

SCAT for Inland Oil Spills:

Shoreline Cleanup Assessment Technique: SCAT Process Part 2





Shoreline Assessment

Activities for:

- ❖ Cleanup Endpoints
- ❖ Pre-survey Planning
- ❖ Shoreline Surveys

Terminology and Forms



SCAT Activity 3: Cleanup Endpoints

Objectives


- Drives Shoreline Treatment Recommendations
- Provide Operations with environmental and safety constraints for cleanup in specific habitats
- Identify resource-specific constraints
- Develop endpoints appropriate for the habitat and its use



SCAT Activity 3: Cleanup Endpoints

- No detectable oil
- No visible oil
- No longer generates sheen
- No longer rubs off on contact
- Removal only if it causes no more harm than natural attenuation
- No further treatment recommended

*This will be covered in
more depth on Day 3.*



SCAT Activity 4: Pre-survey Planning and Team Assignments

Objectives

Determine where to survey, logistics, and team assignments

SCAT Activity 4: Pre-survey Planning and Team Assignments

Methods

- **Revise the SCAT codes and forms if needed to fit spill conditions**
- Form teams with appropriate membership
- Assign survey areas (primary and backup) for each team, based on priorities, logistics, local expertise, and ownership
- Distribute segment maps for primary and backup areas; base sketch maps if available



SCAT Activity 4: Pre-survey Planning and Team Assignments

Methods (cont.)

- Distribute field equipment (see checklist in the Shoreline Assessment Manual)
- Brief team on survey *objectives, logistics, and safety issues*
- Identify team roles
- Discuss cleanup options and criteria for priorities



SCAT Activity 5: Shoreline Surveys

Objectives

- Collect data on habitat types, oiling conditions, ecological/human-use resources
- Reach agreement on cleanup recommendations



SCAT Activity 5: Shoreline Surveys

Methods

Confirm segment boundaries

Using standard terms and codes to describe:

- Habitat characteristics
- Surface oil conditions
- Subsurface oil conditions
- Special considerations (ecological, recreational, cultural)



SCAT Activity 5: Shoreline Surveys

Methods (cont.)

- Sketch the segment/delineate zones on a map, focusing on the oil and *special considerations*
- Log and locate all photographs taken
- Discuss and agree upon cleanup recommendations and priorities

DON'T GET BOGGED DOWN IN THE FORM!! ACTIVITIY SHOULD FOLLOW FROM OBJECTIVE, NOT VICE VERSA

Customize SCAT Terminology to Support Operations!!!

High Priority for Removal

Thick Oil/Mobile Oil

High Public Need

High Recreational Use

High Biological Sensitivity



Capturing Information



General Information on the Segment

River SOS

SAM, pg D-8

RIVER BANK SHORELINE OIL SUMMARY (SOS) FORM: _____ Spill _____ Page _____ of _____

1. GENERAL INFORMATION		Date (dd/Month/yyyy)	Time (24h standard/daylight) ____ : ____ to ____ : ____	Water Level Low / Mean / Bankfull / Overbank Falling / Steady / Rising
Segment ID:	Bank: L / R	Segment Name:		
Survey By: Foot ____ ATV ____ Boat ____ Helicopter ____ Other _____			Weather: Sun / Clouds / Fog / Rain / Snow / Windy / Calm	
2. SURVEY TEAM	Name	Organization	Name	Organization
Team Number				
3. SEGMENT	Total Length:	meters	Length Surveyed:	meters
				Datum:
Survey Start GPS:	WP:	LAT:	LONG:	
Survey End GPS:	WP:	LAT:	LONG:	
4a. RIVER BANK TYPE: <i>Indicate only ONE Primary (dominant) type and ALL Secondary types. CIRCLE those OILED</i>				
BEDROCK: Cliff ____ Ramp ____ Shelf ____		UNCONSOLIDATED: Clay ____ Mud ____ Sand ____ Mixed Fine ____ Shell ____ Mixed Coarse ____		
MAN-MADE: Solid ____ Permeable ____		Pebble-Cobble ____ Boulder ____ Rubble ____ Marsh/Swamp ____ Peat/Organics ____ Wooded ____		
Description: _____		Vegetated ____		
ESI Shoreline Type (primary) ____ (secondary) ____		Other: _____		
4b. OVERBANK / BACKSHORE TYPE: <i>Indicate only ONE Primary (P) and ANY Secondary (S) types.</i>				
Cliff/Bluff: ____ ht. ____ m.	Flat/Lowland/Field ____	Dune ____	Inlet/Channel ____	Delta ____
Sloped: > (5°) (15°) (30°)	Man-Made: _____	Other: _____	Marsh/Wetland ____	Wooded / Vegetated? ____
4c. RIVER VALLEY CHARACTER: <i>Circle or select as appropriate.</i>				
Channel Width: <10 m 10-100 m >100 m estimate _____ m		Shoal(s) Present: Y/N Point Bar Present: Y/N		
Water Depth: >1 m 1-5 m >5 m estimate _____ m		Bar-Shoal substrate: silt/sand/mixed/cobble/boulder/bedrock/debris		
CHANNEL FORM: Cascade ____ Rapids ____ Pool ____ Riffle ____ Glide ____ Jam ____ Other: _____				
RIVER FORM: Straight ____ Meander ____ Anastamosed ____ Braided ____ Other: _____				
VALLEY FORM: Canyon ____ Confined or Leveed Channel ____ Flood Plain Valley ____ Other: _____				
5. OPERATIONAL FEATURES	Oiled Debris? Yes / No	Type:	Amount:	(bags/trucks)
Direct backshore access? Yes / No	Alongshore access from next segment? Yes / No	Suitable for backshore staging? Yes / No		
Access Description / Restrictions:				Current Dominated Channel? Yes/No

