LCP Chemicals Site

OPERABLE UNIT 1 (Marsh)

PROPOSED PLAN

PUBLIC MEETING

December 4, 2014

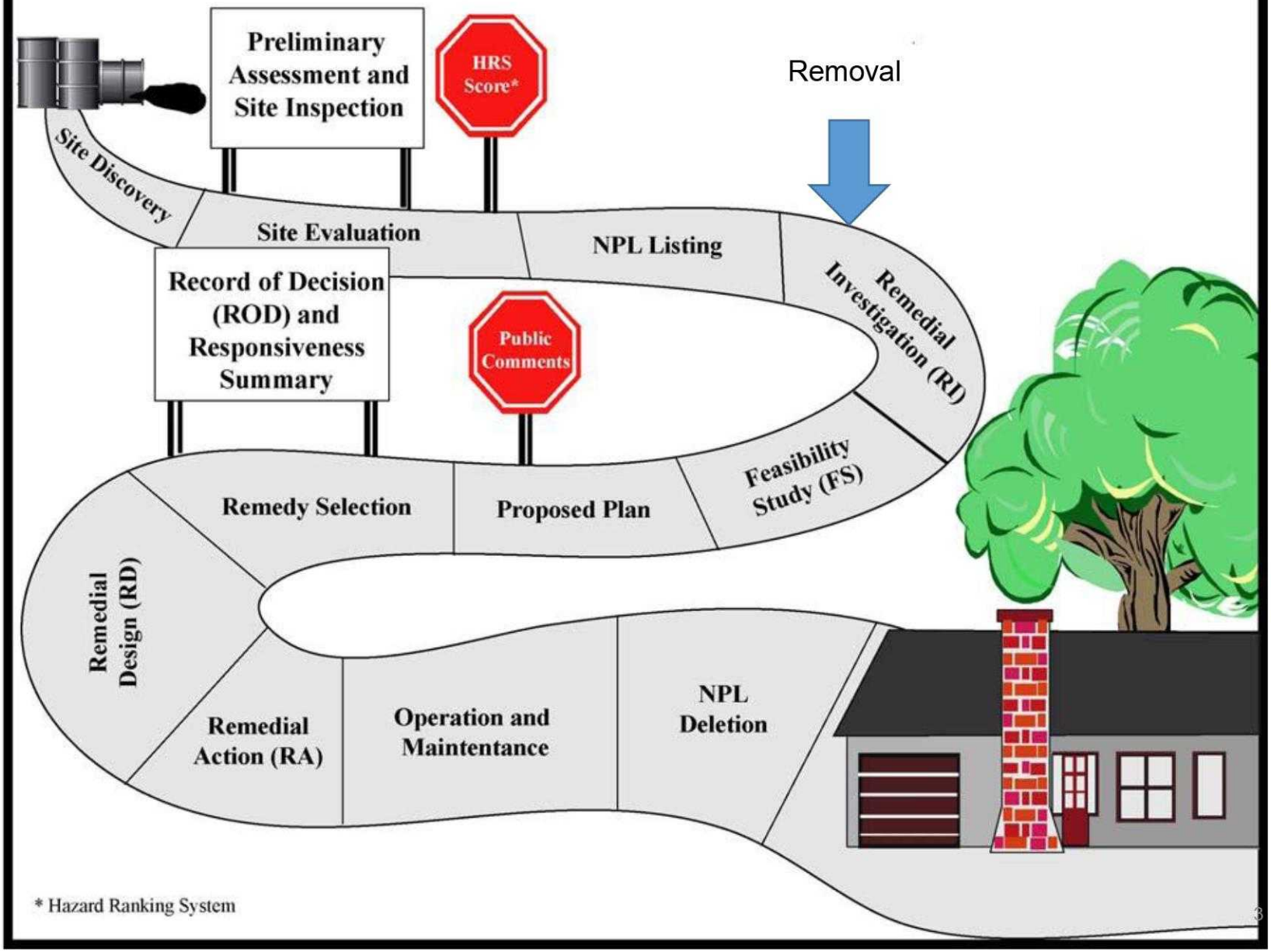
Location: Brunswick-Glynn County Library

6:00 – 8:00 pm

MEETING AGENDA

I. Welcome & Introduction
II. Meeting Purpose & Overview of Superfund Process
III. Site Description & History
IV. Key Components of the Proposed Plan
V. Questions & Answers

The Superfund Process



EPA's Mandate Under Superfund Remedial

- Site Characterization (sampling to determine nature and extent);
- Conduct Baseline Risk Assessments to establish unacceptable risk
- Remedy selection; and
- Remedy implementation.

