

USGS Tribal Partnerships

Presented by

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<http://wa.water.usgs.gov>

at the

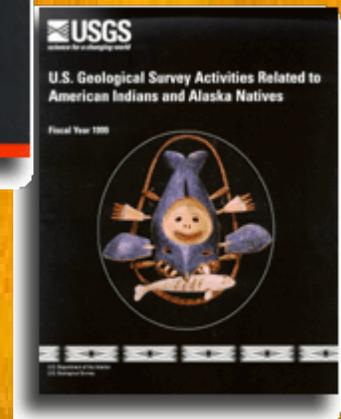
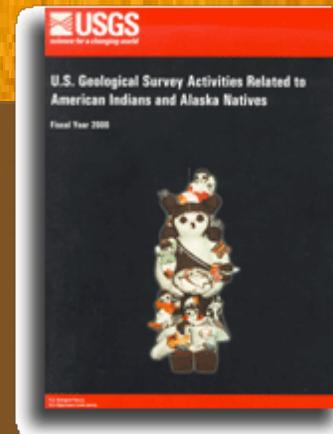
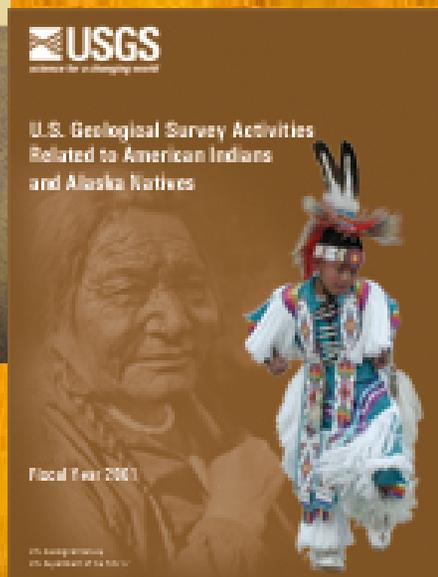
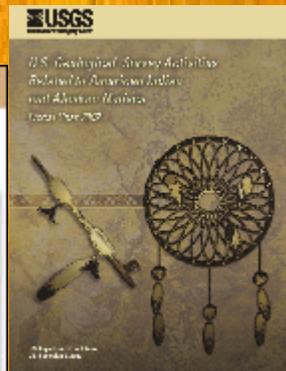
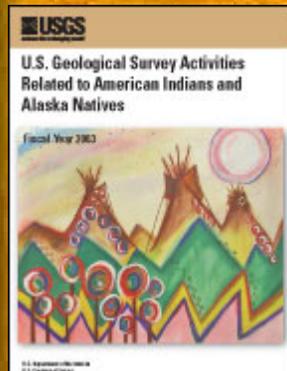
National Forum on Tribal Environmental Science

