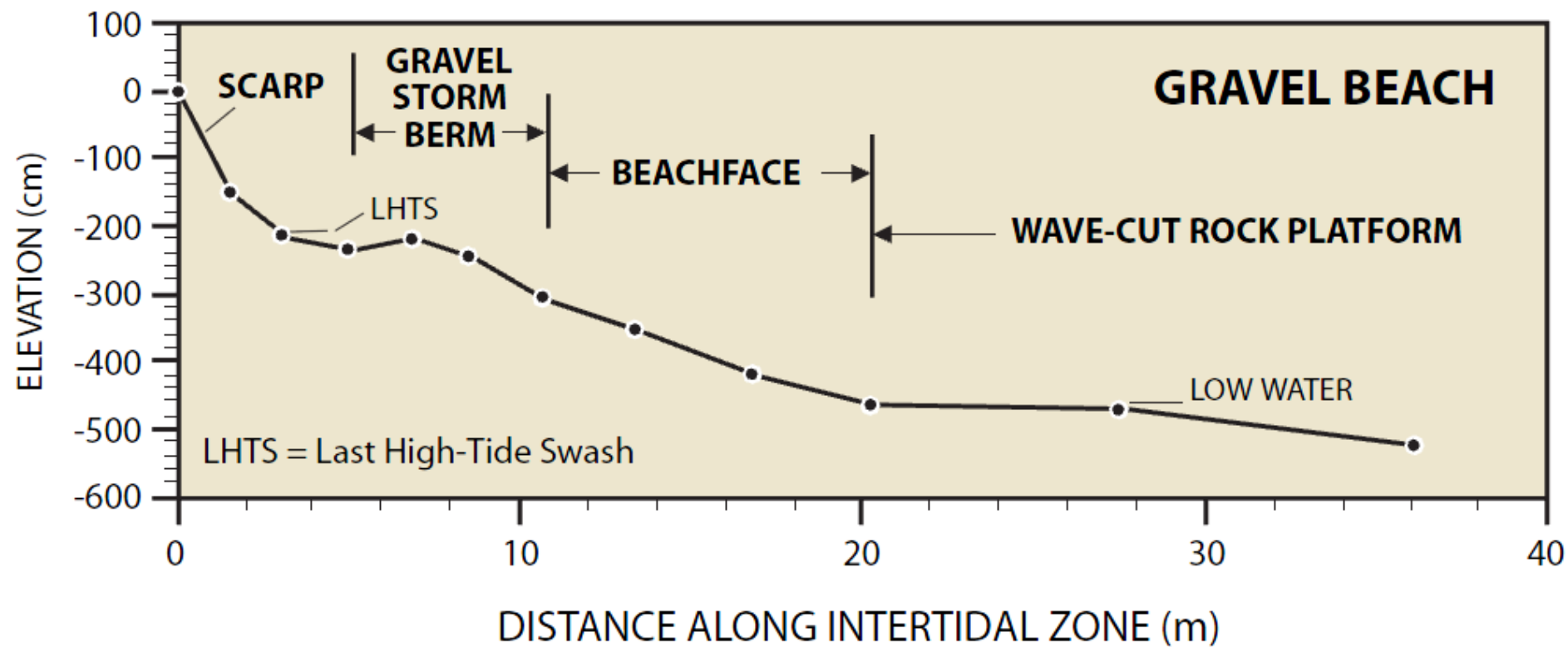


# Photographs are included for the following terminology

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- Oil distribution (as ranges in percent oil cover)
- Surface oiling thickness descriptors
- Surface oiling type descriptors
- Subsurface oiling type descriptors
- Sediment types
- Shoreline types
- Cleanup methods