Features of the LCP Chemicals Marsh

N

Purvis Creek

Entrance Road

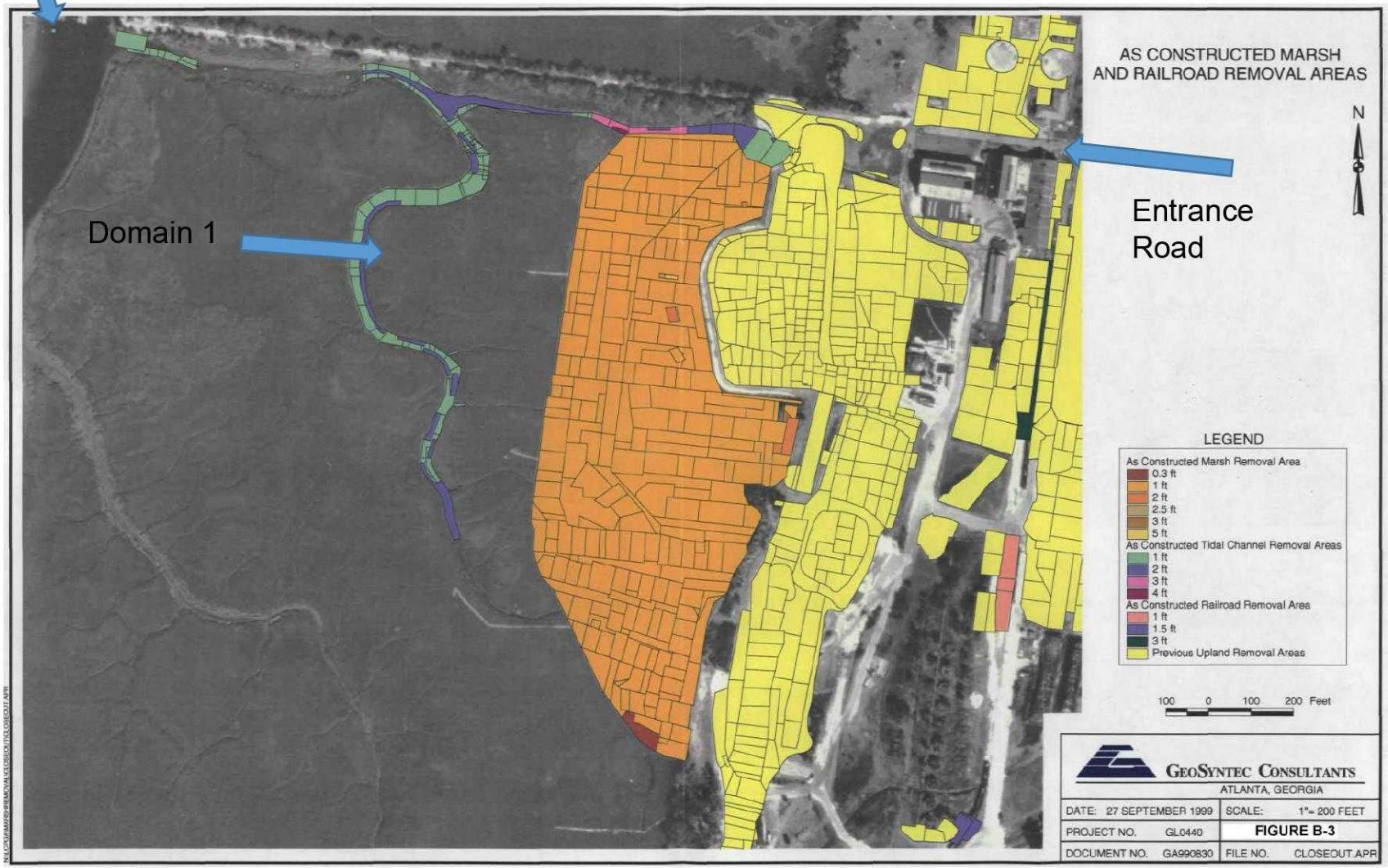
Turtle River

Site Industrial History

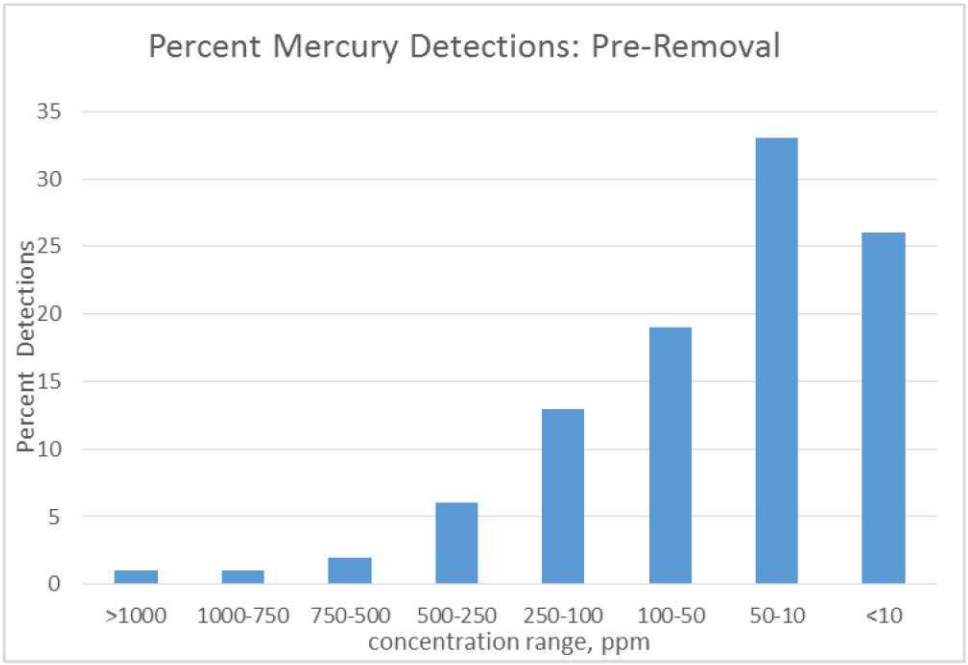
- Use began in 1836 with construction of the Brunswick-Altamaha Canal along the uplands and the marsh boundary;
- ARCO used Site as a refinery from 1919-1929;
- Georgia Power operated an oil-fired power plant from 1937 through 1950;
- Dixie Paint and Varnish Co. purchased part of the Site in 1941 and operated a manufacturing facility until 1955;
- Allied Chemical purchased the Site in 1955 and constructed and operated a chlor-alkali facility, utilizing the mercury-cell process. Main products were chlorine gas, hydrogen gas, and sodium-hydroxide solution;
- LCP Chemicals purchased almost all of the Site in 1979 and continued to operate the chlor-alkali facility until 1994, when operations were discontinued. In May 1998, Allied Signal (Honeywell) purchased the LCP property from the estate in bankruptcy.

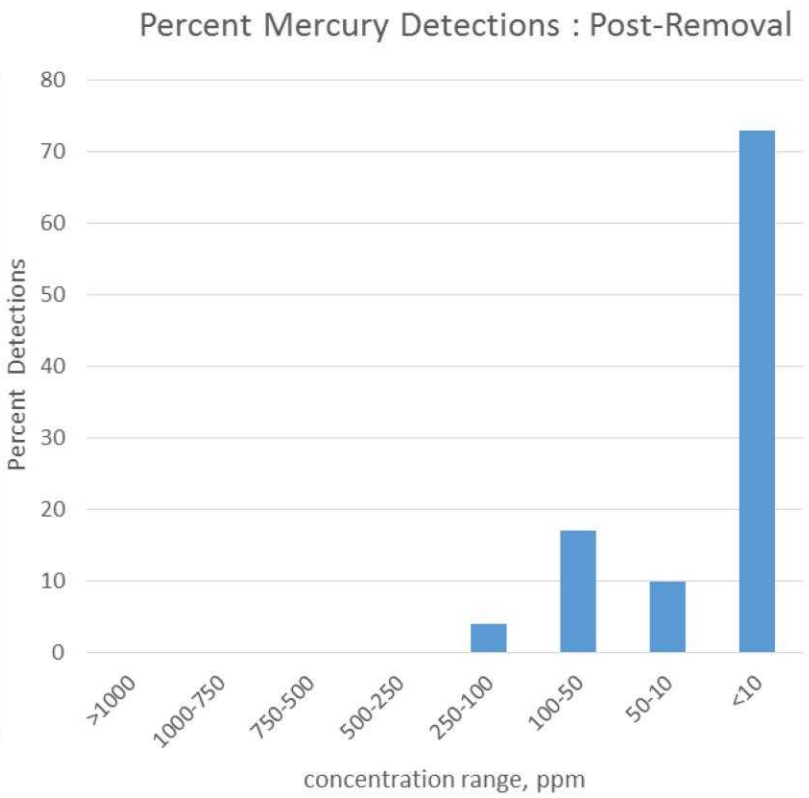
Purvis Creek

Late 1990s Removal Areas

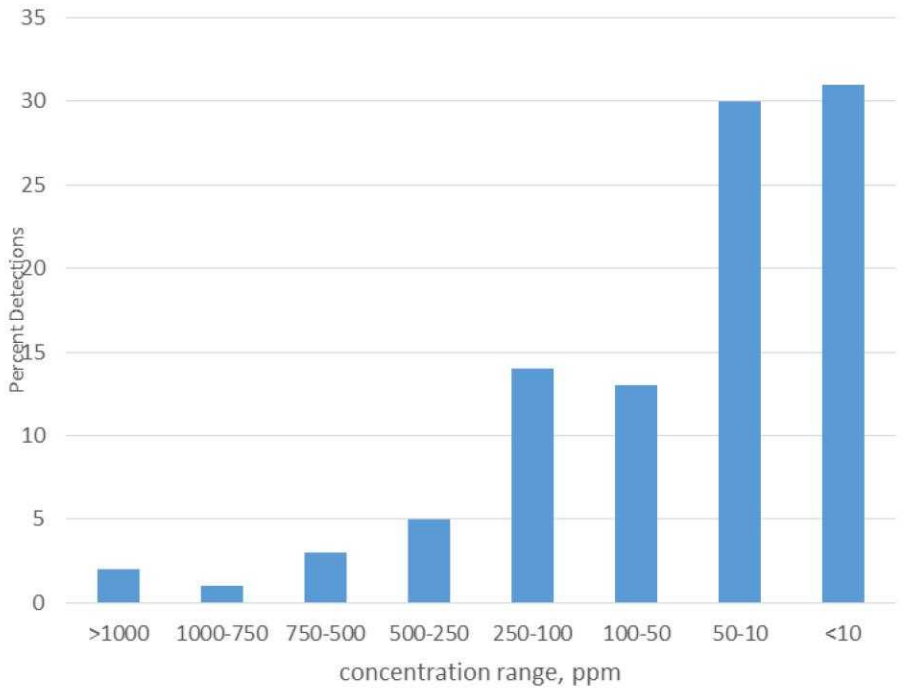


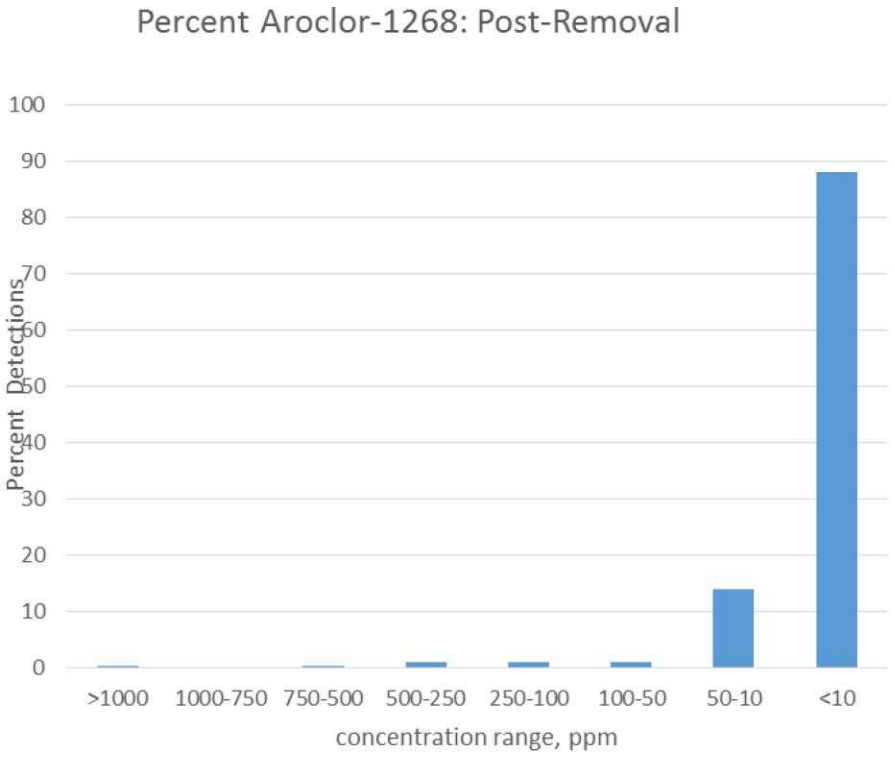
Reduction of Mercury Pre- and Post-Removal





