U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

Annual Integrator Operable Unit (IOU) Program Update

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DOE-Savannah River

Savannah River Site Citizens Advisory Board

September 22, 2014

Purpose

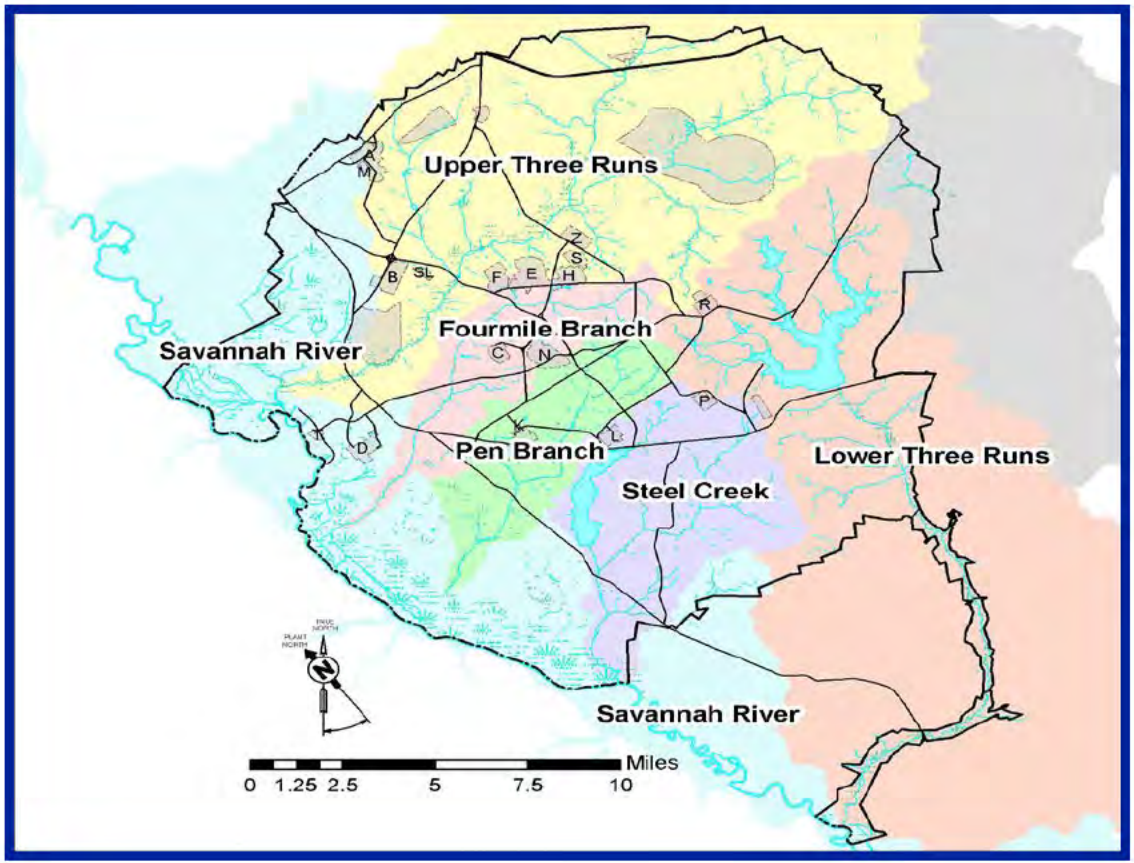
Consistent with the Facilities Disposition and Site Remediation Committee's 2014 Work Plan:

- Provide brief description and update of the Integrator Operable Unit (IOU) Program

IOU Update:

- Upper Three Runs IOU PR 4
- Steel Creek IOU - WADB and Field Start
- D-006 Wetland Restoration
- Lower Three Runs IOU – Phase III
- Path Forward for the IOU Program

