

# SERDP and ESTCP Sediments Research Program

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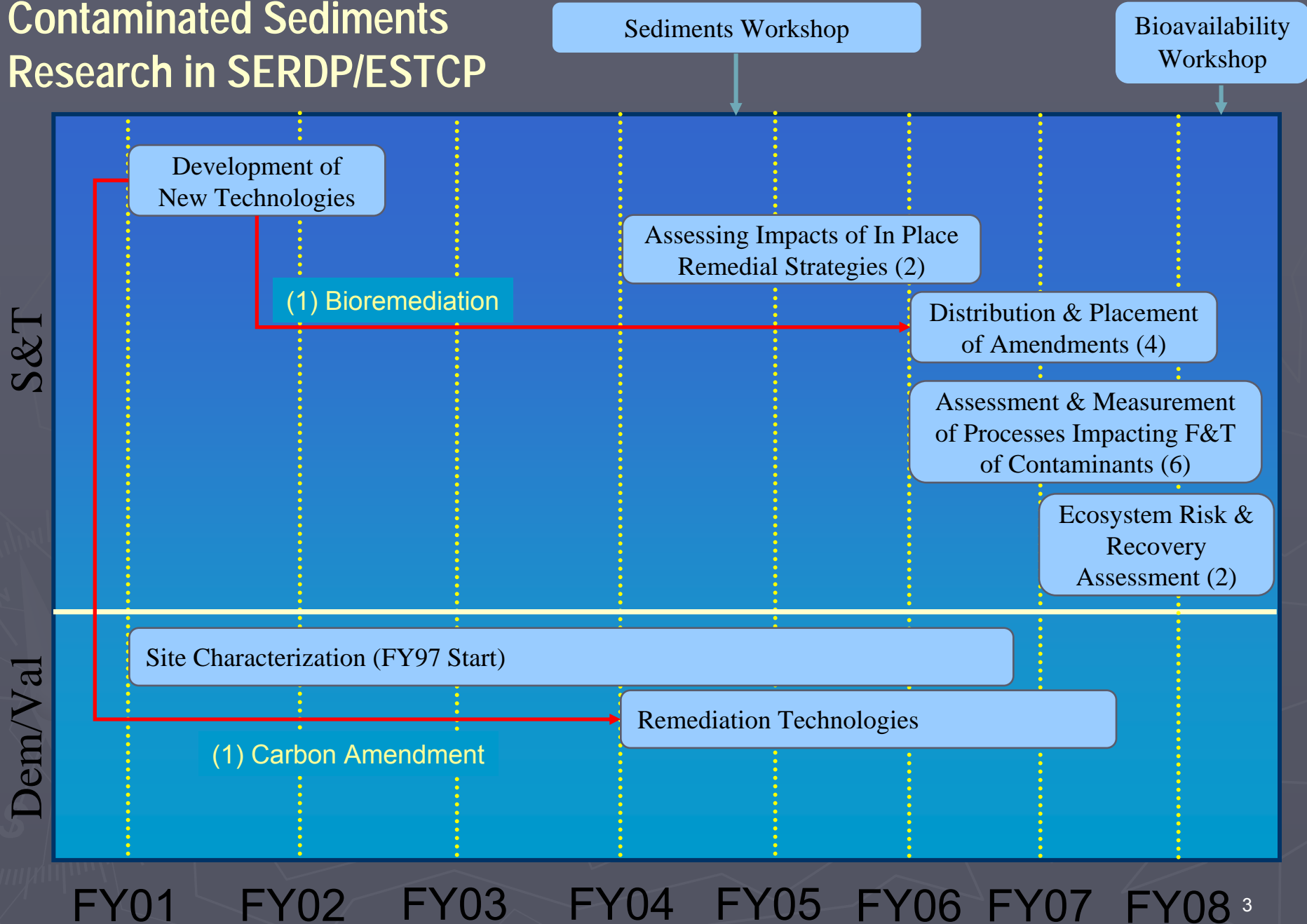
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# DoD's Environmental Technology Programs



- **Basic and Applied Research**
- **Demonstration/Validation**

# Contaminated Sediments Research in SERDP/ESTCP



# Sediments Workshop

- ▶ <http://www.estcp.org/Technology/upload/SedimentsFinalReport.pdf>
- ▶ Major Recommendations
  - Investigative tools
  - Analysis tools
  - Effectiveness of capping
  - MNR guidance
  - Delivery of in situ amendments
  - Standardized test sites
  - Data mining

# Distribution & Placement of Amendments (FY06 Start)

## ► Objectives

- Research and develop active cap amendments for contaminant sequestration and/or degradation. Issues of concern include but are not limited to mechanism of action, bioavailability of sequestered contaminants, long term effectiveness, and erosion resistance
- Research and develop sediment amendments for contaminant in-situ sequestration and/or degradation. Issues of concern include but are not limited to mechanism of action, bioavailability of sequestered contaminants, long term effectiveness, and degree of mixing required for effective treatment.
- Develop and evaluate engineering platforms and approaches for delivery of aqueous, particulate, and gaseous amendments to treat sediments. Issues of concern include but are not limited to distribution, mixing , sediment resuspension, and impact on benthic ecologies.
- Assess the efficacy of active cap placement techniques and the associated impacts such as differential settling of the cap and underlying sediment, displacement of underlying sediment during capping, and degree of mixing between cap materials and surficial sediment.

