



# ANNUAL INTEGRATOR OPERABLE UNIT (IOU) PROGRAM UPDATE

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*Savannah River Site Citizens Advisory Board  
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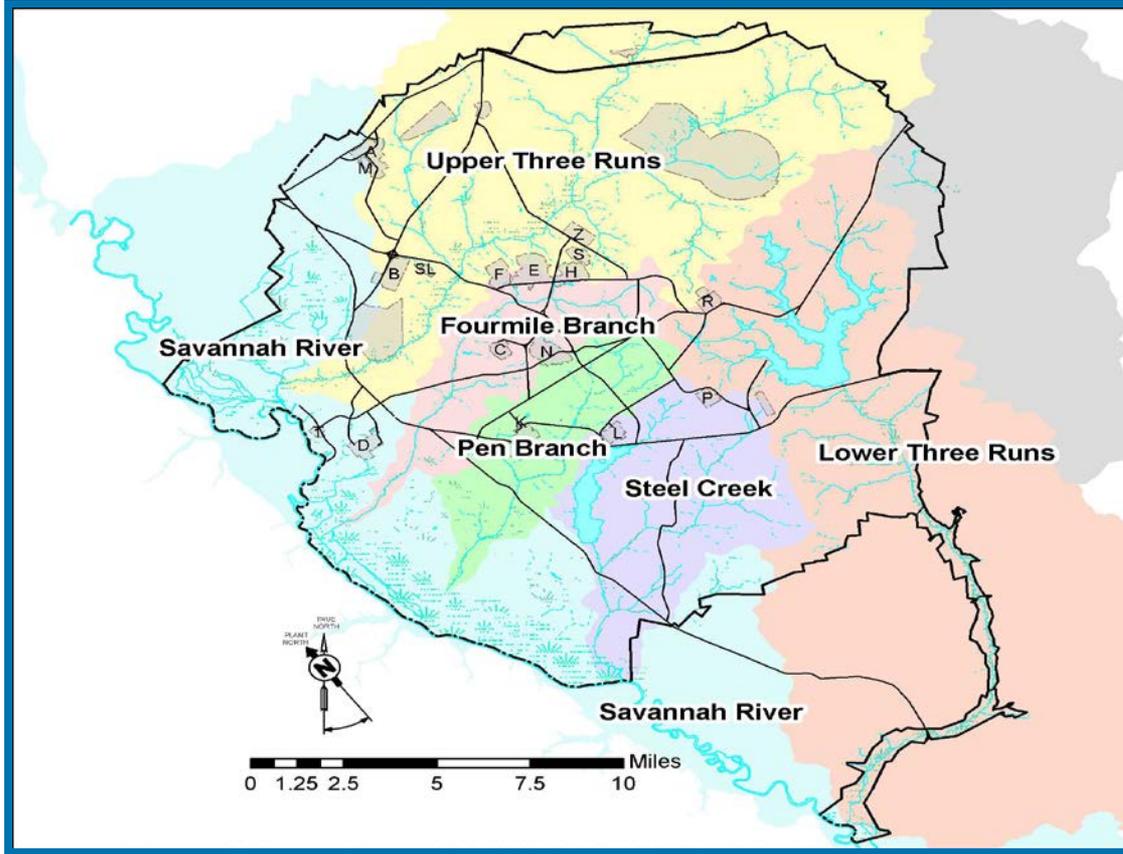
# Purpose

## Consistent with the Facilities Disposition and Site Remediation Committee's 2013 Work Plan:

- Provide brief description of the Integrator Operable Unit (IOU) Program
- Present an update on:
  - Steel Creek IOU - Wetland Area at Dunbarton Bay
- Outline Path Forward for the IOU Program



# IOU Program



- SRS streams were added to the Federal Facility Agreement (FFA) in FY 1997
- IOU includes surface water, sediment, floodplain soils, and biota (plants and animals)



# IOU Program's Purpose

- Evaluate contaminants in SRS stream systems
  - Evaluate human health risk in stream corridors
  - Assess the health of the stream system
  - Monitor contaminant levels based on IOU and other data
- Determine whether early cleanup actions are needed
- Final IOU cleanup decision is made upon completing all Operable Unit actions within the watershed