IOU Program

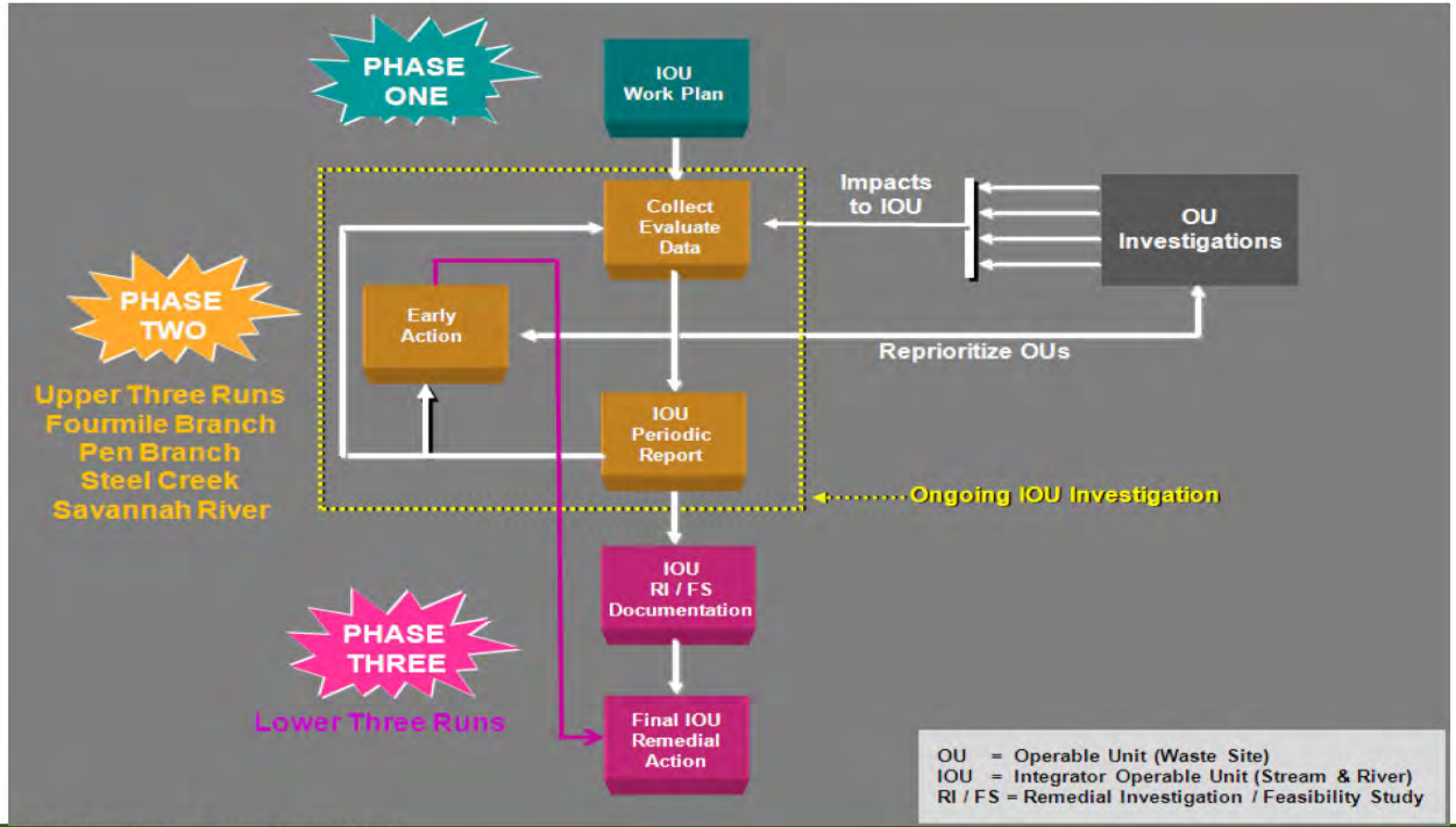


- SRS streams were added to the Federal Facility Agreement (FFA) in FY 1997
- IOU includes surface water, sediment, floodplain soils, and biota (plants and animals)

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 stream 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 cleanup actions within the watershed

IOU Program


PHASE ONE
IOU Work Plan
Collect Evaluate Data
Impacts to IOU
OU Investigations
Early Action
Reprioritize OUs
IOU Periodic Report
Ongoing IOU Investigation
PHASE TWO
Upper Three Runs
Fourmile Branch
Pen Branch
Steel Creek
Savannah River
IOU RI / FS Documentation
PHASE THREE
Lower Three Runs
Final IOU Remedial Action
OU = Operable Unit (Waste Site)
IOU = Integrator Operable Unit (Stream & River)
RI / FS = Remedial Investigation / Feasibility Study

Human Health and Ecological Screening

- IOU Phase II Receptors
  - Human Health
    - On-site Worker
    - Adolescent Trespasser
    - Hypothetical Resident
    - Fisherman (subsistence level - meat consumption only from fish)
    - Recreational Hunter
  - Ecological
    - Benchmark screening, trophic modeling, and biological data

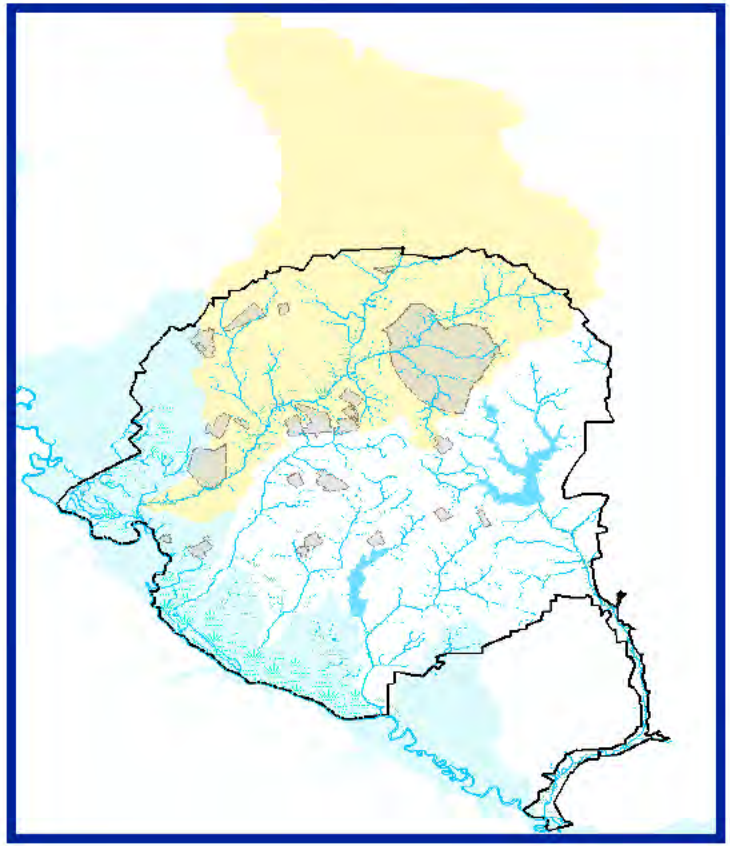
Early Action
Human Health Screening Level