# Distribution & Placement of Amendments (FY06 Start)

## ► Projects

- ER-1491: Rational Selection of Tailored Amendment Mixtures and Composites for In Situ Remediation of Contaminated Sediments (Upal Ghosh, UMBC)
- ER-1492: Quantifying Enhanced Microbial Dehalogenation Impacting the Fate and Transport of Organohalide Mixtures in Contaminated Sediments (Max Haggblom, Rutgers University)
- ER-1493: Reactive Capping Mat Development and Evaluation for Sequestering Contaminants in Sediments (Amy Hawkins [NAVFAC ESC] & Kevin Gardner [Univ of New Hampshire])
- ER-1501: Innovative In-Situ Remediation of Contaminated Sediments for Simultaneous Control of Contamination and Erosion (Anna Knox, SRNL)

# Assessment & Measurement of Processes Impacting F&T of Contaminants (FY06 Start)

## ► Objectives

- Develop and evaluate site characterization tools to measure the rates of important sediment chemical/physical/biological processes affecting the fate and transport of contaminants.
- Develop and evaluate tools and techniques to assess site-specific bioavailability and bioaccumulation of contaminants at sites.
- Develop an improved understanding of how sediment geochemical composition influences contaminant partitioning and bioavailability.
- Understand and quantify sediment exchange processes with overlying water and groundwater.
- Develop improved methods for incorporating uncertainty into measurements of fundamental fate and transport processes.

# Assessment & Measurement of Processes Impacting F&T of Contaminants (FY06 Start)

## ► Projects

- ER-1494: An Integrated Field and Laboratory Study of the Bioavailability of Metal Contaminants in Sediments (Nick Fisher, Stonybrook Univ)
- ER-1495: Modeling and Decision Support Tools Based on the Effects of Sediment Geochemistry and Microbial Populations on Contaminant Reactions in Sediments (Jeanne VanBriesen, Carnegie Mellon)
- ER-1496: Using Passive Polyethylene Samplers to Evaluate Chemical Activities Controlling Fluxes and Bioaccumulation of Organic Contaminants in Bed Sediments (Phil Gschwend, MIT)
- ER-1497: Develop Accurate Methods for Characterizing and Quantifying Cohesive Sediment Erosion under Combined Current-Wave Conditions (Joe Gailani, U.S. Army ERDC)
- ER-1502: Application of Tools to Measure PCB Microbial Dechlorination and Flux into Water during In-Situ Treatment of Sediments (Joel Baker, Univ of Washington)
- ER-1503: Biological Processes Affecting Bioaccumulation, Transfer, and Toxicity of Metal Contaminants in Estuarine Sediments (Celia Chen, Rutgers Univ)



# Ecosystem Risk & Recovery Assessment (FY07 Start)

## ► Objectives

- Develop & evaluate rapid measurement tools or screening assays to efficiently assess ecological risk & assess ecological recovery at contaminated sediment sites for relevant ecological receptors.
- Assess ecological impacts to benthic communities of remedial technologies currently in field use at contaminated sediment sites, including reactive caps, passive caps, or various amendments.

## ► Projects

- ER-1550: Sediment Ecosystem Assessment Protocol (SEAP): An Accurate and Integrated Weight-of-Evidence Based System (Allen Burton, Univ of Michigan)
- ER-1552: Measurement and Modeling of Ecosystem Risk and Recovery for In Situ Treatment of Contaminated Sediments (Dick Luthy, Stanford Univ)

# Remediation of Contaminated Sediments

## ► Objectives

- In situ remediation technologies are sought that specifically address the remediation or management of sediments contaminated with PAHs, PCBs, heavy metals, or mixtures containing these contaminants.
- Contaminated marine, estuarine, brackish, and fresh water sediments are of interest.