# Human Health and Ecological Screening

- IOU Phase II Receptors

- Human Health

- *On-site Worker*

- *Adolescent Trespasser*

- *Potential Resident*

- *Fisherman (subsistence level - meat consumption only from fish)*

- *Recreational Hunter*

- Ecological

- *Benchmark screening and biological data*

## Human Health Screening Level

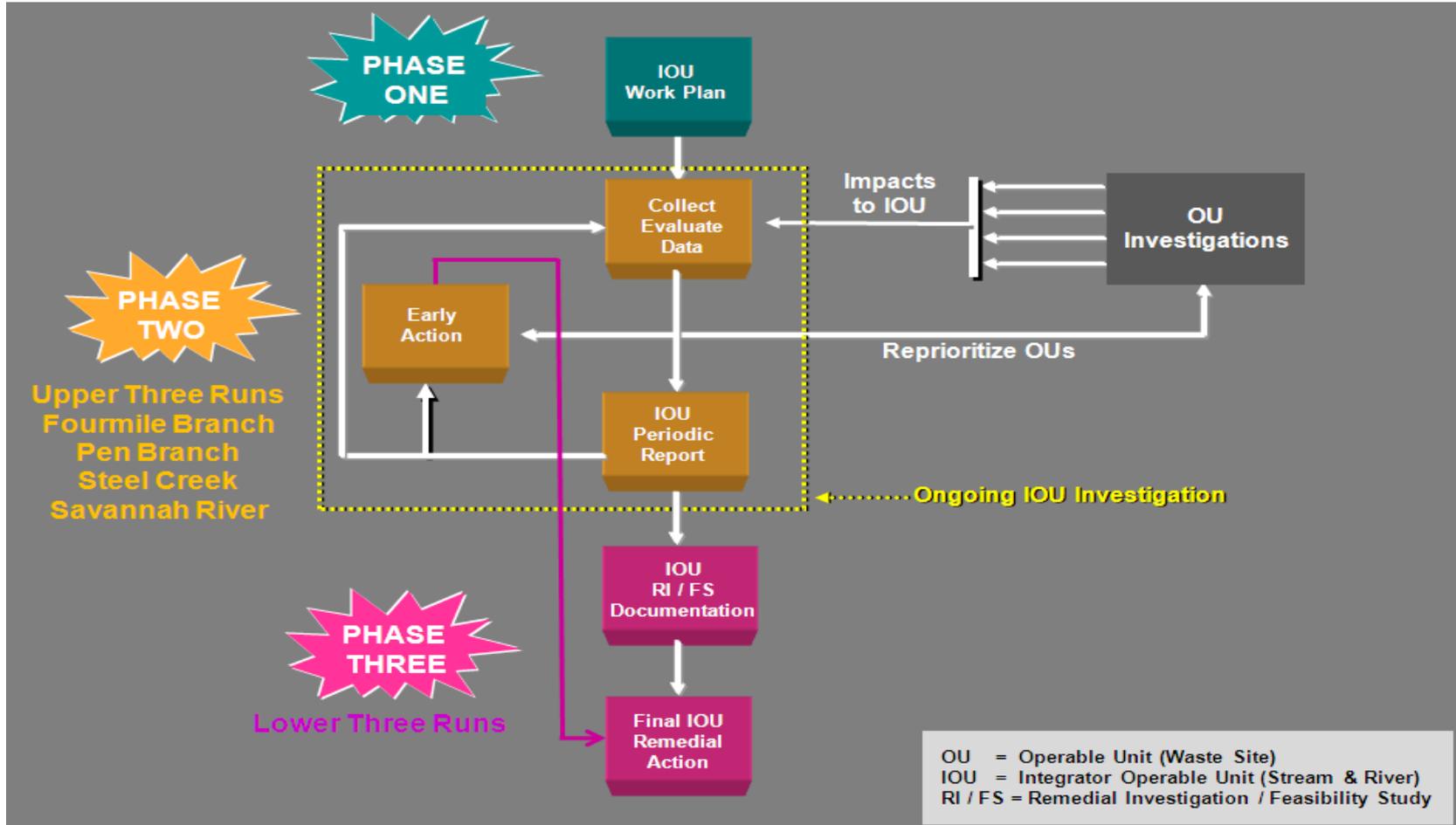
1 in 10,000 **cancer** risk level ( $10^{-4}$ )