1 in 10,000 ***cancer*** *risk level (10^{-4})*
- or -
3 x greater than ***non-cancer*** *threshold*
(Hazard Quotient = 3)

Program Involvement (SRS-DOE)

Upper Three Runs (UTR) IOU

- Phase I Field Start (FS)- June 2003
- First Phase II FS - January 2007
- PR# 4 Submitted in April 2014
- 4th Phase II Field Start - May 2015
- Phase III Field Start - November 2034

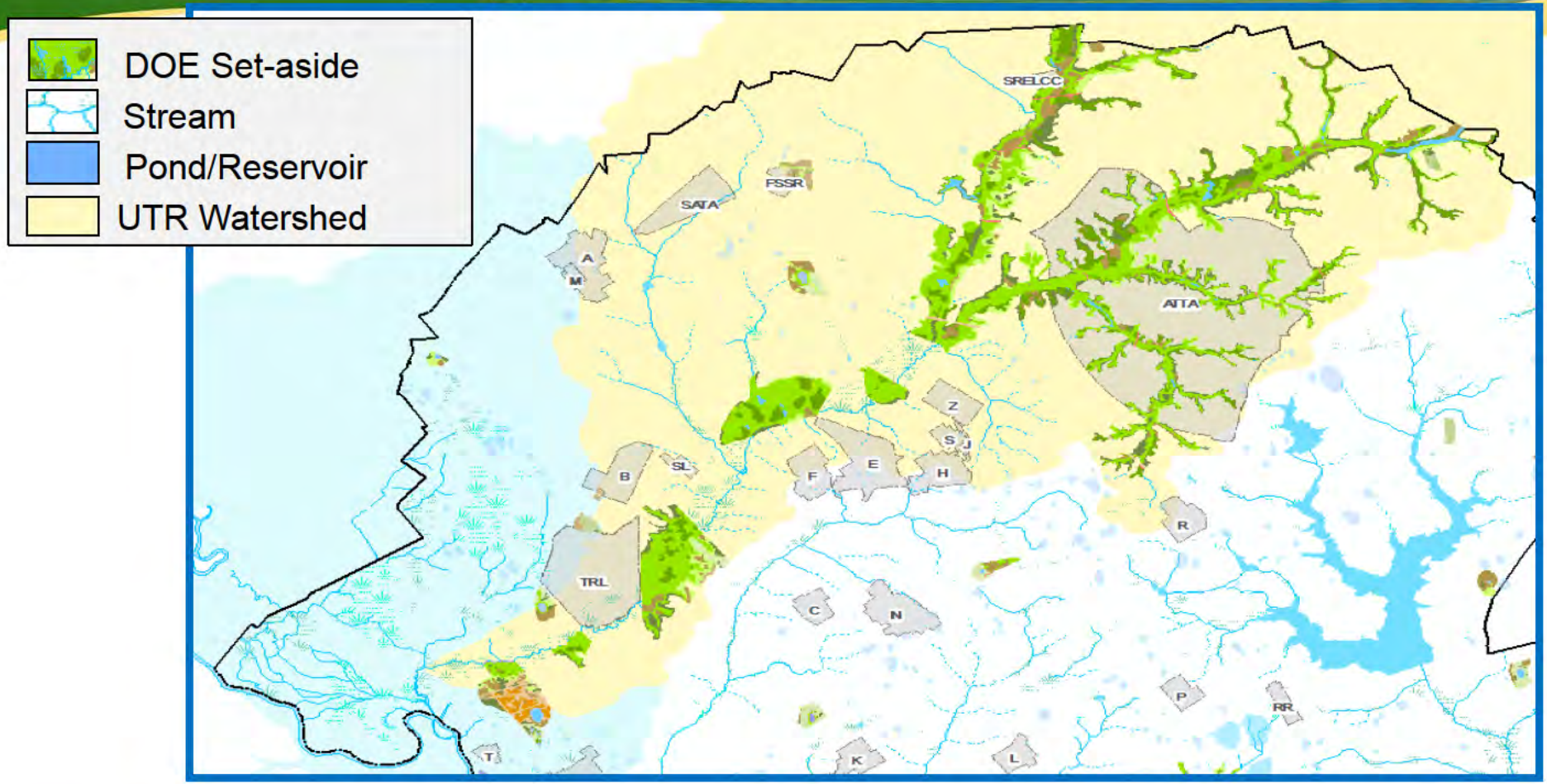


Upper Three Runs IOU

The Upper Three Runs Watershed includes portions of both Aiken, SC and New Ellenton, SC townships.

