Introduction to the SCAT Team Member Course: Rehobeth Beach, DE

Frank Csulak NOAA, SSC May 3, 2016



Team Member Course Objectives

- Use of ESI for planning and response
- Fate and behavior of different types of oil spills
- The Shoreline Assessment process, team roles, field methods, and products
- Shoreline cleanup methods and when they should be applied





Team Member Course Objectives

- Oil behavior and cleanup methods for different shoreline types
- Identification of shoreline types, processes, and ecological resources during field exercises
- Implementation of shoreline assessments, field sketches, completion of SCAT forms























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Team Member Course Objectives

- Understand types of shoreline cleanup endpoints
- Selection of appropriate cleanup methods for different shoreline types and oil types
- Application of all these topics through case studies and field exercises





Subset of Environmental Unit Training

In

ICS



Shoreline Evaluation Process

The shoreline evaluation process requires a commitment of trained personnel to assess, evaluate, and communicate the impacts of oil on the shoreline, as well as to recommend countermeasures to mitigate adverse impacts. At most spills, a repetitive, detailed, and systematic survey of the extent and degree of shoreline contamination is needed for:

- 1 Assessment of the need for shoreline cleanup
- 2 Selection of the most appropriate cleanup method
- 3 Determination of priorities for shoreline cleanup
- 4 Documentation of the spatial oil distribution over time

Where does SCAT belong in the organization?

• SCAT is under the Planning section

• Why?



Organization

Unified Command





Building the EU Organization

Bottom Up

Span of Control

(1:1-7 Range) (1:3-5 optimum)

NO MORE THAN 7



EXAMPLE OF EU SET-UP (EAGLE OTOME)



The Environmental Unit Leader is the Manager of the Environmental Unit and all its moving parts

SCAT Coordinator

Responsibilities:

Report to the Environmental Unit Leader

- Assemble teams for assessment of impacted shorelines
- Determine appropriate Forms to be utilized
- Direct Data Manager/GIS personnel for segmentation of shoreline for surveying and tracking status of impacted conditions (i.e. colors depicting heavy, moderate, light, or no observed oiling <u>criterion</u>)
- Determine end-point criteria based on input from stakeholders and subject matter experts
- Provide Shoreline Treatment Recommendations to Environmental Unit Leader
- Maintain constant cleanup monitoring of Operations
- Provide signoff procedures and protocols to Environmental Unit Leader (Evaluate & construct entire SCAT process*)

* Shown in later slide

Rapid Assessment Teams

Field Observers

Are 2 to 3-person teams, usually representatives from the U.S. Coast Guard the State lead agency and RP, which can quickly deploy to problem sites;

Verbally report to the Situation Unit, who then passes the information on to the appropriate units;

Become members of the shoreline assessment team, if appropriate.

SCAT Teams

Members

Three or four trained personnel prepared to evaluate a section of shoreline, equipped with proper protective gear and suitable transportation to and from the site.

The assessment group should have representatives of the OSC, State, responsible party, and trustees.

Team members must have basic site safety training and training sufficient to complete the Shoreline Oiling Survey Form.

Specific recommendations for cleanup may be included under this phase of the assessment.



OPERATIONS

Transportation Resources IAP's 204's

Click triangle









Shoreline Cleanup Assessment Technique: SCAT Process Part 1

Frank Csulak SSC, NOAA RRTIII May 2006



Shoreline Assessment

- Overview of the Process
- Roles and Responsibilities
- Activities under Each Step
- Terminology and Forms



What is a SCAT Program?

- A systematic approach that:
 - uses standard methods and terminology
 - to collect data on shoreline oiling conditions
 - to support decisionmaking for shoreline cleanup





What is a SCAT Program?

- It is flexible in terms of the scale of the survey and detail of the data sets collected.
- It is multi-agency:
 - Responsible Party
 - Various agency representatives
 - Resource Managers
 - Land Owners





Role of SCAT

- Conduct shoreline assessment surveys (generate data on shoreline types, lengths, and oiling conditions)
- Identify sensitive resources (ecological, recreational, cultural)
- Determine the need for treatment





Role of SCAT (cont.)

- Recommend shoreline treatment methods (to do's and to don't)
- Recommend treatment priorities
- Monitor treatment effectiveness and effects



SCAT Data Should Answer the Following Questions:

- Is treatment necessary at this site?
- What treatment methods are appropriate or recommended?
- What constraints are needed to protect sensitive resources?
- What is the priority for treatment at this site?







SCAT Products in the Planning Process

SCAT Team Members

- SCAT Coordinator
- Team Leader
- Agency Reps
 - Federal On-Scene Coordinator rep
 - State On-Scene Coordinator rep
 - Land Managers when surveying Fed or State Lands
- Others as needed
 - Safety

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- Archaeologist
- Operations



SCAT Coordinator

- Manages all things related to SCAT Teams
- Participates in developing Cleanup Endpoints and Treatment Methods
- Participates in Planning Section meetings
- Prepares Shoreline Treatment Recommendations
- Briefs EU and Operations on issues related to shoreline treatment effectiveness and effects
- Data QA and oversight of all SCAT products
- Resolution of conflicts among stakeholders





SCAT Team Roles: Team Leader

- Should be the most experienced person on team
- Responsible for management of the team
- Completes the forms and sketches in the field
- Guides the team toward consensus on cleanup recommendations, priorities, special constraints, and notes dissenting opinions
- Briefs the SCAT Coordinator, Planning, and Operations staff, as needed
- Acts as the team Safety Officer







SCAT Team Roles: Agency Representatives

- Assist in data collection on shoreline types, oiling conditions, and special considerations
- Provides expertise in resource sensitivity and priorities
- Recommends site-specific constraints or precautions to be followed during cleanup
- Makes recommendations on cleanup methods and priorities
- Monitors effectiveness of cleanup operations



SCAT Team Roles: Operations Representative

- Evaluate appropriateness of cleanup techniques
- Identify logistical constraints and solutions
- Assist in data collection on oiling conditions
- Estimate the level of effort needed for cleanup

This role can be taken by one of the team members (e.g., USCG)




SCAT Team Roles: Data Manager

- Creates base maps with segments, sensitive areas, etc. for SCAT teams to use in recording data
- Conducts QA of daily SCAT forms
- Downloads the team's track line to generate maps for the team to delineate segments, zones, treatment areas, pits, etc.





