Callahan Mine Superfund Site

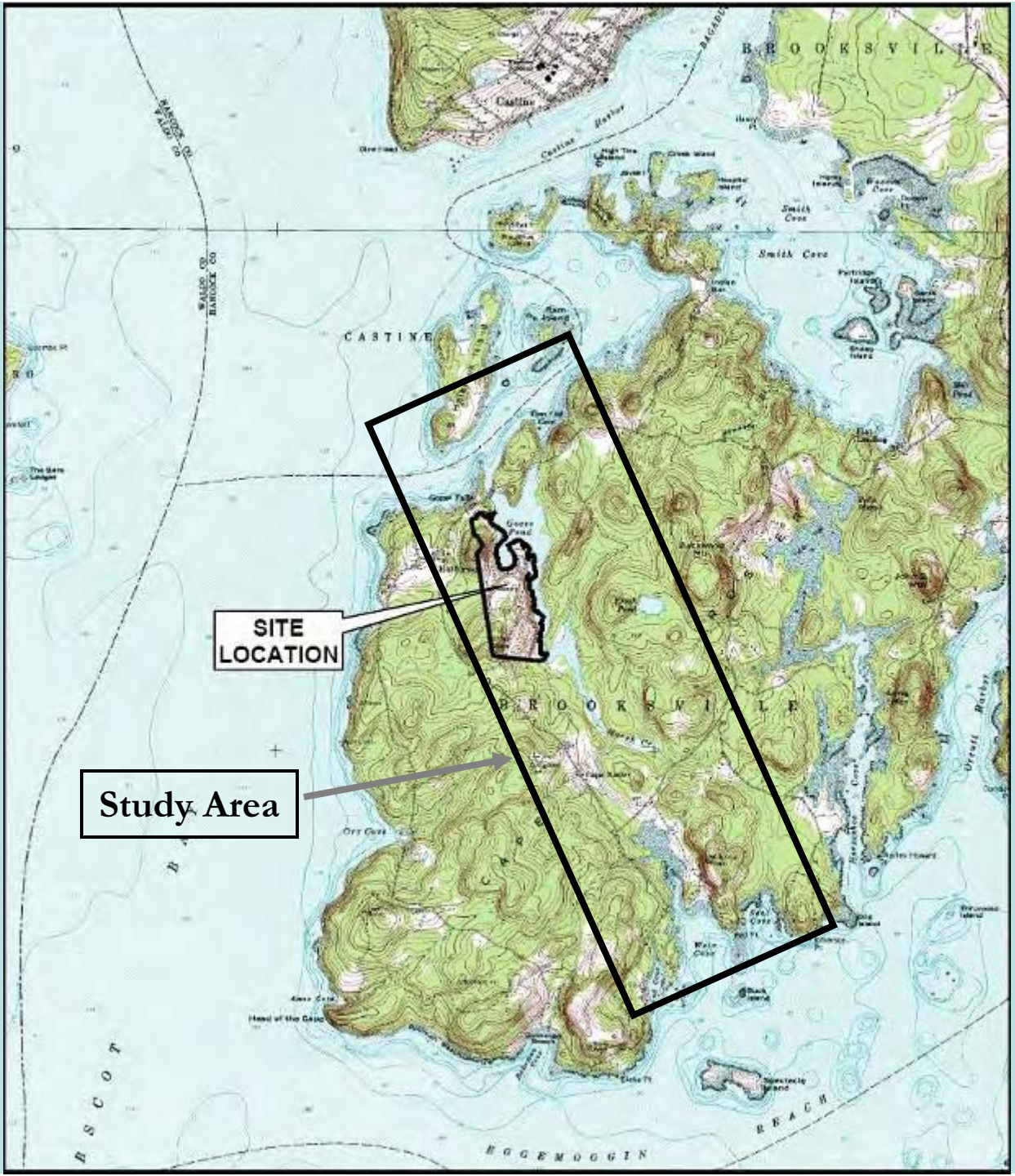
Public Information Meeting

April 28, 2009

SDMS DocID 452136

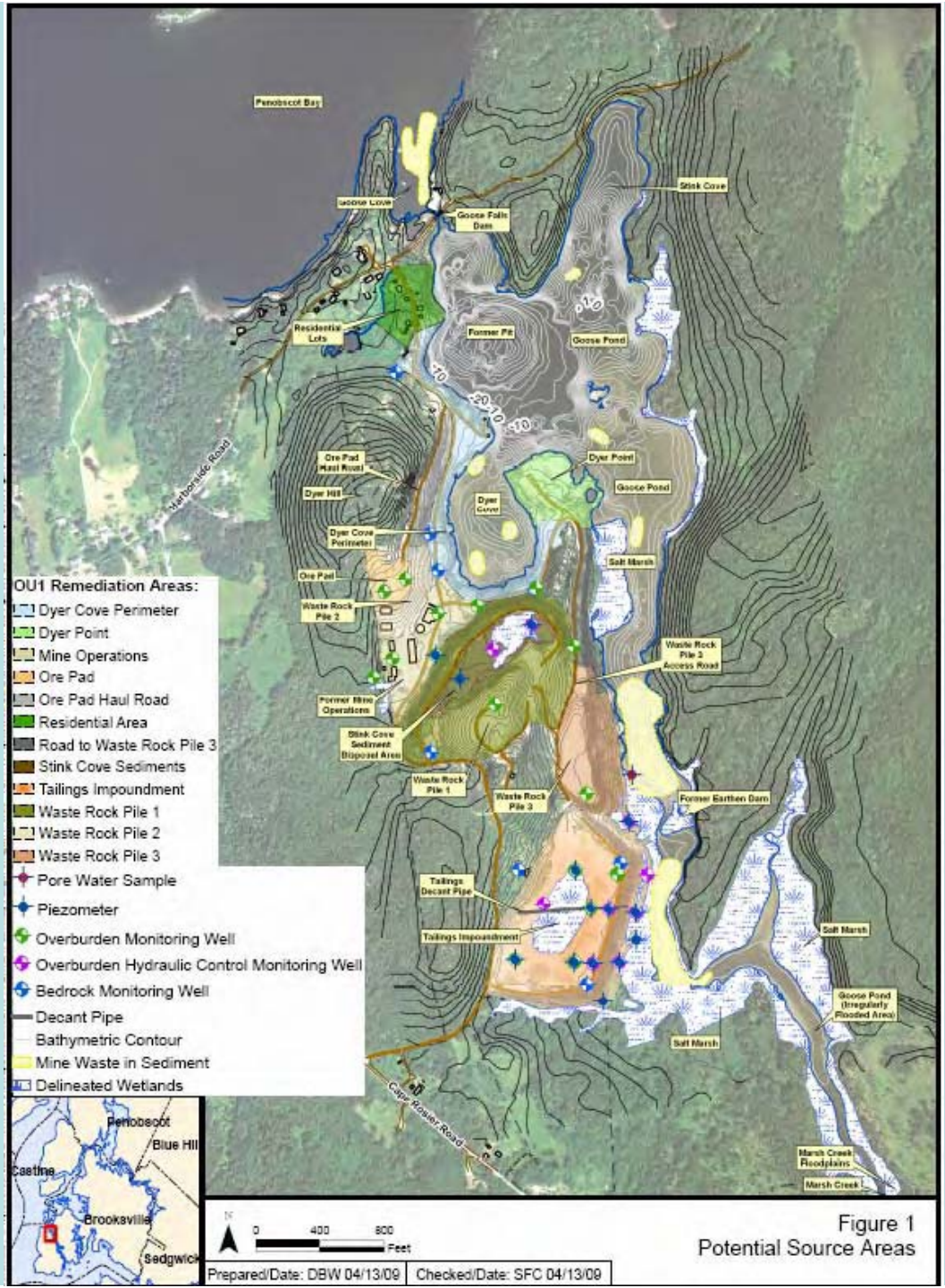
Primary Study Area for RI

- Callahan Mine property and adjacent properties
- Goose Pond
- Goose Cove
- Marsh Creek
- Weir Cove



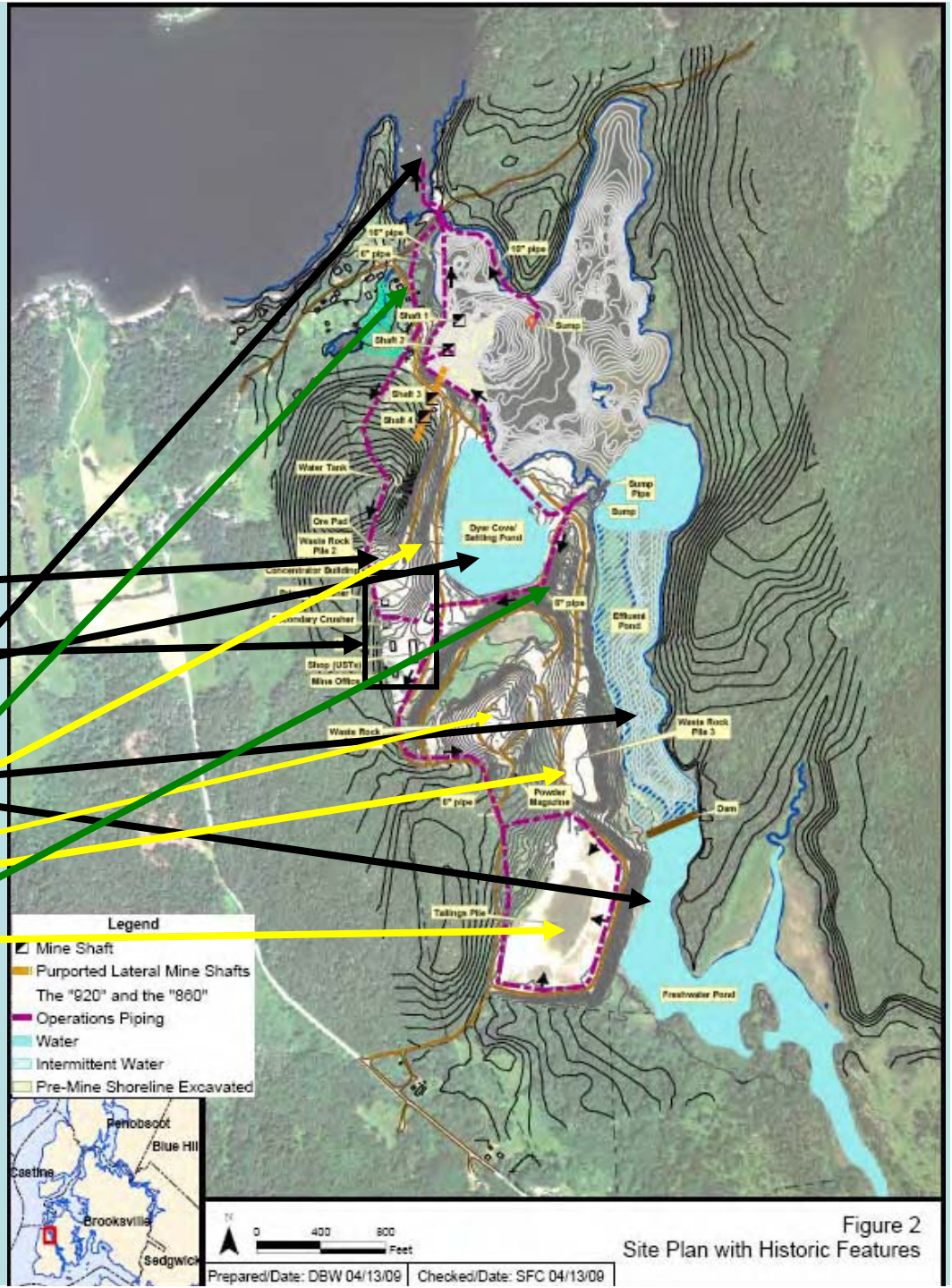
RI Summary

- Focus Areas
  - Soil/waste material
    - Residential properties and access roads
    - Forested areas surrounding waste areas (Halo - 555 acre study area)
    - Waste piles and former operational areas
      - **75 acres**
  - Sediments and Surface water
    - Goose Pond (75 acres)
      - **Dyer Cove (8 acres)**
      - **South Goose Pond mine waste area (10 acres)**
      - **Goose Pond remainder (57 acres)**
    - Salt Marsh (23 acres)
      - **Salt marsh with mine waste (7 acres)**
    - Goose Cove (4 acres)
      - **Cove area with mine waste (1.5 acres)**
      - **Cove area without mine waste (2.5 acres)**
  - Groundwater
    - Off-site Residential wells
    - On-site monitoring wells