Reduction of Aroclor-1268 Pre- and Post-Removal

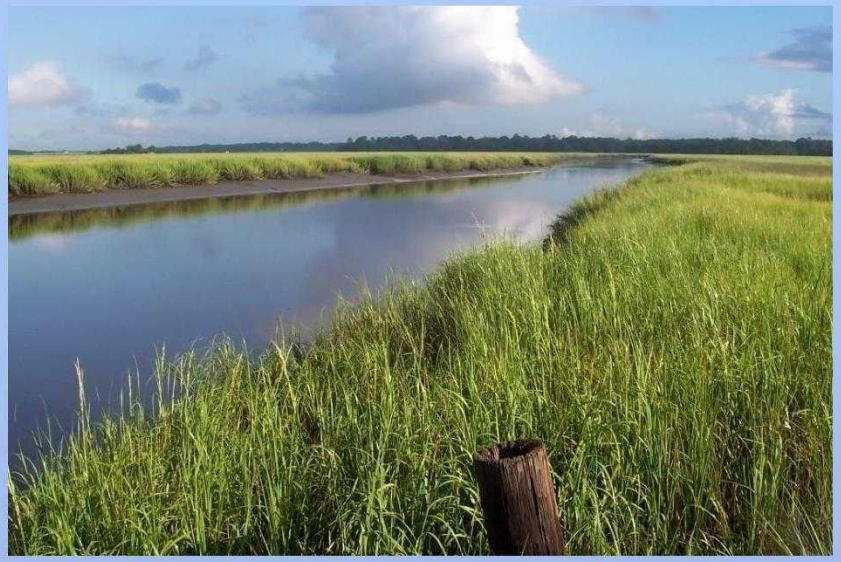




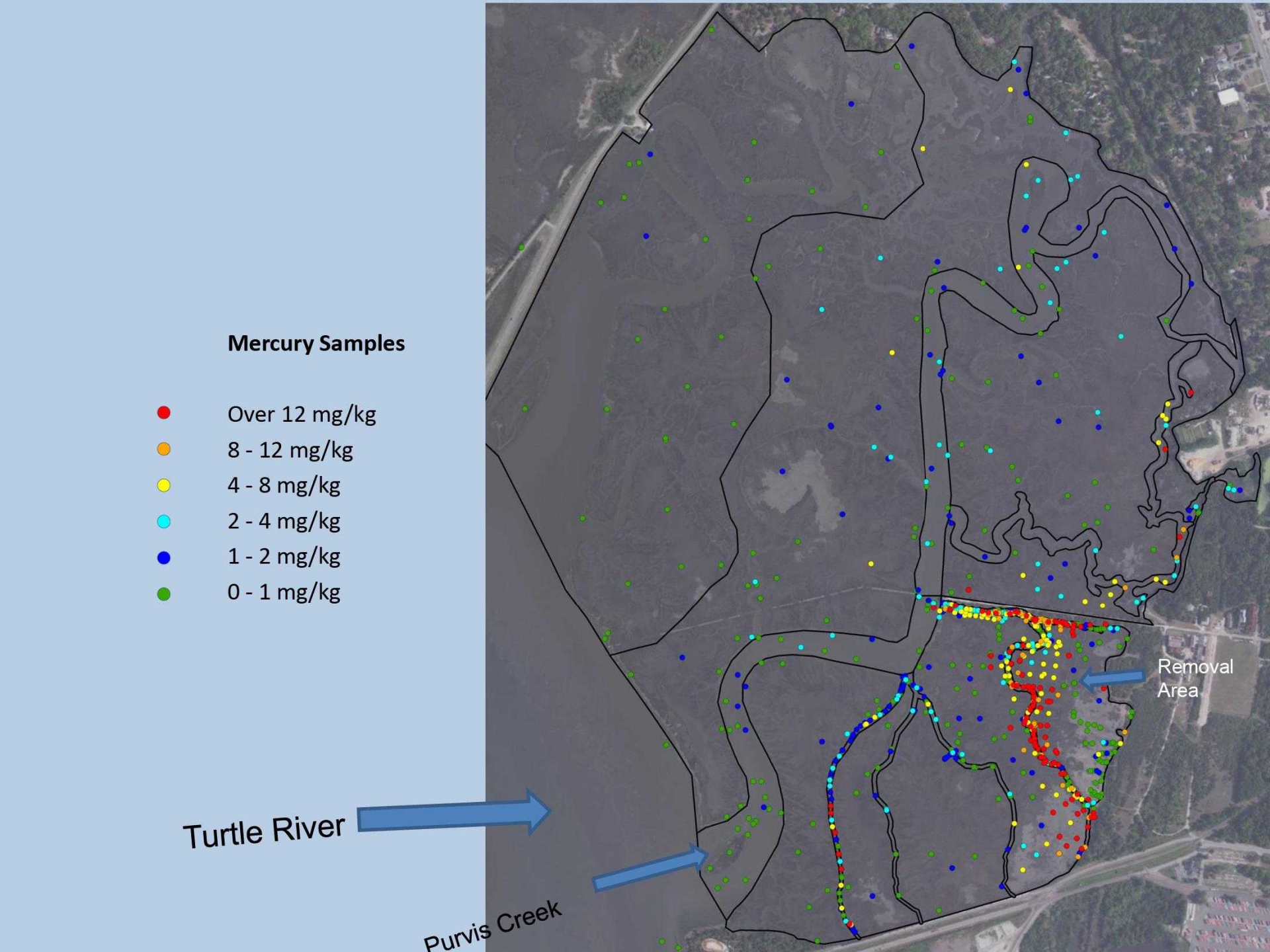
Marsh Remedial Investigation

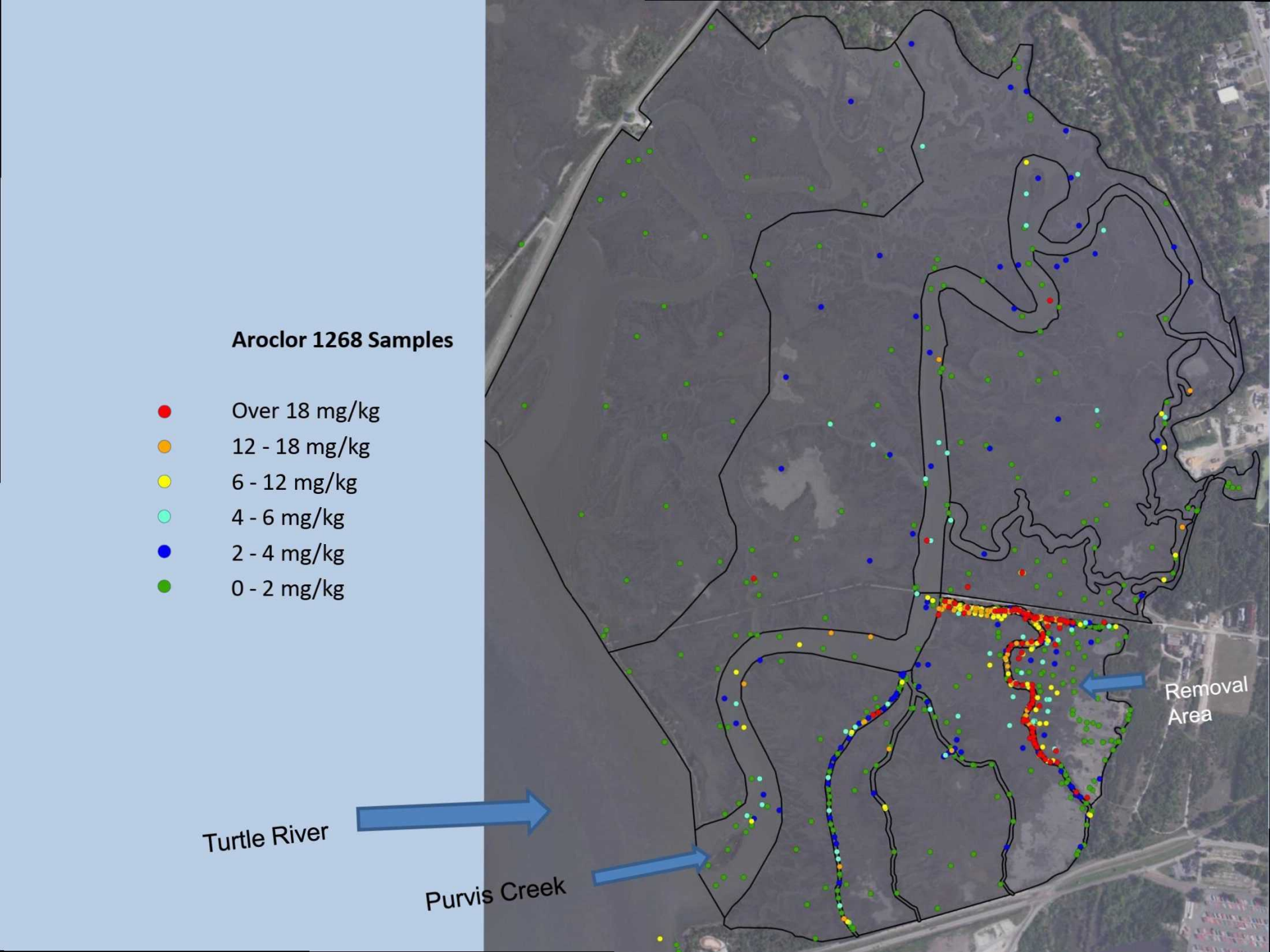
- Marsh Remedial Investigation Objectives:
  - Determine extent of contamination
    - How far and where contamination has migrated?
  - Determine nature of contamination
    - What are the contaminants and at what concentrations?
  - Baseline Risk Assessments
    - Primary Goals
      - Qualitative and quantitative estimation of risk posed to **human health** and the **environment** by the actual (current) or potential (future) presence or release of contaminants (chemicals).
      - This evaluation is for both cancer and non-cancer risks.