- or -

3 x greater than **non-cancer** threshold  
(Hazard Quotient = 3)



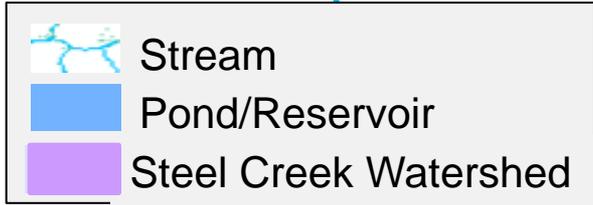
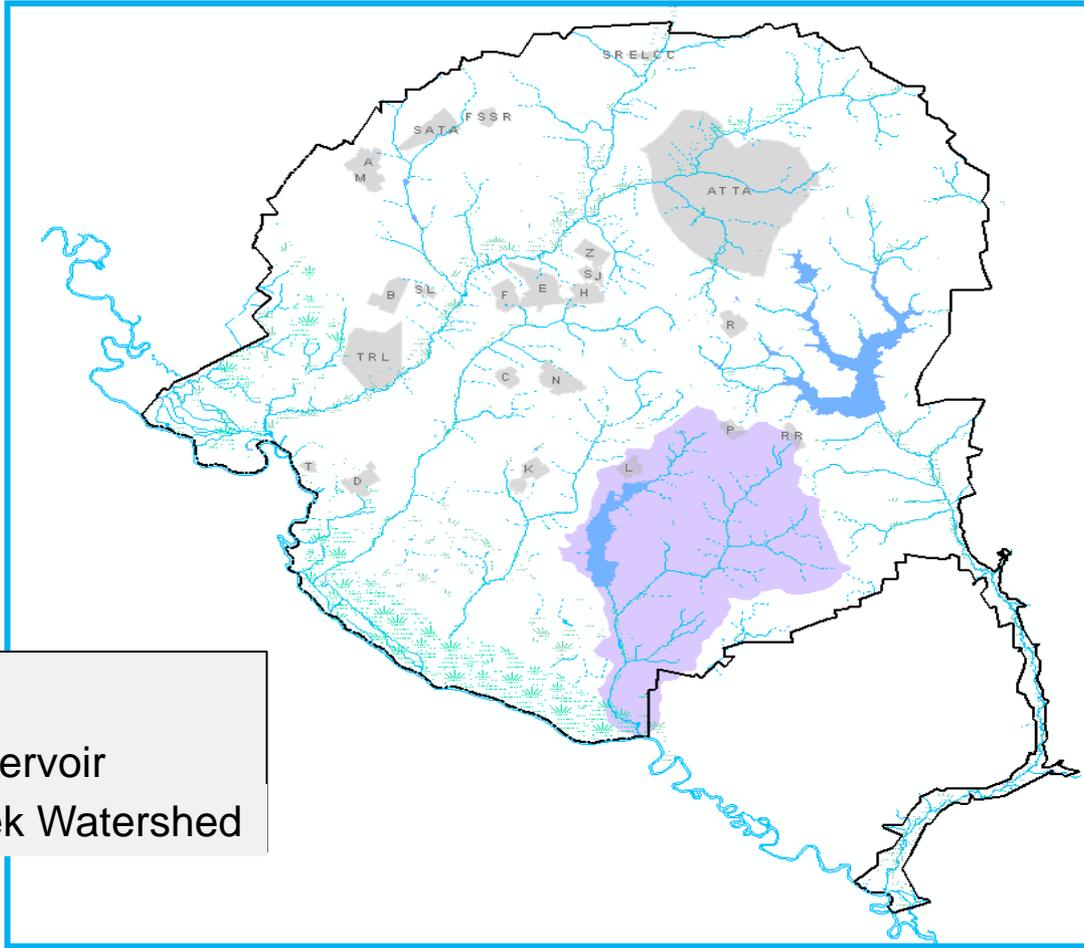
# IOU Program