Upper Three Runs has one of the most diverse stream biota (macroinvertebrate assemblages) in the world.

Upper Three Runs IOU – A Valuable Resource



Upper Three Runs IOU – Upper Three Runs PR 4

- UTR PR4 Revision 0 Submitted April 2014
- Human Health Evaluation
  - No problems warranting action were identified
  - Single benchmark exceedance for Radium-226 (naturally occurring radionuclide) for the onsite worker for sediment
- Ecological Evaluation (past bio-assessments revealed)
  - Ecological degradation in the upper reaches of Crouch Branch (macroinvertebrate data)
  - Low biotic integrity (fish and macroinvertebrates) in Tims Branch
  - Crouch Branch and Tims Branch undergoing additional study and trophic modeling effort (kingfisher, raccoon, belted kingfisher, and great blue heron)
- Comments on Rev. 0 received (EPA & SCDHEC) – responses due September 2014

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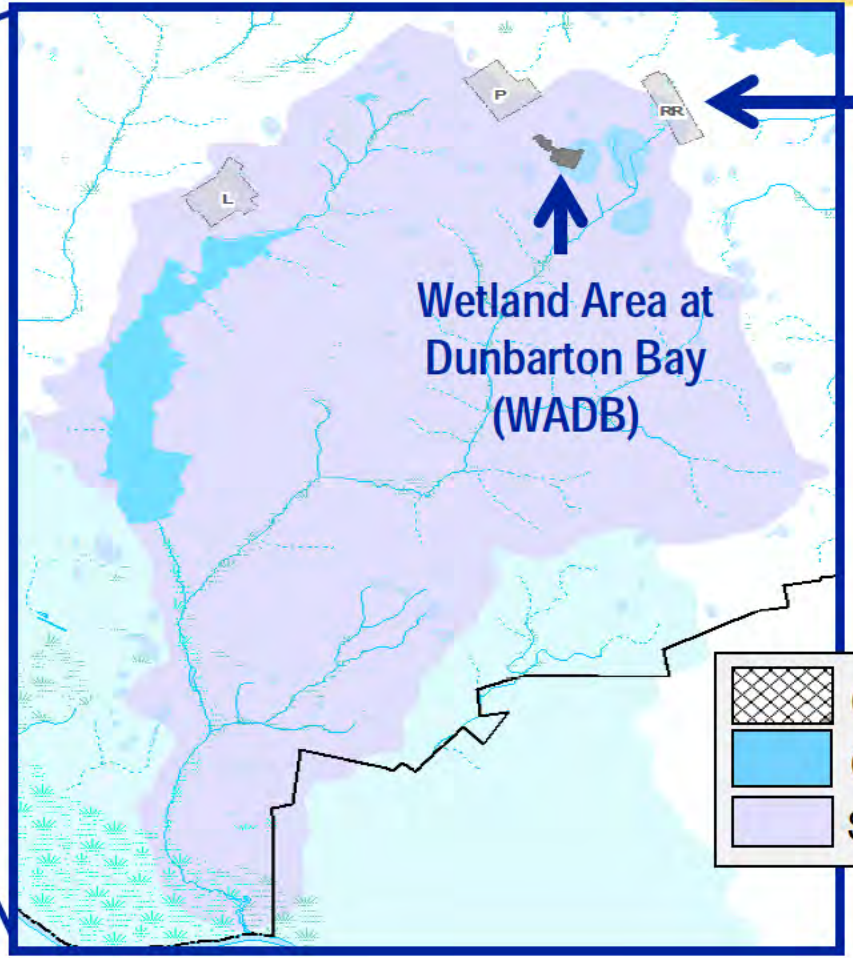
Steel Creek (SC) IOU



Steel Creek IOU – Wetland Area at Dunbarton Bay (WADB)

- Historical overflow from P-Area Ash Basin
- Ash deposits cover 38 acres; ash 1-3 feet in depth

Steel Creek IOU – Wetland Area at Dunbarton Bay

Dunbarton Bay (Transitioning to Cypress/Tupelo Habitat)

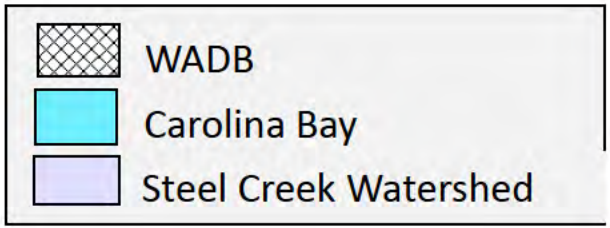
Steel Creek IOU – Wetland Area at Dunbarton Bay

- WADB Status
  - Statement of Basis/Proposed Plan was submitted in May 2013
  - Issuance of Record of Decision (ROD) for WADB - August 2015
  - Remedial Action start - November 2016
  - ROD Issuance (August 2015) and RA Start (November 2016) for WADB have been delayed to allow DOE to commit resources to more environmentally significant D-Area ash projects