SCAT Team Roles: Data Manager

- Downloads and geo-references SCAT team photographs
- Enters daily SCAT data
- Generates daily summaries:
 - shoreline cleanup status,
 - maps of shoreline cleanup status
 - specific data summaries requested by the UC



SCAT Activities

- 1. Reconnaissance survey
- 2. Segmenting the shoreline
- 3. Developing spill-specific cleanup guidelines and endpoints
- 4. Pre-survey planning and team assignments
- 5. Shoreline surveys



SCAT Activities

- 6. Generate shoreline treatment recommendations, tables, maps, etc.
- 7. Monitoring cleanup operations
- 8. Post-treatment inspections
- 9. Final sign-off of cleanup activities





SCAT Activity 1: Reconnaissance Survey

Objectives



Get an overall perspective on shoreline types and degree of contamination

- Determine the extent of oiling on the shoreline
- Identify logistical constraints for shoreline access for both SCAT and cleanup teams





SCAT Activity 1: Aerial Reconnaissance Survey

Methods

- Fly entire impact area at 400-500 feet and 70-80 knots in helo or high-wing aircraft
- Use charts or GPS to record:
 - Flight path, including date and time
 - General degree of shoreline oiling (H, M, L: with definitions)
 - References to photographs/video taken







SCAT Activity 2: Shoreline Segmentation

Objective

 Divide shoreline into units, called segments, for recording and tracking survey data, Operations activity, and final sign off





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SCAT Activity 2: Segmenting the Shoreline

Methods

- Use appropriate maps for consistent coverage
- Mark segments based on homogeneity of geomorphology (ESI maps) and degree of oiling (from reconnaissance flight)
- Should include local staff familiar with area







Example of Simple SCAT Segments



Texas City Y SCAT Segments

SCAT Activity 2: Segmenting the Shoreline

Methods (cont.)

- Segment boundaries should be readily recognizable in the field
- Size appropriate to spill conditions (0.2-2 km)
- Pre-number segments with alphanumeric code



SCAT Activity 3: Cleanup Guidelines and Endpoints

Objectives

- Guide Operations in conducting cleanup using methods to minimize impacts
- Provide Operations with environmental and safety constraints for cleanup in specific habitats
- Identify resource-specific constraints





Cleanup Matrix for Sand Beaches

			0il Category	
Response Method	Ι	II	III	IV
Natural Recovery	А	В	В	C
Barriers/Berms	В	В	В	В
Manual Oil Removal/Cleaning	D	В	А	А
Mechanical Oil Removal	D	В	В	В
Sorbents	-	В	А	А
Vacuum	-	-	В	А
Debris Removal	-	А	А	А
Sediment Reworking/Tilling	D	В	В	В
Vegetation Cutting/Removal	-	С	С	С
Flooding (deluge)	А	А	А	В
Low-pressure, Ambient Water Flushing	В	В	В	В
High-pressure, Ambient Water Flushing	-	-	-	-
Low-pressure, Hot Water Flushing	-	-	С	С
High-pressure, Hot Water Flushing	-	-	-	-
Steam Cleaning	-	-	-	-
Sand Blasting	-	-	-	-
Solidifiers	-	-	В	-
Shoreline Cleaning Agents	-	-	С	С
Nutrient Enrichment	-	А	А	В
Natural Microbe Seeding	-	I	Ι	Ι
In-situ Burning	-	-	С	C

SCAT Activity 3: Cleanup Guidelines and Endpoints

Methods (cont.)

- Observe actual operations to confirm proper use
- Develop plans to monitor effectiveness or effects of new methods, as needed
- Modify cleanup endpoints as methods become ineffective or unacceptable impacts occur during use





SCAT Activity 4: Pre-survey Planning and Team Assignments

Determine where to survey, logistics, and team assignments

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SCAT Activity 4: Pre-survey Planning and Team Assignments

- 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

- Distribute field equipment (checklist in the SAM)
- Brief team on survey objectives, logistics, and safety issues
- Identify team roles
- Discuss cleanup options and criteria for priorities
- Everyone must read and sign the SCAT Site Safety Plan





Tides are Important!





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Customize SCAT Terminology to Support Operations!!!

High Priority for Removal Thick Oil/Mobil Oil

 Large amount of oil that could re-float and oil other areas, or penetrate deeper into porous substrates

High Recreational Use

- To return areas to public use
- High Biological Sensitivity
 - High use by animals now, or those arriving soon





General Information on the Segment All SCAT Forms

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Survey By: Foot /AT	V/Boat	/ Helicopter / Ov	erlook / Other _		Weather:	Sun / Cloue	ds / Fog / Rain	Wind	y / Calm	
2. SURVEY TEAM		Name		Organ	ization		Name			Organization
Team Number										
3. SEGMENT		Total Length:		Length		m	Datu	m: WGS84		
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SCAT Activity 5: Shoreline Surveys

Objectives

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





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SCAT Activity 5: Shoreline Surveys

Methods

- Confirm segment boundaries
- Using standard terms and codes to describe:
 - Shoreline characteristics
 - Surface oil conditions
 - Subsurface oil conditions
 - Special considerations (ecological, recreational, cultural)







SCAT Activity 5: Shoreline Surveys

Methods (cont.)