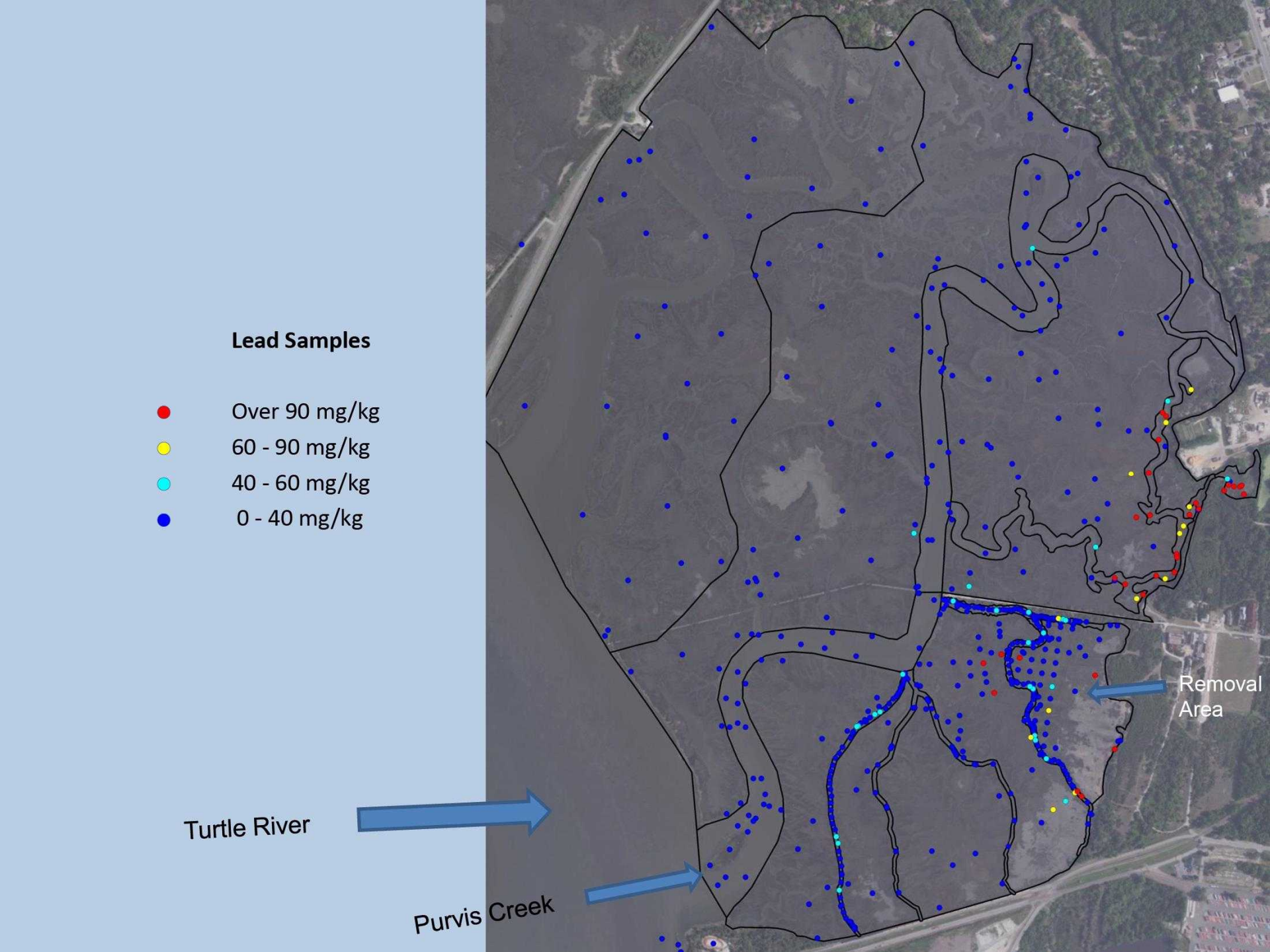
• Major Chemicals of Concern (COCs)

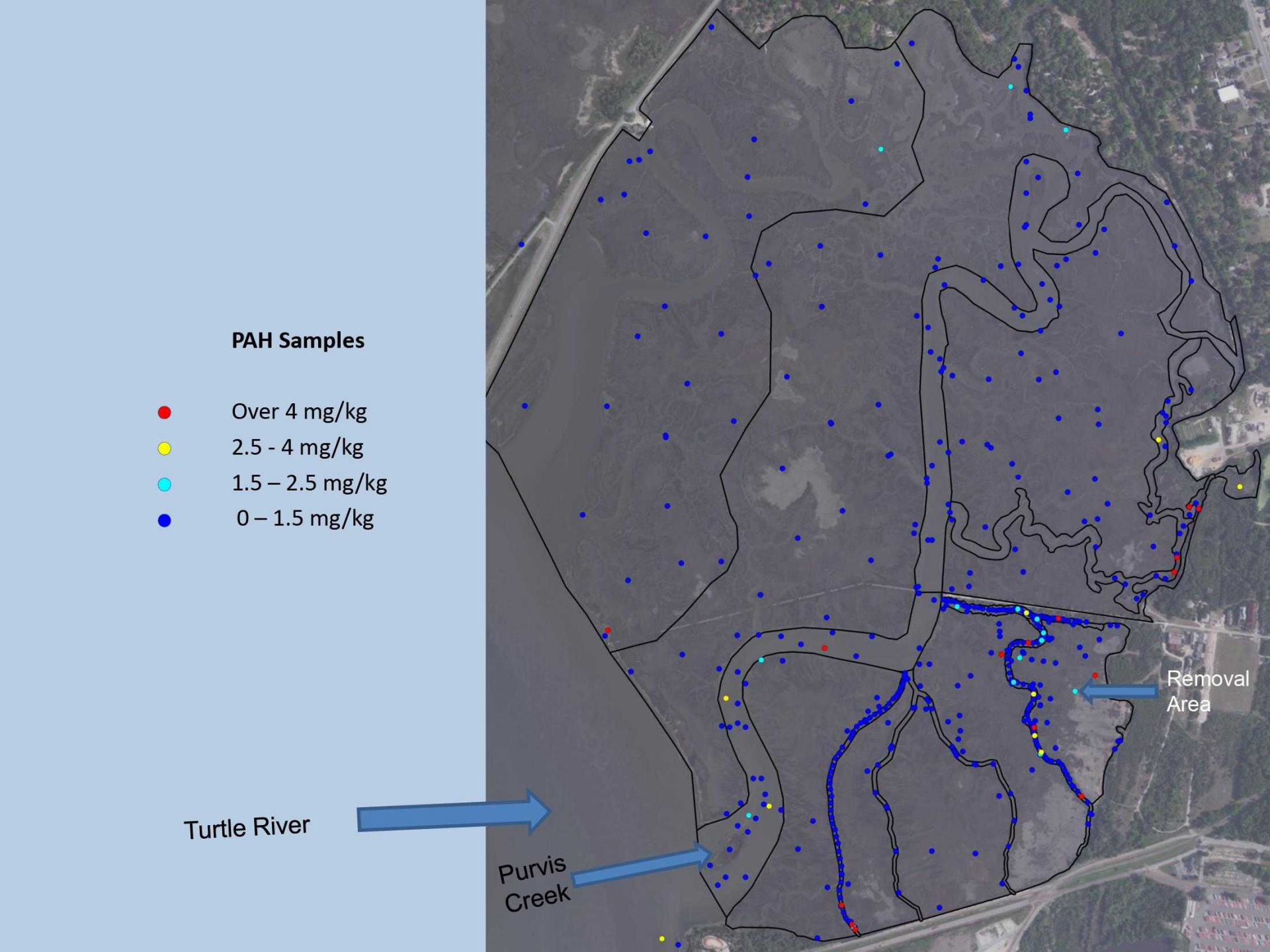


- Mercury (Including methyl-mercury)
- PCB (Aroclor 1268)
- Lead
- Polycyclic Aromatic Hydrocarbons (PAHs)


Mercury Samples
Over 12 mg/kg
8 - 12 mg/kg
4 - 8 mg/kg
2 - 4 mg/kg
1 - 2 mg/kg
0 - 1 mg/kg
Removal Area
Turtle River
Purvis Creek


Aroclor 1268 Samples
Over 18 mg/kg
12 - 18 mg/kg
6 - 12 mg/kg
4 - 6 mg/kg
2 - 4 mg/kg
0 - 2 mg/kg
Removal Area
Turtle River
Purvis Creek


Lead Samples
Over 90 mg/kg
60 - 90 mg/kg
40 - 60 mg/kg
0 - 40 mg/kg
Removal Area
Turtle River
Purvis Creek