Steel Creek IOU – Dunbarton Railroad Yard

SC PR 4 Field Start

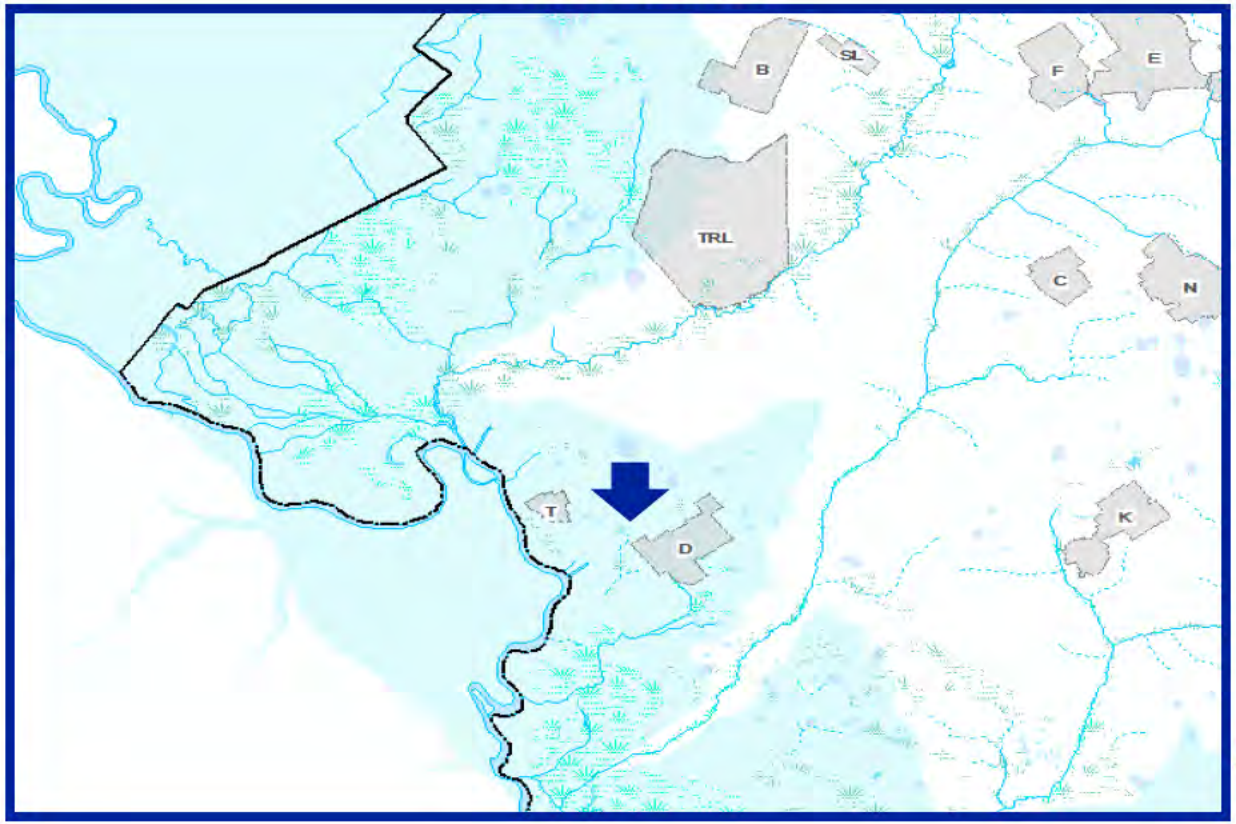
- Conducted a walk-down (August 2014) to identify sampling locations at potential discharge points to SC IOU



Savannah River and Floodplain (SRFS) IOU – D006

D-006 Petroleum Release Site Removal Area Floodplain/Wetlands Restoration

- Wetland area fully restored
- Request to discontinue separate annual reporting
- Future reporting will be within the SRFS IOU
- Approval acquired from SCDHEC & EPA



SRFS IOU – D-006

A. 2011 photo of early action taken at D-006
B. 2014 photo showing same stretch of channel from riprap dam shown in photo A