Historic Operational Areas and Waste Disposal

- Highest levels of contamination are associated with former operational features or waste disposal areas:
  - Operational features
    - Ore Pad
    - Mine Facilities
    - Settling Pond
    - Discharge effluent area
  - Waste Disposal
    - Waste Rock Piles
    - Tailings Pile
    - Access Roads

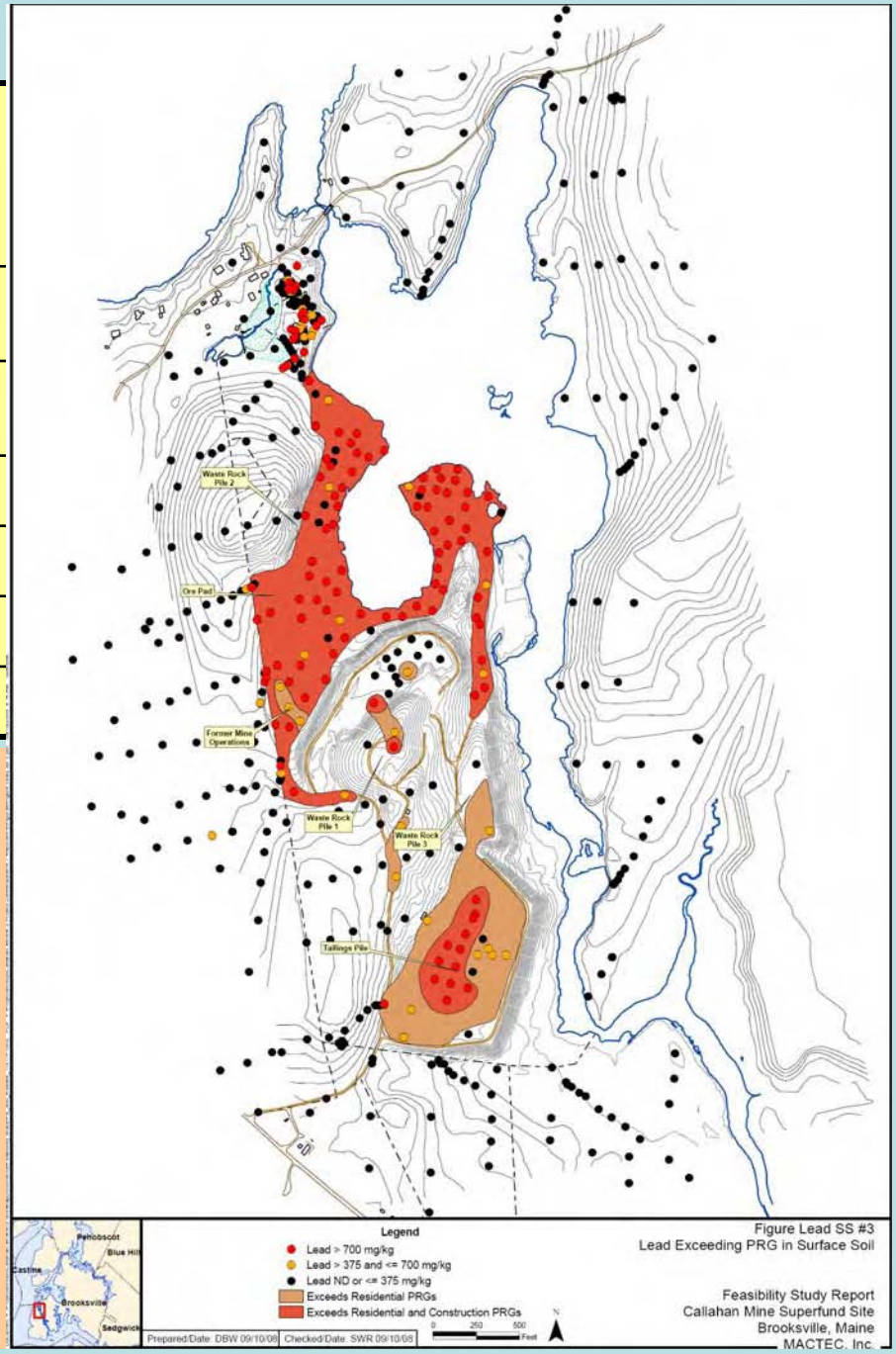


RI Soil and Waste Material Summary

Source Area	Halo Areas 95% UCL of mean (mg/kg)	Source Areas 95% UCL of mean (mg/kg)	Acceptable level for human contact (mg/kg)	Acceptable level for ecological health (mg/kg)
PCBs - 1242	**Not detected**	655	1	1
PCBs – 1248	**Not detected**	595	1	1
Arsenic	12	65	14	20
Copper	108	4,046	650	536
Lead	79	1,520	350	1,240
Zinc	260	12,501		792

Conclusions (RI, HHRA, and BERA):

- Halo area does not contain contaminants above levels of concern.
- Sources area have much higher levels of PCBs, arsenic, copper, lead, and zinc than surrounding areas due to mine related activities.
- PCB levels are unsafe for any human contact.
- Lead and arsenic would be unsafe for residential level contact but acceptable for occasional visits.
- Source area contamination could present a threat to ecological receptors if the material were to become incorporated into a soil layer.