6. OILING DESCRIPTION: Indicate 100% overlapping zones in different tidal zones by numbering them (e.g. A1, A2)

Zone ID	WP # Start	WP # End	Substrate Type(s) Or ESI Code	River Bank Zone				Oil Cover						Oil Thickness					Oil Character							
								Area		Distribution		Size														
				MS	LB	UB	OB	Length (m)	Width (m)	Distr. % (>1)	or Number per unit area	Avg Size (cm)	Large Size (cm)	TO	CV	CT	ST	FL	FR	MS	TB	PT	TC	SR	AP	No

7. SUBSURFACE OILING CONDITIONS: Format: Indicate Zone ID in Pit #, e.g., A-1, B-2, B-3, (use only number if not in zone, e.g., 4, 5)

Pit #	WP	Substrate Type Surface/Subsurface	River Bank Zone				Pit Depth (cm)	Oiled Interval (cm-cm)	Subsurface Oil Character								Water Table (cm)	Sheen Color B,R,S,N	Clean Below Yes / No
		/						-											
		/						-											
		/						-											
		/						-											

8. COMMENTS: Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations; Oiling Descriptions

Sketch / Map: Yes / No Photos/Video: Yes / No Numbers: (-) Photographer Name:



Stream SOS

SAM, pg D-10

6-L. LEFT BANK (facing downstream) SURFACE OILING DESCRIPTION *Indicate 100% overlapping oil zones by numbering them (e.g. L-A1, L-A2).*

Zone ID	WP # Start	WP # End	Substrate Type(s) or ESI Code	Stream Bank Zone				Oil Cover						Oil Thickness					Oil Character							
								Area		Distribution		Size														
				MS	LB	UB	OB	Length (m)	Width (m)	Distr. % (>1)	<div>α</div> Number per unit area	Avg Size (cm)	Large Size (cm)	TO	CV	CT	ST	FL	FR	MS	TB	PT	TC	SR	AP	No

6-R. RIGHT BANK (facing downstream) SURFACE OILING CONDITIONS: *Indicate 100% overlapping oil zones by numbering them (e.g. R-A1, R-A2).*

Zone ID	WP # Start	WP # End	Substrate Type(s) or ESI Code	River Bank Zone				Oil Cover						Oil Thickness					Oil Character							
								Area		Distribution		Size														
				MS	LB	UB	OB	Length (m)	Width (m)	Distr. % (>1)	or Number per unit area	Avg Size (cm)	Large Size (cm)	TO	CV	CT	ST	FL	FR	MS	TB	PT	TC	SR	AP	No

7. COMMENTS: *Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations; Oiling Descriptions*



Page ____ of ____

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SCAT APP



INLAND SHORELINE AND WETLAND ASSESSMENT FORM - MDEQ SCAT

Shoreline Habitat	Measure	Choice	Oiled Debris Type	Oil Distribution	Cleanup Recommendations
Exposed Rocky Shores/Platforms	FT	Yes	Vegetative	Continuous (91 - 100% Cover)	Barriers/Berms
Sand Beach	M	No	Man-made	Broken (51 - 90% Cover)	Physical Herding
Gravel Beach			Vegetative and Man-made	Patchy (11 - 50% Cover)	Manual Oil Removing/Cleaning
Rip Rap Structure			N/A	Sporadic (1 - 10% Cover)	Mechanical Oil Removal
Tidal Flat					Sorbents
Man Made Structure	Weather			Oil Thickness	Vacuum
Brackish Marsh	Sun			Pooled Oil (> 1cm)	Natural Attenuation
Freshwater Marsh	Clouds			Cover (0.1 - 1cm)	High Pressure flooding
Swamp	Fog			Coat (can be scraped; < 0.1cm)	Low Pressure flooding
Cut Bank	Rain			Stain (Visible; not recoverable)	High Pressure, Hot Water flooding
Riparian	Snow			Film (Sheen)	Bioremediation
				Oil Type	Oiled Debris
				Fresh Oil (Liquid oil)	Remove
				Mousse (Emulsified/weathered oil)	In Situ Cleaning
				Tarballs (< 10cm)	None
				Patties (> 10cm)	
				Tar (Highly weathered; solid state)	Oiled Vegetation
				Surface Oil Residue (Non-cohesive; soft asphalt)	Cut and Remove
				Asphalt Pavements (Cohesive; heavily oiled sediment)	In Situ Cleaning
					None
				Subsurface Oil	
				Subsurface Asphalt (Hardened oil)	Subsurface Oiling
				Oil-filled Pores (Completely filled pore spaces)	Excavation
				Partially Filled Pores (Pore spaces filled; not flowing)	Sediment Reworking/Tilling
				Oil Residue (Sediment oiling; little to no accumulation)	Flushing
				Oil Film (Sediments with sheen)	Subsurface Collection
					Recreational Issues
					Restricted access
					Non-Restricted access

Cleanup Recommendations	Comments
Oiled Debris:	
Oiled Vegetation:	
Subsurface Oiling:	
Recreational:	
Wildlife, Cultural and Ecological:	