# SURFACE OIL DISTRIBUTION – Per cent Cover

C

## Continuous

91-100% cover

*(seen here as black oil on light sand beach)*

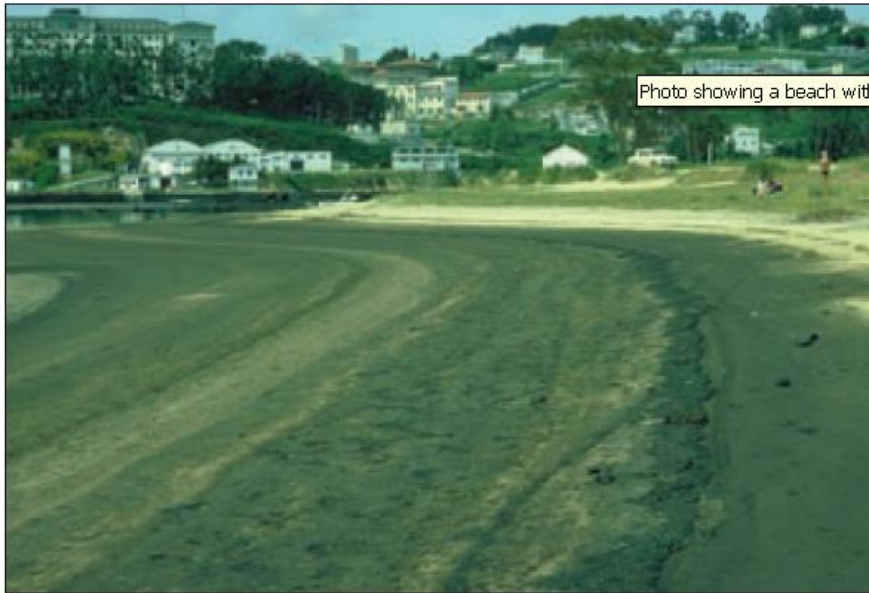


Photo showing a beach with long streaks of black oil.