PCB contamination in Source Area

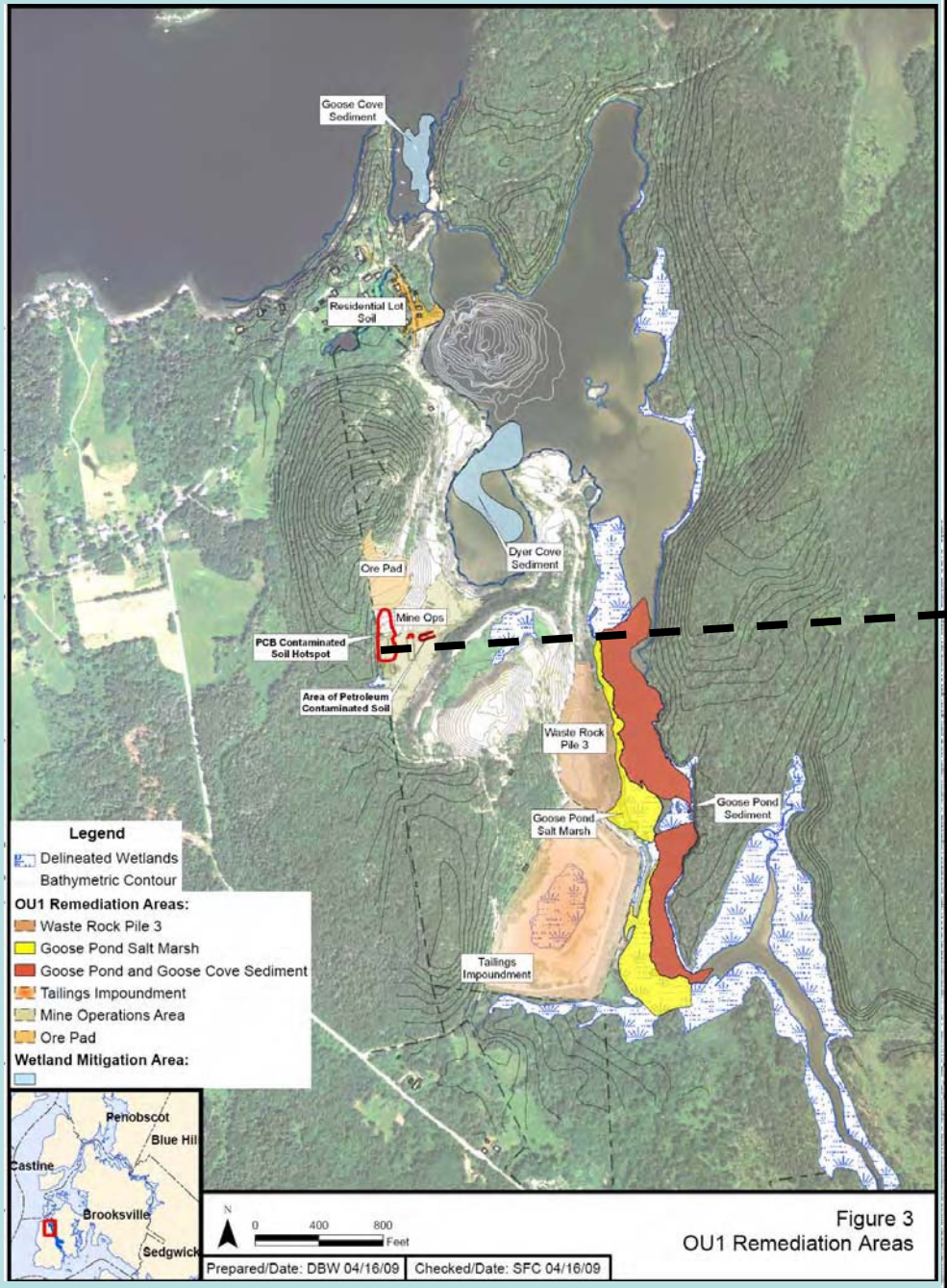


Figure 3
OU1 Remediation Areas

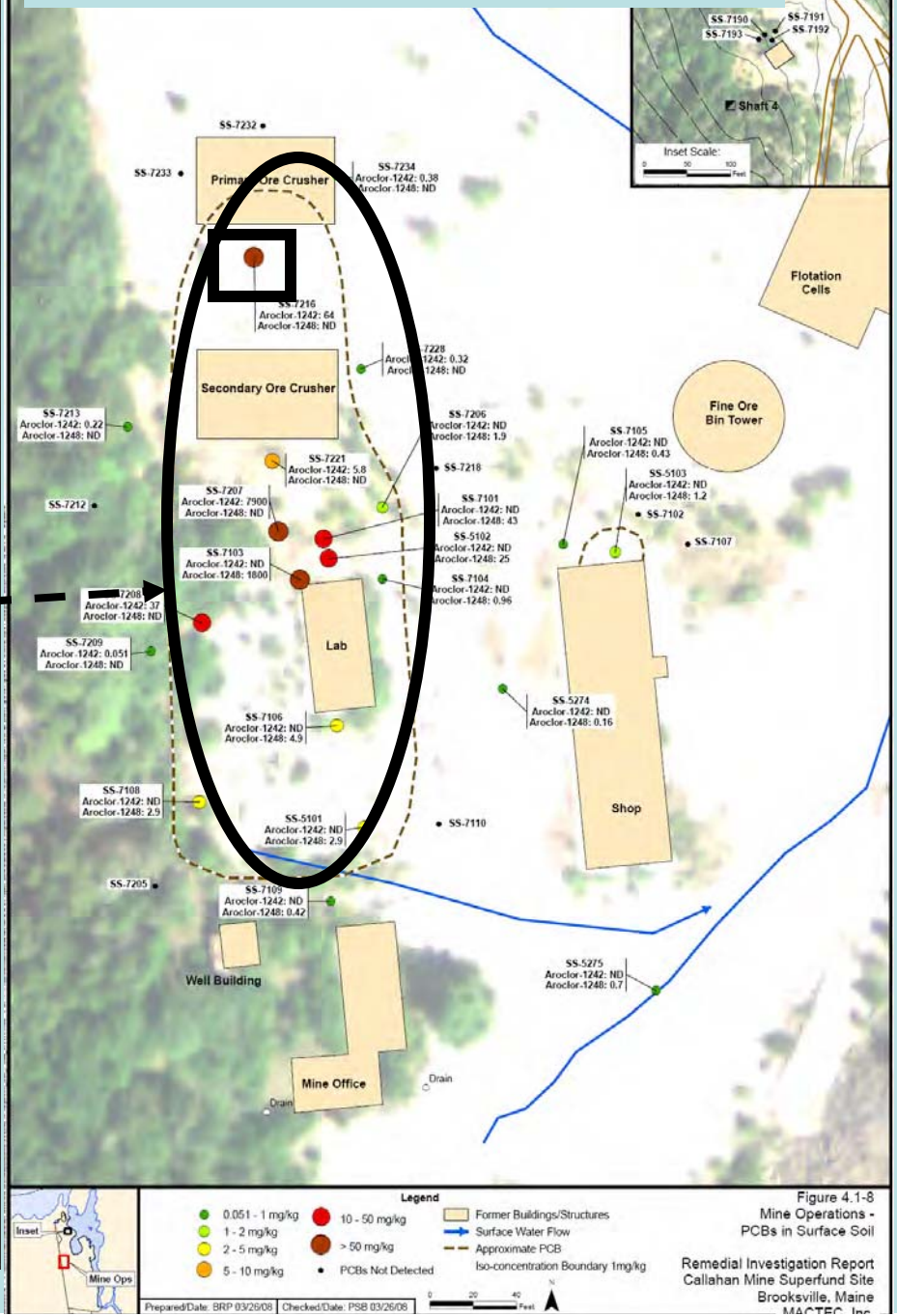


Figure 4.1-8
Mine Operations - PCBs in Surface Soil

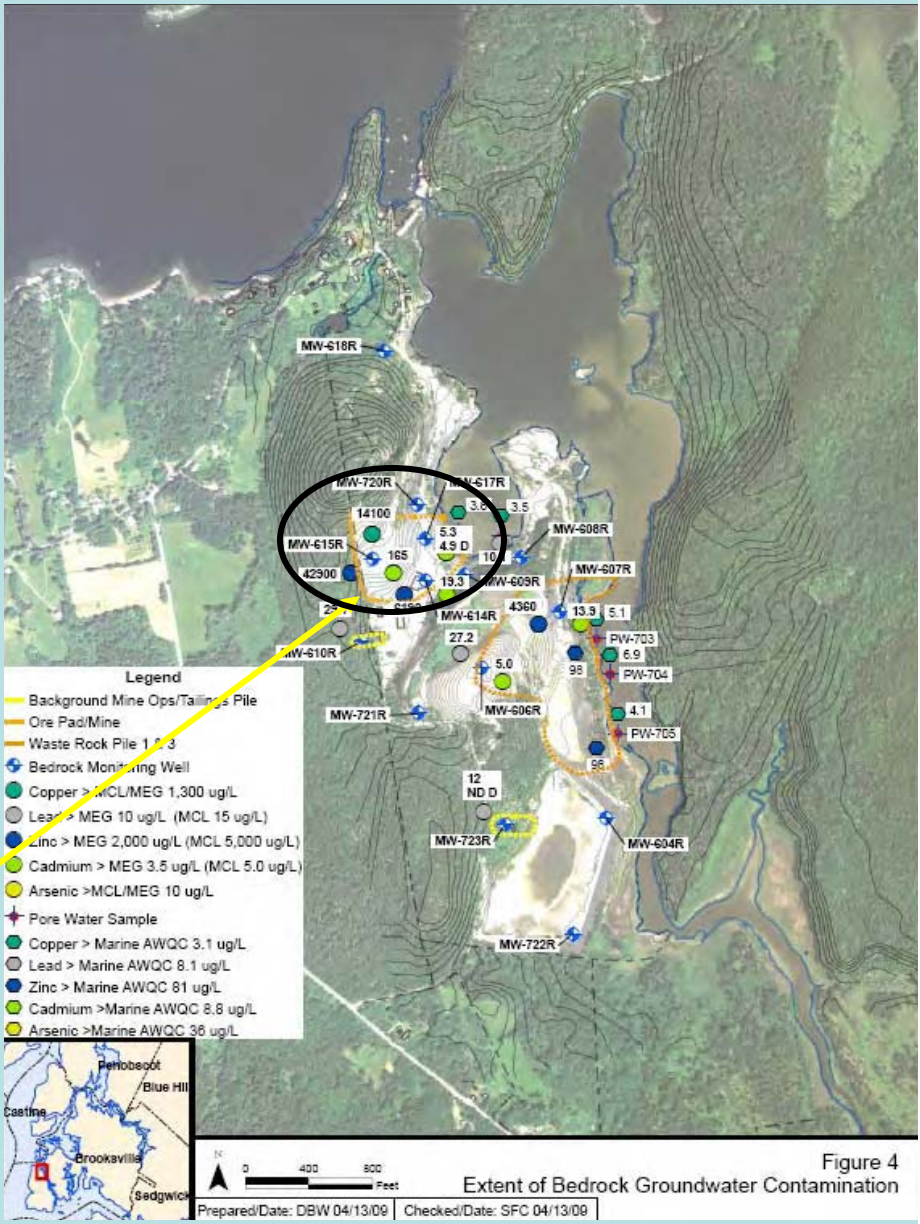
Remedial Investigation Report
Callahan Mine Superfund Site
Brooksville, Maine
MACTEC, Inc.

RI Groundwater Summary

	Site bedrock groundwater (ug/l)	EPA safe drinking water level or risk advisory (ug/l)	Maine Maximum Exposure Guideline (MEG) (ug/l)	Background (ug/l)
Arsenic	**5**	**10**	**10**	**Not detected**
Cadmium	**165**	**5**	**3.5**	**3**
Copper	**14,100**	**1,300**	**1,300**	**84**
Lead	**13**	**15**	**10**	
Manganese	**9,750**	**840**	**500**	**74**
Zinc	**42,900**		**2,000**	**717**

Conclusions (RI and HHRA):

- Bedrock groundwater has been impacted by leaching from mine waste rock.
- Most significant contamination is in the vicinity of the former Ore Pad.
- Groundwater discharges to Goose Pond.
- Groundwater above EPA and Maine criteria is unsuitable for use as a water supply.

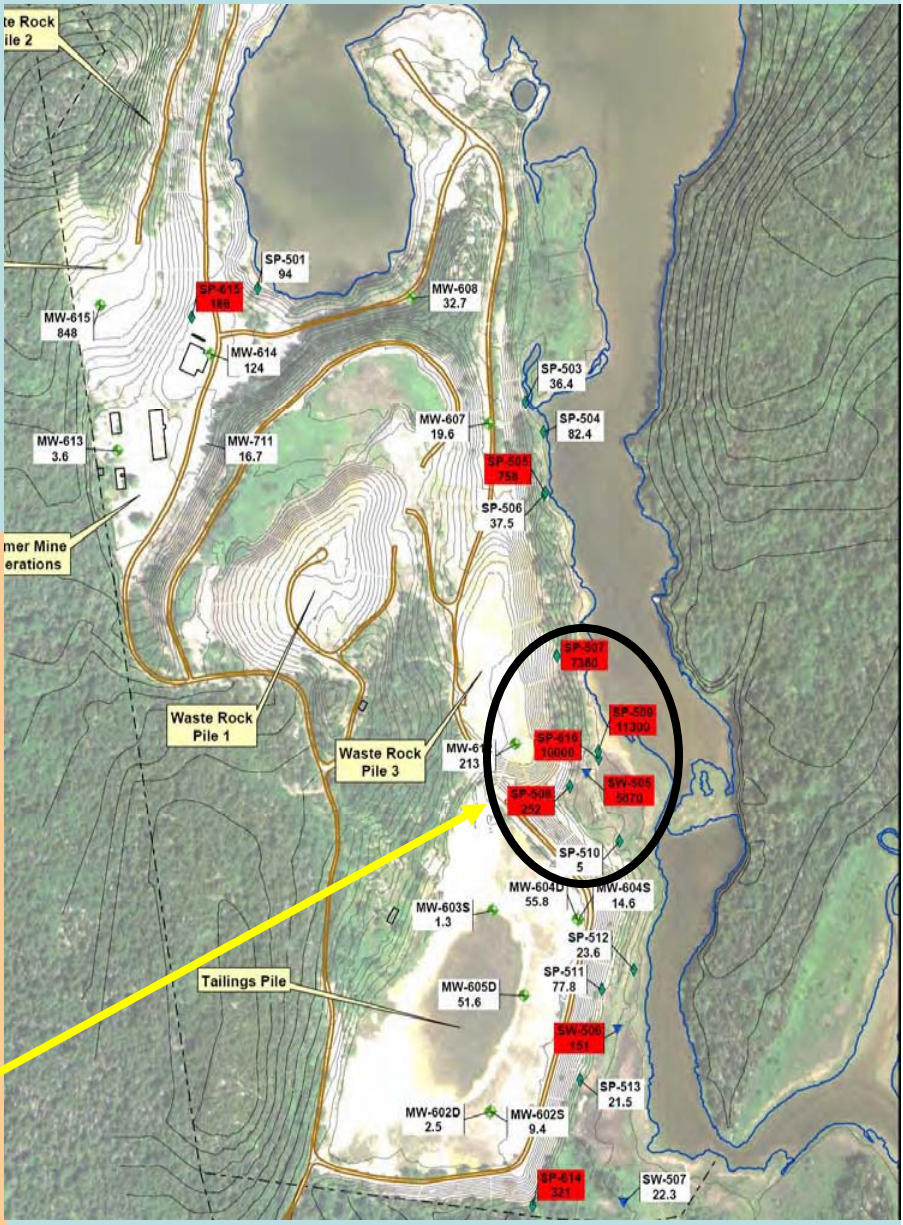


RI Surface water Summary

	Surface water – Goose Pond (ug/l)	Surface water – seeps (ug/l)	Ecological water quality criteria (ug/l)
Cadmium	**3**	**854**	**9**
Copper	**59**	**11,300**	**3**
Lead	**5**	**178**	**8**
Manganese	**200**	**8,050**	
Zinc	**524**	**172,000**	**81**