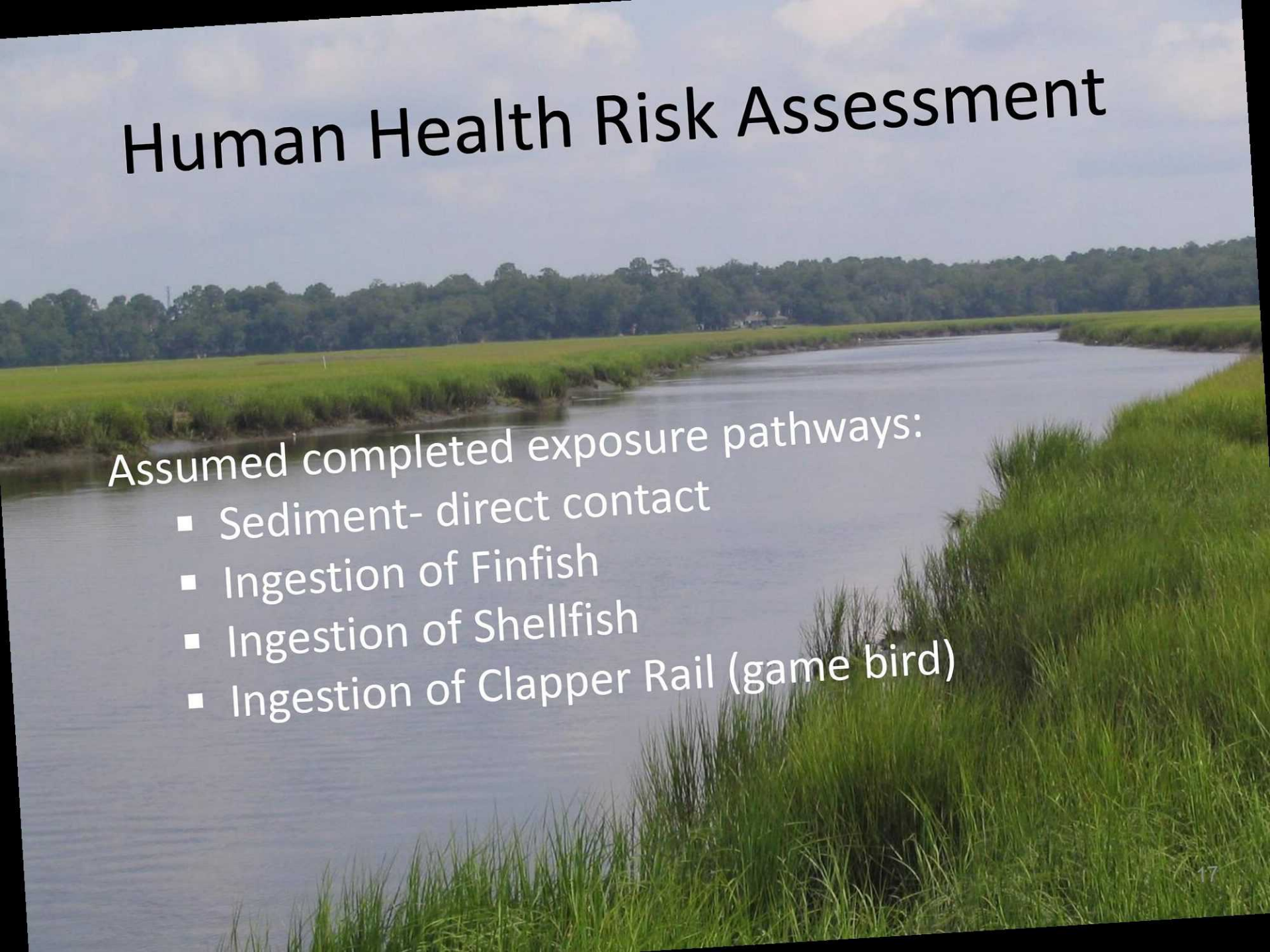

PAH Samples
Over 4 mg/kg
2.5 - 4 mg/kg
1.5 – 2.5 mg/kg
0 – 1.5 mg/kg
Removal Area
Turtle River
Purvis Creek

Marsh Baseline Human Health Risk Assessment

Baseline Risk Assessment

- Why is determining risk important?
  - Superfund is a “risk" driven program. If there is unacceptable risk, cleanup is warranted at a site.
  - EPA’s acceptable cancer risk range is 1×10^{-6} to 1×10^{-4}
  - EPA’s goal is to reduce the “risk” to an acceptable level (less than $1 \text{ X } 10^{-4}$ excess cancer risk, or Hazard Index of less than 1)

Human Health Risk Assessment



Assumed completed exposure pathways:

- Sediment- direct contact
- Ingestion of Finfish
- Ingestion of Shellfish
- Ingestion of Clapper Rail (game bird)

Summary of Exposure Pathways and Risks from the Human Health Risk Assessment

Exposure Scenario	Receptor	Cancer Risk	Non-cancer Hazard
Marsh Trespasser	Lifetime Adult Adolescent	1×10^{-05}	 0.06 0.08
Recreational Finfish Consumer	Lifetime Adult Adolescent Child	1×10^{-04}	 **3** **3** **4**
High Quantity Finfish Consumer	Lifetime Adult Adolescent Child	**2×10^{-04}**	 **5** **5** **8**
Shellfish Consumer	Lifetime Adult Adolescent Child	6×10^{-05}	 **2** 0.7 **4**
Clapper Rail Consumer	Lifetime Adult Adolescent Child	1×10^{-04}	 **2** 1 **5**

Baseline Ecological Risk Assessment Conclusions

- The small organisms living in the marsh sediment are at risk from the contaminants, especially in the LCP Ditch and the Eastern Creek;
- Modeling and tissue data from collected finfish suggest there are long-term effects to resident fish populations;
- Lead and PAHs are not of concern to wildlife predators but are of concern to the small organisms living in the sediment; and
- PCB and mercury are of concern to both the small organisms and the marsh's wildlife.

Baseline Ecological Risk Assessment Conclusions (continued)

Summary of Risks to Wildlife Receptors

Assessment Endpoints	COCs	Maximum NOAEL HQ	Maximum LOAEL HQ	Areas of Concern
Diamondback terrapin	None	< 1	< 1	None
Clapper rail	MeHg	3.0	1.0	Domain 1
Redwing blackbird	MeHg	1.0	0.3	Eastern Creek, LCP Ditch, Domain 1
Green heron	MeHg	**10.6**	**3.5**	Eastern Creek, LCP Ditch, Domains 1, 3
Marsh rabbit	Aroclor 1268	4.8	0.5	Eastern Creek, LCP Ditch
Raccoon	Aroclor 1268	4.9	0.5	Eastern Creek, LCP Ditch
River otter	Aroclor 1268	3.9	0.4	Domains 2, 3, 4

Remedial Action Objectives

- Reduce releases of hazardous substances from the smaller contaminated creeks to Purvis Creek;
- Reduce contaminant exposures to fish-eating birds and mammals in the marsh;
- Reduce risks from contaminated sediment to bottom-living organisms;
- Reduce finfish exposures from ingestion of contaminated prey;
- Prevent human exposure to contaminants, through ingestion of finfish and shellfish contaminated above protective levels; and
- Restore surface water quality.

FEASIBILITY STUDY

- Identify remediation technologies to cleanup contaminants in the marsh sediment;
- Screen and evaluate these technologies;
- Where appropriate, combine technologies into remedial alternatives; and
- Perform a detailed evaluation on the remedial alternatives

Feasibility Study
Alternatives Retained for LCP Chemicals Marsh

- **Alternative 1:** No Action;
- **Alternative 2**: Sediment Removal of 48 acres;
- **Alternative 3**: Sediment Removal, Capping and Thin-Cover Placement for the 48 acres;
- **Alternative 4**: Sediment Removal of 18 acres;
- **Alternative 5**: Sediment Removal, Capping and Thin-Cover Placement for 18 acres; and
- **Alternative 6**: Sediment Removal, Capping and Thin-Cover Placement for 23 acres.

Evaluation Criteria for Superfund Remedial Alternatives

1. **Overall Protectiveness of Human Health and the Environment**
2. **Compliance with ARARs**
3. **Short-term Effectiveness**
4. **Long-term Effectiveness and Permanence**
5. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment**
6. **Implementability**
7. **Cost**
8. **State/Support Agency Acceptance**
9. **Community Acceptance**

Hydraulic Dredging

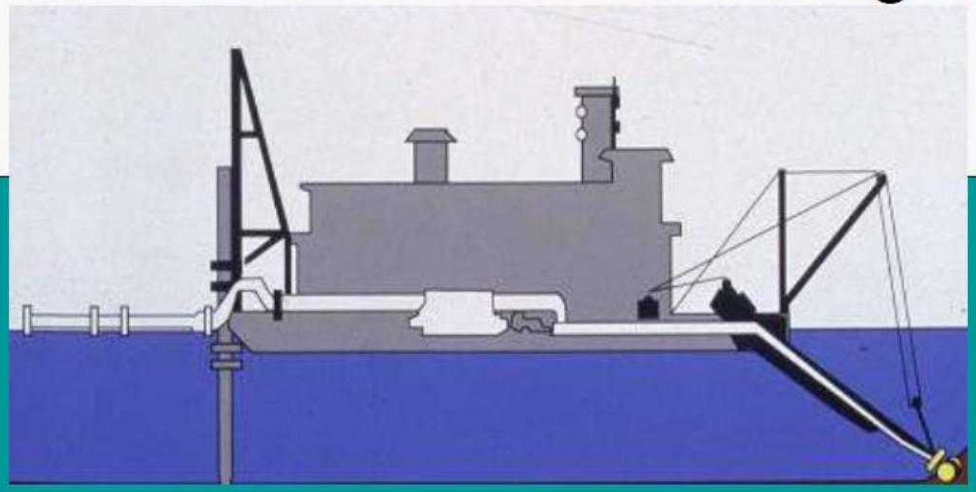
Advantages:

- May result in least uncertainty about long-tem effectiveness of cleanup, through removal of contaminants from marsh;
- Minimize uncertainty with predictions of cap stability and potential for future exposure and transport of contaminants;
- May reduce risks more quickly and achieve objectives faster.

