US Environmental Protection Agency

Hazardous Substance
Research Centers
**HSRC Mission**

- Short- and long-term research on manufacture, disposal, clean-up, and management of hazardous substances.
- Dissemination of research information and findings.
- Training, technology transfer, and technical outreach and support.
History of the HSRCs

- The HSRC program was created by Congress in 1989.
- Initial role was to assist with federal Superfund statute through research.
- In mid-1990s, role was expanded to include outreach services.
- Five centers were chosen to represent region pairs.
HSRC Program: 1989-2001

- >$150 million in funding
- 1250 technical articles
- 27 patents
- 21 new technologies
- 162 field demonstrations
- >300 outreach communities
Five new HSRCs were selected in 2001.
Each Center’s funding level is approximately $1,000,000/year.
70% of funds used for research.
30% of funds used for outreach.
Unique research focus for each center.
EPA regional associations were modified.
HSRC Program: 2001-2006

- Northeast HSRC for Urban Environments
  - Outreach for EPA Regions 1, 2, 3
  - Research focuses on metropolitan areas
  - University partners
    - John Hopkins
    - University of Maryland
    - Morgan State University
    - University of Connecticut
    - New Jersey Institute of Technology
Current Northeast HSRC projects

- Exposure pathways for airborne contaminants
- Transport of hazardous aerosols
- Fate and transport of heavy metals and hazardous organics in groundwater and soils
- New measurement techniques for chromium toxicity
HSRC Program: 2001-2006

Midwest HSRC

- Outreach for EPA Regions 5 and 7
- Research focuses on low-cost in-situ technologies
- University partners
  - Purdue University
  - Virginia Tech
  - University of Cincinnati
  - Michigan State University
  - Kansas State University
  - Central State University
  - Haskell Indian Nations U.
  - Howard University
  - University of Missouri
Current Midwest HSRC projects

- Phytoremediation of dredged sediments
- Monitored natural attenuation of TCE
- Constructed wetlands for heavy metal removal
- Bioremediation stressors
- Sustainable phytoremediation
- Biodegradation of PCBs by rhizosphere organisms
- Indicators of bioremediation success
**HSRC Program: 2001-2006**

- **South and Southwest HSRC**
  - Outreach for EPA Regions 4 and 6
  - Research focuses on contaminated sediments
- **University partners**
  - Louisiana State University
  - Georgia Tech
  - Rice University
  - Texas A&M
Current South/Southwest HSRC projects

- Bioavailability of recalcitrant contaminants in sediments
- Contaminant release from sediments during dredging
- TNT degradation by plants
- Design of “active” sediment caps
HSRC Program: 2001-2006

- Rocky Mountain HSRC
  - Outreach for EPA Region 8
  - Research focuses on mining issues
  - University partners
    - Colorado State University
    - Colorado School of Mines
    - Montana Tech
Current Rocky Mountain HSRC projects

- Transport and transformation of arsenic and selenium
- Fate and transport of mining wastes in surface water
- Bioreactor treatment systems for mining waste
- Natural recovery from heavy metal pollution
HSRC Program: 2001-2006

- Western Region HSRC
  - Outreach for Regions 9 and 10
  - Research focuses on VOCs in groundwater
  - University partners
    - Oregon State University
    - Stanford University
Current Western Region HSRC projects

- Anaerobic bioremediation of PCE and TCE
- Aerobic transformation of TCE
- Use of palladium catalysts for groundwater remediation
- Site characterization of groundwater contamination
- Optimization of redox conditions for TCE remediation
Other Government Partners

- Department of Defense
- Department of Energy
- Department of Transportation
- State Environmental Regulatory Agencies
Outreach Program

- TOSC – Technical Assistance to Communities
- TAB – Technical Assistance to Brownfields Communities
- TOSNAC – Technical Assistance to Native American Communities
Outreach - TOSC

- Technical Outreach Services for Communities
- Independent, unbiased technical assistance
  - Technical document review and interpretation
  - Laymen workshops and short courses
  - Link to MHSRC technical assistance materials and people…publications, videos, and web sites
  - Facilitation and conflict resolution among stakeholders
  - Program adapts to meet needs of community
Outreach - TAB

- TAB – Technical Assistance to Brownfields
- TAB provides assistance to communities and municipalities affected by Brownfields
  - Training, land use planning assistance, risk assessment, document review/interpretation
Outreach - TOSNAC

- Technical Outreach Services for Native American Communities
- Similar to TOSC, except focused on Native American communities
- National program through Haskell Indian Nations University
Outreach – Site Locations

TOSC & TAB Community Sites

- Regional Breakout
- TOSC Sites
- TAB Sites
- TOSC/Native American Site
- TAB/Native American Site
Outreach Program

GRAND CALUMENT SEDIMENT PROJECT

- Major dredging of Grand Calumet River will be conducted over the next five years (more than 2 million cubic yards) for both navigational and environmental purposes. The river runs through a densely populated urban setting in northwest Indiana (Cities of Gary, Hammond and East Chicago).

- The Army Corps of Engineers has selected a site to construct a confined disposal facility (CDF) for sediment storage/disposal in East Chicago one-half mile from a high school.

- TOSC awarded a grant from EPA's Great Lakes Office to provide support to local stakeholder groups. The Grand Calumet Task Force, a local community organization, is subcontractor to TOSC on grant.
Outreach Program

In this project, the HSRC will address:

- Dredging technology selection, especially the issue of mechanical vs. hydraulic dredging (Louis Thibodeaux or Danny Reible as lead).
- Human health risk assessment during placement of sediments into CDF.
- Ecological risk assessment, concerning resuspension of sediment contaminants during dredging (Diane Henshel, IU-Bloomington as lead).
- Review of CDF design considerations (Milind Khire, MSU Civil and Environmental Engineering as lead).
- Application of natural treatment technologies (e.g., phytoremediation, bioremediation) for sediments placed into CDF, particularly for reducing toxicity of PAHs and PCBs (Clatyon Rugh, MSU as lead).
Technology Transfer Program

Mission: To disseminate technological knowledge gained through the Center research and outreach programs

Accomplished through:
- Conferences and short courses
- Web sites (www.mhsrc.org)
- Fact sheets and brochures
- Partnership with ITRC
ITRC and HSRC Partnerships

- Unbiased peer review
- Workshop instructors
- Specialty team members
- Link to state agencies
- Cutting edge technology transfer
- Access to proof-of-concept data
- Student training
- Facilitate research opportunities