Conclusions (RI, HHRA and BERA):

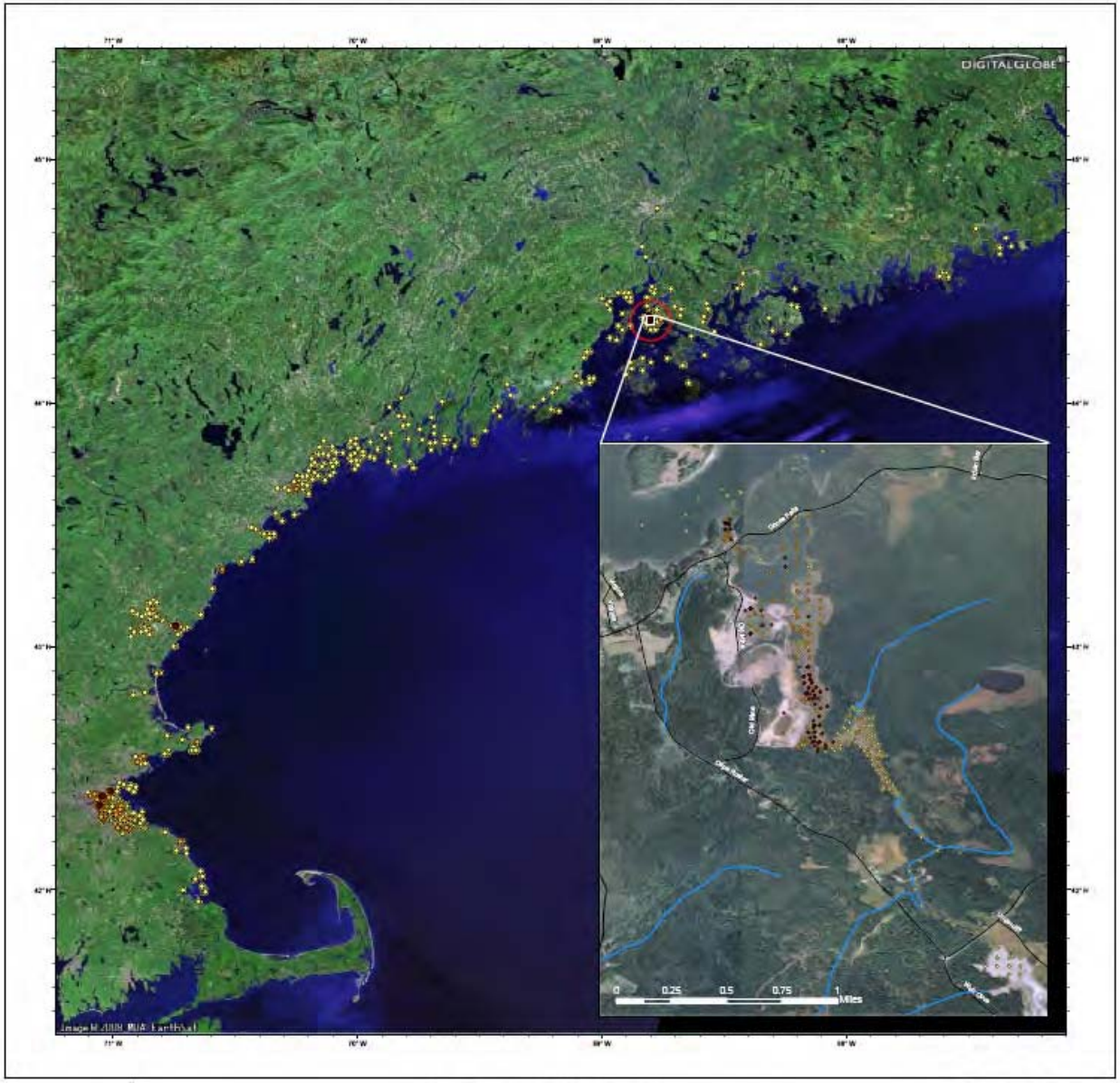
- Surface water is not a source of drinking water and no human health threat was identified from exposure to surface water.
- Concentrations of copper and zinc were detected in Goose Pond above water quality criteria. This could cause an adverse impact on aquatic organisms.
- Concentrations of cadmium, copper and zinc in the seeps that discharge from the waste rock and tailings piles were two orders of magnitude above acceptable criteria.
- Seeps adjacent Waste Rock Pile #3 contain the highest concentrations of copper and zinc.
- Significant dilution occurs as the seeps mix with Goose Pond, therefore Goose Pond surface water concentrations will vary with tides.



Sediment Evaluation

- Sediments were evaluated by EPA as follows:
  - Regional context
    - How do the Site contaminant levels compare to other locations along the Gulf of Maine?
      - A database developed by the United States Geological Survey (USGS) containing over 4,000 samples was available to provide data to compare Site concentrations with other areas.
  - Local Context
    - How do the Site contaminant levels vary within the Site?
    - Are there sub-areas of the Site that stand out as “hot spots” due to consistent high concentrations verse adjacent areas?
  - Ecological Relevance
    - Is there evidence that the contamination is accumulating in the tissue of Site organisms (clams, crabs, salt grass, and fish)?
    - Are there areas of acute toxicity (high mortality in sediment toxicity tests)?
    - Is there evidence of community level impacts to the benthic community?

Zinc Concentrations in Sediment along the New England Coast



Zinc Results (ppm)

- ND - 410
- 410 - 5,100
- 5,100 - 61,900

0 10 20 30 40 50 Miles

EPA

Created by the EPA Region 1 GIS Center on 4/10/2009
Map Tracker ID: 5312

Lead Concentrations in Sediment along the New England Coast

Lead Results (ppm)

ND - 218 · 218 - 710 · 710 - 7,000

0 10 20 30 40 50 Miles

EPA

Created by the EPA Region 1 GIS Center on 4/10/2009.
Map Tracker ID: 5898

Copper Concentrations in Sediment along the New England Coast

Copper Results (ppm)

ND - 270 · 270 - 790 · 790 - 29,800

0 10 20 30 40 50 Miles

EPA

Created by the EPA Region 1 GIS Center on 4/10/2009
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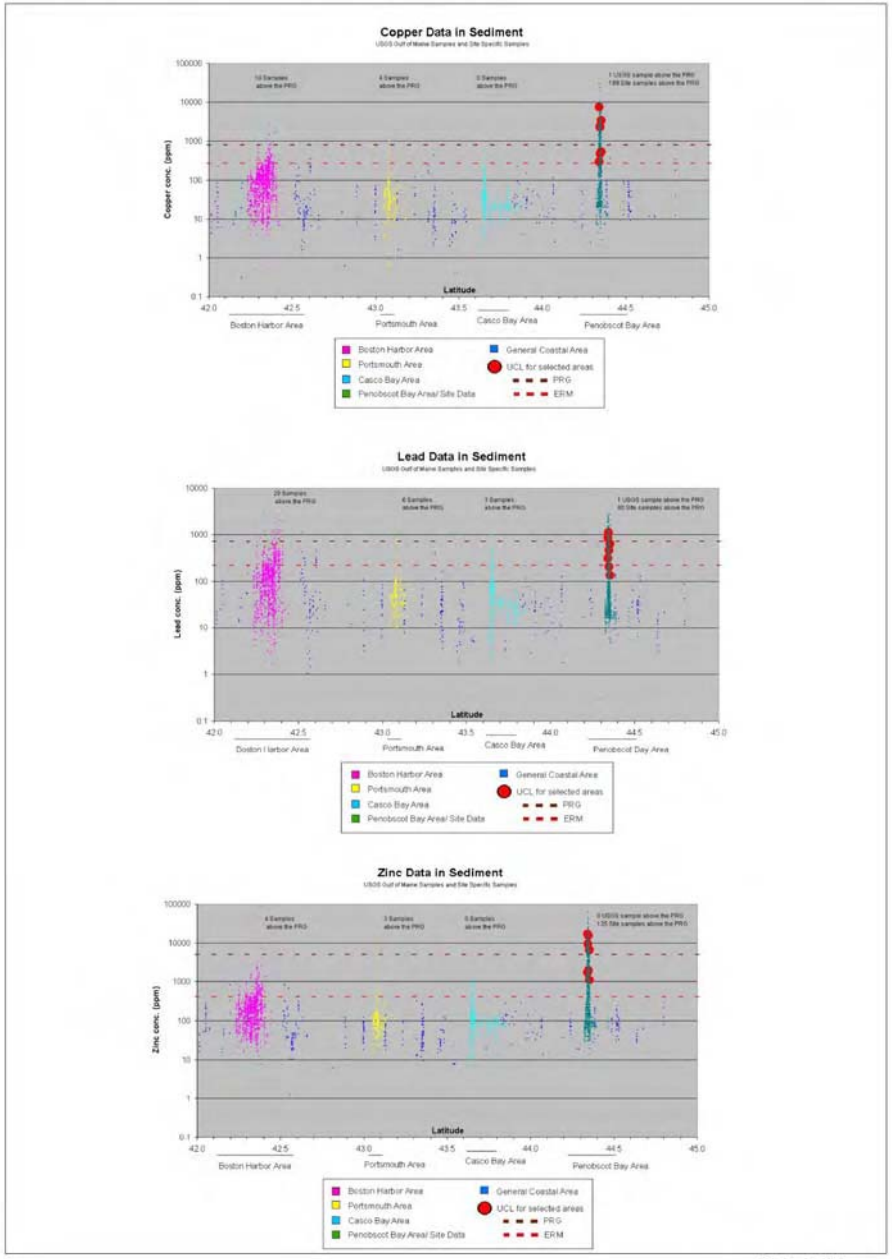
Chemical Concentrations in Sediment along the New England Coast



