USCG Sector DelBay 2015
Ecological Risk Assessment (ERA)
for Bakken and Dilbit Crude Oils

What is an ERA?

- *"Comparative process to evaluate the possible ecological consequences of human activities, e.g., accident, and natural catastrophes"*

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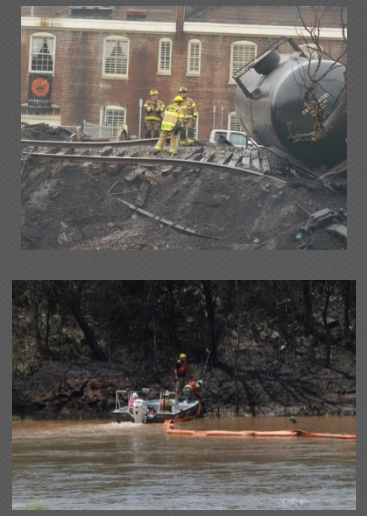

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This process adapted from US EPA 1997 http://www.epa.gov/oswer/riskassessment/ecorisk/pdf/intro.pdf

What are the basic elements?

- Problem Definition/Formulation
  - Activities 1-5 (pre-workshops)
- Conceptual Model/Analysis Plan
  - Activities 6-8 (1st workshop)
- Analysis and Risk Characterization
  - Activities 9-10 (2nd workshop)
- Document and Apply
  - Activities 11-12 (post-workshops)

ERA Participation

2 Workshops – June 9-10 and 23-24, 2015, Delaware County, PA Emergency Training Center

PLANNING COMMITTEE

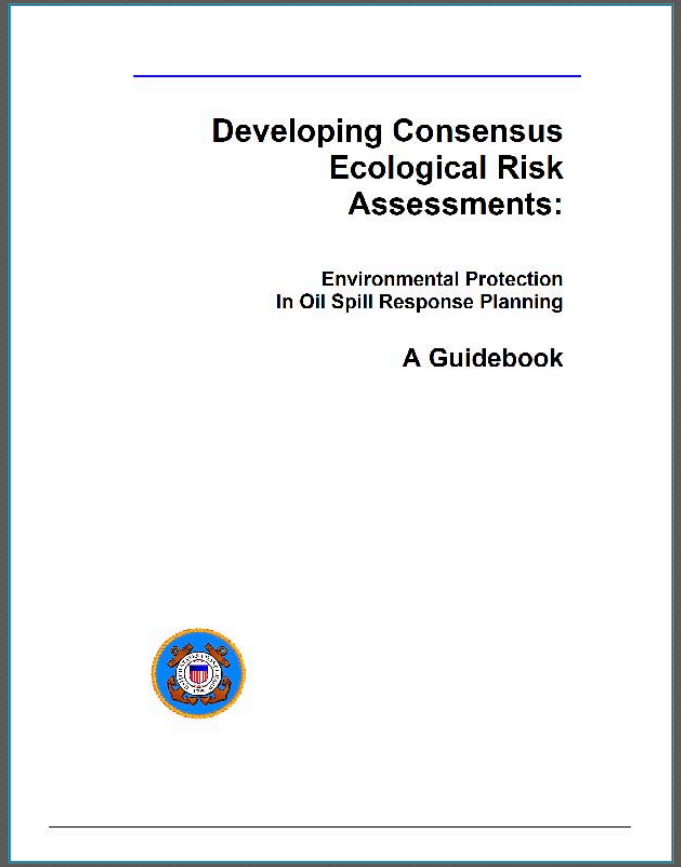
- Project Staff (SEA, USCG, SRA)
- Subcommittees
  - Fate and Transport Subcommittee – Ed Levine, NOAA
  - Resources Subcommittee – Ben Anderson, DNREC/Deb Scholz, SEA
  - Effects Subcommittee – Clay Stern USFWS
  - Response Options Subcommittee – Rich Gaudiosi, DBRC
- Rail presentations from CSX and Norfolk Southern

WORKSHOP PARTICIPANTS

- Invited 178 participants
- About 100 attended, about 85% returned
- PA, DE, and NJ state reps, resource trustees, rail and energy companies, OSROs, FFs, plus
  - NGOs-Partnership for the Delaware Estuary and Delaware Riverkeeper
  - Academia-Dr. Michel Boufadel, Haskin Shellfish Research Lab

Adapting USCG ERA Guidebook

- USCG Guidebook (2000)
  - SEA Consulting Group adapted the guidance to apply to Bakken and Dilbit oils and potential incident locations in Sector DelBay AOR