Disadvantages:

- Implementation and effectiveness may be impaired by narrowness of creeks;
- Recontamination through re-suspension and settling;
- Significant levels of local traffic to ship offsite;
- Disruptive to the marsh ecosystem.

Conceptual Illustration Of Environmental Dredging And Processes



In-Situ Capping

Advantages:

- Quickly reduces exposure to fish and biota and, unlike dredging, requires less infrastructure for material handling;
- Potential for contaminant re-suspension and dispersion of contaminated sediment is reduced;
- No contaminated sediment is transported on trucks through community.

Disadvantages:

- Contaminants remain in environment where they could become exposed if cap is disturbed or if contaminants significantly move through cap.

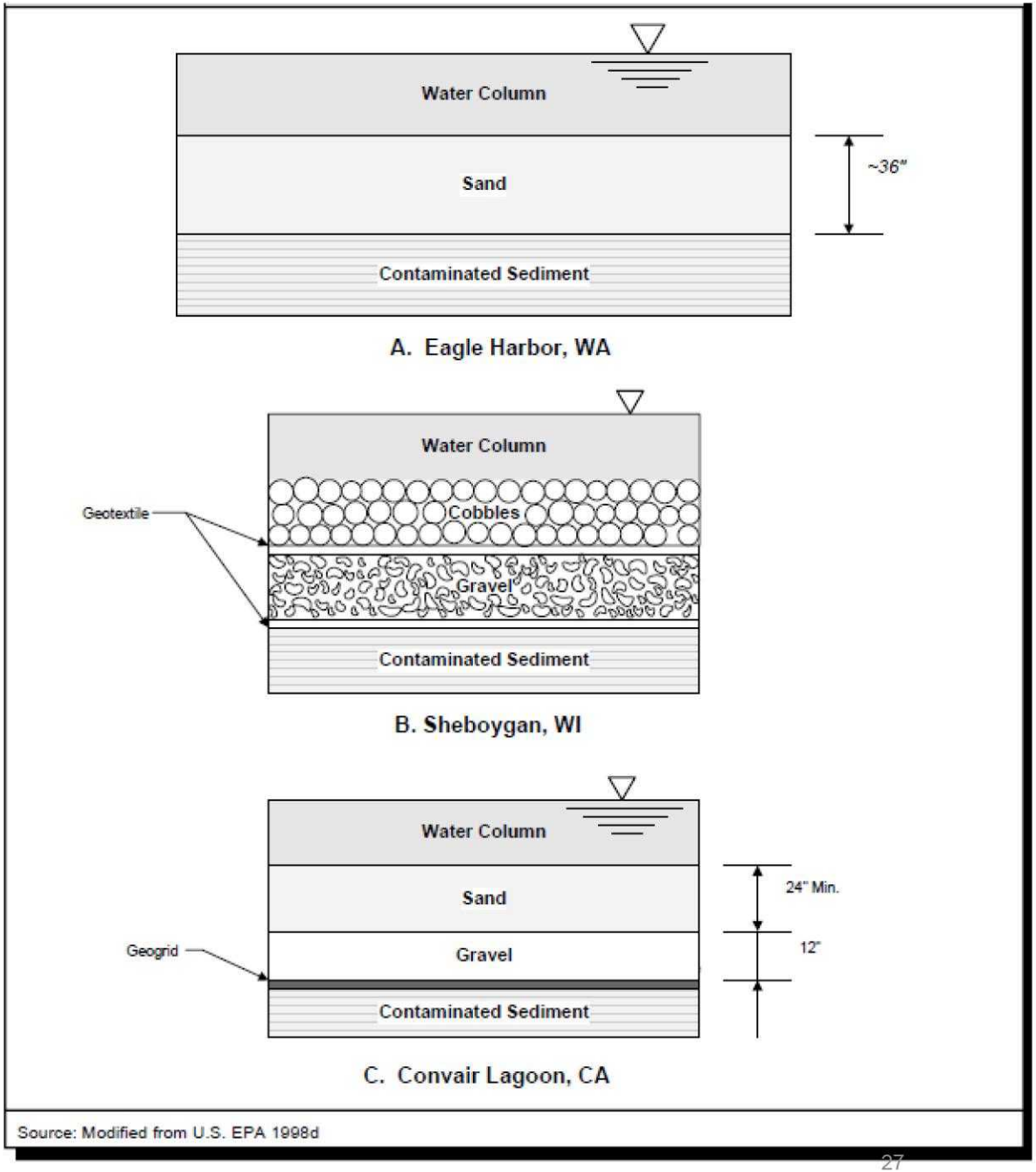


Photo 2.

Hydraulic placement of a subaqueous cap with a spreader barge

Thin-Layer Placement

Advantages:

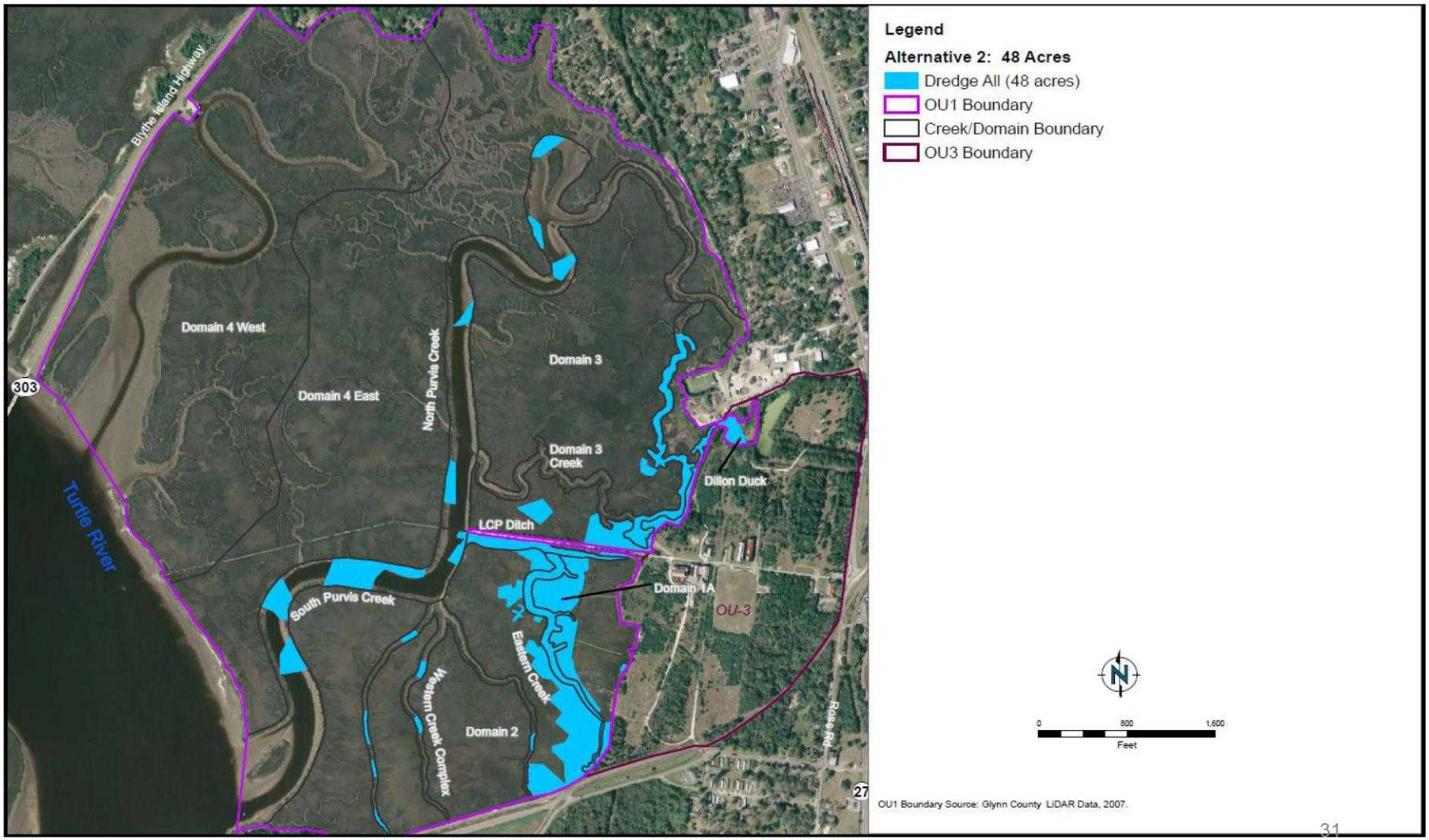
- Accelerates natural recovery by adding a thin layer of clean sediment over contaminated sediment;
- Most effective after high risk sediment areas have been remediated;

Disadvantages:

- Limited long-term demonstrated durability due to more recent usage with limited long-term monitoring data available, to date.