## Broken

51-90% cover

*(seen here as brown oil on tan sand beach)*

B





# SURFACE OIL DISTRIBUTION – Per cent Cover

---

P

## Patchy

11-50% cover

*(seen here as black oil bands on a white sand beachface)*

## Sporadic

1-10% cover

*(seen here as brown oil bands on a white sand beachface)*

S



# Surface Oil Descriptions – Thickness

PO

## Pooled Oil

fresh oil or mousse > 1 cm thick

*(seen here as accumulation around a large boulder)*

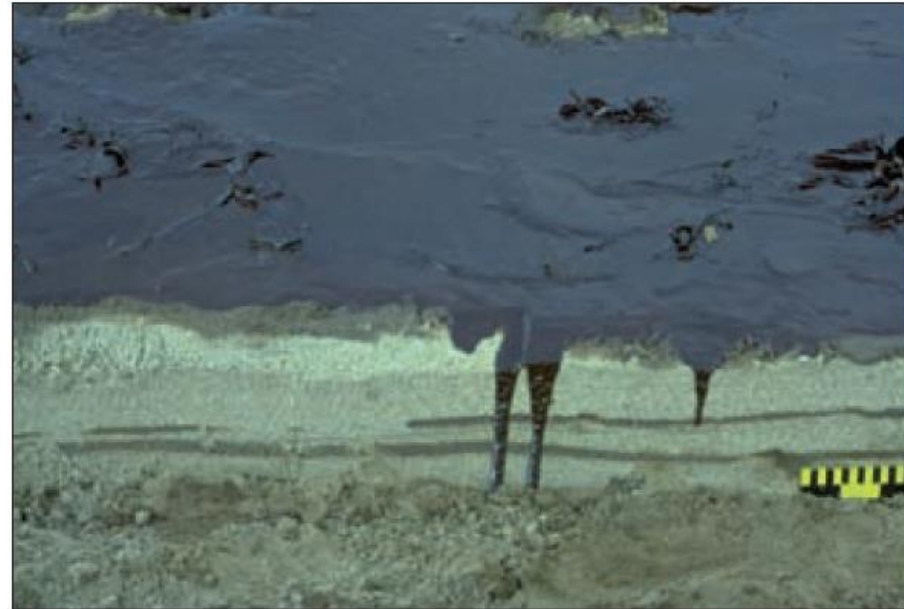


## Cover

oil or mousse > 0.1 cm to < 1 cm thick

*(seen here as oil covering sand beach surface and running into a small trench)*

CV



# Surface Oil Descriptions – Thickness

---

CT

## Coat

visible coating of oil < 0.1 cm – can be scraped off with fingernail

*(seen here as a thin layer of oil on riprap)*



## Stain

visible oil which cannot be scraped off with fingernail

*(seen here as splotches on cobbles)*

ST





# Surface Oil Descriptions – Thickness

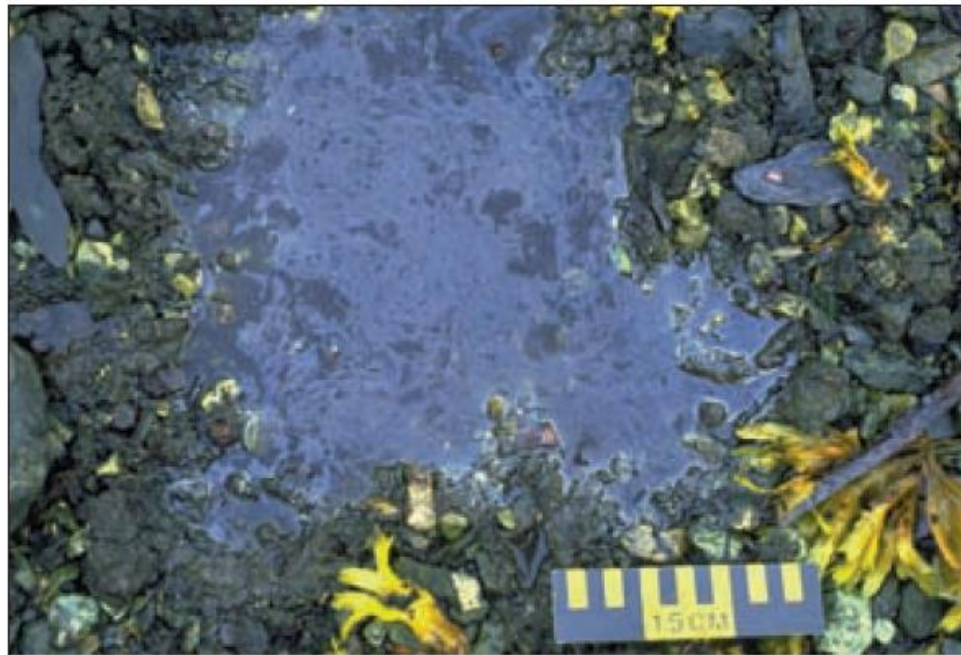
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## Film

transparent or iridescent sheen, or oily film

*(seen here as oil sheen floating on water)*



# Surface Oil Descriptions -- Type

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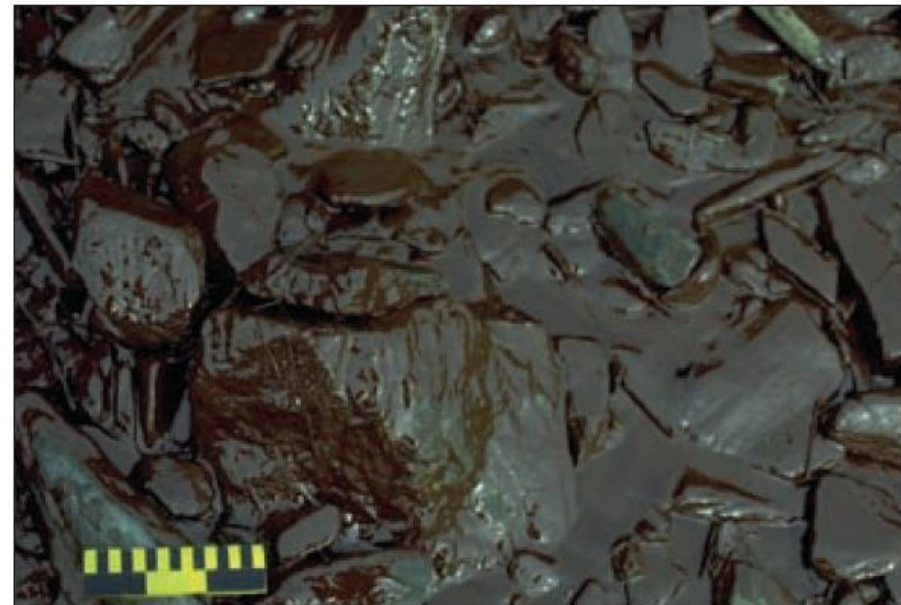
FR