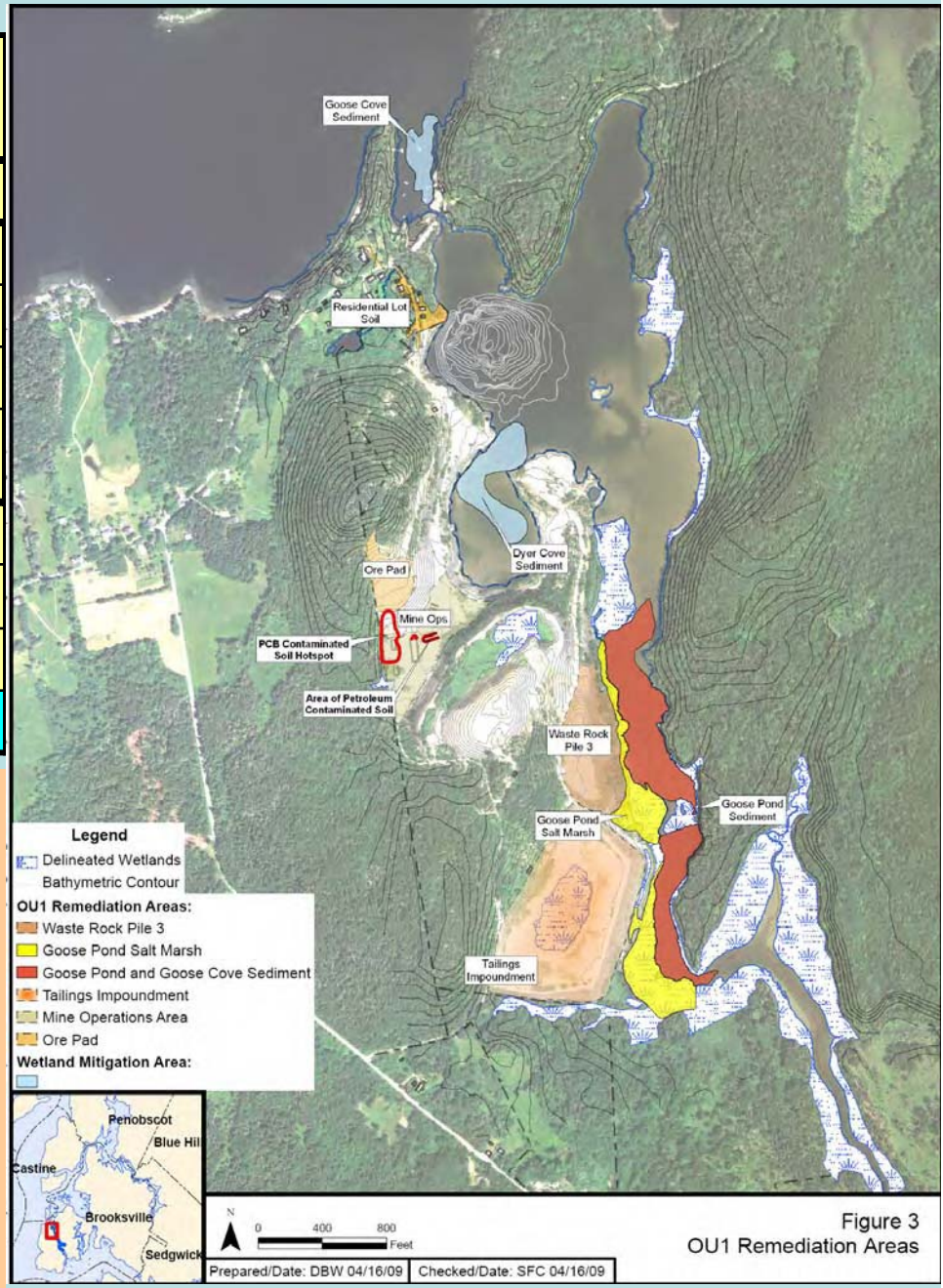
EPA

Created by the EPA Region 1 GIS Center on 4/10/2009
Map Tracker ID: 5658

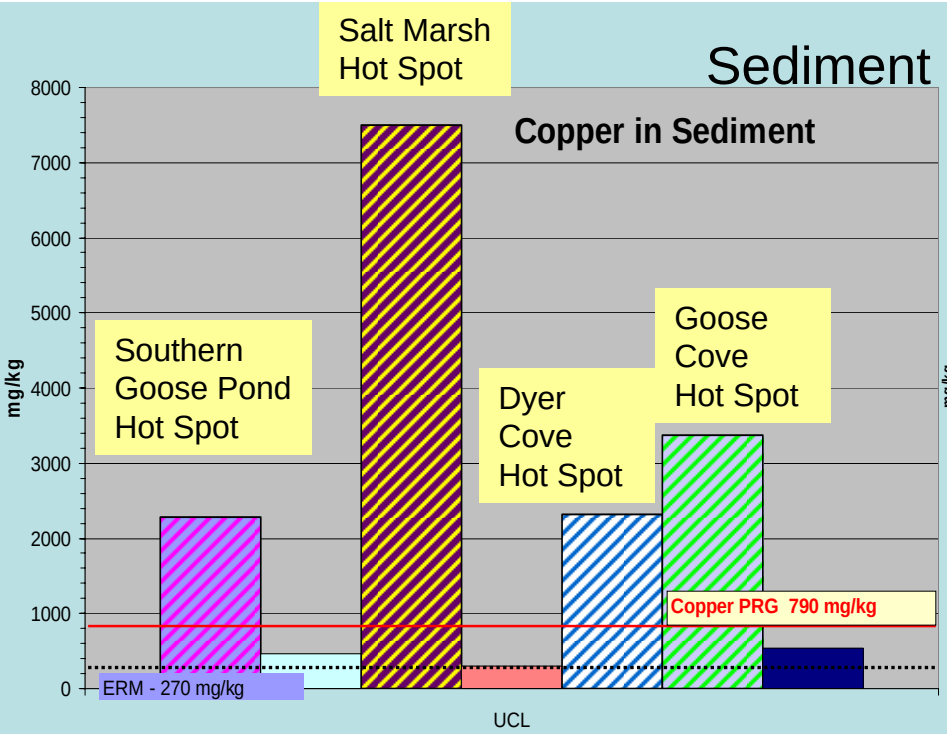
RI Sediment Results

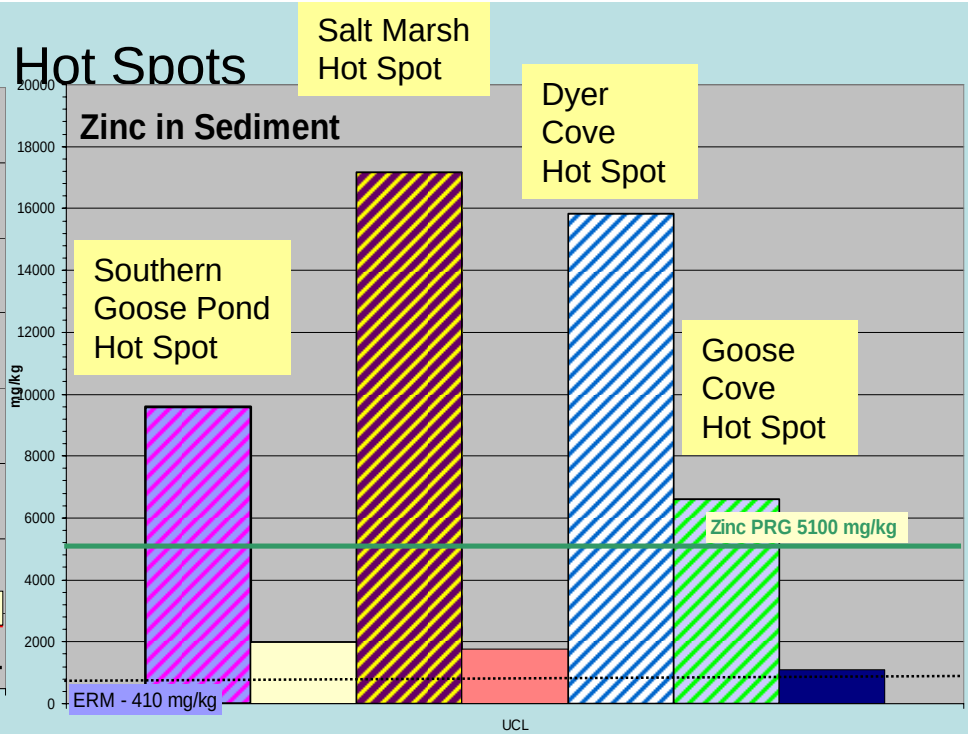
All concentrations are the estimated 95% upper confidence limit of the mean in milligrams per kilogram	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
Site specific cleanup threshold	790	710	5,100
Goose Pond Hot Spot (red)	2,228	1,110	9,801
Salt Marsh Hot Spot (yellow)	7,498	837	17,161
Dyer Cove (light blue)	2,316	457	15,635
Goose Cove Hot Spot (light blue)	3,370	622	6,607
Remainder of Goose Pond	464	200	1,979
Remainder of Salt Marsh	296	303	1,773
Remainder of Goose Cove	523	133	1,111
Background	23	32	368

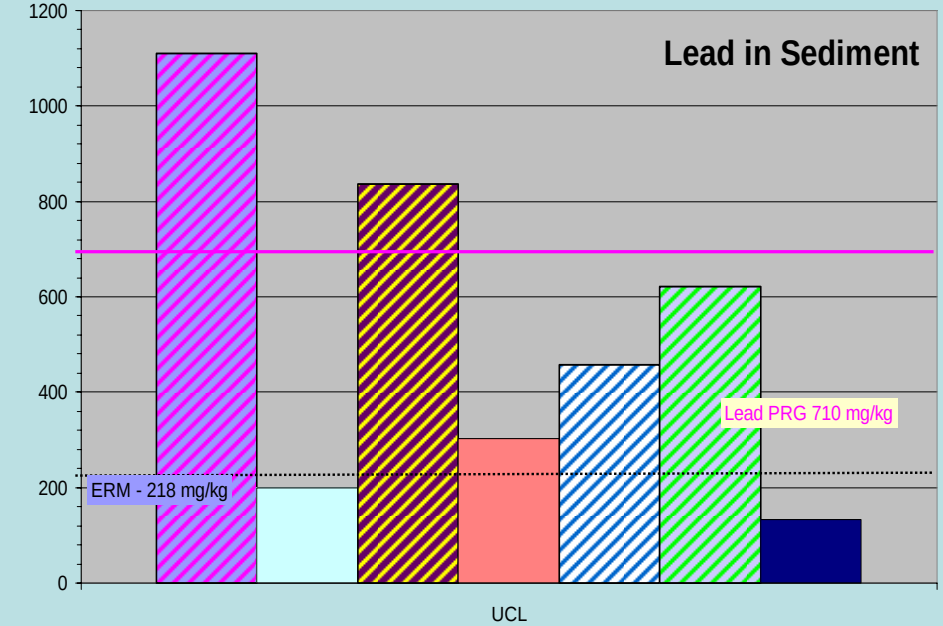
- All sediment areas contain contaminants above background.
- Concentrations of copper, lead, and zinc were found to be among the highest along the entire Gulf of Maine (Cape Cod, MA to New Brunswick, Canada). Shown in posters.
- Worst contamination is limited to four sub-areas that are associated with mine waste disposal practices have very high concentrations of copper, lead, and zinc.