# Remediation of Contaminated Sediments: ESTCP

## ► Characterization & Monitoring

- ER-0624: Demonstration and Evaluation of Solid Phase Microextraction for the Assessment of Bioavailability and Contaminant Mobility (Danny Reible, Univ of Texas)
- ER-0709: Determination of Sediment PAH Bioavailability using Direct Pore Water Analysis by SPME (Dave Nakles, ERM)

## ► Remediation

- ER-0510: Field Testing of Activated Carbon Mixing and In Situ Stabilization of PCBs in Sediment (Dick Luthy, Stanford)
- ER-0622: Development of Guidance for Monitored Natural Recovery at Contaminated Sediment Sites (Victor Magar, Environ)
- ER-0825: In Situ Wetland Restoration Demonstration (Amy Hawkins, NAVFAC ESC)
- ER-0827: Demonstration and Validation of Enhanced Monitored Natural Recovery at DoD Sites (Bart Chadwick, Navy SPAWAR)
- ER-0835: Evaluating the Efficacy of a Low-Impact Delivery System for In-Situ Treatment of Sediments Contaminated with Methylmercury and Other Hydrophobic Chemicals (Charlie Menzie, Exponent)

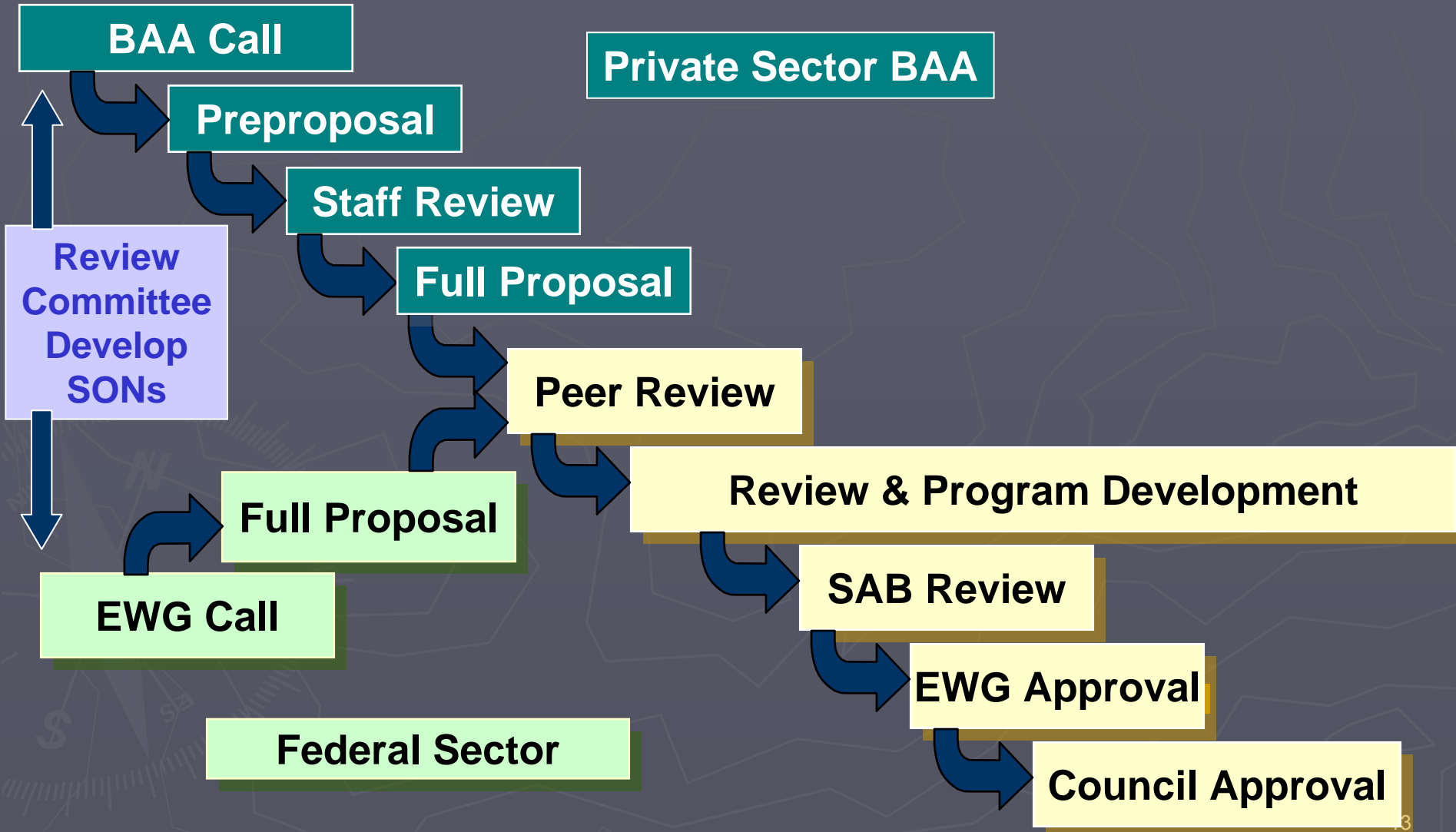


# Bioavailability Workshop

## ► Objectives

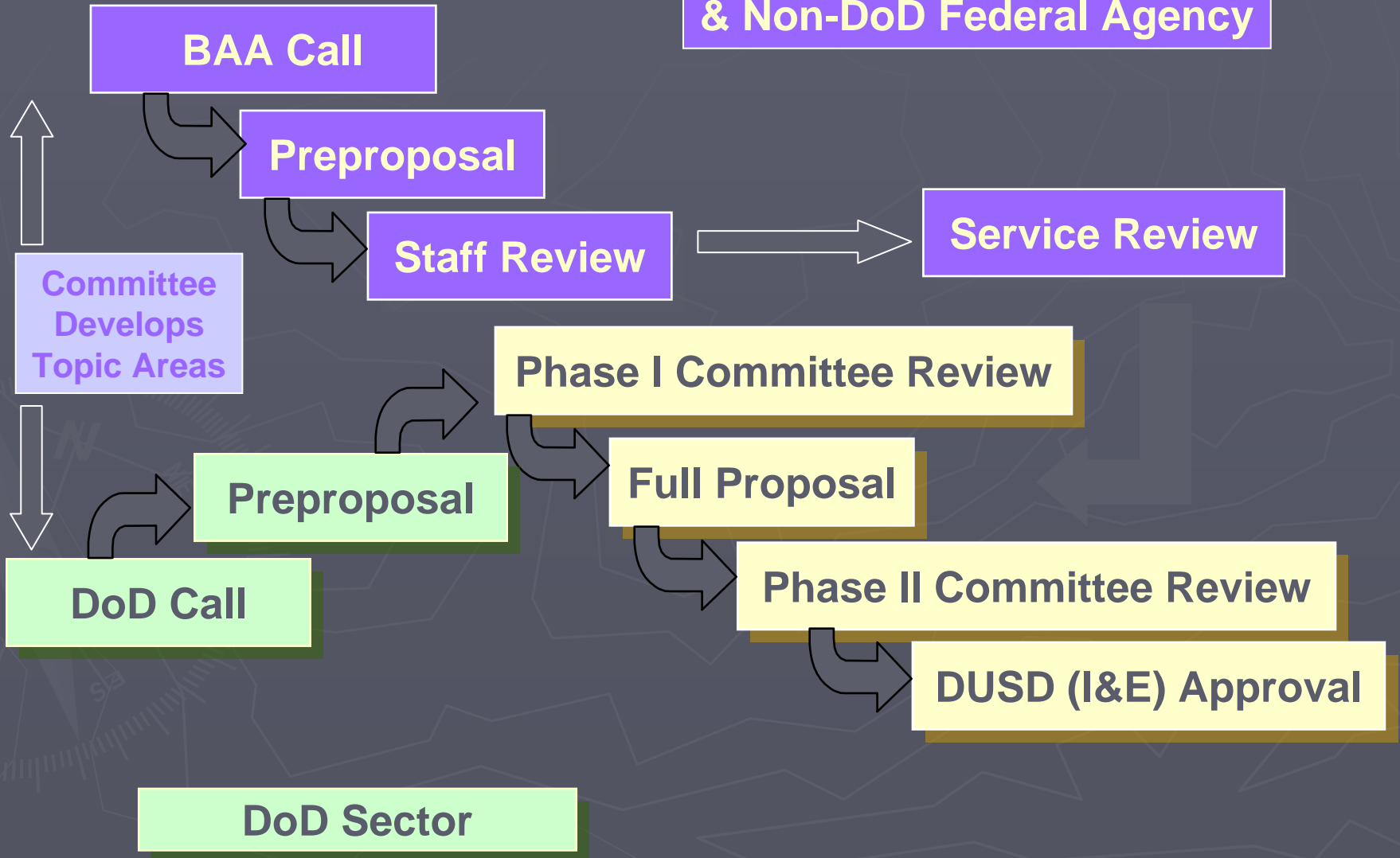
- Examine the current state of the science and technology for understanding and assessing bioavailability processes in soils and sediments that may impact risk-based remedial action decisions
- Evaluate current and potential future applications of bioavailability concepts and assess barriers to their implementation
- Identify and prioritize research and demonstration opportunities that, if addressed, can facilitate regulatory acceptance and field implementation of bioavailability concepts to support risk assessments at DoD sites.

# SERDP Solicitation Process



# ESTCP Solicitation Process

Private Sector BAA  
& Non-DoD Federal Agency



DoD Sector

Sponsored by SERDP & ESTCP

*Partners in Environmental  
Technology*

Technical Symposium and  
Workshop

December 2-4, 2008

Marriott Wardman Park Hotel  
Washington, D.C.



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- **4 December 2008: Day of Sediments**
    - **Technical Sessions**
      - **Bioavailability Issues**
      - **Amendments**
    - **Short Course**
      - **MNR and Capping**