**Fresh Oil**  
unweathered, liquid oil

**Mousse**  
emulsified oil

*(seen here as brown oil coating cobbles)*

MS



# Surface Oil Descriptions -- Type

TB

## Tarballs

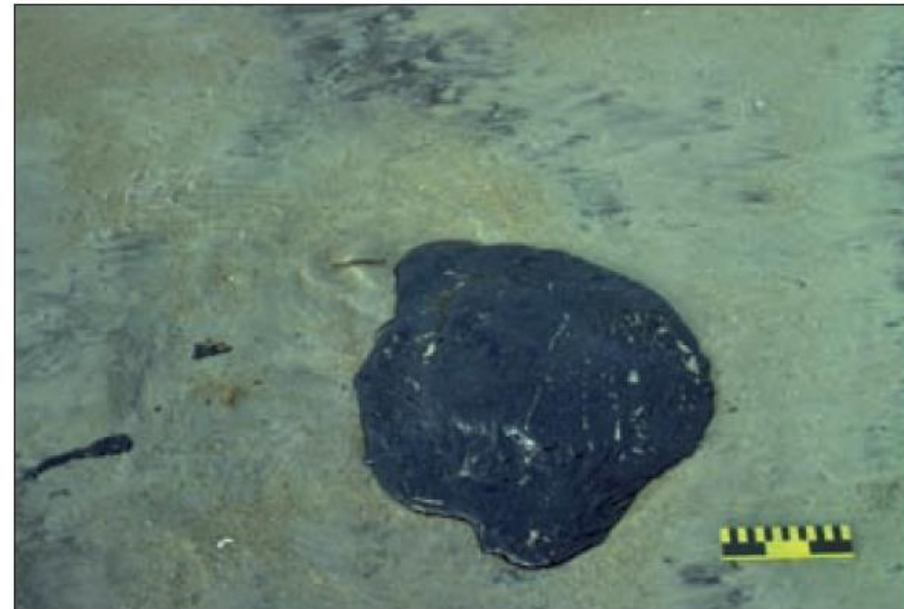
discrete accumulations of oil < 10 cm in diameter

*(seen here scattered on sand beach)*

**Patties**  
discrete accumulations of oil > 10 cm in diameter

*(seen here as single black patty on sand beach)*

PT





# Surface Oil Descriptions -- Type

TC

## Tar

highly weathered oil of nearly solid consistency

## Surface Oil Residue

non-cohesive, heavily oiled surface sediments  
characterized as soft, incipient asphalt  
pavements

SR



# Surface Oil Descriptions -- Type

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## **Asphalt Pavements**

cohesive, heavily oiled surface sediments

*(seen here as thick black deposit on a beachface)*



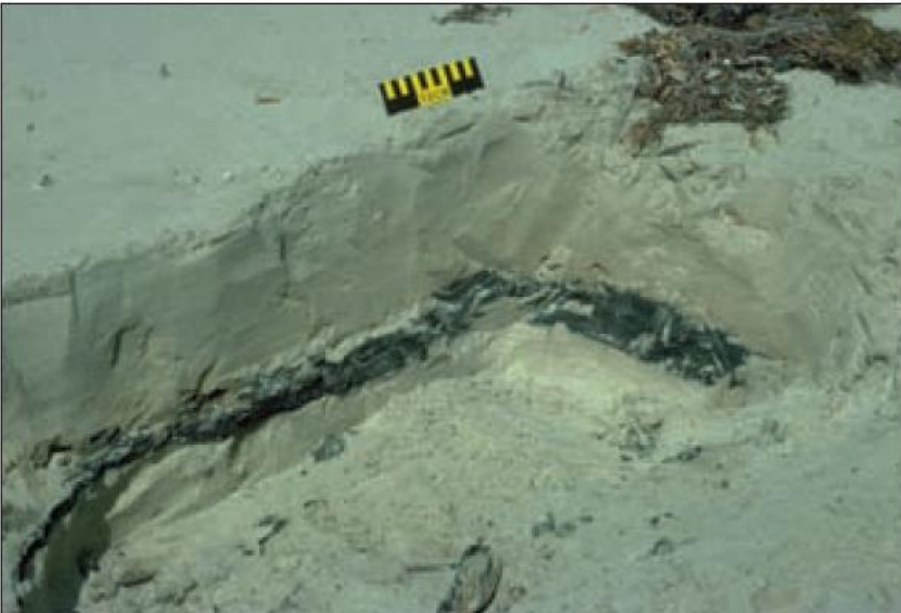
# SubSurface Oil Descriptions -- Type

SAP

## Subsurface Asphalt Pavement

a buried layer of hardened oil

*(seen here as black layer buried in a white sand beach)*



## Oil-filled Pores

pore spaces are completely filled with oil to the extent that oil flows out of sediments when disturbed

*(seen here as brown oil pebbles)*

OP





# SubSurface Oil Descriptions -- Type

PP

## Partially Filled Pores

pore spaces filled with oil, but generally does not flow out when disturbed

## Oil Residue

sediments visibly oiled with black/brown coat or cover on clasts, but little or no accumulation of oil within pore spaces

OR



# SubSurface Oil Descriptions -- Type

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OF

## Oil Film

sediments are lightly oiled with an oil sheen or stain on the clasts.