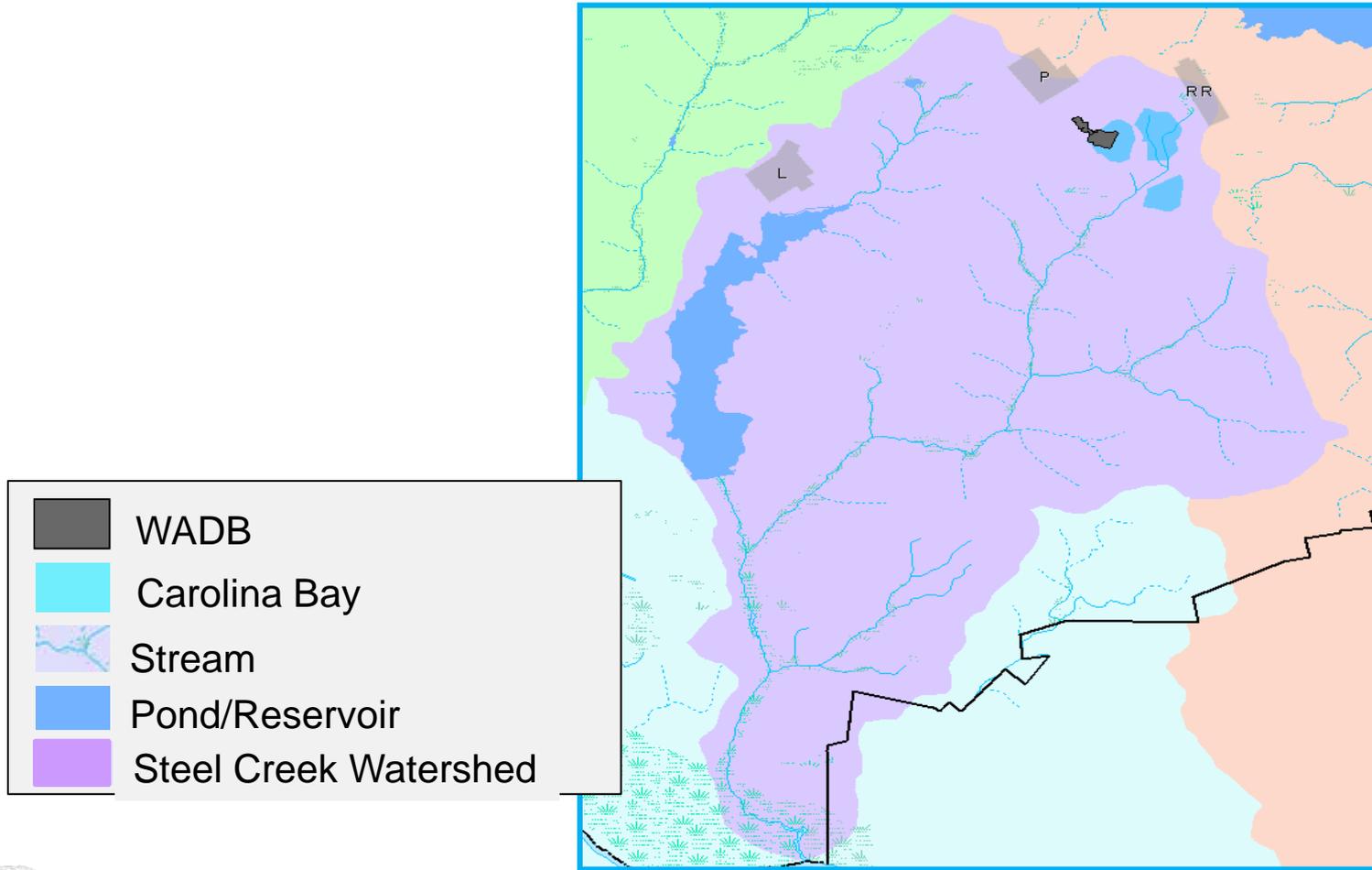
# Program Involvement (Savannah River Site – Department of Energy)



# Steel Creek IOU



# Steel Creek IOU and the Wetland Area at Dunbarton Bay (WADB)



# Status (Wetland Area at Dunbarton Bay – Sampling)

- In 2010, coal ash was discovered in the Wetland Area at Dunbarton Bay
  - Historical overflow from P-Area Ash Basin
  - Deposits cover 38 acres; ash 1-3 feet in depth
- Media Sampled
  - Ash/Soil
  - Surface Water
  - Groundwater
  - Biota (plants & animals)
  - Reference site (Bay 100) sampled primarily for ecological comparisons



