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Office of **Response and Restoration**

## Oil Observing Tools: An Assessment Perspective

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## Natural Resource Damage Assessment (NRDA)

- Oil Pollution Act, 15 CFR 990
- Who: Trustees
- Responsibilities:
  - Determine amount of injury to natural resources and lost services from time of incident through recovery of resources
  - Develop and oversee implementation of restoration plan(s) to compensate the public for injuries and lost services
  - Ensure the polluters pay for assessment and restoration

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## Injury Assessment

- **Injury Determination**
  - **Pathway:** establish pathway from discharge to the exposed resource(s)
  - **Exposure:** confirming resources were exposed to oil/dispersants/other related materials
  - **Injury determination:** document adverse effects occurring resulting from exposure and response actions
  
- **Injury Quantification:** determine degree, geographical + temporal extent of injuries

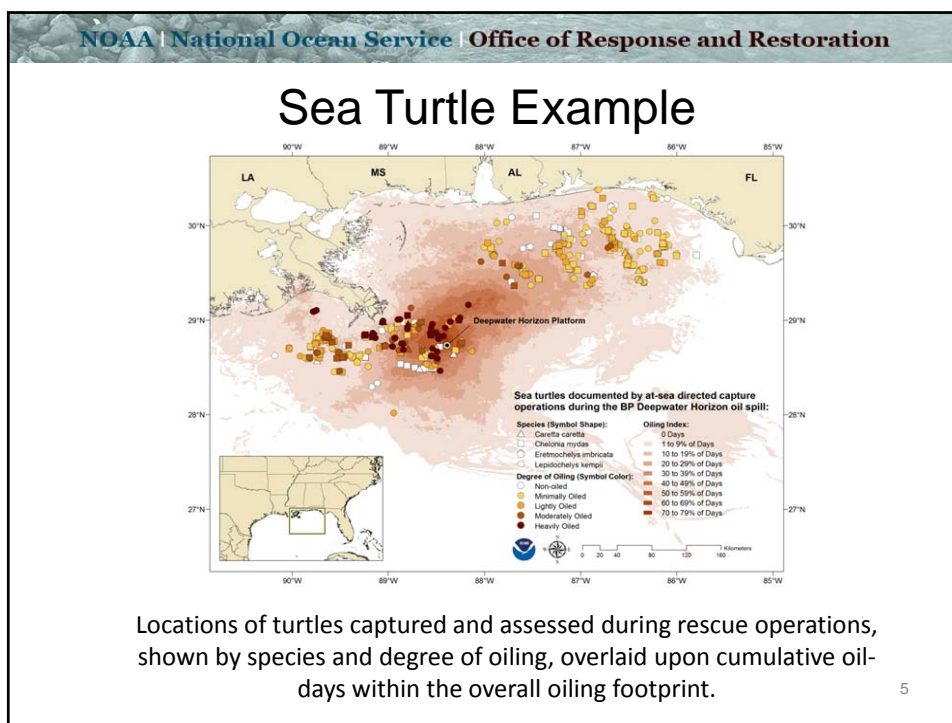


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## Oil Observations Used in Assessments

- Surface oiling “footprints” of exposure
  - Cumulative, daily, weekly, or other timeframes relevant to resources of interest
  - Overlay resources (e.g., turtles, mammals, birds telemetry, boats and aerial surveys) with surface oil
- Percent cover of oil, or other information about surface oil ‘patchiness’
- Persistence of surface oiling for exposure duration
- Information about surface oiling “thickness”
  - Thin and ‘thicker than thick’
  - Estimates of oil thickness for determination of surface mixing zone concentrations, volumes of water exceeding toxic thresholds, etc.