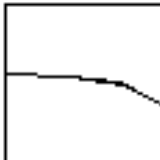










The original
creator of
SCAT forms

present job



OIL COVER ESTIMATION CHART

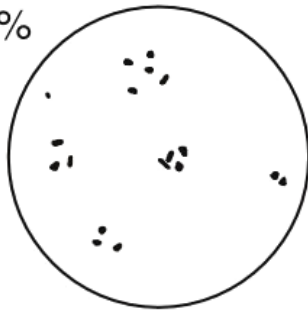
SPORADIC 1*-10%		PATCHY 11-50%			BROKEN 51-90%			CONTINUOUS 91-100%
								
1%	10%	20%	30%	40%	60%	70%	80%	91%
								

*TRACE = <1%

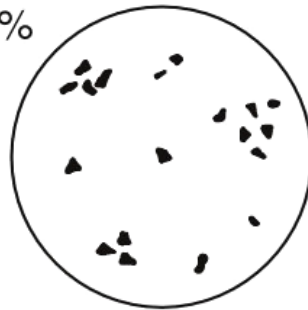


Comparison Chart for Visual Percent Cover Estimation

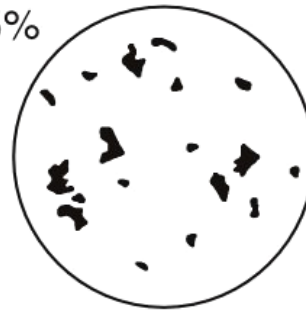
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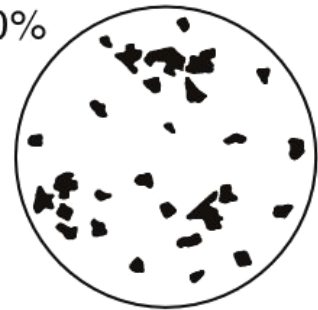
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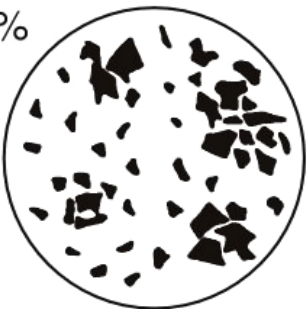
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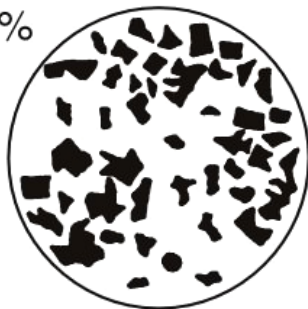
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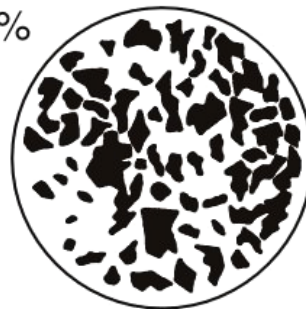
20%



30%



40%



50%





SCAT Terminology

Surface Oil Distribution

C	Continuous	91-100% cover
B	Broken	51-90%
P	Patchy	11-50%
S	Sporadic	<1-10%
T	Trace	<1%



Continuous (91-100% Cover)



B

Broken (51-90% cover)



P

Patchy (11-50% cover)

2012.09.19

S

Sporadic (1-10% cover)



SCAT Terminology

Surface Oiling Descriptor – THICKNESS

- PO** Pooled/Thick Oil (fresh oil or mousse > 1 cm)
- CV** Cover (oil or mousse >0.1 cm to <1 cm on any surface)
- CT** Coat (visible oil <0.1 cm, can be scraped off with fingernail)
- ST** Stain (visible oil, cannot be scraped off with fingernail)
- FL** Film (transparent or iridescent sheen or oily film)



Pooled /Thick Oil

Fresh or emulsified oil > 1cm thick





Cover

Fresh or emulsified oil 0.1 - 1.0 cm thick



2012.09.19



Coat

Visible oil < 0.1cm can be scraped off with fingernail





Stain

Visible oil that cannot be scraped off with fingernail





Film

Transparent or iridescent sheen or oily film

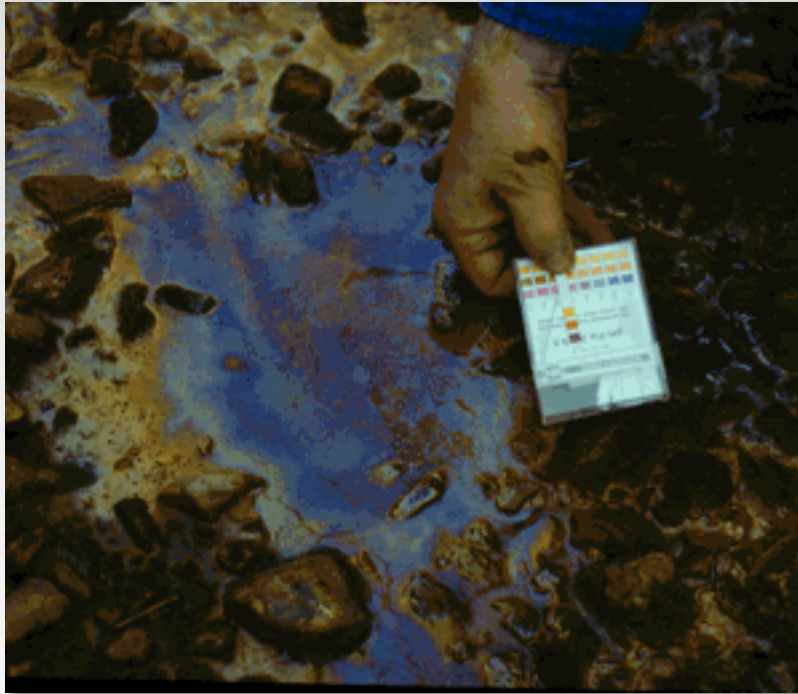


Bacterial Films – Not Oil Sheen!