SRFS IOU – D-006

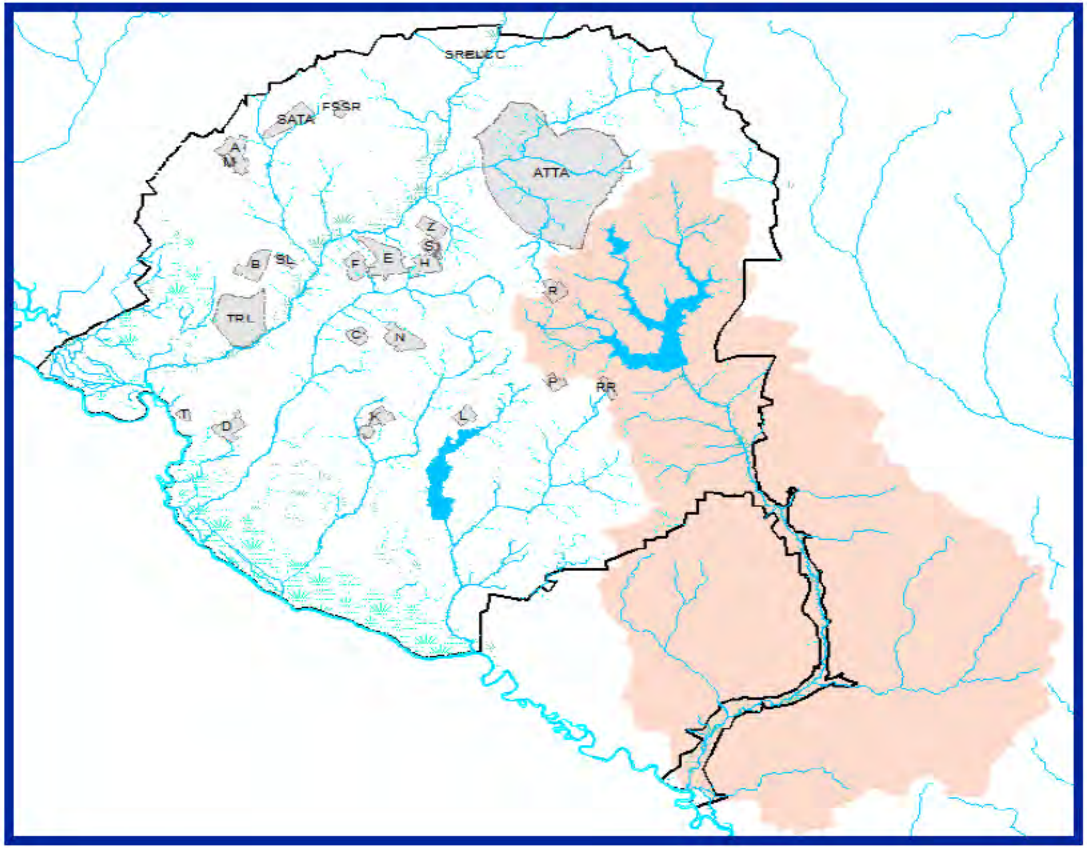
- Results of SREL Assessment
  - D-Area stream channel is clearly dominated by wetland plant species, especially several wetland rushes, sedges, and floating-leaved plants
  - More than half of the species are obligate (always occur in wetlands) or facultative (usually occur in wetlands) wetland plants, and most of them likely established from the wetland seed bank materials placed into the wetland

Photos of various wetland species found in the D-006 stream channel

A. American Bur-Reed and Black Willow
B. American White Water Lily, Common Rush, Floating Marsh pennywort
C. Round-Fruited Hedge Hyssop
D. Floating Marsh pennywort and Woolgrass

Lower Three Runs IOU

Lower Three Runs Watershed



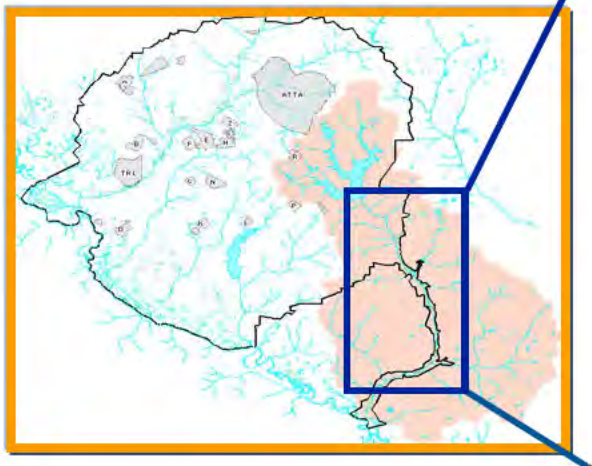
= Stream
= Pond/Reservoir
= LTR Watershed