September 28, 2006

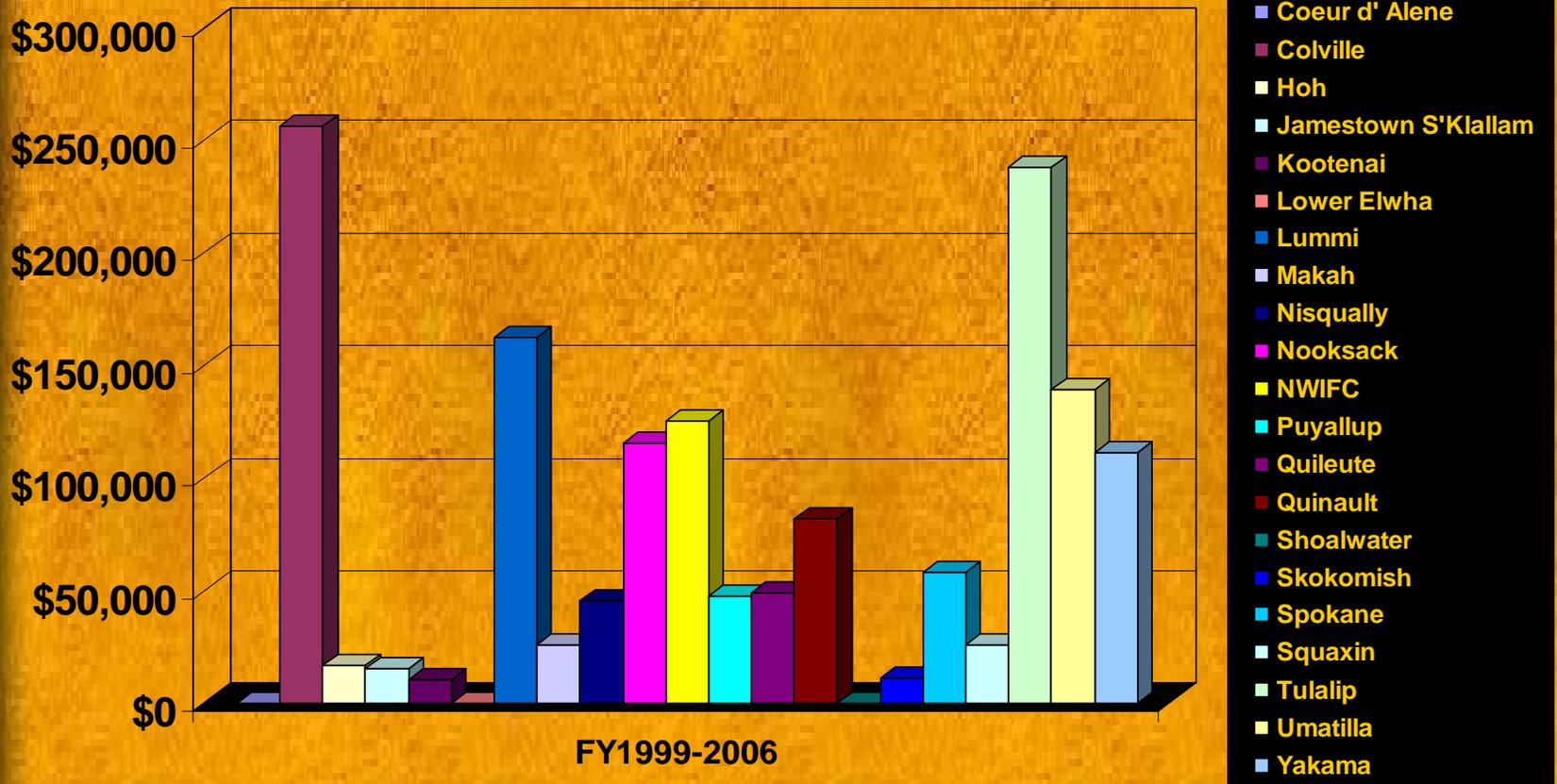


The U.S. Geological Survey

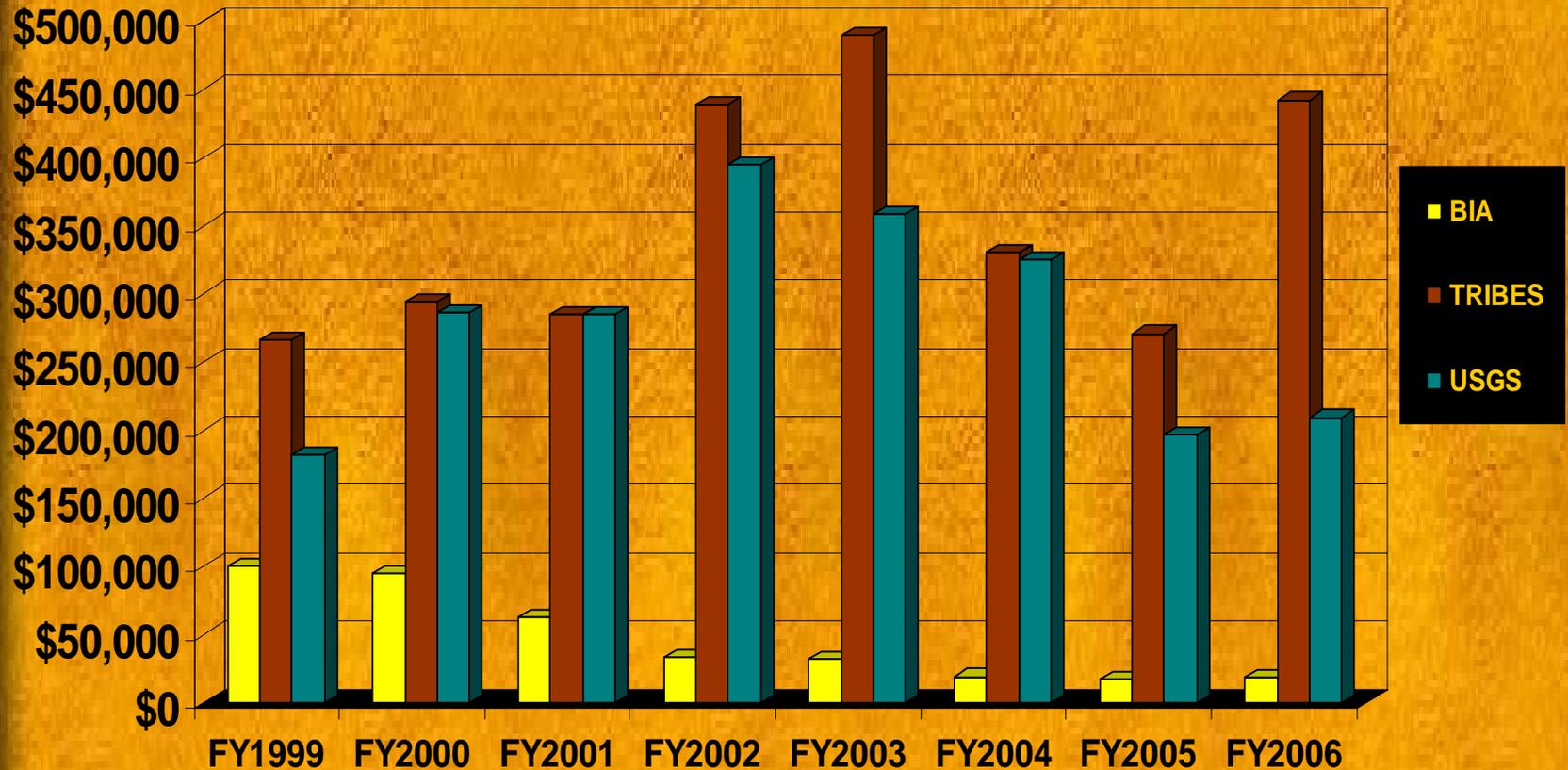
- Non-regulatory, impartial, natural science data and information
- 127-year-old Bureau within DOI
- Working in partnership with ~185 Indian governments