Test: Break the film into pieces.

If edges are ragged and stay broken = Natural

If edges are swirly and the pieces come back together = Oil sheen



SCAT Terminology

Surface Oiling Descriptors - TYPE

- FR** Fresh Oil (unweathered, liquid oil)
- MS** Mousse (emulsified oil occurring over broad areas)
- TB** Tarballs (discrete accumulations of oil <10 cm in diameter)
- TC** Tar (highly weathered oil, of tarry, nearly solid consistency)



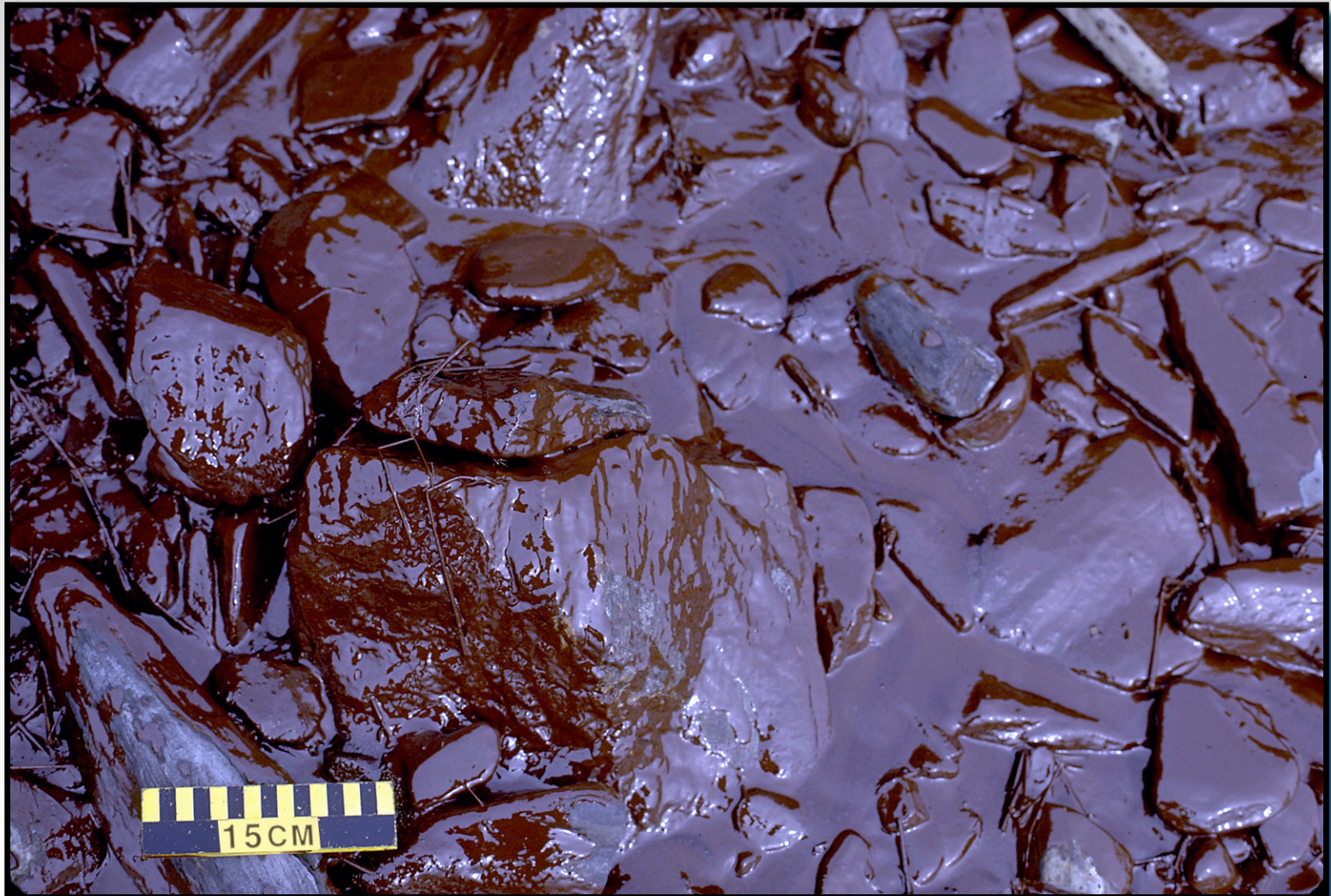
Fresh Oil

Unweathered liquid oil





Mousse Emulsified oil



TB

Tar Balls

Discrete accumulations of oil < 10 cm in diameter





Patties

Discrete accumulations of oil > 10 cm in diameter





Tar

Highly weathered oil of nearly solid consistency



SCAT Terminology

Surface Oiling Descriptors - TYPE

- SR** Surface Oil Residue (non-cohesive, oiled surface sediments)
- AP** Asphalt Pavements (cohesive, heavily oiled surface sediments)
- NO** No oil (no evidence of any type of oil)