- Sketch the segment, focusing on the oil and special considerations
- Log and locate all photographs taken
- Discuss and agree upon cleanup recommendations and priorities





SKETCH MAP





SIR 2 | Plaquemines 6 | South Pass LAPL06-001-35 | 29 July 2013



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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%





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Continuous (91-100% Cover)




Broken (51-90% cover)





Patchy (11-50% cover)





Sporadic (1-10% cover)





Trace <1% cover)



Surface Oiling Descriptor – THICKNESS

- **TO** 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)



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Pooled /Thick Oil Fresh or emulsified oil > 1cm thick



















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)

























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





Surface Oil Residue Balls (SRBs) Tar ball sized pieces of surface residue





Asphalt Pavement Cohesive, heavily oiled surface sediments



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 (OR), Oil Residue Balls (ORB)



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)





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Macondo Spill Sandy Beach Surface Oil Terms

Surface O	il Categories - Sandy Beaches – Macondo Spill	
SOP	Small Oil Particles mousse drops, sticky, classified in TB as SOP if less than 10cm – if greater classified as Mousse (MS)	_
SR	Surface Residue Non-cohesive, oiled surface sediments up to 5cm deep, soft/crumbly, Sediments may contain some oil filled/partially filled pore spaces and have some liquid consistency but majority is sand saturated with oil May or may not be partially buried	tot.
SRB/SRP	Surface Oil Residue Ball/Patty Discreet, non-cohesive, sand saturated oiled sediments in a ball (<10cm) or patty (10cm-1m) – may be SOP with sand that has become incorporated by wind or waves or may have broken off zones of SR	
MS	Mousse Emulsified oil with rusty orange to dark brown colour, liquid consistency may sink into sand, saturating and then becoming SR	_



SCAT-OPS JOB AID

Sub Surface Oil Character

АР	Asphalt pavement, cohesive mixture weathered oil and sediment
OP	Oil filled pores, pore spaces are completely filled with oil, oil flows out when disturbed
PP	Partially filled pores, pore spaces filled with oil but generally does not flow out when disturbed
OR	Cover (>= $0.1 - 1$ cm) or Coat (> $0.01m - 0.1$ cm) of oil residue on sediments and/or some pore spaces partially filled with oil – surface oil residue balls (SRB)
OF	Stain (<=0.01cm) or film oil residue on sediment surfaces, non-cohesive
TR	Trace, discontinuous film or spots of oil on sediments, or an odour/tackiness with no visible evidence of oil
NO	No Oil



SCAT Process Part 2:

Data Submittal, Products, STRs, Sampling Methods, eSCAT Frank Csulak May 3, 2016 RRTIII Meeting





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General SCAT Process Flowchart



SCAT Product in the Planning P

SHORELINE CLEANUP ASSESSMENT TEAM WORK PLAN: MATAGORDA BRANCH

(Texas City Y Spill)

	This incident-specific SCAT plan is approved:	
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27 MAR 14 Date

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cc: Operations Section, Shoreline Cleanup Supervisor
Operations Section Chief
National Oceanographic and Atmospheric Administration, SSC
U.S. Environmental Protection Agency
U.S. Department of Interior, U.S. Fish and Wildlife Service
State Historic Preservation Officer
State Agencies

Table of Contents

- 1. Plan Purpose and Objectives
- 2. Health and Safety
- 3. Organization, Staffing, and Schedule
- 4. SCAT Survey Methods
- 5. Field Documentation
- 6. Command Post Data Management and Results
- 7. Spill Cleanup Endpoints Standards

Appendix A: Shoreline Oiling Summary Form

Appendix B: Shoreline Treatment Recommendation Form

Appendix C: Segment Inspection Report

Result of a SCAT Survey

- No oil observed (NOO)
- No Further Treatment (NFT) recommended
- Shoreline Treatment Recommendation (STR)



SCAT Activity 6: Generate Treatment Recommendations Methods

- Check for accuracy, completeness, legibility
- Data are entered and reports generated
- Generate shoreline treatment recommendations
- Generate maps and tables on shoreline oiling, treatment status, etc.
- Debrief Planning/Operations staff as needed on special issues, problems, recommendations


USCG Response Types

- Type 5: one operational period and one responder
- Type 4: one operational period and multiple responders
- Types 3-1: may extend into multiple operational periods and involve increasingly complex organizational structures





Products/Tools by Incident Type

Products/ Tools	Туре З	Type 2	Type 1
Shoreline Treatment Recom- mendation/ Priorities	Map showing segments and attached table with habitat-specific cleanup guidelines and endpoints; list priorities for cleanup	Printout of SCAT data and STR by segment/date; sort by new data, status, task force, etc.	Generate segment- specific STR from the SCAT database
Shoreline Operational Stage Map	Manual transfer of operational stage on computer-generated base map	Digitize operational stage on computer- generated base map and/or kmz file	Track operational stage in the SCAT database, to generate updated status maps using GIS
Shoreline Inspection Report	Typed list of sign-off status	Printout of updated spreadsheet list with sign-off status	Database/GIS tracking of sign-off status

Selecting the Right Cleanup Methods Involve Tradeoffs



Shoreline Treatment Recommendation (STR)

Habitat Type	Cleanup Endpoint	Allowable Cleanup Methods
Sand Beaches	Sand Beaches should be visibly free of all oil and oil residue. No oil odor should be evident and there should be no subsurface oil existing.	 Manual removal with shovels/rakes; minimize removal of clean sediments on/under oiled layers Use of heavy equipment will require additional approval. Passive recovery of sheen with sorbents.
Marshes Vegetated Spoil Banks Scarps Forested Wetlands	General: No potentially mobile oil as evidenced by sheen remaining on substrate. Residual oil does not rub off on contact (no oil greater than stain).	 Remove loose oiled debris (use best mgt guidelines). Passive removal using snares on a rope or other sorbent material as appropriate. Minimize foot traffic, and avoid disturbance and removal of peat mat or soil Other options to be determined on a site-specific basis include flushing, manual pickup of pooled oil, and monitoring.
		 Aggressive cleanup methods should not be employed. Natural recovery should be considered