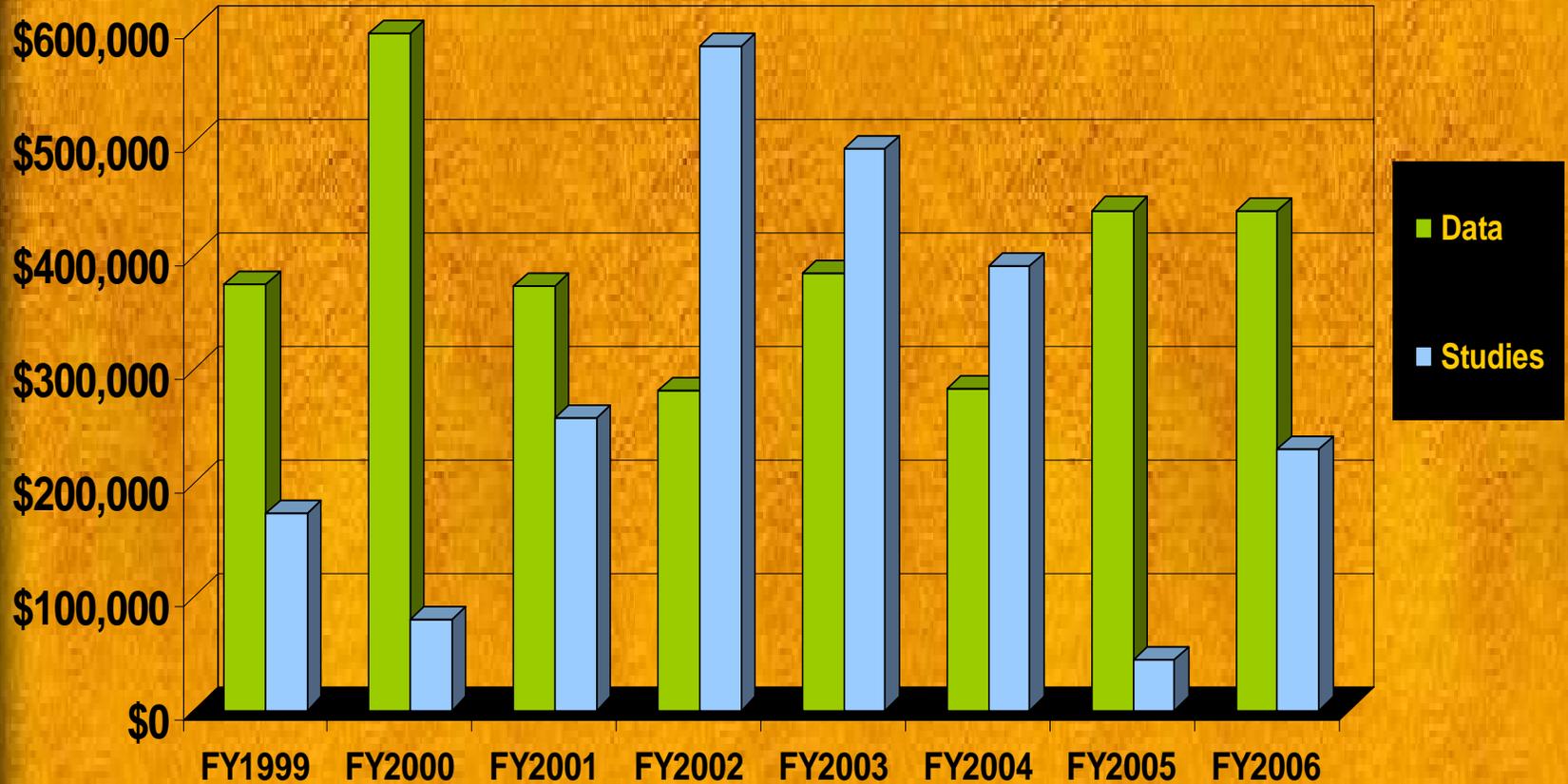
Tribes with USGS Water Programs in Washington



Distribution of Funding

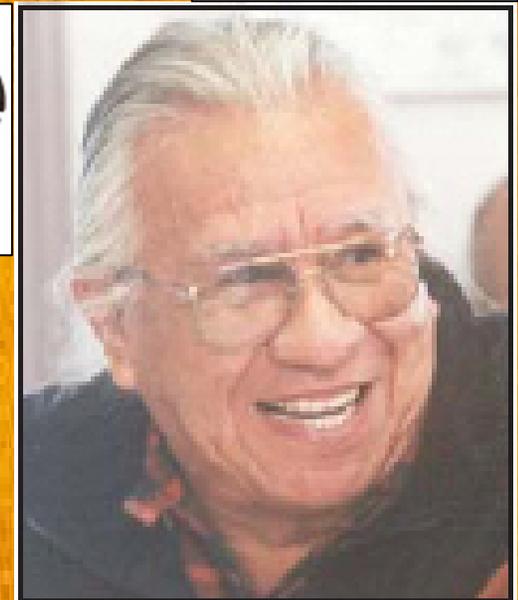
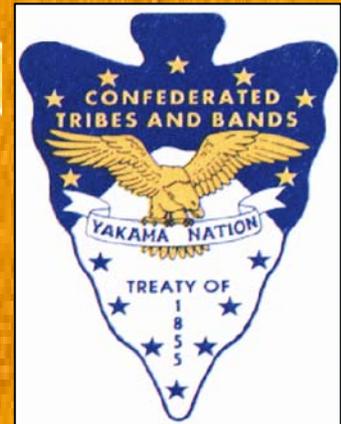


Type of Projects



3 Model USGS/Tribal Projects

- **Confederated Tribes of the Colville Reservation**
 - FDR Lake Roosevelt
- **Yakama Nation**
 - GW in the Yakima River Basin and its relation to the SW resources
- **Northwest Indian Fisheries Commission**
 - Tribal Assessment of Water Resources in Western Washington