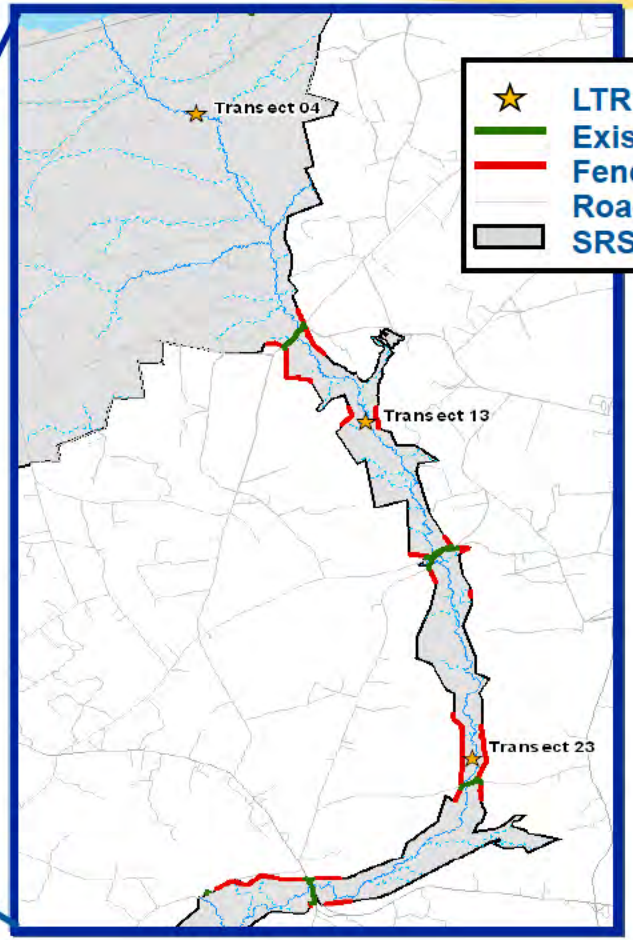
Lower Three Runs IOU – Early Action

- Intensive characterization effort was conducted in 2009/2011
- Periodic Report 4 (Approved September 2012)
  - Three discernible areas of cesium-137 contamination above our action level were identified below PAR Dam in wetland soils
  - Early Action was taken and completed in 2012 below PAR Pond dam
    - Removal of contaminated sediment/soil
    - Action level and cleanup level were based on adolescent trespasser risk
    - Additional fencing at road crossings and points of illegal access
    - Placement of additional warning and no trespassing signs

Lower Three Runs IOU – Early Action

Location of Cesium-137 Hotspots and Fence Extensions





Lower Three Runs IOU – Early Action

Fence Installation

Lower Three Runs IOU – Early Action

Removal of Contaminated Sediment/Soil

Lower Three Runs IOU – Phase III Assessment

- Phase II (Monitoring & Assessment) vs Phase III (RI/BRA/FS and Final Action)
- Early phases of "final" assessment for FY 2017 Baseline Risk Assessment
  - Data groupings (Subunits)
  - Human Health Risk Assessment
    - *Exposure/receptor scenarios still being developed*
  - Ecological Assessment
    - *Trophic modeling (great blue heron, raccoon, belted kingfisher, river otter)*
    - *Evaluation of coots at Pond B and other biological data*

Great blue heron
Ardea herodias

Lower Three Runs IOU – Phase III Assessment

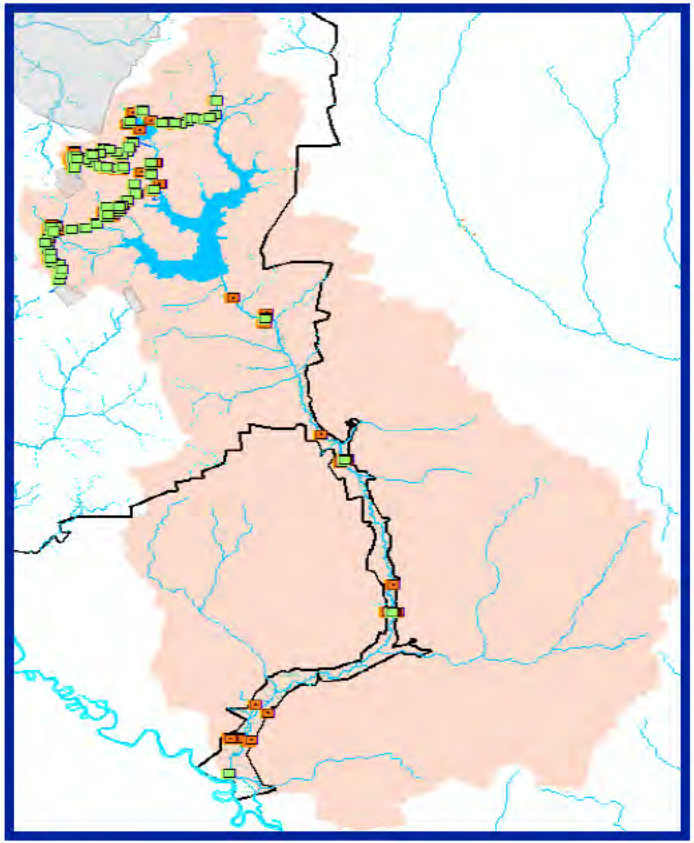
Data Sufficiency

Adequate data exists to support Phase III remedial decision making.

LTR IOU Data	# Analytical Records		
Media	Ponds and Canal System 2009/2010 Data	PAR Pond Supplemental Data	Background Data
Sediment	5539	16,636	564
Sediment/Soil	26,750	*	1040
Surface Water	15,455	1538	855
Fish	504	6354	268