# Wetland Area at Dunbarton Bay



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# Status (WADB)

- The prominent feature of the WADB is Dunbarton Bay - a Carolina bay that includes cypress/tupelo habitat
- Carolina bays are an important land feature providing valuable wetland habitat to a variety of organisms
- Amphibians, in particular, can be sensitive to elevated metals in coal combustion ash



Three Species of the  
Genus Rana (True Frogs)  
Green Frog, Bullfrog, and Leopard  
Frog  
(shown top to bottom)



# Dunbarton Bay (Transitioning to Cypress/Tupelo Habitat)



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# Bay 100 (Reference Bay to the WADB)



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# Drift Fence Used to Collect the Majority of Biota Samples



**“Capture” bucket**



# Human Health and Ecological Screening (WADB)

- Final action determination supports the Steel Creek IOU
- IOU Receptors
  - Ecological
    - *Contaminant screening*
    - *Biological data*
    - *Trophic modeling*
  - Human Health
    - *On-site Worker*

## Human Health Screening Level

1 in 1,000,000 **cancer** risk level ( $10^{-6}$ )

- or -

Greater than **non-cancer** threshold  
(Hazard Quotient = 1)



# Status (WADB – Ecological Risk Assessment)

- Results of Savannah River Ecology Lab study
  - Levels of arsenic, selenium, and strontium, and also copper, nickel, and uranium in tissue were elevated in the WADB when compared to the reference site
  - The number of species in the WADB was comparable to the reference bay indicating that the ash is not adversely impacting the biodiversity of *herpetofauna* (reptiles & amphibians)

**Southern toad  
(*Bufo terrestris*)  
the most common  
species at both  
WADB and Bay 100**



- Ecological Risk Assessment (continued)
  - Trophic modeling assessed the potential threat of metals to the raccoon and great blue heron
  - Aluminum in soil/ash exceeded the lowest observed adverse effect level (LOAEL) for the raccoon at WADB and the reference bay due to incidental soil ingestion.
  - Levels of aluminum were *higher* at Bay 100, representing naturally high aluminum levels in soils, not unit-related



Great blue heron  
*Ardea herodias*

# Status (WADB - Risk Determinations)

- Ecological Risk Assessment
  - No problems warranting action
- Human Health Risk Assessment
  - Arsenic and cesium-137 exceeded the  $1.0E10-06$  risk level for the on-site worker in surface ash/soil
  - Risk =  $9.9E-05$
- *Total surface soil area warranting action is 38 acres*
  - Volume of ash is 80,220 cubic yards ( $yd^3$ )