# Sediment Types

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R

**Bedrock Outcrop**



**Boulder**  
>256 mm in diameter

B





# Sediment Types

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C

## Cobble

64 – 256 mm in diameter



## Pebble

4 – 64 mm in diameter

P

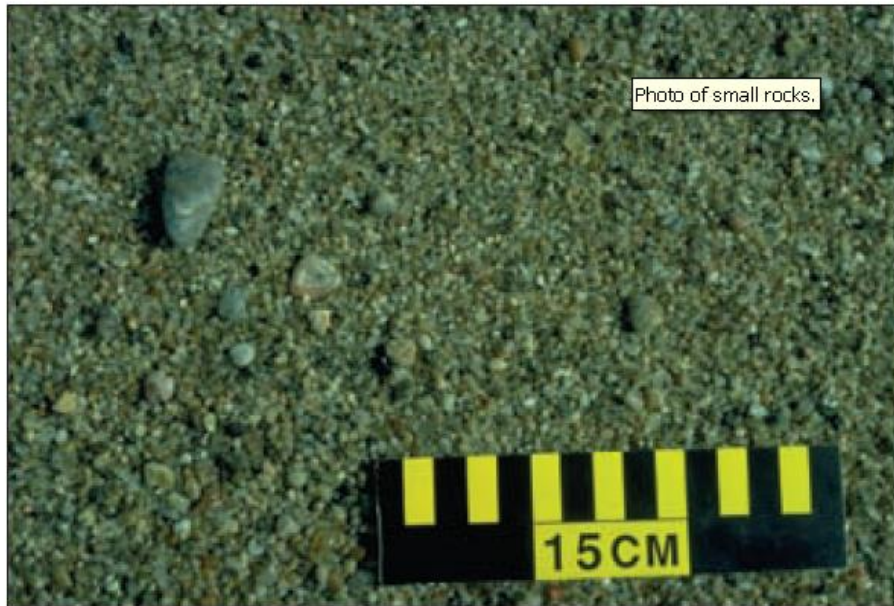


# Sediment Types

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G

**Granule**  
2 – 4 mm



**Sand**  
0.06 – 4 mm

S



# Sediment Types



**Mud**  
silt and clay





# Shoreline Types

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1

## Exposed Rocky Shores

*(also includes exposed seawalls)*



## Exposed Rocky Platforms

*(also includes clay scarps)*

2



# Shoreline Types

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3

## Fine-grained Sand Beaches

*(also includes scarps in sand)*



4

## Course-grained Sand Beaches



5

## Mixed Sand and Gravel Beaches

*(also includes mixed sand and shell beaches)*



# Shoreline Types

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6a

## Gravel Beaches

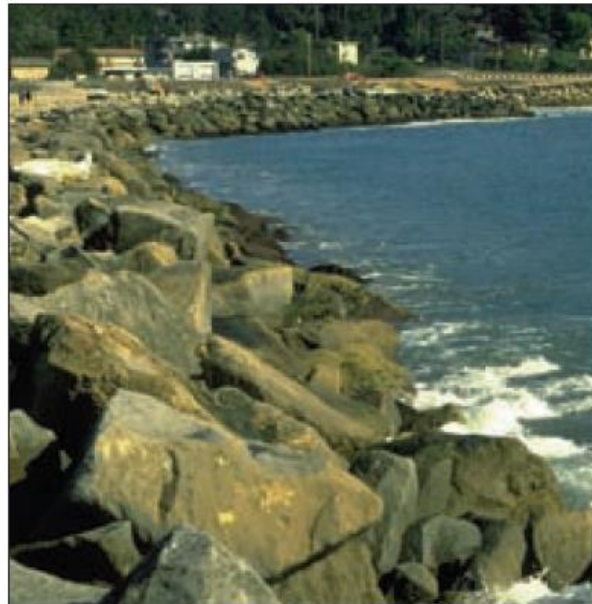
*(also includes shell beaches)*

6b

## Riprap Structures

7

## Exposed Tidal Flats





# Shoreline Types

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8a

**Sheltered  
Rocky Shores**

8b

**Sheltered  
Man-made Structures**

9

**Sheltered  
Tidal Flats**



# Shoreline Types

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**Salt to Brackish Marshes**