M/V Westchester Spill

SCAT Cleanup Recommendations and Priorities SCAT Site Nos. Date/Time: 03 Dec 00

Platform:

Observers:

USE ONLY AS A GENERAL REFERENCE

4 to MM5

M38 to MM25 0 **B8 B1** B9 flats **B2** в B9 slough **B**3 ortJackson B4 **B5 Cleanup Priorities** SCAT B8/B9 – sandflats – remove pooled oil on flats - no vegetation cutting 2. SCAT B9 - slough - start bank washing as soon as free oil removal is complete 3. Riprap in SCAT zones B2/B3 4. Rest of oiled riprap 5. Mudflats in SCAT B3 (200' zone of pooled oil) 6. Mudflats in SCAT B2

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prepared by NOAA

Shoreline Treatment Recommendation (STR)

Guidelines for Hot-Water Flushing of Oiled Riprap/Bulkheads

- Water temperature not to exceed 120°F.
- Spray nozzle will be held at a distance of 5 inches or greater from the surface. All spraying/flushing
 will be into water for collection.
- No attached seaweed will be sprayed with hot water.
- Once the water level reaches the seaweed, hot-water flushing will be terminated.
- Once hot-water washing is terminated, all released oil will be recovered immediately. Cold-water flushing of the seaweed is allowed when oil has accumulated in it.
- Removal of heavily oiled seaweed will be allowed in specific areas identified by SCAT. If seaweed is
 to be cut, the root attachment and a 30-cm stem will be left.
- Cold-water flushing will be conducted until no more oil is mobilized.
- Hot-water flushing will be repeated until no free oil is released by the hot wash and no more than a stain (cannot be scraped off with a fingernail) remains on the surface.
- Sorbents will be deployed along areas where sheens are being released from the shoreline.

NOTE: The guidelines will be revised, as needed, in response to changing conditions as the oil weathers.

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SCAT Field Maps and GIS



SCAT Annotated Field Sketch Map

GIS Shoreline Current Oiling Layers



2-Step Process to Calculate Oiling Degree

Step 1	P11 11	Width of Oiled Area						
		Wide >6 m	Medium >3 m to 6 m	Narrow >0.5 m to 3 m	Very Narrow <0.5 m			
	Continuous 91 – 100%	Heavy	Heavy	Moderate	Light			
ution	Broken 51 – 90%	Heavy	Heavy	Moderate	Light			
strib	Patchy 11 – 50%	Moderate	Moderate	Light	Very Light			
OIID	Sporadic 1 – 10%	Light	Light	Very Light	Very Light			
	Trace < 1%	Very Light	Very Light	Very Light	Very Light			



Step 2		Initial Categorization of Surface Oil						
		Heavy	Moderate	Light	Very Light			
	Pooled Oil > 1 cm	Heavy	Heavy	Moderate	Light			
rage	Cover 0.1 – 1.0 cm	Heavy	Heavy	Moderate	Light			
Ave	Coat 0.01 – 0.1 cm	Moderate	Moderate	Light	Very Light			
	Stain/Film < 0.01 cm	Light	Light	Very Light	Very Light			

Cosco Busan, November 2007





Local Name: Keel Boat Pass Islan STR #: \$4-009.r.2

.r.2 Survey Date:

Segment Name

LASB05 - 014-20 LASB05 - 015-10

Location: Keel Boat Pass Island St. Bernard Division 5

Shoreline Type: Salt- and brackish-water marsh Mixed sand and shell beaches

Oiled Area For Treatment:

	Zone A: salt marsh with 30 yd x 5 yd topographic low with pooled mousse and oiled organic material (coffee grounds).
	Zone 8: salt marsh, 230 yd x 1-2 yd area with heavily oiled wrack and patches of pooled mousse.
	Zone C: salt marsh/shell berm, 150 yd x 2-3 yd area with heavily oiled shell hash, heavily oiled wrack, and patches of pooled oil.
	Zone D: salt marsh/shell berm, 130 yd x 4 yd area with heavily oiled shell hash, heavily oiled wrack, and patches of pooled oil.
	Zone E: salt marsh/shell berm, 10 yd x 3 yd area with heavily olied shell hash, heavily olied wrack, and some pooled oil.
	Zone F: salt marsh/shell berm, 15 yd x 4 yd area with olied shell hash.
	Zone G: salt marsh/shell berm, 115 yd x 1 yd area with heavily oiled shell hash and pooled oil in numerous locations
	Zone H: salt marsh/shell berm, 85 yd x 2 yd area with heavily oiled shell hash with pooled oil.
	New Zones in r.2 with similar oiling conditions: Zone B1: 50 yds Zone I: 200 yds Zone J: 612 yds Zone K: 64 yds
	Refer to the attached map.
	If oiling conditions similar to those described above are observed in other shoreline locations on this island, these areas can be treated under this STR. The SCAT teams and SCAT-Ops Liabons can assist with decisions regarding additional treatment areas if such oiling conditions are observed.
Clea	anup Recommendation:
	Manually remove the heavily oiled shell, oiled wrack that is tacky and poses risk to wildlife, oiled coffee grounds, and pooled oil using shovels, rakes, other appropriate hand tools, and/or gloved hands.
	Loose sorbent materials can be used to remove/reduce pooled surface mousse or liquid oil. In areas of higher concentrations and minimal live vegetation, loose organic surbent materials (e.g., bagasse, kenaf,

higher concentrations and minimal live vegetation, loose organic sorbient materials (e.g., bagasse, kenat, etc.) can be applied and raked across the area to increase the oil sorption, both on the surface and where the oil is soaked into the soil. The oiled sorbert material will then be raked up and bagged. All sorberts applied to pooled oil and oil-saturated sorbert materials must be removed. In areas with lower concentrations or more vegetation, and as a final treatment step in the raked areas, a thin layer of the loose organic sorbert materials can be applied in a targeted and judicious manner, to any remaining tacky oil residues on the substrate and/or vegetation, as a means of short-term widtle protection. This material can be left in place to naturally degrade (as approved by the RRT on 8 April 2011). The on-site monitors