Surface Oil Residue

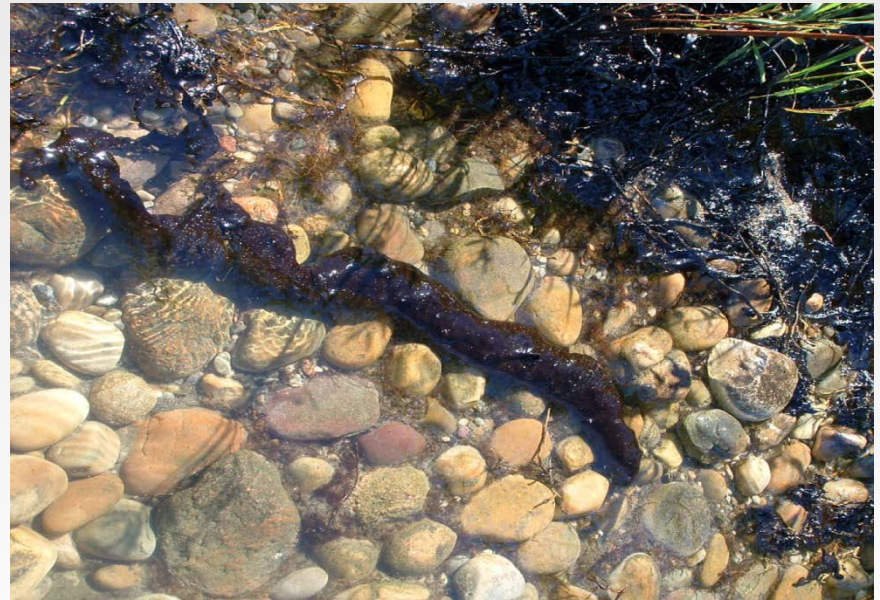
Non-cohesive, heavily oiled surface sediments



Mat and “Logs”

Lake Wabamun,
Canada

Revise the SCAT terms
as needed for unique
conditions!





Asphalt Pavement

Cohesive, heavily oiled surface sediments





SCAT Terminology

Subsurface Oiling Descriptors - TYPE

- OP Oil-Filled Pores (pore spaces completely filled with oil)
- PP Partially Filled Pores (oil does not flow out of the sediments when disturbed)
- OR Oil Residue (sediments are visibly oiled with black/brown coat or cover on the clasts, but little or no accumulation of oil within the pore spaces)



Oil-Filled Pores

Pore spaces filled with liquid oil that flows out





Oil Residue

Sediments visibly coated but no free oil in pore spaces



SCAT Terminology

Subsurface Oiling Descriptors – TYPE

- OF Oil Film (sediments are lightly oiled with an oil film, or stain on the clasts)
- TR Trace (discontinuous film or spots of oil, or an odor or tackiness)



Oil-Film

Sediments are lightly oiled with an oil sheen or stain





SCAT Form Exercise

You will fill out a form here in the class, based on a field basemap and photographs



Sketch / Map: Yes / No Photos/Video: Yes / No Numbers: (-) Photographer Name: _____

STREAM BANK SHORELINE OILING SUMMARY FORM

STREAM BANK SHORELINE OILING SUMMARY FORM EXPLANATIONS

Calibration IS VERY IMPORTANT! Do a calibration exercise to make sure that all teams are consistently using the same terms and estimations.

Units: Use of metric units is preferred. However, if you must use English units, be consistent and note which are used (feet, inches).

Water Level: Circle the water level during the survey, and if the water level was rising or falling during the survey.

Segment/Survey Length: Always record both segment and survey lengths on the first survey, especially where the team creates the segments in the field. On repeat surveys, always enter in the Survey Length, especially if only part of the segment is surveyed.

Start/End GPS: The preferred format for latitude and longitude is decimal degrees, but be consistent among teams. Record the datum if different than WGS84.

SURFACE OILING CONDITIONS: Record the following for each bank of the stream, left and right, facing downstream

Zone ID: Use a different ID for each oil occurrence, e.g., two distinct bands of oil on the upper bank and in overbank areas, or along the bank where the oil distribution changes from 10 % to 50%. Describe each oil occurrence on a separate line.

Stream Bank Zone: Use the codes to indicate the location of the oil being described, as in the midstream (MS), lower bank (LB), upper bank (UB), or overbank (OB) zone above the normal water level.

Distribution: Enter the estimated percent of oil on the surface (preferred), or codes for the following intervals:

C	Continuous	91-100% cover
B	Broken	51-90%
P	Patchy	11-50%
S	Sporadic	<1-10%
T	Trace	<1%

Surface Oiling Descriptors - Thickness: Use the following codes:

TO	Thick Oil (fresh oil or mousse > 1 cm thick)
CV	Cover (oil or mousse from >0.1 cm to <1 cm on any surface)
CT	Coat (visible oil <0.1 cm, which can be scraped off with fingernail)
ST	Stain (visible oil, which cannot be scraped off with fingernail)
FL	Film (transparent or iridescent sheen or oily film)

Surface Oiling Descriptors - Type

FR	Fresh Oil (unweathered, liquid oil)
MS	Mousse (emulsified oil occurring over broad areas)
TB	Tar Balls (discrete accumulations of oil <10 cm in diameter)
PT	Patties (discrete accumulations of oil >10 cm in diameter)
TC	Tar (highly weathered oil, of tarry, nearly solid consistency)
SR	Surface Oil Residue (non-cohesive, oiled surface sediments)
AP	Asphalt Pavements (cohesive, heavily oiled surface sediments)
No	No oil (no evidence of any type of oil)

SUBSURFACE OILING CONDITIONS

Oiled Interval: Measure the depths from the sediment surface to top/bottom of subsurface oiled layer. Enter multiple oil layers on separate lines.