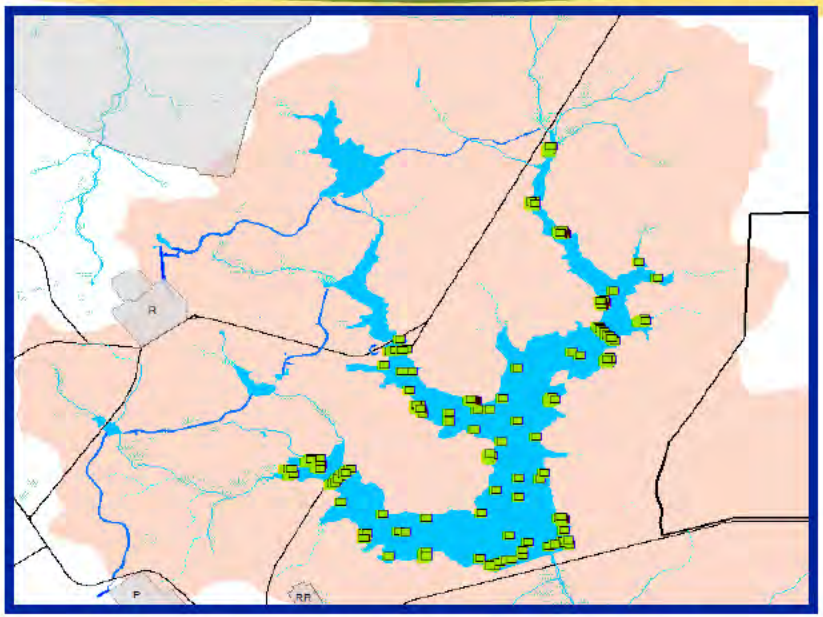
* Supplemental data (data not associated with the 2009/2010 characterization effort) is available for the LTR IOU. PAR Pond data, for example, does not include sediment/soil (floodplain) data.

Lower Three Runs IOU – Phase III Assessment



2009/2010 Characterization Data

(6274 Sediment and 33608 Sediment/Soil Analytical Records)



Supplemental Data for PAR Pond

(16,636 Analytical Records for Sediment)

= Stream

= Pond

= Watershed

Sampling Locations

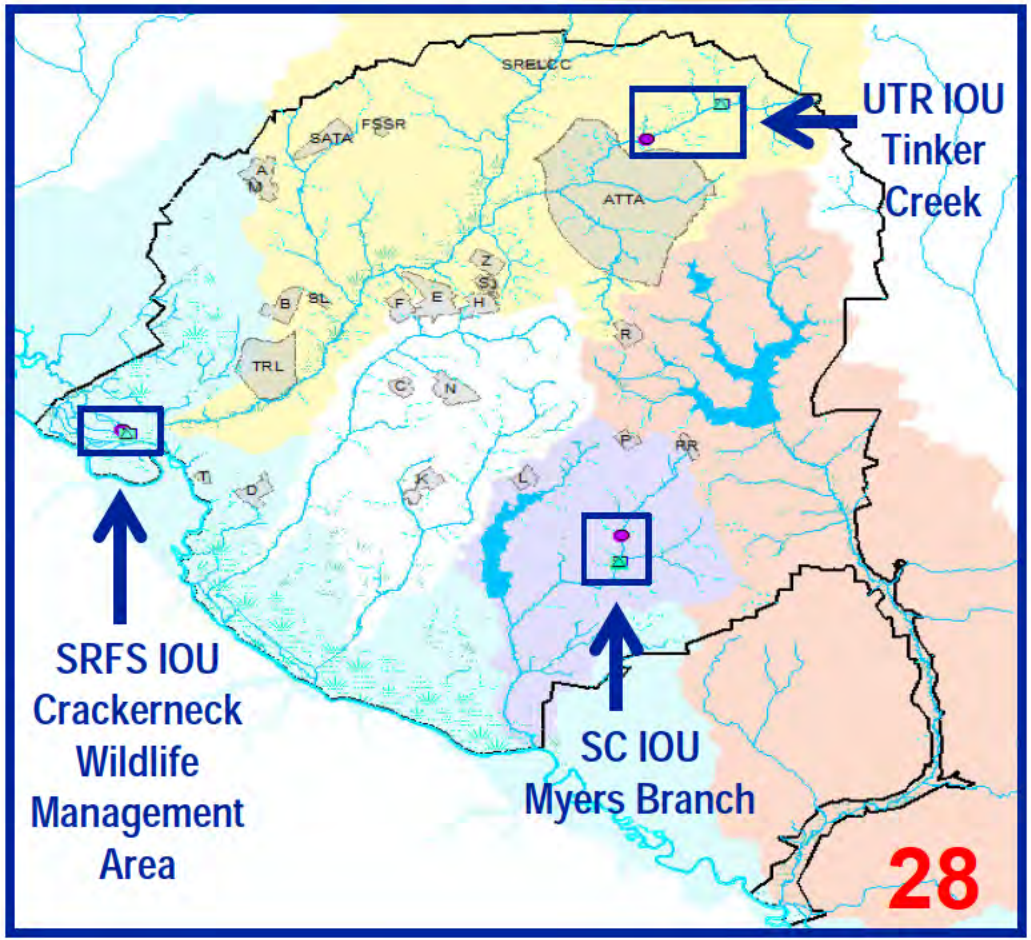
= Sediment

= Sed/Soil

Lower Three Runs IOU – Phase III Assessment

Background data were also collected during the 2009/2010 characterization effort to support Phase III

- Sediment
- Sediment/Soil
- Surface Water
- Fish



Path Forward for the IOU Program

IOU	FY14	FY15	FY16	FY17	Final ROD
Upper Three Runs	PR 4 complete				2040
Fourmile Branch			PR 5		2038
Pen Branch		PR 4			2037
Steel Creek					2039
Lower Three Runs				BRA*	2020
Savannah River and Floodplain Swamp				PR4	2041

* Baseline Risk Assessment supporting Phase III of the IOU program