prehistoric artifacts, graves,

Deepwater Horizon MC252

Shoreline Treatment Recommendation Operational Permit to Work

Local Name: Keel Boat Pass Islan STR #: S4-009.r.2 Survey Date:

human remains, or other cultural resources are discovered in the project area, all work in the immediate area must cease. The onsite Operations Supervisor must be notified, who must contact the Section 106 Team. Work shall not resume until the Operations Supervisor has been advised by the Section 106 Team. Contact the Section 106 Team at: section106@bpgom.com and/or call the SCAT Lead Archaeologist in Houma (520-850-2944) or Alvin Banguilan (404-229-5451).

Safety Concerns:

Follow the site safety plan.

Comments:

Revision 2 addresses additional oiling zones and allows the use of loose organic sorbents.

Attachments:	Segment Map	Sketch SC	AT Form	neet Other:	Photos, BMPs
Prepared By:	Zengel, Scott	Date	Prepared: 14-Apr-2	011	~
Final Approva	I: Print Samuel j	Broussard	WILLIAM CARTOR	Bet	7 STONG
	Sign Sosc	1/18/11 0905 F	OSC 4/10/11 10	BP EUL	S

** When Treatment is Completed, send a Segment Completion Report to SCAT **

Shoreline Treatment Recommendation Operational Permit to Work

Local Name: Keel Boat Pass Islan STR #: S4-009.r.2 Survey Date:

Segment	Name

LASB05 - 014-20 LASB05 - 015-10

Location: Keel Boat Pass Island St. Bernard Division 5

Shoreline Type: Salt- and brackish-water marsh Mixed sand and shell beaches

Treatment Type:	Surface	Subsurface	Submerged Manual	Mechanical
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Oiled Area For Treatment:

Zone A: salt marsh with 30 yd x 5 yd topographic low with pooled mousse and oiled organic material (coffee grounds).

Zone B: salt marsh, 230 yd x 1-2 yd area with heavily oiled wrack and patches of pooled mousse.

Zone C: salt marsh/shell berm, 150 yd x 2-3 yd area with heavily oiled shell hash, heavily oiled wrack, and patches of pooled oil.

Zone D: salt marsh/shell berm, 130 yd x 4 yd area with heavily oiled shell hash, heavily oiled wrack, and patches of pooled oil.

Zone E: salt marsh/shell berm, 10 yd x 3 yd area with heavily oiled shell hash, heavily oiled wrack, and some pooled oil.

Zone F: salt marsh/shell berm, 15 yd x 4 yd area with oiled shell hash.

Zone G: salt marsh/shell berm, 115 yd x 1 yd area with heavily oiled shell hash and pooled oil in numerous locations

Zone H: salt marsh/shell berm, 85 yd x 2 yd area with heavily oiled shell hash with pooled oil.



Cleanup Recommendation:

Manually remove the heavily oiled shell, oiled wrack that is tacky and poses risk to wildlife, oiled coffee grounds, and pooled oil using shovels, rakes, other appropriate hand tools, and/or gloved hands.

Loose sorbent materials can be used to remove/reduce pooled surface mousse or liquid oil. In areas of higher concentrations and minimal live vegetation, loose organic sorbent materials (e.g., bagasse, kenaf, etc.) can be applied and raked across the area to increase the oil sorption, both on the surface and where the oil is soaked into the soil. The oiled sorbent material will then be raked up and bagged. All sorbents applied to pooled oil and oil-saturated sorbent materials must be removed. In areas with lower concentrations or more vegetation, and as a final treatment step in the raked areas, a thin layer of the loose organic sorbent materials can be applied in a targeted and judicious manner, to any remaining tacky oil residues on the substrate and/or vegetation, as a means of short-term wildlife protection. This material can be left in place to naturally degrade (as approved by the RRT on 8 April 2011). The on-site monitors will advise on the appropriate thickness of the loose sorbent to be left on the surface in the treatment areas.

Minimize disturbance to live marsh vegetation in oil removal locations.

Minimize the removal of clean shell material.

Do not disturb or remove any natural debris, beach wrack, or other organic materials that are not oiled unless they are blocking access to or are mixed with oiled sediments. Where blocking access, unoiled wrack or other materials should be moved as little as necessary to the nearest tidally influenced area.

If the cleanup crews will be walking in the marsh, past the firm shell/sand edge of the platform, the on-site SCAT-Ops Liason should determine whether to require walking boards to avoid marsh impacts in soft areas.

To limit disturbance to pelicans and other birds, manual work crews should be limited in size and number to the minimum number of crews and personnel needed to get the work done in a reasonably efficient time frame. Have work crews and personnel work as closely together as possible during cleanup operations, rather than spread across the entire work area.

Ecological Concerns:

WILDLIFE CONCERNS

Certain species of colonial nesters believed to utilize this island may initiate nesting during the continuation of this work; therefore, Louisiana Department of Wildlife and Fisheries (LDWF) survey the island at regular intervals and determine whether the proposed activity will create a disturbance to wildlife. Contact Matthew Weigel (985 665 1083) with LDWF for assistance with avoiding disturbance to pelicans and nesting birds during on-site cleanup operations.

Piping plover, a federally listed species, as well as other migratory shorebirds and nesting birds, may occur in the area. The U.S. Fish and Wildlife Service (USFWS) has representatives in each of the Louisiana Branches. The USFWS or its representatives shall coordinate with LDWF staff to assist operations in the implementation of all BMPs to minimize impact to vegetated areas, the wrack line, tidal foraging habitat, and natural beach topography. This effort may include establishing temporary exclusion zones, delineating travel corridors, and recommending adaptive measures to minimize disturbance. They can also be contacted for technical assistance with avoiding disturbance to shorebirds in this area.