Adaptions made by SEA for This ERA

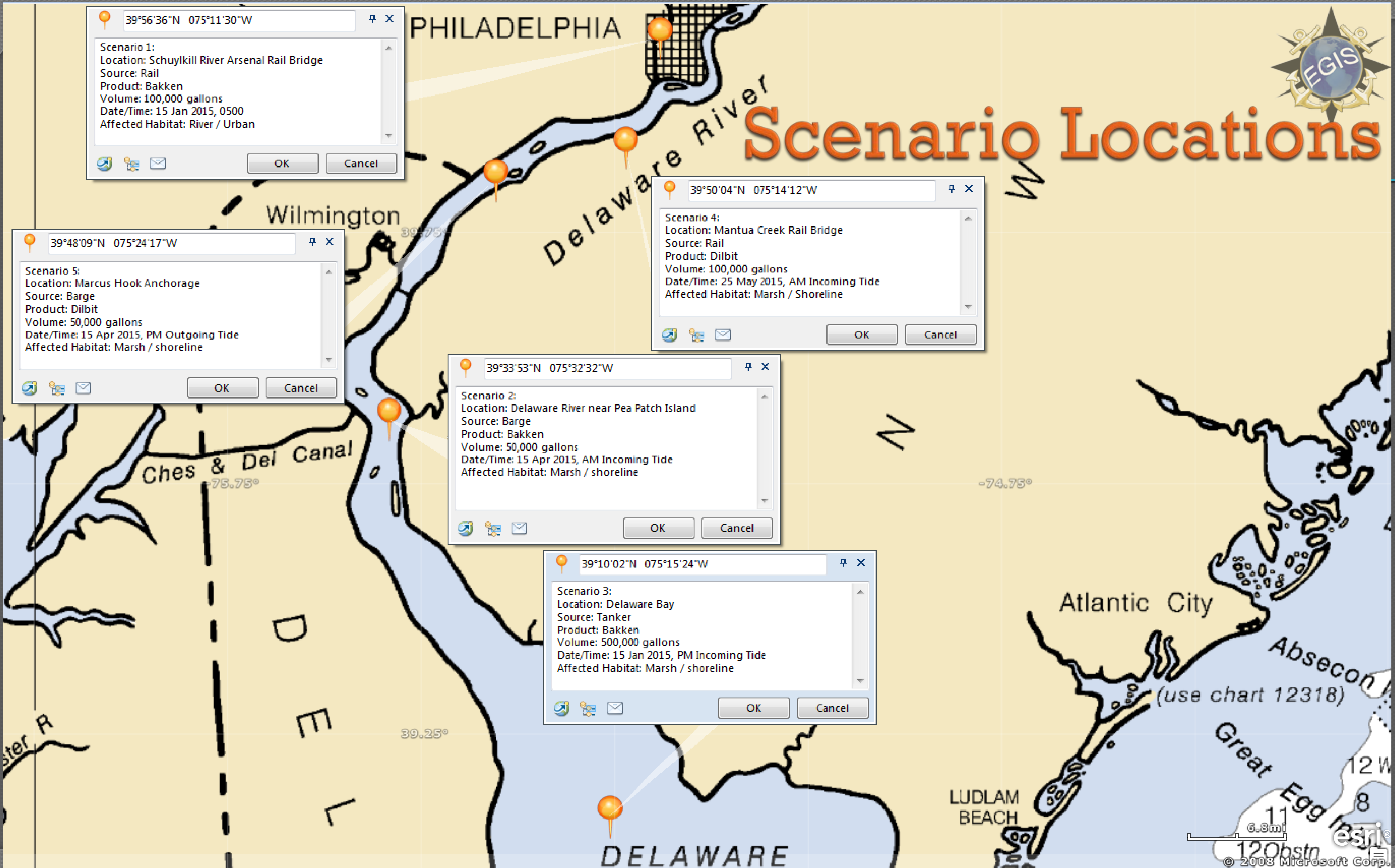
- Two types of crude oil (Bakken and diluted bitumen)
- Five spill scenarios
  - Rail, barge, and tanker modes of transportation
  - Two seasons (winter and spring)
  - Three different settings, i.e., creek (freshwater), river (brackish/salt water depending upon the volume of fresh water flowing into the river), and bay (saltwater)
- Two phases of response
  - Initial emergency phase (initial 4-6 hours) and
  - Longer-term (6 hours onward, especially 4 – 7 days)
- New set of 10 response actions
- New conceptual models were developed
- Revised risk ranking matrix
- Assessed human health and safety risks in addition to ecological risks
- Special consideration was given to T/E species throughout the process

ERA implications for Endangered Species Act

- For this ERA, the USCG has been in consultation with USFWS and NOAA. What we are doing will help us to be better prepared and is in compliance with Section 7(a) (1).
  - This project and workshops meet the intent of section 7(a) (1) – which calls for Federal agencies to consider actions to protect endangered species
    - This is NOT to address the paperwork requirements of section 7(a) (2)
  - Workshop: Addresses the *qualitative* analysis of ecological risks due to response actions and oil exposure
  - Natural Resource Damage Assessment and Recovery (NRDAR): Lead by the Natural Resource Trustees, addresses the *quantitative* analysis of injuries to natural resources from the oil spill and is beyond the scope of the ERA project.