Subsurface Oiling Descriptors: Use the following codes:

OP	Oil-Filled Pores (pore spaces are completely filled with oil)
PP	Partially Filled Pores (the oil does not flow out of the sediments when disturbed)
OR	Oil Residue (sediments are visibly oiled with black/brown coat or cover on the clasts, but little or no accumulation of oil within the pore spaces)
OF	Oil Film (sediments are lightly oiled with an oil film, or stain on the clasts)
TR	Trace (discontinuous film or spots of oil, or an odor or tackiness)

Sheen Color: Describe sheen on the water table as brown (B), rainbow (R), silver (S), or none (N)



INLAND SHORELINE AND WETLAND ASSESSMENT FORM - MDEQ SCAT

Denotes List or Checkbox

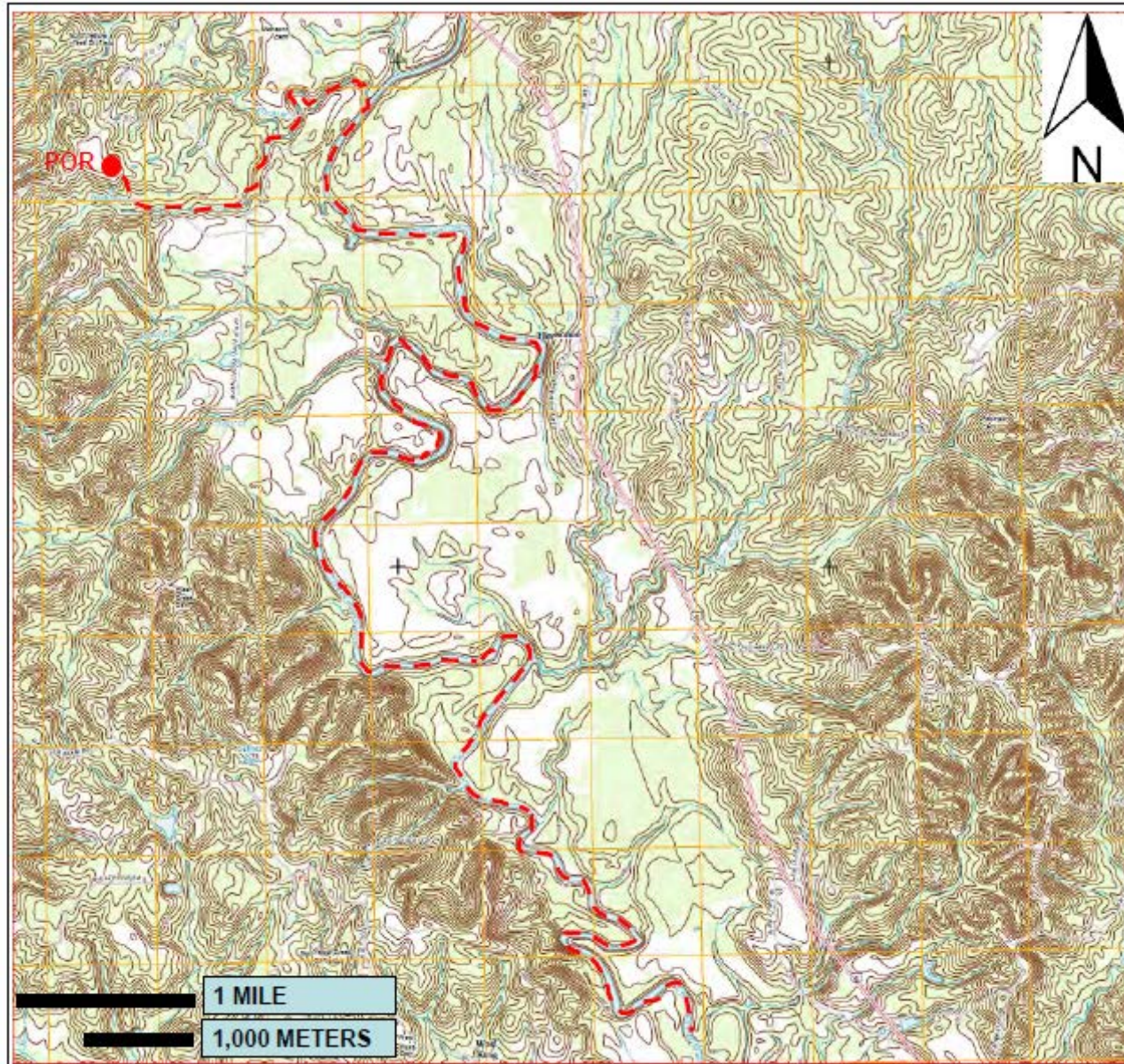
1. GENERAL INFORMATION		Date (dd/mm/yy)	Description	Winds:
Incident:			Time (24h Clock):	24hr Precip.:
Segment ID:			Temperature (F):	
Survey By: <input type="checkbox"/> Foot <input type="checkbox"/> Boat <input type="checkbox"/> Air <input type="checkbox"/> Overlook <input type="checkbox"/> Other:			Weather Conditions:	
2. SURVEY TEAM		Name	Organization	Affiliation
Signature:				Phone Number
3. SEGMENT		Total Length:	Length Surveyed:	Differential GPS:
Start GPS: N			W	
End GPS: N			W	Comment:
4. SHORELINE HABITAT AND CHANNEL TYPE				
Primary (P)	Secondary (S)	Select one (P) and any (S)		Units
<input type="checkbox"/>	<input type="checkbox"/>		Channel Width:	
<input type="checkbox"/>	<input type="checkbox"/>		Channel Depth:	
<input type="checkbox"/>	<input type="checkbox"/>		Cutbank Height:	
<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/>	<input type="checkbox"/>			
5. HABITAT CHARACTER DESCRIPTION				
Physical Description:				
7. OPERATIONAL FEATURES				
	Yes or No	Type and/or description:		
Access via boat only:				
Oiled Debris:				
Oiled Vegetation:				
Can substrate support foot traffic:				
Access Restrictions:				
8. OIL CONDITIONS				
	Description	Comments		
Oil Distribution:				
Oil Thickness:				
Oil Type:				
Oiled Wildlife:				
Subsurface Oil:				
9. CLEANUP RECOMMENDATIONS		Description	Comments	
Cleanup Recommendations:				
Oiled Debris:				
Oiled Vegetation:				
Subsurface Oiling:				
Recreational:				
Wildlife, Cultural and Ecological:				