Refer to the March 17, 2011 "Guidance for Avoiding and Minimizing Disturbance of Nesting Migratory Birds and Listed Birds Near Shoreline Cleanup Areas" for all response activities. NRAs/READs will continue to document all BMPs that were, and were not, complied with by any and all Response personnel on the BMP Implementation Checklist and in their 214/DUD reports, including those exceptions specifically pre-arranged in an STR.

All STRs and Field Plans require NRA and/or READ staffing for implementation to ensure compliance with trust resource laws and regulations. As specified in the BMPs, Section 7 in consultation with Section 106 will provide recommendations regarding the appropriate number/type of NRAs/READs required based on geography, needs of trust resources, safety and methodologies used by Operations.



Pooled Mousse and Oiled Organic Matter (Coffee Grounds)



Pooled Mousse and Oiled Organic Matter (Coffee Grounds)

R S4-009 r Keel Boat Pass Island St. Bernard Parish Division 5









SCAT Activity 7: Monitoring Cleanup Operations

Objective

- Assist Operations with implementation of the treatment recommendations, as requested
- Conduct field assessment to evaluate new methods or equipment





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



SCAT Activity 8: Post-Treatment Inspections

Objective

 Inspect segments determined by Operations to be ready for SCAT inspection prior to final approval for sign-off





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

SCAT Activity 8: Post-Treatment Inspections Methods

- Receive notification from Operations that a segment is ready for inspection
- Inspect segment against final cleanup endpoints
- Identify additional cleanup needed, using SCAT forms/sketches
- Recommend segment for final sign-off





Segment ID:	Segment Name	
Survey Date:	Survey Time:	
Tides:	Weather:	
Inspection Completed Along Entit	re Segment: Yes / No	
Result/Recommendation:		
No oil observed.		
Meets cleanup endpoints.		
No further treatment recommended	ed.	
Further treatment recommended.		
(Provide written details of issues and	required actions.)	-
		_
Continued monitoring required.		
(Provide written details of frequer	ncy and schedule.)	0
SCAT Team Members:		
Name	Signature	
FOSC Rep		
SOSC Rep		
SOSC Rep RP Rep		

1. GENERAL INFORMATION Site Name	Date (dd/mm/yy)	Time (24h s	tandard/daylight)	Tide Height
Division/Segment:	1	ho	s to hrs	H/M/L
Inspection By: Foot / Boat / Helicopter /	Ū.	Sun / Clouds / For / Rain / Snow / Win		
2. INSPECTION TEAM Name	Organizat	ion	Signa	ture
	2			
	-			
3. SEGMENT Description of Shoreline S	urveyed:			
A SHOPELINE TUBES - Salar Disease	(D) and Canadam (C)		_	
A SHOKELINE ITTES Select Primary	(r) and Secondary (S) t	pies present		
Marsh or wetlands (includes Floa	ning Marsh)	Wata		
Find Chall of Mud Fiats	all Danahas	Wave-cut Scal	ps	
Sand, Shell of Mixed Sand & Sh	CH BEACHES	IODEL INC.	FANTID DI ANT	19 Las 2000
5. CLEANUP ENDPOINTS KEP	ER TO REVISED SI	IORELINE C	LEANUP PLAN	28 Jan. 200/
If yes, describe:				
Hyes HNo. Oily debris present that is a	nollution risk and sho	uld be removed	7 If yes, describe:	
	portución tisk and sito	and be removed	. Il yes, describe.	
Yes No Oil coat or stain present the	et is a substantial risk to	the public or y	vildlife? If yes, des	eribe:
Diene Diene ein einen einen benehmten		, and harring an i		
EVer ENa Observed sheening at site t	hat is a source of secon	dans nollution a	nd a rick to wildlif	67
Lites Lite describe:	that is a source of secon	daily politicion a	ing a risk to whith	
If yes, describe:				
Other oiling conditions or observations:				
6. RECOMMENDATIONS				
Yes No Recommend Additional Ad	ctive Cleanup (Stage 1)	. Comments:		
Yes No Recommend continued mai	ntenance of passive sor	bent recovery fi	or sheens (Stage 2)	. Comments:
Tyes TNo Site meets the cleanup ende	points (Stage 3). Record	nmend natural r	ecovery for residu	al pollution
D D	and the grade of the states			- I

Bayou Perot Oil Spill: Shoreline Cleanup and Assessment Leam (SCAT) Inspection Form						
1. GENERAL INFORMATION	Date (dd/mm/yy)	Time (24h	standard/daylight)	Tide Height		
Site Name:		-		L/M/H		
Division/Segment:		h	irs to hrs	H/M/L		
Inspection By: Foot / Boat / Helicopter /		Sun / Clouds / Fog / Rain / Snow / Windy				
2. INSPECTION TEAM Name	Organizati	on	ature			
3. SEGMENT Description of Shoreline Surve	eyed:					
4 SHOPELINE TYPES Salast Drimory (D)	and Casandamy (C) to	magnessant				
4. SHORELINE I YPES Select Philliary (P)	and Secondary (S) ()	pes present				
Marsh or Wetlands (includes Floating	g Marsh)	Riprap				
Tidal Flats/Mud Flats		Wave-cut Scarps				
Sand, Shell or Mixed Sand & Shell	Beaches	Other:				

Bayou Perot Oil Spill: Shoreline Cleanup and Assessment Team (SCAT) Inspection Form