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## Water Column Considerations

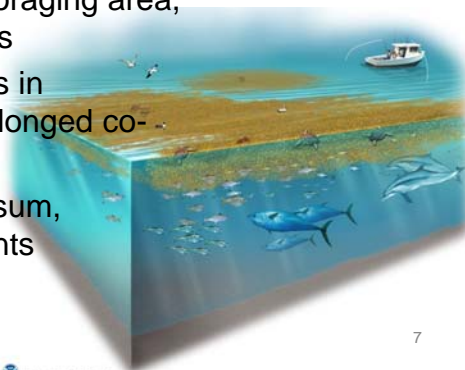
Surface oiling congregates in convergence zones and persists resulting in prolonged exposure to sensitive resources

- High level of biological activity in ocean surface, sensitive early life stages concentrated at the surface
- UV enhanced toxicity – especially at/near surface
- Even thin sheens (~ 1 um) are toxic to fish and invertebrates
- Surface oil mixing into surface mixing layer results in toxic concentrations of oil in water

## Sargassum Assessment Considerations

Sargassum: designated as Essential Fish Habitat (EFH)

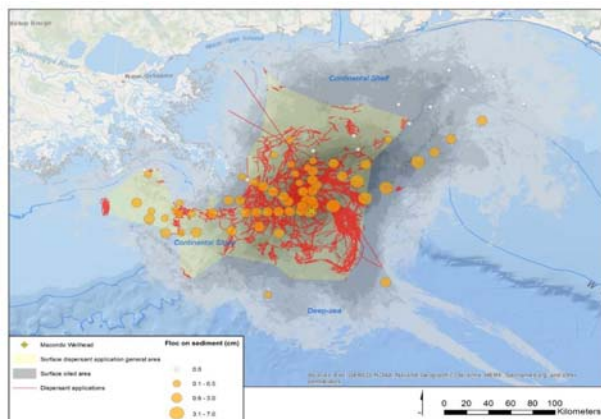
- Fish larvae and invertebrates, larger fish, sea turtles, sea birds rely on Sargassum as habitat, foraging area, protection from predators
- Sargassum concentrates in convergence zones, prolonged co-location with surface oil
- Direct toxicity to Sargassum, especially with dispersants



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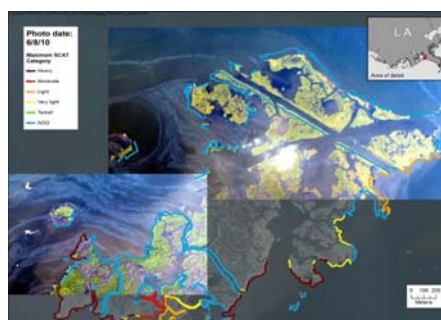
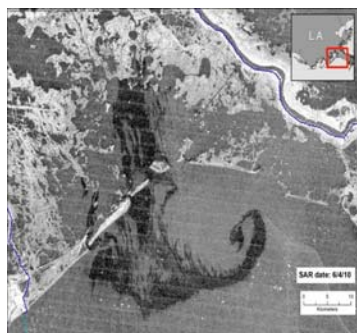
## Surface Oil and Sea Floor Floc

- Larger quantities of floc were observed on the sea floor beneath areas experiencing persistent surface oil and application of dispersants.



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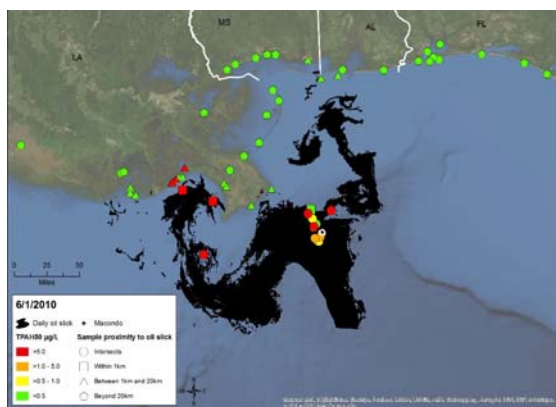
## Use of SAR in Nearshore Environment



Use of SAR and aerial imagery to document oiling beyond SCAT for additional information on *exposure*

## Surface Oiling Products to Guide Field Sampling?

- The synoptic sampling dream



- Satellite
- Overflight
- Surface water
- Subsurface water
- gradient
- Air gradient
- Slick thickness