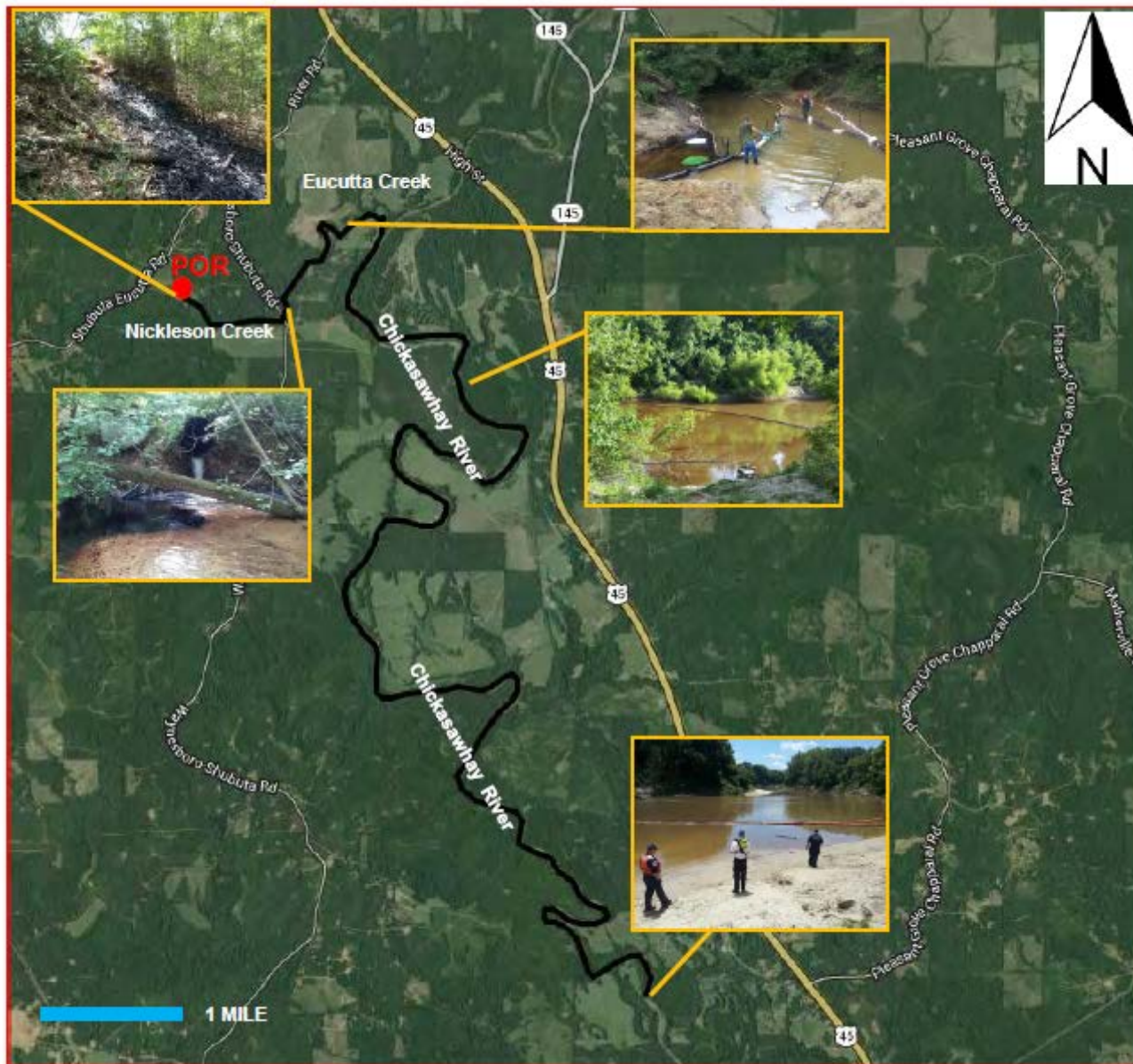


Shubuta Crude Oil Spill

On June 27th, 2013 ~200 barrels (8,946 gallons) of medium to heavy weight crude oil (21 API) spilled from a production tank battery and entered into Nickleson Creek followed by Eucatta Creek and then into the Chickasawhay River. Approximately 12 miles of waterway were impacted. Discharge may have occurred over 12 hours before being detected.