No Action

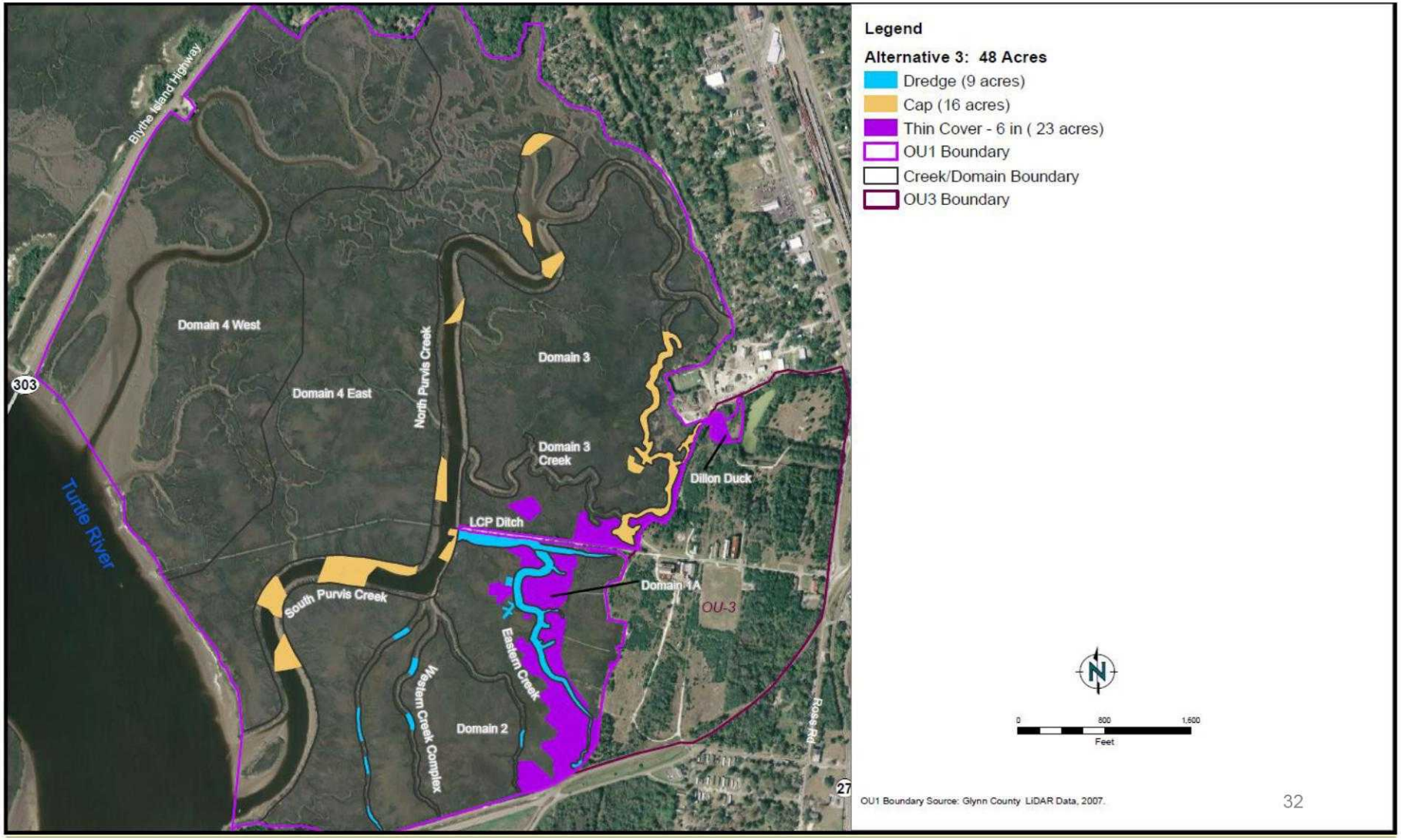
Alternative 2:
Sediment dredging of 153,000 cubic yards over 48 acres (average depth of 18 inches), clean backfill, institutional controls and long-term monitoring.
Cost: $64.8 million, time to complete: 3-to-4 years



Alternative 3

Sediment dredging of 27,000 cubic yards over 9 acres, clean backfill, 16 acres of capping and 23 acres of thin-cover placement, institutional controls and long-term monitoring.

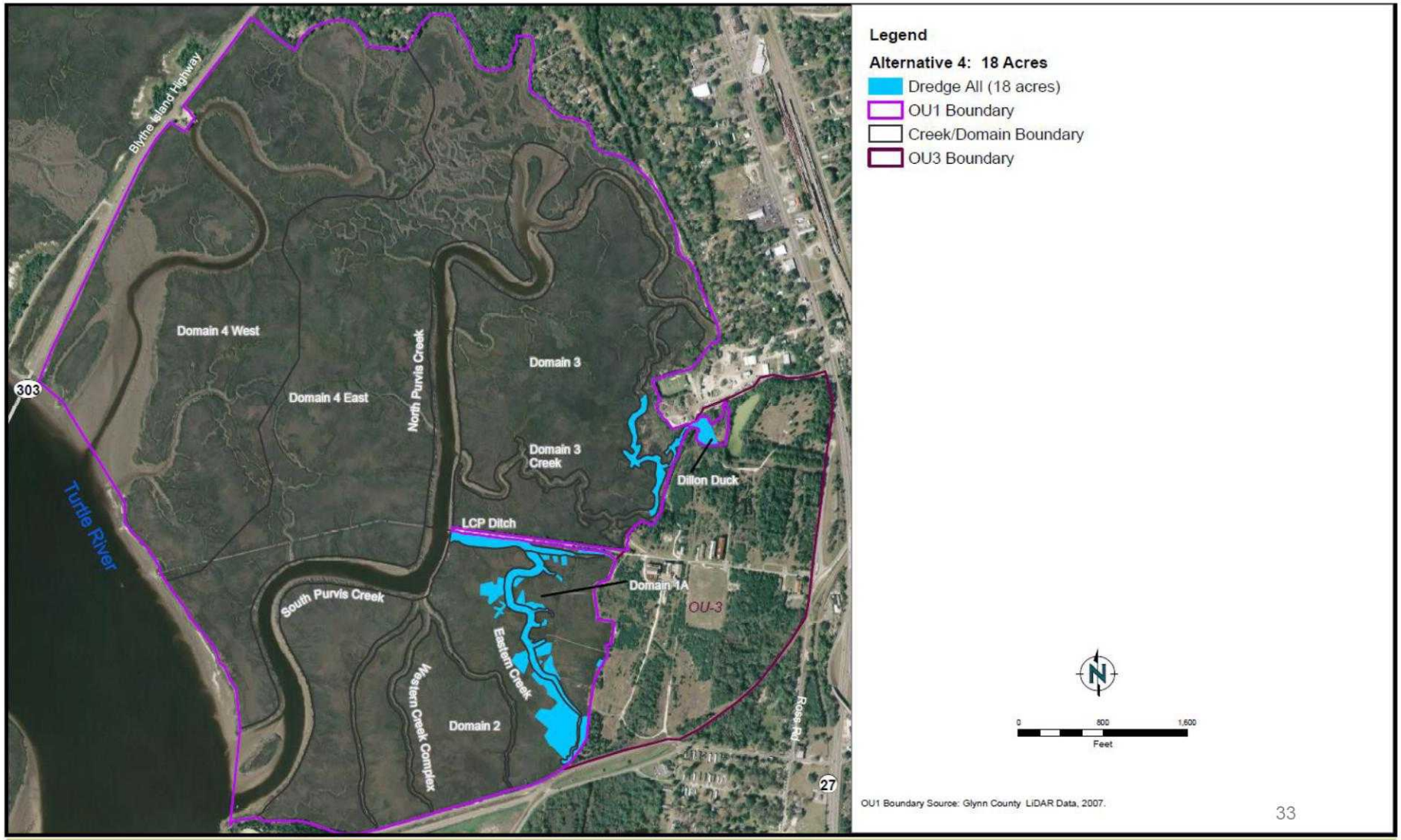
Cost : $38.7 million, time to complete: 3-to-4 years



Alternative 4

Sediment dredging of 57,000 cubic yards over 18 acres, clean backfilling, institutional controls and long-term monitoring.