Sediment Hot Spots

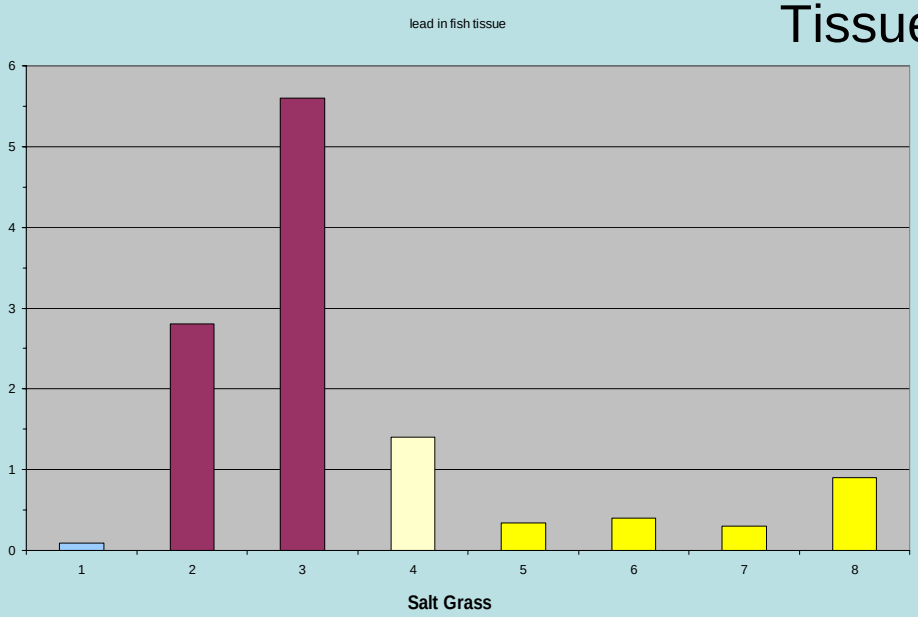


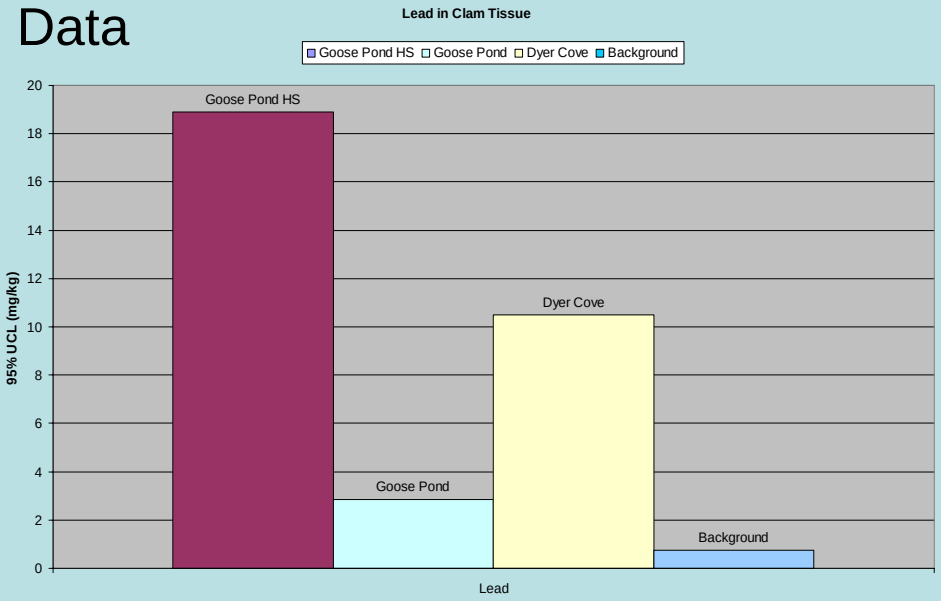


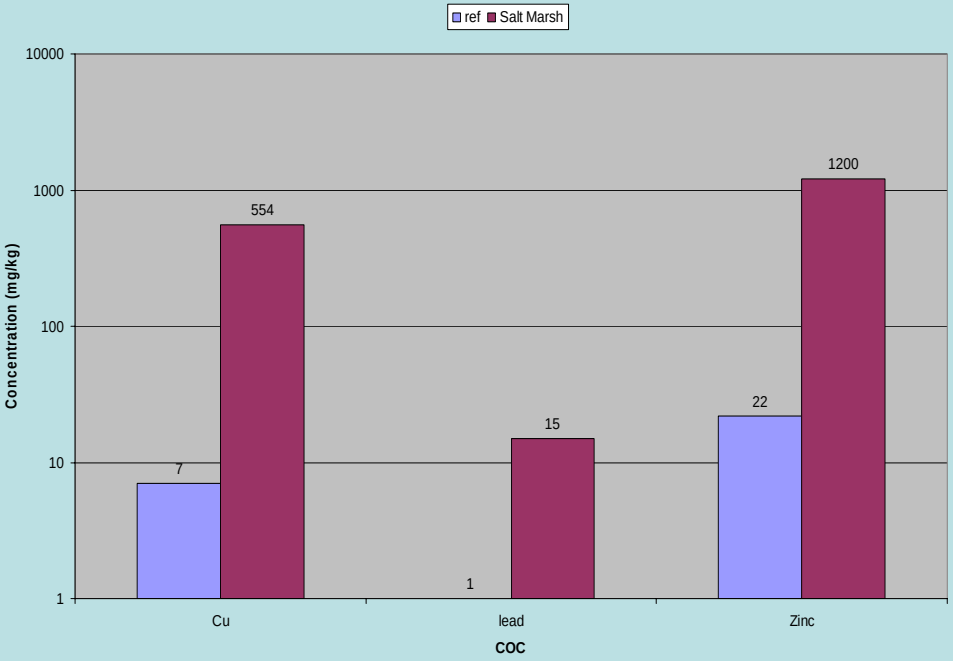


- Four areas of the Site have much higher contaminant levels.
  - Southern Goose Pond Hot Spot (purple)
  - Salt Marsh Hot Spot (yellow)
  - Dyer Cove Hot Spot (white with blue stripes)
  - Goose Cove Hot Spot (green stripes)

Tissue Data





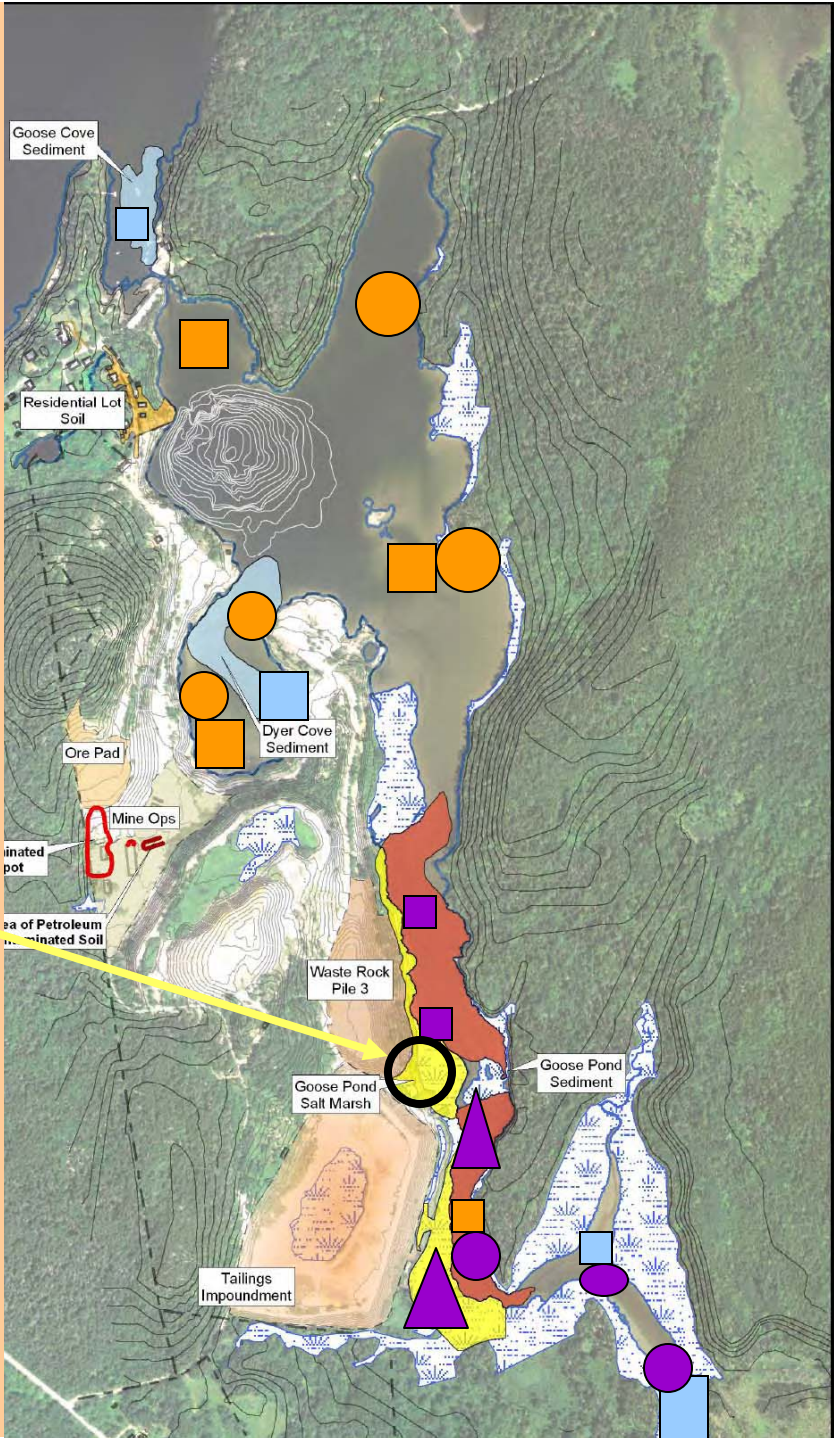


Contaminant concentrations in tissue within Southern Goose Pond hot spot (red) are consistently higher than the reference areas (blue) and other Site areas (yellow).

- **Fish tissue has 62x more lead.**
- **Clams tissue has 25x more lead using UCL of mean and 57x using the maximum concentration.**
- **Salt grass has over 14x more lead.**

Ecological Risk Summary

- **Two sediment toxicity tests in southern Goose Pond identified an area of acute toxicity to benthic organisms (purple box).**
- **Other toxicity tests were either inconclusive (orange box) or non-toxic (blue box)**
- **Fish tissue levels were highest in the area of southern Goose Pond (purple circle).**
- **Other areas were above background but much lower (orange circle).**
- **The seeps with the highest copper and zinc concentrations are located in southern Goose Pond.**
- **Food chain modeling identified a potential threat to insect feeding shore birds (Spotted Sandpiper) and fish eating birds (Great Blue Heron) in the southern Goose Pond area (purple triangle).**
- **Benthic community survey did not reveal significant impairment. Clam survey did document that in Southern Goose Pond there are fewer clams and the clams are smaller than adjacent areas of the Site.**



