



***Lessons Learned from the
Shenandoah Valley Water Resources Consortium***

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2006 America Rivers Most Endangered River Sections

- Pajaro River
- Upper Yellowstone River
- Willamette River
- Salmon Trout River
- **Shenandoah River**

Shenandoah River

Water Resources Problems

- Water Availability
 - Average Annual Rainfall Equal to San Antonio, Texas
 - Drought Prone Area
 - Rapid Population Growth in Northern Valley
- Water Quality
 - Fish Kills
 - High Mercury Content from WWII-Vintage Waste Sites
 - Agricultural Waste Run Off
- Complicating Factors
 - Karst Geographic Features
 - River Is the Reservoir/Storage Facility
 - Impact of Air Pollution from Ohio River Coal Burning Electricity Generating Plants
 - Multi-County, Interstate

Regional Resources Policy Committee



- Elected Officials from 9 Virginia & West Virginia Counties and Cities Represented
- Created a **Strategic Plan** for Regional Policy to Provide Long-Term Protection of the and Plan for Using Ground and Surface Water

Strategic Plan Cornerstone

Develop a “Shenandoah Valley Water Resources Science Plan” to provide decision-makers with the ability to better see how policy actions affect future watershed conditions.

Science Questions Posed to USGS

1. What is the inter-relationship of flow between groundwater and stream flow in the Shenandoah Valley?
2. What are the current levels of groundwater pollution in the Valley?
3. Can groundwater budgets be defined by local area?
4. Can underground "watersheds" be defined for karst areas?
5. What is the potential for deepwater reservoirs as either a source of water or as a storage area?
6. What is the interrelationship between air quality and water quality?
7. What is the interrelationship between soil quality and water retention and water quality?

Federation of Earth Science Information Partners

- ESIP Federation is a Network of More than 100 Partner Organizations that collects, interprets and develops applications for Earth Observation Information (<http://www.esipfed.org>)
 - All Earth Observing Data Centers
 - Government Research Labs
 - Research Universities
 - Technology Developers
 - Education, Nonprofit and Commercial Resource Providers
- EPA, NASA, NOAA are Strategic Partners
- More Than 400 Individuals Active in ESIP Initiatives

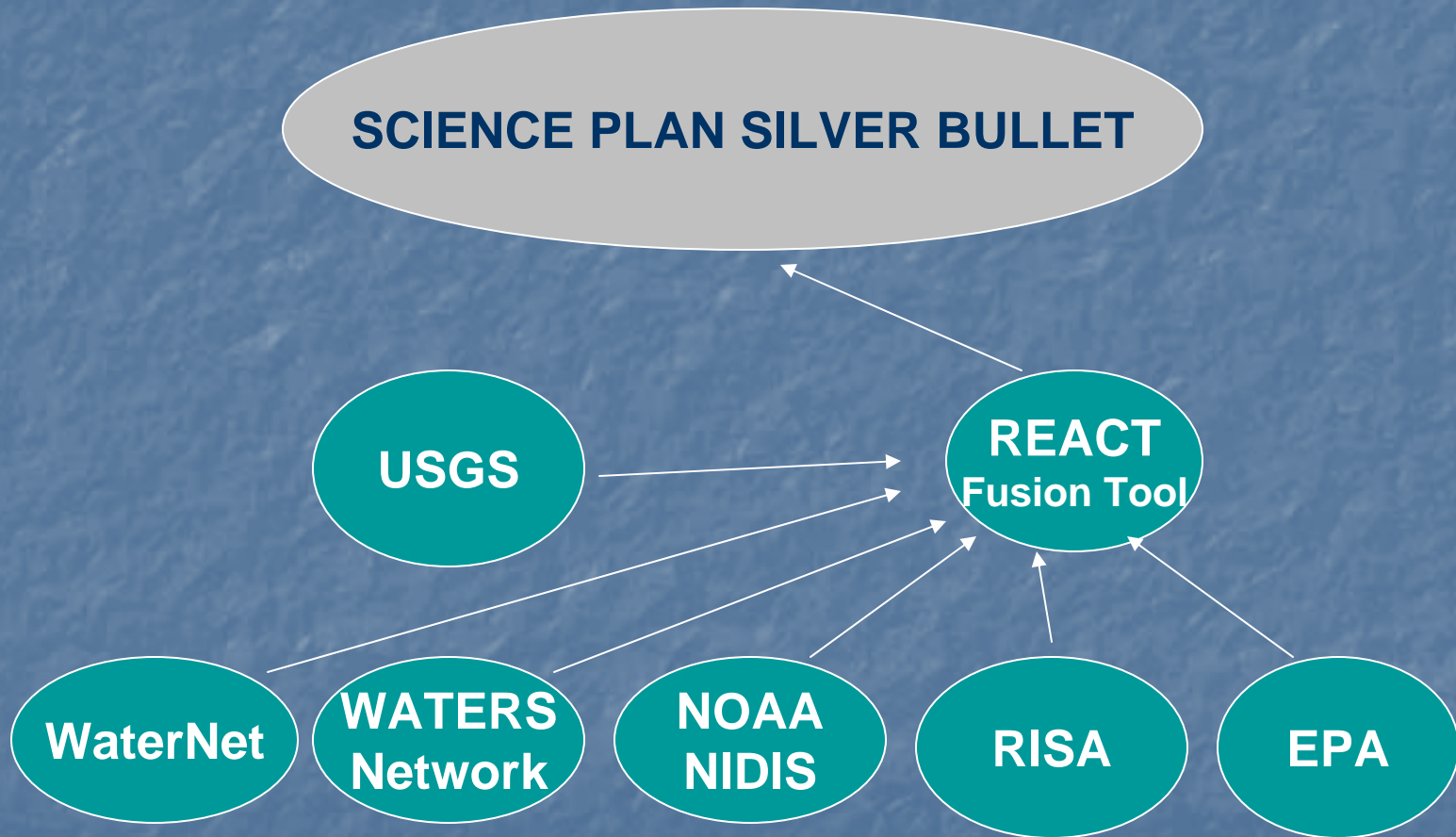
ESIP Federation Contributions to the Shenandoah River Consortium

Satellite and *In Situ* Data (including models, visualizations and decision support tools)

- Data Fusion Technology
- Technical Assistance for Using and Interpreting Data

***ESIP Contributions were supplemental and complementary to USGS Field Science Work*

The ESIP Game-Plan



Science Plan Silver Bullet

- Effectively “Fused” data from a number of Earth Observation Data Centers in a series of “Mix-and-Match” Google-like overlays
- Discovered that metadata searches alone did not produce all of the key data sets required. Human input into the process was essential
- Readily available data did not produce the level of resolution required by decision-makers in the Shenandoah Valley.
- ESIP “Tiger Team” is working to refine the Science Plan Silver Bullet demonstration for the ESIP Winter Meeting

Lessons Learned

- **Information Bundling:** The Whole is (Much) Greater than the Sum of the Parts.
- **Information Fusion:** Fusion of Earth Observation data necessary for operational users.
- **Technical Assistance:** End-Users need Technical Assistance to properly exploit the information provided.
- **User Test-Beds:** Involve End-Users early and often in the development of new EO applications.

Questions

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