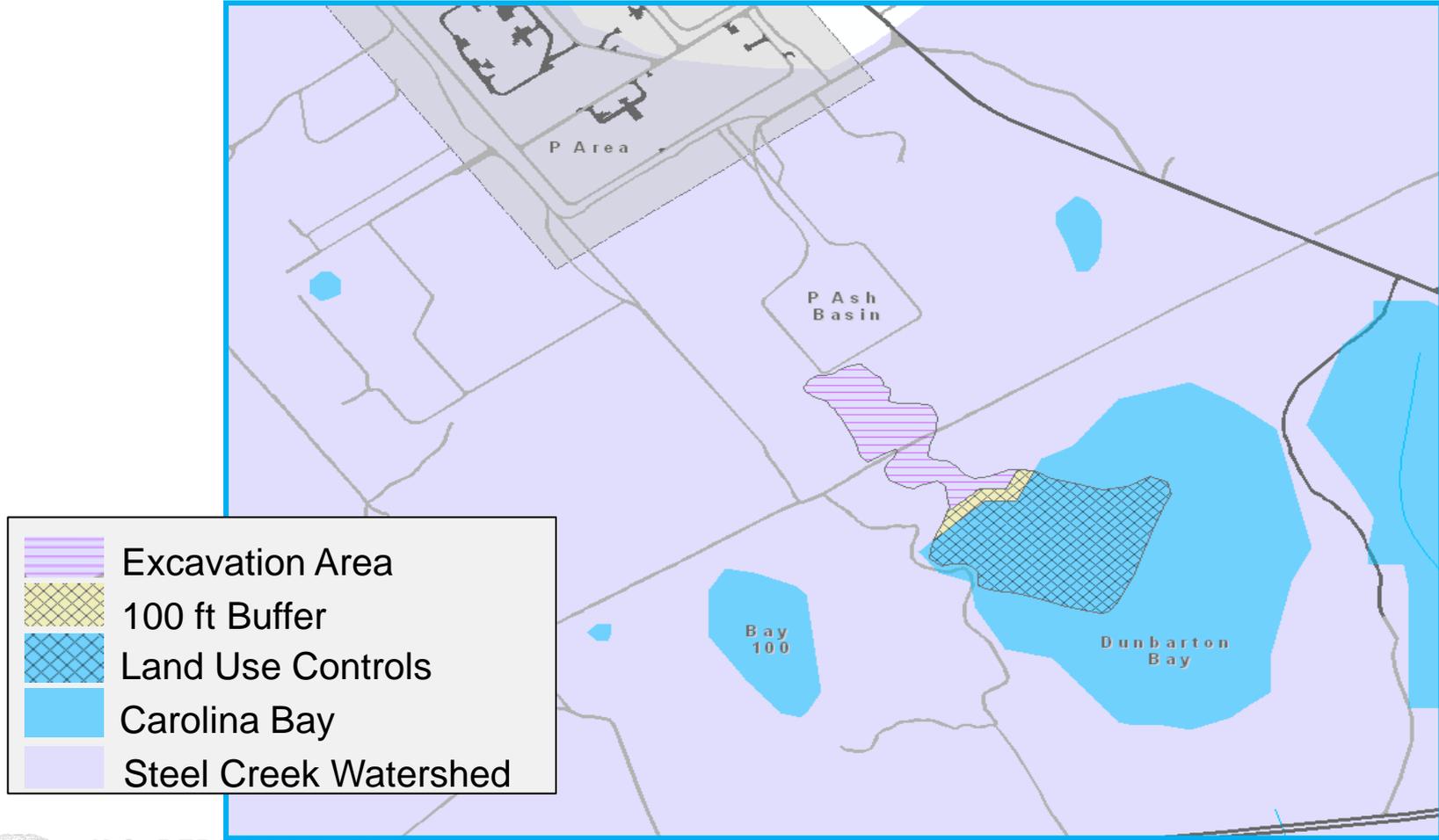
# Status (WADB - Preferred Alternative)

- Preferred Alternative

- Excavating 13 acres (22,000 yd<sup>3</sup>) of ash/soil to the edge of the 100 ft (30-m) buffer at Dunbarton Bay
- Transporting the waste to an approved ex situ containment facility located off-SRS (likely: Three Rivers Landfill)
- Land Use Controls (LUCs) for 25 acres since some material will be left in place
- Estimated cost for completion is \$11 million



# Wetland Area at Dunbarton Bay



# Status (WADB – Land Use Controls)

- Land Use Controls include:
  - Warning signs at the subunit boundary where ash remains
  - Notify the Environmental Protection Agency and SC Department of Health and Environmental Control in advance of any major changes in land use that would necessitate re-evaluation of the remedy
  - Institutional controls (administrative controls) and use restrictions for on-site workers (Site Use/Site Clearance Program) and work controls (worker training and briefings)



# Path Forward for the IOU Program

- Wetland at Dunbarton Bay
  - Statement of Basis/Proposed Plan was submitted in May 2013
  - Issue Record of Decision (ROD) for WADB: August 2014
  - Remedial Action start: by November 2015



# Path Forward for the IOU Program (continued)

| IOU                                    | FY12                    | FY13 | FY14 | FY15 | FY16 | FY17 |
|----------------------------------------|-------------------------|------|------|------|------|------|
| Upper Three Runs                       |                         |      | PR4  |      |      |      |
| Fourmile Branch                        |                         |      |      |      | PR 5 |      |
| Pen Branch                             |                         |      |      | PR 4 |      |      |
| Steel Creek                            |                         | PR 5 |      |      |      |      |
| Lower Three Runs                       | PR 4<br><i>complete</i> |      |      |      |      | BRA* |
| Savannah River and<br>Floodplain Swamp | PR 3<br><i>complete</i> |      |      |      |      | PR4  |

\* Baseline Risk Assessment supporting Phase III of the IOU program  
(ROD will be issued March 2020)