Scenario Focus	Location	Scenario Details
	BAKKEN	
1. Urban / Rail	Incident at the Arsenal Bridge crossing the Schuylkill River, PA January 15, 2015	• River / urban • Typical 4-8 cars • Fire – plume model • Volume: 100,000 gal (½ burned, ½ in the water)
2. Barge	Incident on the Delaware River at Eddystone, PA; resultant spill flows to Pea Patch Island April 15, 2015	• River / marsh / shoreline • Volume: 50,000 gal.
3. Tanker	Incident in the Upper Delaware Bay (DE) January 15, 2015	• Bay / open water / shoreline • Affects 3 states • Volume: 500,000 gal.
	DILBIT	
4. Rail	Incident into a marsh/ tidal creek at Mantua Creek, Paulsboro, NJ May 25, 2015	• Creek/ marsh / shoreline • Volume: 100,000 gal.
5. Barge	Incident at the Marcus Hook (PA) anchorage April 15, 2015	• River / marsh / shoreline • Affects 3 states • Volume: 50,000 gal.

Scenario Locations



39°56'36"N 075°11'30"W

Scenario 1:
Location: Schuylkill River Arsenal Rail Bridge
Source: Rail
Product: Bakken
Volume: 100,000 gallons
Date/Time: 15 Jan 2015, 0500
Affected Habitat: River / Urban

OK Cancel

39°50'04"N 075°14'12"W

Scenario 4:
Location: Mantua Creek Rail Bridge
Source: Rail
Product: Dilbit
Volume: 100,000 gallons
Date/Time: 25 May 2015, AM Incoming Tide
Affected Habitat: Marsh / Shoreline

OK Cancel

39°48'09"N 075°24'17"W

Scenario 5:
Location: Marcus Hook Anchorage
Source: Barge
Product: Dilbit
Volume: 50,000 gallons
Date/Time: 15 Apr 2015, PM Outgoing Tide
Affected Habitat: Marsh / shoreline

OK Cancel

39°33'53"N 075°32'32"W

Scenario 2:
Location: Delaware River near Pea Patch Island
Source: Barge
Product: Bakken
Volume: 50,000 gallons
Date/Time: 15 Apr 2015, AM Incoming Tide
Affected Habitat: Marsh / shoreline

OK Cancel

39°10'02"N 075°15'24"W

Scenario 3:
Location: Delaware Bay
Source: Tanker
Product: Bakken
Volume: 500,000 gallons
Date/Time: 15 Jan 2015, PM Incoming Tide
Affected Habitat: Marsh / shoreline

OK Cancel

Timing of Response Actions

- Overall goal
  - Define the *right things to do right* during the "emergency" phase
- Emergency phase – two perspectives
  1. Health and safety – while oil is still flammable
  2. Environmental – while the oil is still waterborne and/or actionable

1. Timeframe 1: First 2-6 hours
   - Align/coordinate first responder and USCG/NCP actions
2. Timeframe 2: First 4-7 days of response
   - Emphasis on environmental and socioeconomic impacts

Info Gathered between the Workshops

- Refined trajectory models for scenarios 1 and 3
- Extent of contamination maps
- Oil budgets (weathering effects in percentages of initial oil fate)
- Currents
- Nautical charts – Bathymetry/water depths
- ESI maps (on topo sheets) for DE, PA and NJ
- Estuary sensitive areas maps
- Extent of contamination maps
- M/V Athos oil spill after action report
- Maps of water intakes
- List of state endangered species from ACP (supplement those on the ESI maps)
- Estimates of bird and fish distributions (state reps and USFWS reps)
- MSDS for Bakken and Dilbit oils, 3 types of foam

Some Key Findings

- Bakken and dilbit oils are characterized with flammability hazards during the early stages of a spill
- Response to Bakken and dilbit oils is different
  - Behaviors of the oils are different from one another and not all dilbit oils are the same.
- Bakken oils: the primary initial strategy is to mitigate safety risks from flammable vapors.
- Dilbit oils: it is imperative for containment and skimming operations to be implemented immediately, i.e., within a couple of hours, to recover the oil before the diluents separate from the bitumen and spread subsurface
- Uncertainty exists around the use of fire-fighting foam.
- Important take away – the long duration of recovery for freshwater mussels

Some Next Steps

- Develop recommendations for a holistic "concept of operations" approach for dilbit oil spills, i.e., a priority sequence of response actions to implement near the spill source
- As appropriate, generic, key topic areas should be developed into best BMPs presented in tabular format or list and incorporated into the ACP
- Future ERAs - assess the potential risks and net environmental benefit of response actions that involve materials regulated by NCP Subpart J
- Consider investigating water column concentrations and dilution of foam used on Bakken oils