Div A-Segment 1 Zone 1



Div B-Segment 2 Zone 1



Div B-Segment 2 Zone 2



06/30/2013 10:13

Div C-Segment 3 Zone 2



6. OILING DESCRIPTION: Indicate 100% overlapping zones in different tidal zones by numbering them (e.g. A1, A2)

Zone ID	WP # Start	WP # End	Substrate Type(s) Or ESI Code	River Bank Zone				Oil Cover						Oil Thickness					Oil Character							
								Area		Distribution		Size														
				MS	LB	UB	OB	Length (m)	Width (m)	Distr. % (>1)	α Number per unit area	Avg Size (cm)	Large Size (cm)	TO	CV	CT	ST	FL	FR	MS	TB	PT	TC	SR	AP	No
A	112	114	MUD		✓			1,500	0.5	100					✓				✓							
B	114	115	MUD		✓			8	1	100				✓					✓							
C	115	118	MUD		✓			1,450	0.3	100					✓				✓							
D	118	119	MUD		✓			900																	✓	

7. SUBSURFACE OILING CONDITIONS: Format: Indicate Zone ID in Pit #, e.g., A-1, B-2, B-3, (use only number if not in zone, e.g., 4, 5)

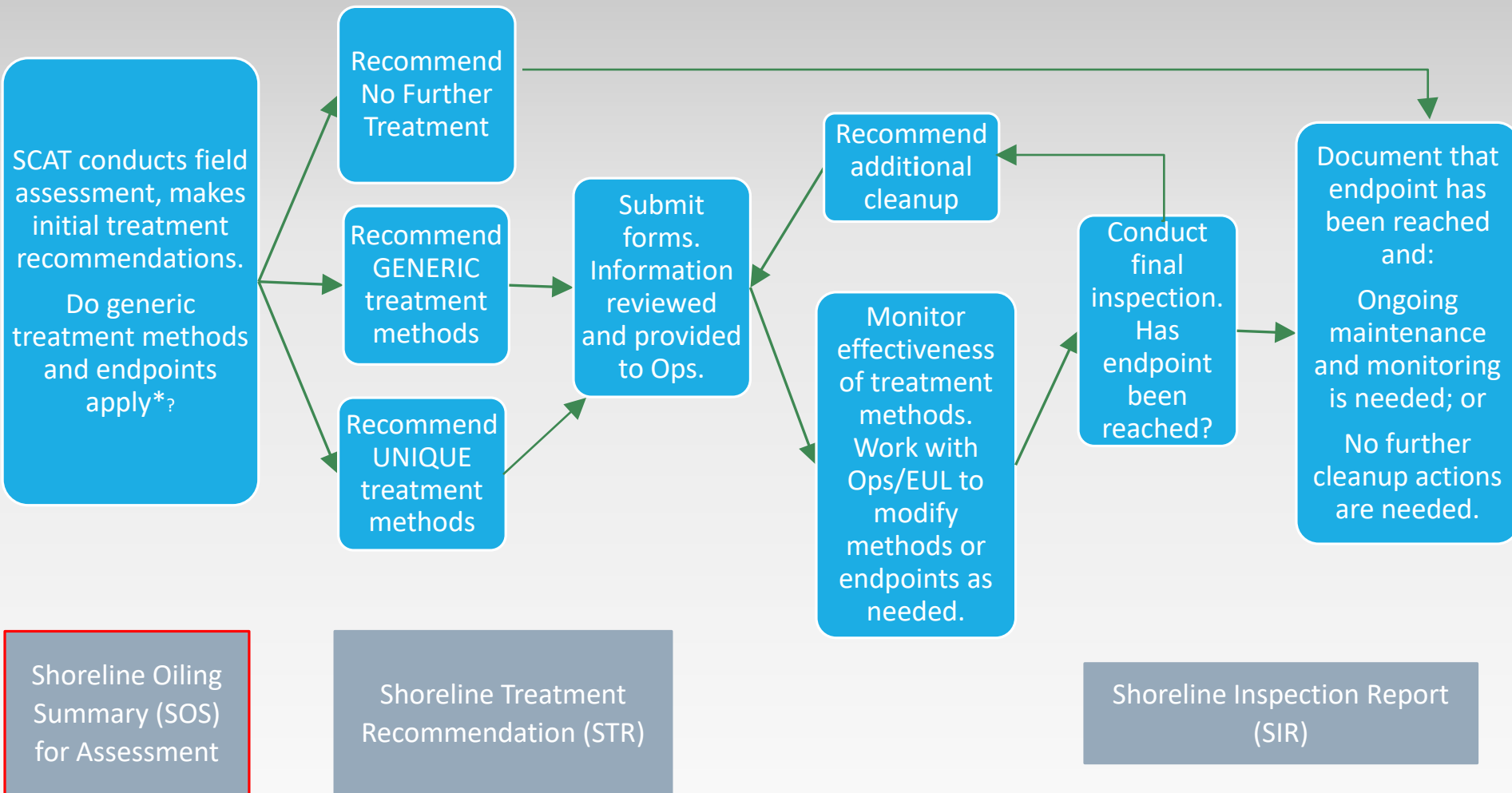
Pit #	WP	Substrate Type Surface/Subsurface	River Bank Zone				Pit Depth (cm)	Oiled Interval (cm-cm)	Subsurface Oil Character								Water Table (cm)	Sheen Color B,R,S,N	Clean Below Yes / No
A-1	113	M / M		✓			15	-							✓		-	-	-
C-1	117	M / M		✓			10	-							✓		-	-	-
		/						-											
		/						-											

8. COMMENTS: Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations; Oiling Descriptions

FLUSH - LOW PRESSURE FROM BOATS IN ZONES A & C - AVOID SEDIMENT EROSION.
 ZONE B - USE SORBENTS TO RECOVER FLOATING OIL IN ROOT BALLS THEN
 PUSH UNTIL NO FREE BLACK OIL MOBILIZED.

Sketch (Map) Yes / No Photos/Video Yes / No Numbers: (14 - 30) Photographer Name: SMITH

SCAT TEAM ACTIONS



* Generic Treatments and Endpoints provided in SCAT Workplan.