**10a**



**Freshwater Marshes**

**10b**



# Shoreline Types

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Swamps

10c



Mangroves

10d

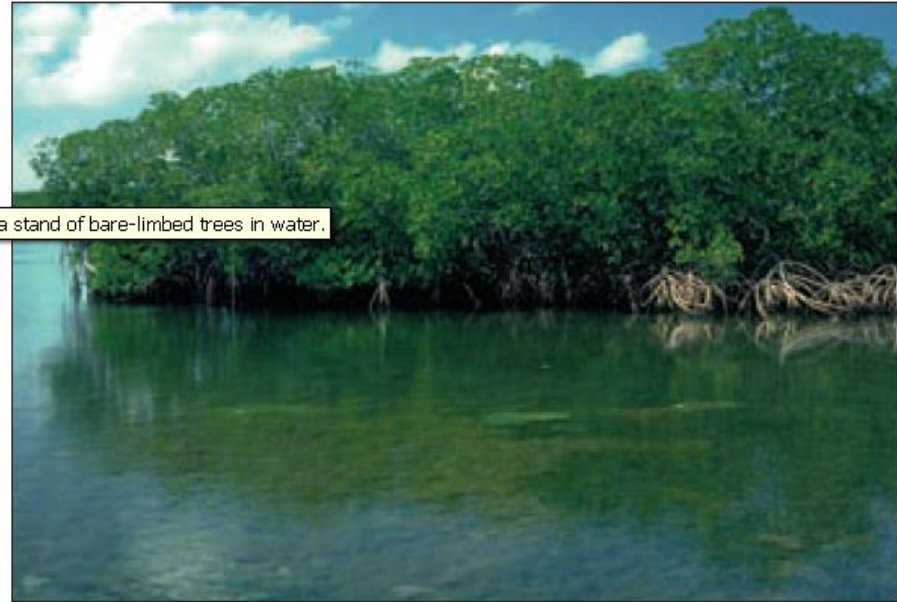


Photo of a stand of bare-limbed trees in water.



# Cleanup Methods

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**Barriers/Berms**

**Physical Herding**



# Cleanup Methods

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**Manual Oil Removal/Cleaning**



**Mechanical Oil Removal**





# Cleanup Methods

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**Sorbents**



**Vacuum**



# Cleanup Methods

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**Debris Removal**



**Sediment Reworking/Tilling**



# Cleanup Methods

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**Vegetation Cutting/Removal**



**Flooding (deluge)**





# Cleanup Methods

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**Low-pressure Flushing**



**High-pressure Flushing**





# Cleanup Methods

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## High-pressure, Hot-water Flushing



# Percent Coverage Estimation (oil bands)

- Sporadic
- Patchy
- Broken
- Continuous

Sporadic  
1\* - 10%



1%

10%

Patchy  
11 - 50%



20%

30%

40%

Broken  
51 - 90%



60%

70%

80%

Continuous  
91 - 100%



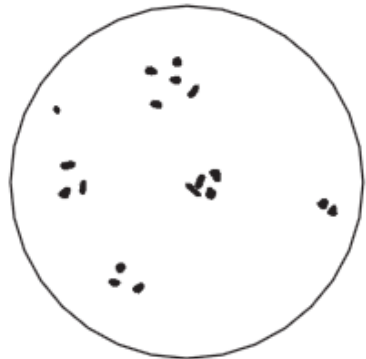
91%



\* Trace = < 1%

# Percent Coverage Estimation- discrete oil deposits (tarballs)

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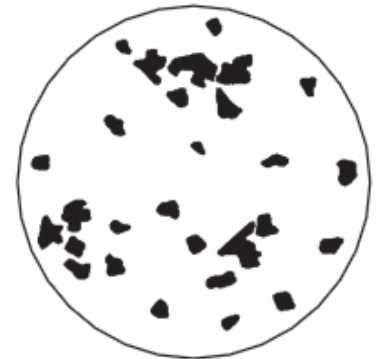
1%



3%



5%



10%



20%



30%



40%



50%



# Important things to remember

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- Importance of Liaisons
- QA/QC data daily
- Develop and establish a SCAT database prior to response
- Maintain SCAT personnel continuity



# Thanks!



15 cm