5. CLE	EANUP	ENDPOINTS	REFER TO REVISED SHORELINE CLEANUP PLAN (28 Jan. 2007)
TYes	🛛 No	Floating or potentia	ally mobile heavy oil present that is a substantial secondary pollution threat?
		If yes, describe:	
Yes	No	Oily debris present	that is a pollution risk and should be removed? If yes, describe:
_	_		
🛛 Yes	No	Oil coat or stain pr	esent that is a substantial risk to the public or wildlife? If yes, describe:
-	-	_	
TYes	□ No	Observed sheening	at site that is a source of secondary pollution and a risk to wildlife?
-	-	If yes, describe:	
		•	
Other o	iling co	onditions or observat	ions:

6. REC	6. RECOMMENDATIONS					
TYes	No	Recommend Additional Active Cleanup (Stage 1). Comments:				
TYes	No	Recommend continued maintenance of passive sorbent recovery for sheens (Stage 2). Comments:				
-						
Yes	🛛 No	Site meets the cleanup endpoints (Stage 3). Recommend natural recovery for residual pollution.				
Attach	nents: S	sketch/Map: Yes / No Photos: Yes / No Additional Comments: Yes / No				







State	Length of shoreline by Segments within Status Category (miles)					
	Total Segment Length Surveyed	STR Process	SIR1 Process	(Pending Approval) Removal Actions Deemed Complete	Removal Actions Deemed Complete	Operational Pause
Louisiana	3191	105	97	11	2977	0
Mississippi	228	26	5	19	176	2
Alabama	238	41	5	15	177	0
Florida	480	28	10	1	441	0
DOI	239	65	7	2	152	14
All States*	4375	265	123	48	3924	16

Updated NOAA Job-Aids

An FOSC's Guide to NOAA Scientific Support







U.S. Department of Commerce NOW's Office of Response and Resizeated + Energency Response Division

Characteristic Coastal Habitats

Choosing Spill Response Alternatives

June 2010

Characteristics of Response Strategies:

A Guide for Spill Response Planning in Marine Environments





A joint publication of: U.S. DEPARTMENT OF COMMENCE U.S. Coast Guard U.S. Environmential Protection Agency American Petroleum Institute

June 2010

New/Updated NOAA Job-Aids

Oil Spills in Mangroves

PLANNING & RESPONSE CONSIDERATIONS



Oil Spills in Marshes

PLANNING & RESPONSE CONSIDERATIONS September 2013





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Sea Turtles

BIOLOGY, PLANNING, AND RESPONSE

Oil and




eSCAT

- Field computers for direct data capture:
 - GPS coordinates of start/end of segment
 - Waypoints for photos, pits, etc.
 - Digital photographs
 - Wireless connection for download
- Status:
 - Many prototypes, seldom actually used, but this will change over time





Sample Collection by SCAT

- Why would SCAT collect a sample?
 - For fingerprinting to determine if the oil was a match or not with the source oil
 - For treatability studies
 - For assessment of weathering
- SCAT does not sample for:
 - NRDA
 - Any other requests outside of the response





Sample Collection Methods

- Develop uniform sample ID protocol (segment, date, matrix, team, sequence #) and label the container
- Wear new Nitrile gloves for each sample
- Skim oil directly into the jar or use gloved hand or clean spoon/scoop
- Dry/clean outside of the container, wrap in bubble wrap or a sorbent pad and place in ziploc bag
- Place on ice and keep cold and under chain of custody until transferred
- Fill out a chain of custody form for all samples collected





What is Chain of Custody?

- A legal term that refers to the ability to guarantee the identity and integrity of a sample through reporting of the test results
- Samples are in your "custody" when they are:
 - In your physical possession
 - In your view after being in your physical possession
 - In your physical possession then locked up so that tampering cannot occur;
 - In a secured area, with access restricted to authorized personnel only
- A CoC form is the tool used to track possession of a sample



CLEANUP METHODS:

Objectives Description When to Use Environmental Effects Constraints





- Develop a basic understanding of common cleanup methods and appropriate guidelines on when and where they should be used.
- Understand how SCAT can make recommendations and place constraints on cleanup
- Understand how oil type, quantity, shoreline type, habitat sensitivity, and certain other factors effect selection and use of countermeasures



Objectives

- Understand the potential that countermeasures may cause collateral injuries to the environment
- Know of several job-aids available to SCAT for making cleanup recommendations
- Refer to Appendix B of the SAM
- Refer to pictures in the SCAT Job-Aid



Characteristic Coastal Habitats

Choosing Spill Response Alternatives





U.S. DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administra National Ocean Service Office of Response and Restoration Emergency Response Division

June 2010

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Cleanup Matrix for Sand

			0il Category							
Response Method	Ι	II	III	IV						
Natural Recovery	А	В	В	C						
Barriers/Berms	В	В	В	В						
Manual Oil Removal/Cleaning	D	В	Α	А						
Mechanical Oil Removal	D	В	В	В						
Sorbents	-	В	Α	А						
Vacuum	-	-	В	А						
Debris Removal	-	А	А	А						
Sediment Reworking/Tilling	D	В	В	В						
Vegetation Cutting/Removal	-	С	С	С						
Flooding (deluge)	А	А	А	В						
Low-pressure, Ambient Water Flushing	В	В	В	В						
High-pressure, Ambient Water Flushing	-	-	-	-						
Low-pressure, Hot Water Flushing	-	-	С	С						
High-pressure, Hot Water Flushing	-	-	-	-						
Steam Cleaning	-	-	-	-						
Sand Blasting	-	-	-	-						
Solidifiers	-	-	В	-						
Shoreline Cleaning Agents	-	-	С	C						
Nutrient Enrichment	-	А	Α	В						
Natural Microbe Seeding	-	I	I	Ι						
In-situ Burning	-	-	С	C						

Why SCAT Needs to Know about Cleanup Methods

- SCAT Teams recommend specific cleanup methods, constraints, and habitats to avoid
- SCAT are the eyes of the EU in the field; they observe and report back when the recommended methods are:
 - Not being properly implemented
 - No longer effective
 - Causing more harm than good