Sediment Evaluation Summary

- Sediments were evaluated by EPA as follows:
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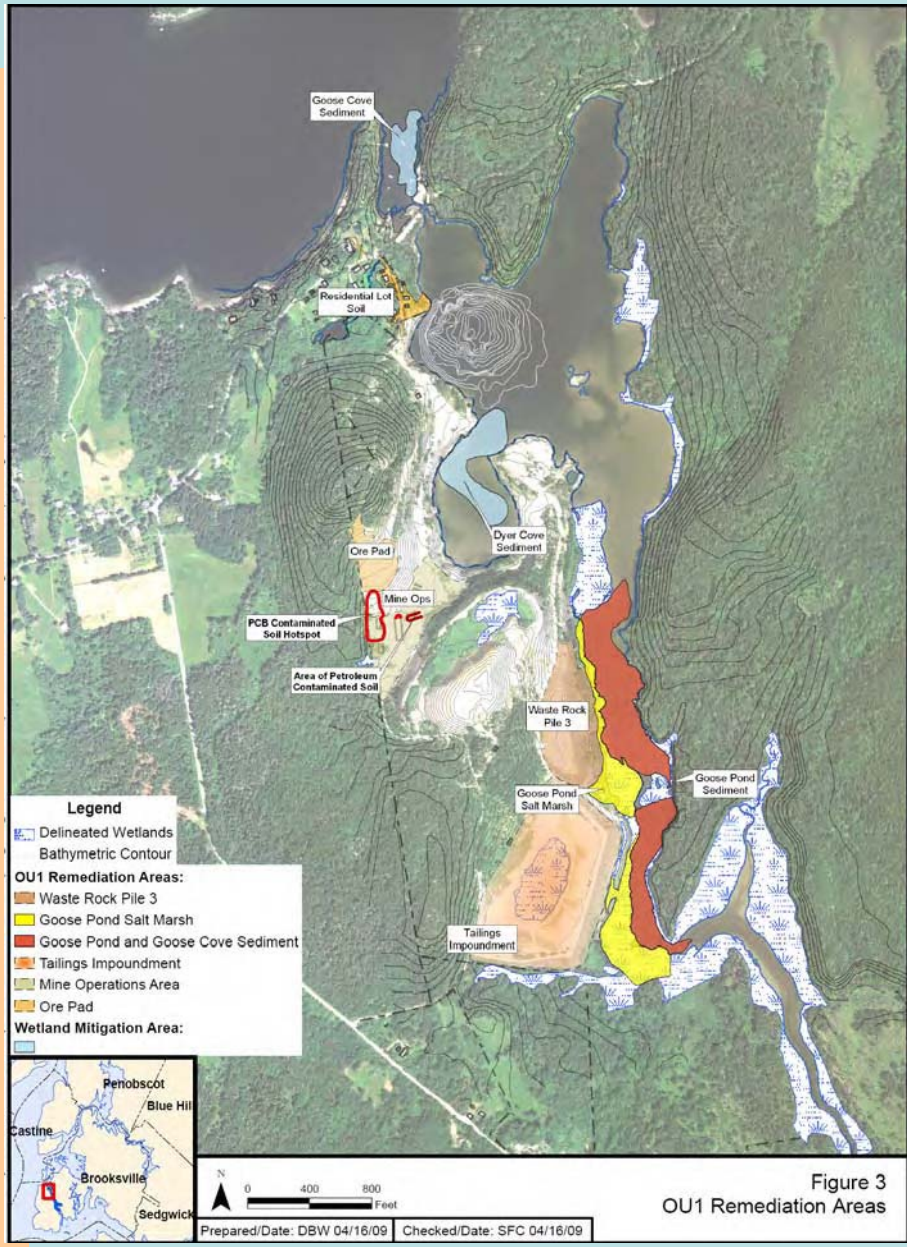
    - How do the Site contaminant levels compare to other locations along the Gulf of Maine?
      - **Site concentrations are among the highest along the entire Gulf of Maine.**
  - Local Context
    - How do the Site contaminant levels vary within the Site? **Yes**
    - Are there sub-areas of the Site that stand out as "hot spots" due to consistent high concentrations verse adjacent areas?
      - **Four hot spot areas.**
  - Ecological Relevance
    - Is there evidence that the contamination is accumulating in the tissue of Site organisms (clams, crabs, salt grass, and fish)? **Yes.**
    - Are there areas of acute toxicity (high mortality in sediment toxicity tests)? **Yes.**
    - Is there evidence of community level impacts to the benthic community? **No, but the clam survey documented fewer clams and smaller clams in Southern Goose Cove.**



Overall RI Summary

Human Health Threats:

- Current and future contact with PCB contaminated soil and waste within the former Mine Operations Area;
- Current residential contact with lead and arsenic contamination in a small area where mine waste was used as road and yard fill;
- Future residential contact with lead and arsenic contamination throughout the Site where waste rock, ore, or tailings are present and
- Future use of groundwater within the Site boundaries as a water supply.

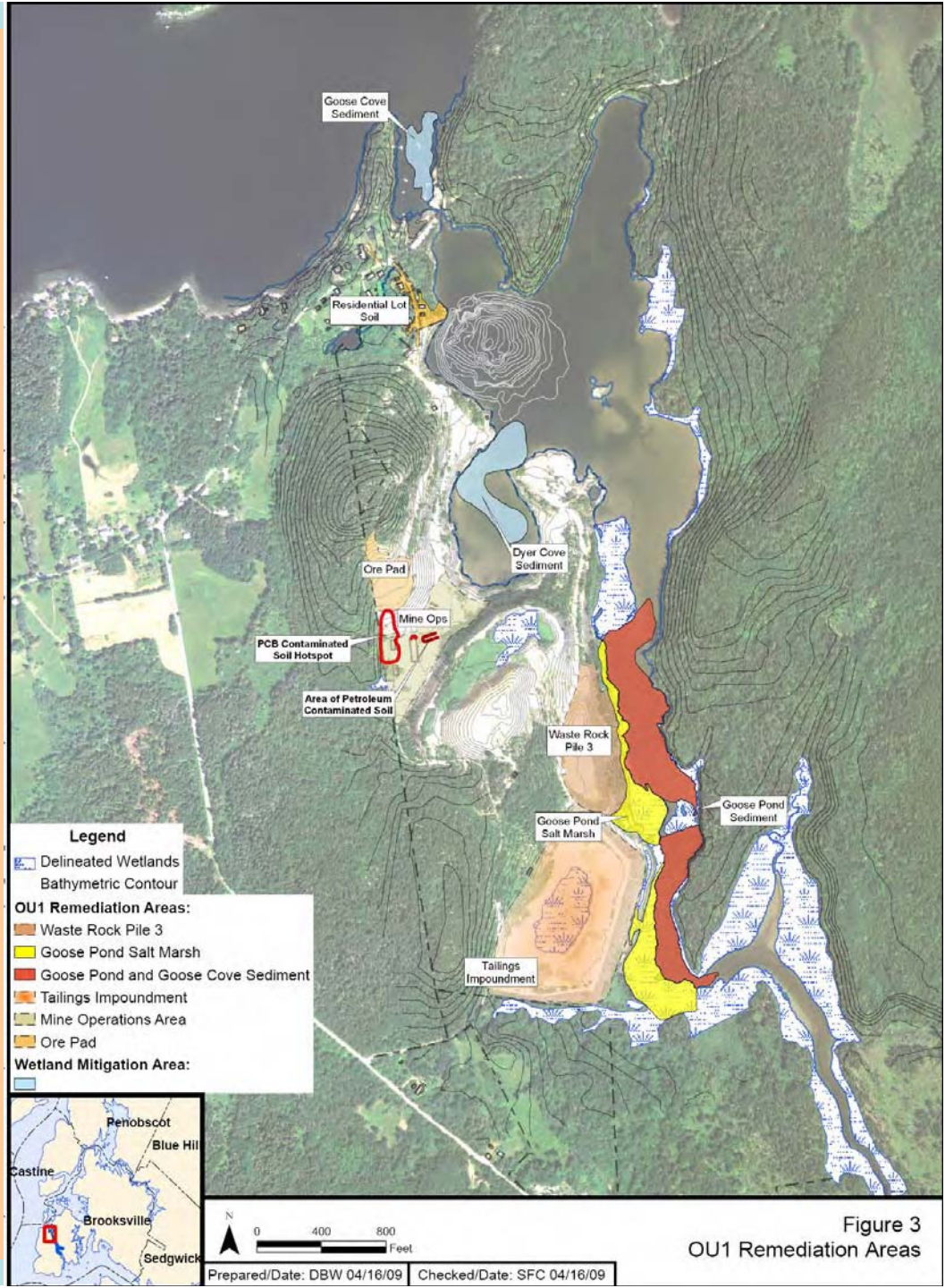
Ecological Threats:

- Potential for acute impacts to the benthic community due to copper, lead, and zinc contamination in the Southern Goose Pond hot spot;
- Potential for impact to insect eating and fish eating birds due to copper, lead, and zinc contamination in the Southern Goose Pond hot spot;
- Potential impacts to aquatic organisms when surface water concentrations exceed water quality standards; and
- Potential for impacts to several terrestrial receptors if the waste rock, ore, and tailing were to become part of a soil layer and accumulate in prey tissue.

- **Based on threats to Human Health and Environment, a Feasibility Study will be prepared to evaluate cleanup options.**

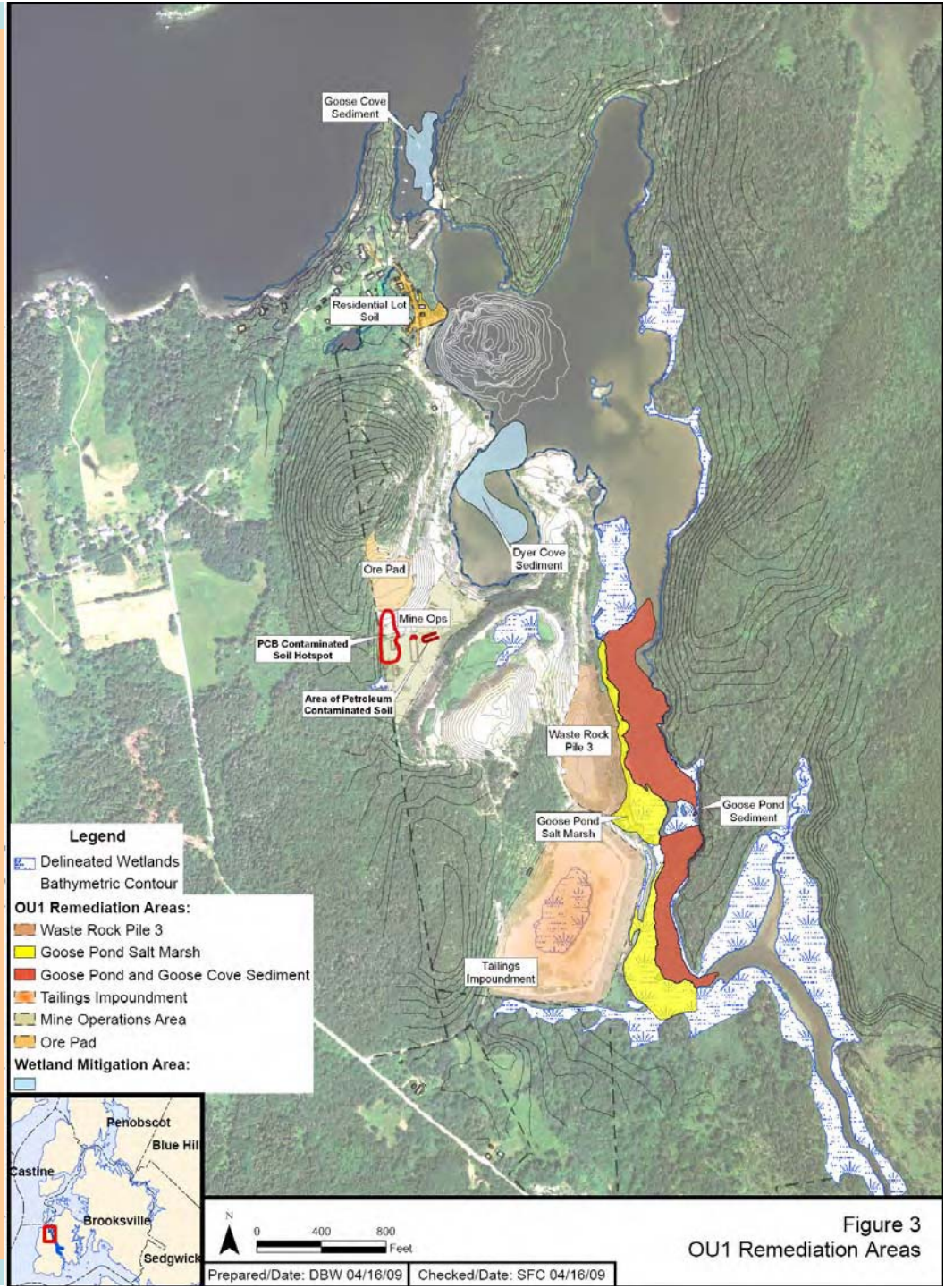
- **EPA has decided to separate the cleanup into two phases, known as Operable Units.**