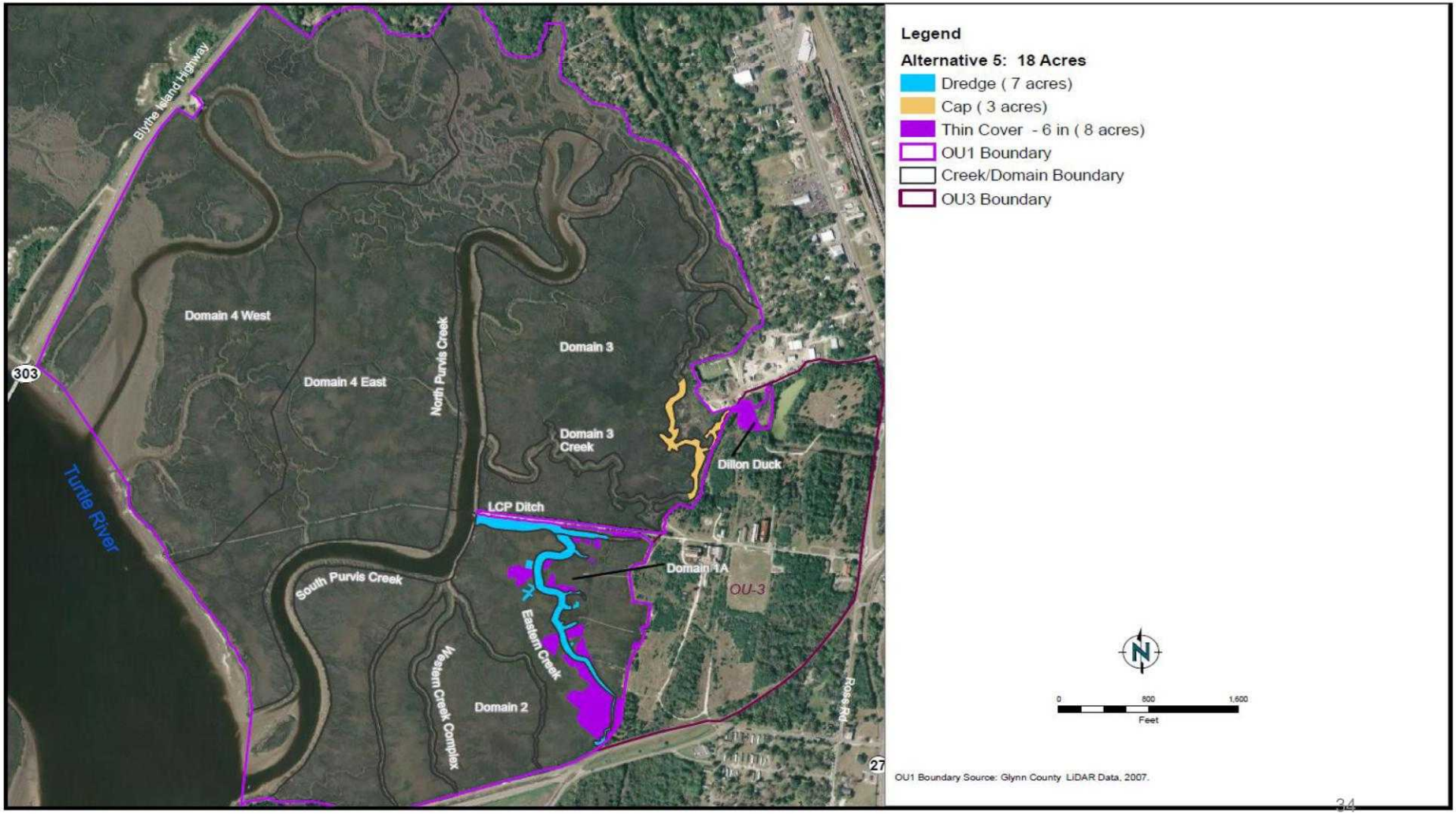
Cost: $34.1 million, time to complete: 2 years.



Alternative 5

Sediment dredging of 22,000 cubic yards over 7 acres, clean backfill, 3 acres of capping and 8 acres of thin-cover placement, institutional controls and long-term monitoring.

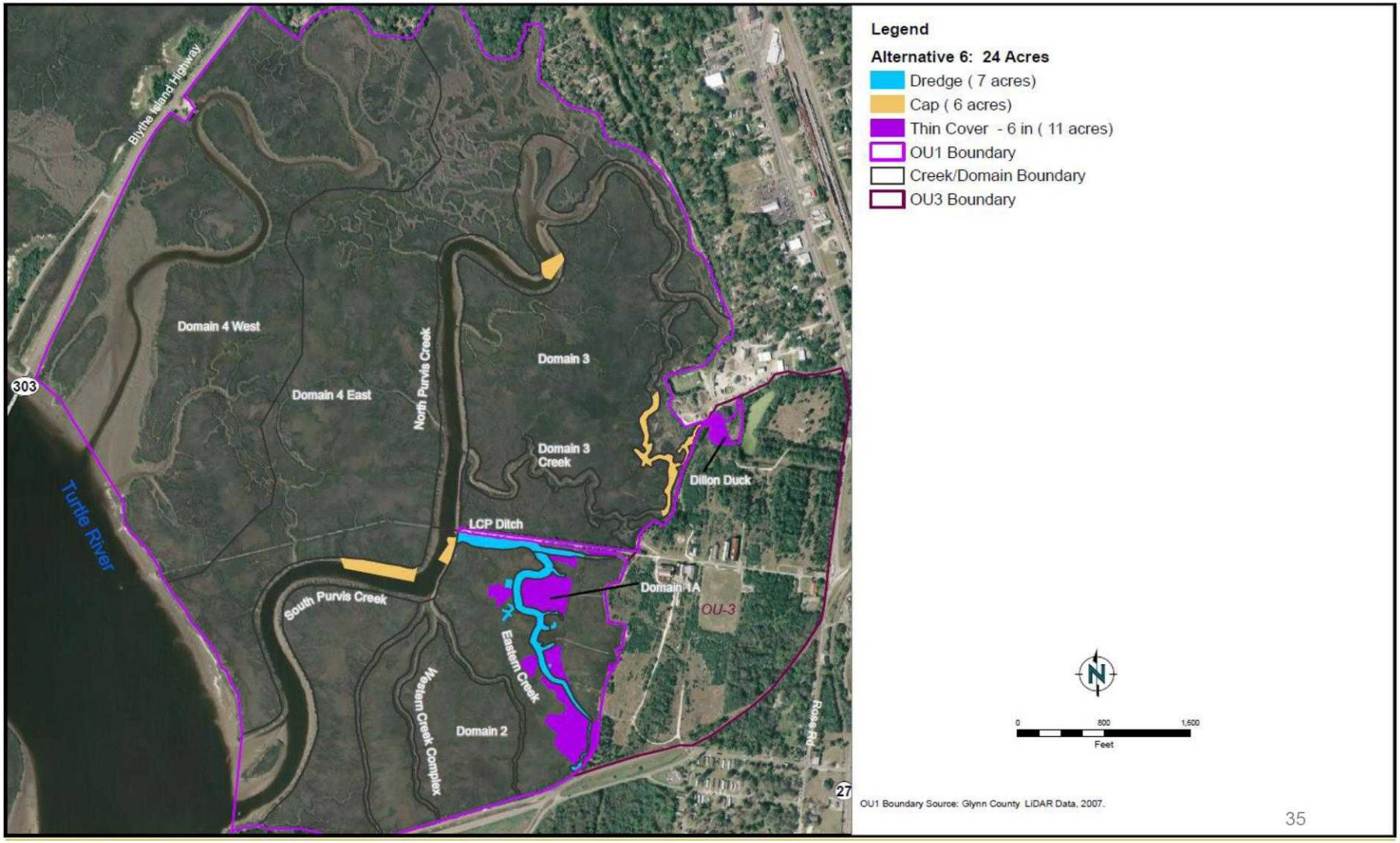
Cost : $25.0 million, time to complete: 2 years



Alternative 6

Sediment dredging of 22,000 cubic yards over 7 acres, clean backfill, 6 acres of capping and 11 acres of thin-cover placement, institutional controls and long-term monitoring.

Cost : $28.6 million, time to complete: 2 years



EPA's Preferred Alternative for the LCP Chemicals Marsh: Alternative 6

- Dredging of seven acres (22,000 CY) of the LCP Ditch and Eastern Creek to a target depth of 18 inches and backfill with 12 inches of clean material;
- Capping of 6 acres (14,000 CY) of the Domain 3 Creek and Purvis Creek South;
- Thin cover placement on 11 acres (13,000 CY) of the Dillon Duck, Domain 1A and Domain 2;
- Long-term monitoring, including biological monitoring; and
- Institutional Controls.
- Georgia EPD supports this alternative.

Clean-Up Levels (CUL)

COC	Proposed SWAC CULs (mg/kg) [1]	Proposed Benthic CULs (mg/kg)[2]
Mercury	2	11
Aroclor 1268	3	16
Lead	NA	177
PAHs	NA	4

NA – Not applicable because lean and PAHs only affect the benthic organisms.
1- Surface weighted average concentration, which provide for protection of human health.
2 – Not-to-exceed concentration for protection of benthic organisms.

Tentative Timeline

- **Public Comment Period**
  - December 4, 2014 – February 2, 2015
- **December 4, 2014**
  - Proposed Plan Public Meeting in Brunswick, GA
- **March 2015**
  - Record of Decision Issued
- **March 2016 – March 2017**
  - Remedial Design Phase
- **March 2017**
  - Remedial Action Commences

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