6. OILING DESCRIPTION: Indicate overlapping zones in different tidal zones by numbering them (e.g. A1, A2)																											
Zone ID	ESI Type			Т	Tidal Zone			Oil Cover Zone Area 1-100% <1% Size						Oil Thickness Oil Character													
		WP Start	WP End	LI	МІ	UI	SU	Length (m)	Width (m)	Distr. %	# per unit area	Av Siz (ca	vg ze n)	Large Size (cm)	то	cv	СТ	ST	FL	FR	MS	тв	PT	TC	SR	AP	No
													_														
7. SUI	BSUR	FACE	E OIL	INC	G C	ON	DIT	IONS:	Forma	t: Zone	ID das	sh I	ren	ch Nu	ımber	in t	hat Z	lone,	e.g.	, "A-	•1, B•	-1, B	-2"				
Pit	WP	Substrate T Surface Subsurfac		ype Tidal Zo				ne	Trench Depth	Oi Inte	led rval			Su	bsurface Oil Character						Wate Tabl	r Sh b C	heen Color	Cle	an B	elow	
#				Subsurfac		e	LI	M	ניט	I SU	(cm)	(cm	-cm)	OP	PP	OR	OF	TR	тв	SR	AP	NO	%	(cm)	B,1	R,S,N	1 X
8. COMMENTS: Cleanup Recommendations; Ecological/Recreational/Cultural Issues; Wildlife Observations; Oiling Descriptions																											

Shoreline Cleanup Methods

- Objective
- Description
- Applicable Habitat Types
- When to Use
- Biological Constraints
- Environmental Effects
- Waste Generation



Natural Recovery



Natural Recovery

Natural recovery is appropriate when access is severely restricted such as this muddy tidal flat in Cook Inlet, AK.





Deepwater Horizon Spill

3 July 2010

Deepwater Horizon oil spill

27 July 2010



Barriers and Berms



Physical Herding







Morris J. Berman spill in Puerto Rico



Manual removal can include the use of sorbents and scrapers to remove the oil. Cleanup workers are perched on steep riprap at the spill of 53,000 gallons of a heavy fuel oil from the Cosco Busan spill in San Francisco Bay in November 2007. Demonstrates that manual removal can have significant safety concerns.



Mechanical Removal



1976 spill from the Urquiola in Spain

Mechanical Removal

Mechanical removal of heavily oiled soils along the Kalamazoo River from the Enbridge pipbeline spill in July 2010 during a major flood.





West Dauphin Island Deep Clean – 13 Jan 2011 Excavation of sand from a depth of 4 ft; stockpiling the sand, allowing it to dry; then screening it Deepwater Horizon, Alabama, 2011















Chalk Point spill in 2000 in the Patuxent River, MD











Loose Sorbent Application: DM932 Spill, New Orleans



Before



Testing of a loose sorbent on riprap during the DM932 spill in New Orleans in 2008.

Loose Natural Sorbent Application



Application of bagasse (ground up sugar cane stalks)





Vacuum





Vacuum




Vacuum





Vacuum





Vacuum



"RTMENT OF CO"

Debris Removal





Sugarland Run spill of diesel

Debris Removal





Debris Removal





Sediment Re-working/Tilling

Exxon Valdez oil spill in Prince William Sound in 1990, during the second year of cleanup



Sediment Re-working/Tilling





Sediment Re-working/Tilling







Large-scale berm relocation on remote beaches on Unalaska Island





Tilling: Bring subsurface oil to the surface for removal by sifting

Break up larger oil particles to speed degradation





Mechanical Beach Cleaners for Sediment Sifting





Beach Tech

Barber 600 HD Surf Rake



Sand Shark





Cherrington

Vegetation Cutting



Removing of oiled vegetation as on the right for the DWH spill in Barataria Bay. Cutting can be to access oiled areas, as on the left for a spill in the Miss River Delta.





Flooding/Deluge





Exxon Valdez oil spill in 1989

Flooding/Deluge





PEPCO spill in the Patuxant River, MD, 2000

Flooding/Deluge





DWH response

Low-pressure, Ambient-temperature Flushing





Low-pressure, Ambient-temperature Flushing





Low-pressure, Ambient-temperature Flushing





High-Pressure Flushing





High-Pressure Flushing





High-Pressure Flushing





High-Pressure, Hot-Water Flushing



High-Pressure, Hot-Water Flushing





High-Pressure, Hot-Water Flushing





Athos spill in the Delaware River, November, 2004

Surface Washing Agents





In-Situ Burning

2001 Mosquito Bay spill of S. Louisiana



1411

In-Situ Burning





You should now ...

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SCENARIO

For SCAT

SCENARIO

- On the morning of May 1, 2016 at 02:30 local time, the M/T SABLE (277,734 DWT -owned/operate by OilTran Inc. of Greece) is anchored approximately 15 miles off Rehoboth Beach, DE. Arrangements have been made to lighter the Gullfaks crude oil off the SABLE for delivery to Philadelphia Energy Solutions.
- The lightering vessel OSG 310 is alongside to port conducting the operation when sudden surge of the SABLE's pumps causing overpressure failure of the transfer hose. Shut down of pumps was delayed for several minutes.
- Approximately 50, 250 gallons of Gullfaks crude oil discharges into the water.







Tue	Wed	Thu	Fri	Sat
May 3	May 4	May 5	May 6	May 7
3		2	- C	<u>e</u>
Rain possible in the p.m.	A couple of t-storms possible	A couple of showers possible	Partly sunny	A thunderstorm possible
63°Lo 52°	70°Lo 51°	70°Lo 51°	71°Lo 53°	68° Lo 51°
	more	more	more	more
Day	Hi 63° RealFeel® 65° Precipitation 35%	Night	L0 C Reall Precip	52° Feel® 48° Itation 25%
Mostly cloudy with rain in the afternoo	a chance of	Partly closes	udy	WES
	NE 9	mph 13 mph		NE 7 mph