- **Operable Unit 1 will target the areas with the most significant threat to human health or the environment.**



- **OU 1 Response Areas**
  - **Tailing impoundment:**
    - **Eliminate material transport.**
    - **Prevent seeps**
    - **Comply with Mine Rules**
  - **PCB Hot Spot:**
    - **Prevent any human contact**
  - **Residential yards for lead and arsenic:**
    - **Prevent long-term human contact**
  - **Waste Rock Area 3:**
    - **Eliminate source of seeps.**
    - **Comply with Mine Rules**
  - **Southern Goose Pond Sediments and Salt Marsh:**
    - **Eliminate source for ecological impacts**
    - **Comply with Clean Water Act**
  - **Ore Pad/Mine Ops area:**
    - **Remove source of groundwater contamination.**
    - **Remove source of seeps**
  - **Dyer Cove and Goose Cove:**
    - **Possible cleanup as part of wetlands restoration**

- **OU 2 Response Areas**
  - **All areas not included in OU 1.**
  - **Groundwater, Waste Rock Pile 1, Waste Rock Pile 2, On-site Access Roads**

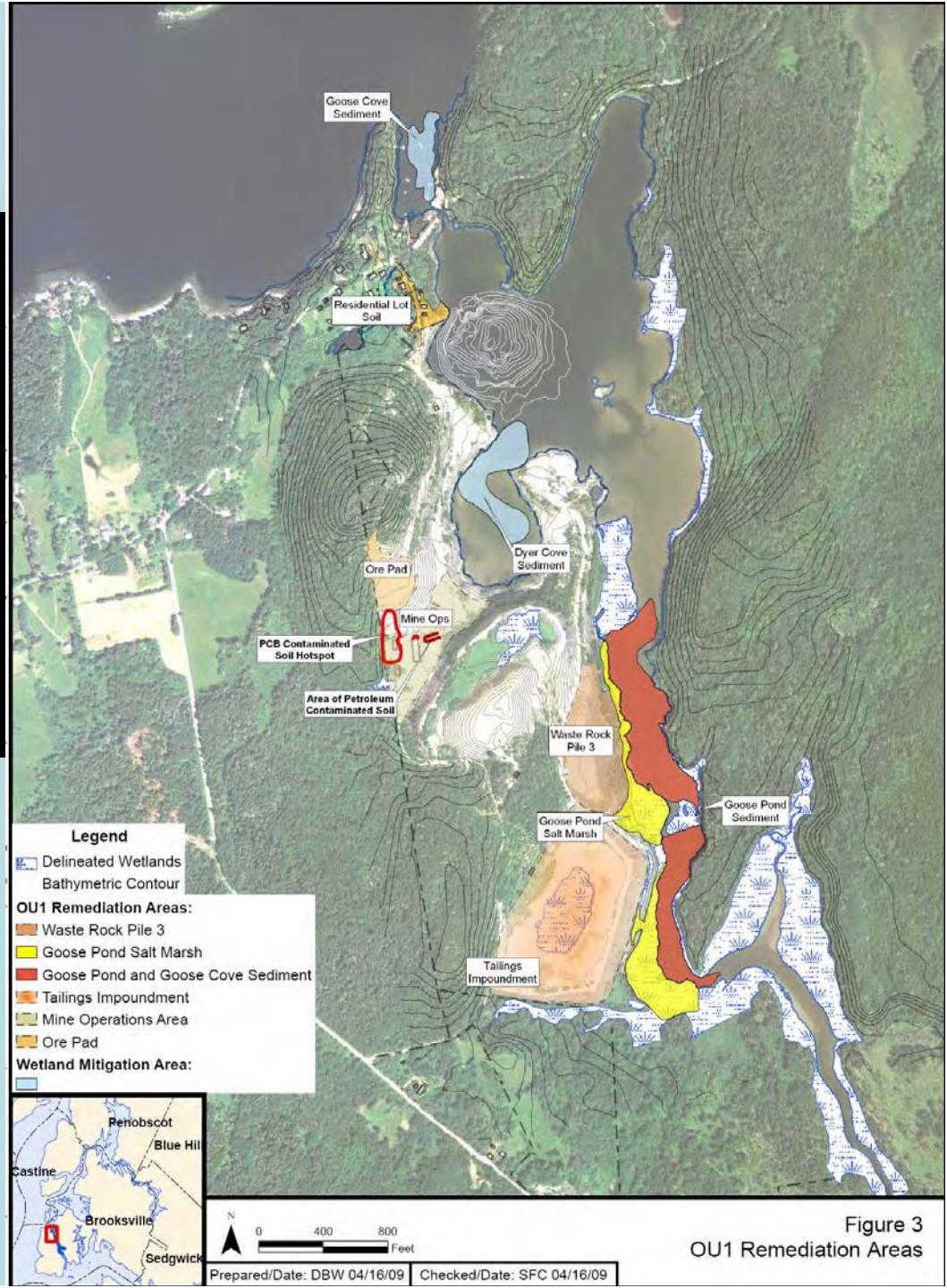


Human Health Cleanup Level (Preliminary Remediation Goals)

	Cleanup level assuming future residential use of Site (150 days per year) (mg/kg)	Cleanup level assuming future recreational use of Site (52 days per year) (mg/kg)
PCBs	1	1
Lead	375	700
Arsenic	14	30

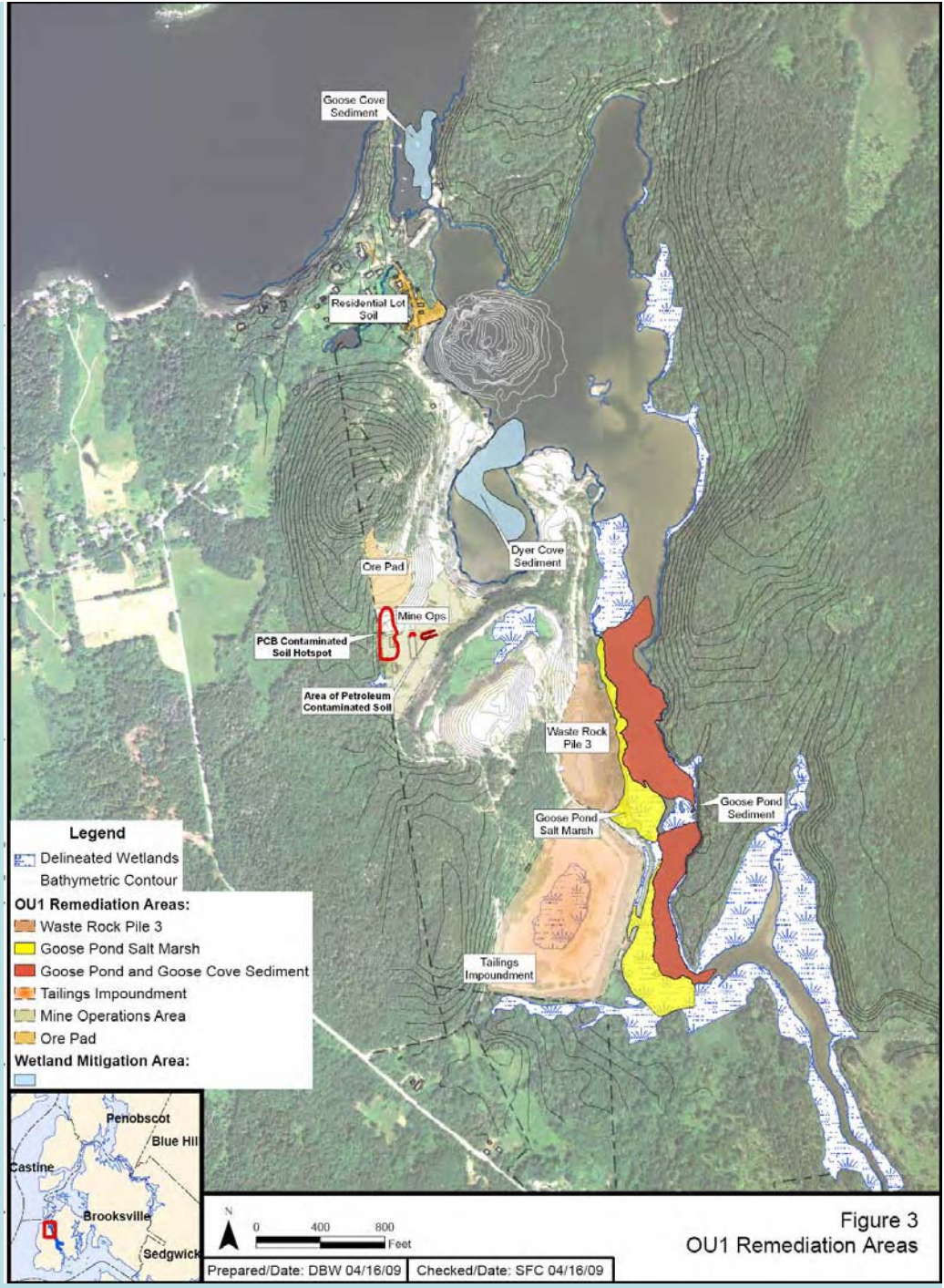
Lead and arsenic cleanup levels will only apply to areas within the OU 1 area.

OU 2 will address lead and arsenic contamination for the remaining areas.



Eco Cleanup Levels
Preliminary Remediation Goals

Eco **Wetland soil/ sediment PRGs**	**Cleanup level safe for ecological receptors** **Mg/kg**
Copper	790
Lead	710
Zinc	5,100



Next Steps

- Complete Feasibility Study by end of June 2009
- Issue Proposed Plan in July 2009
- 30 day comment period July/August 2009
- Cleanup decision and Response to Comments by end of September 2009

Next Steps

- Complete OU 2 RI/FS
- Design Cleanup
- Reach agreement for payment and implementation for cleanup
- Begin Cleanup

Information Repositories

- Remedial Investigation, Human Health Risk Assessment, and Baseline Ecological Risk Assessment are available at:
  - EPA Record Center
  - Brooksville Town Office
  - Maine DEP
  - Marine Environmental Research Institute (MERI)

- The Callahan Mine Site Reuse Assessment was also added to the Site Repositories as will copies of the Site Update and meeting handout.

Information and Contacts:

- **Internet users may access current site information at: http://www.epa.gov/superfund/sites/npl/me.htm#statelist**

Site information can also be found at:

Brooksville Free Public Library
1 Town House Road
Brooksville, Maine 04617

For More Information Please Contact:

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- End of Presentation