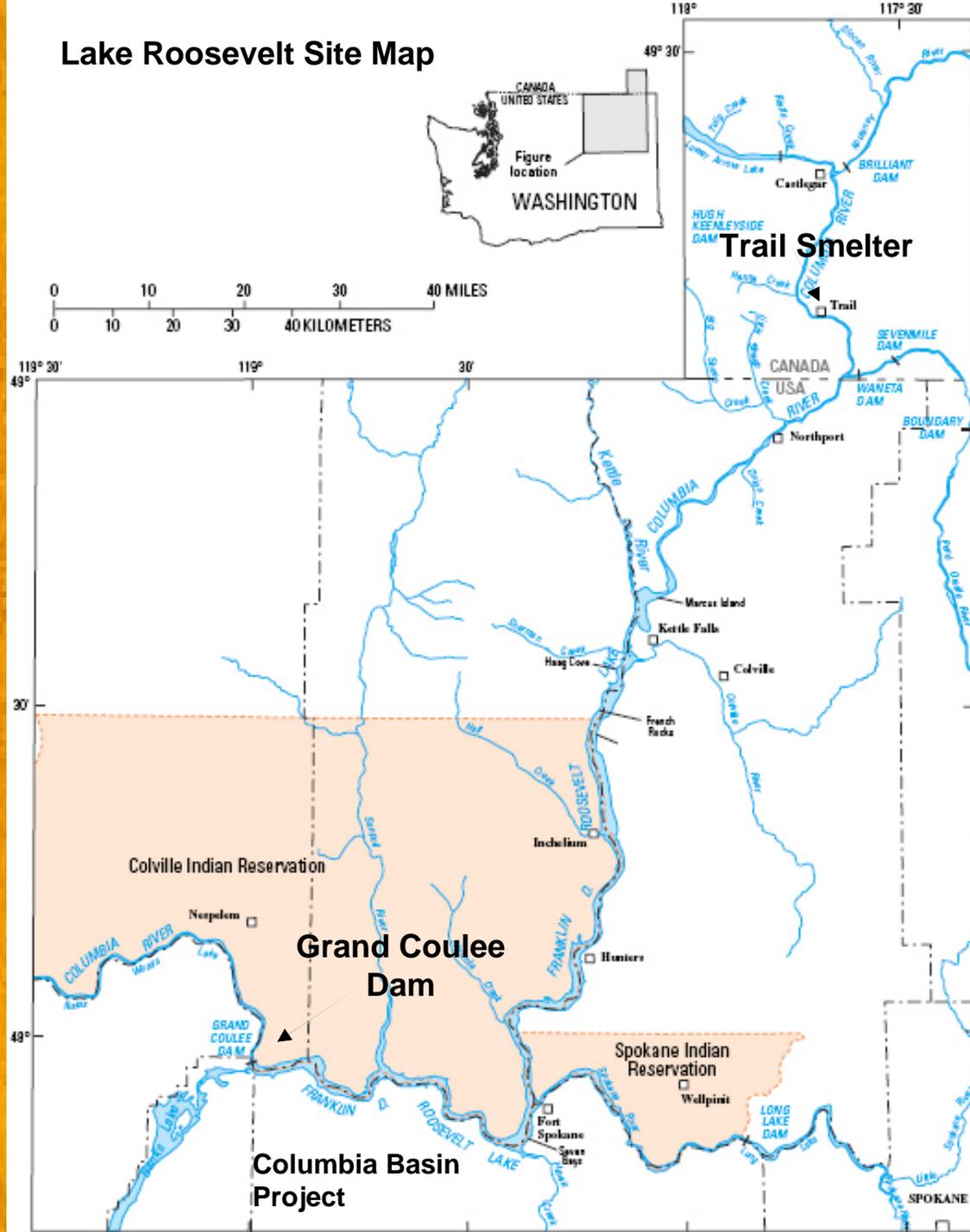


Billy Frank, Jr.

→ Lake Roosevelt

- Impoundment of the Columbia R. behind Grand Coulee Dam
 - Largest reservoir within Columbia Basin Project, over 9.5M acre-feet at full pool
 - About 151 miles long
 - Upper 15-20 miles are often free-flowing
 - Teck Cominco located north of U.S. border

Lake Roosevelt Site Map

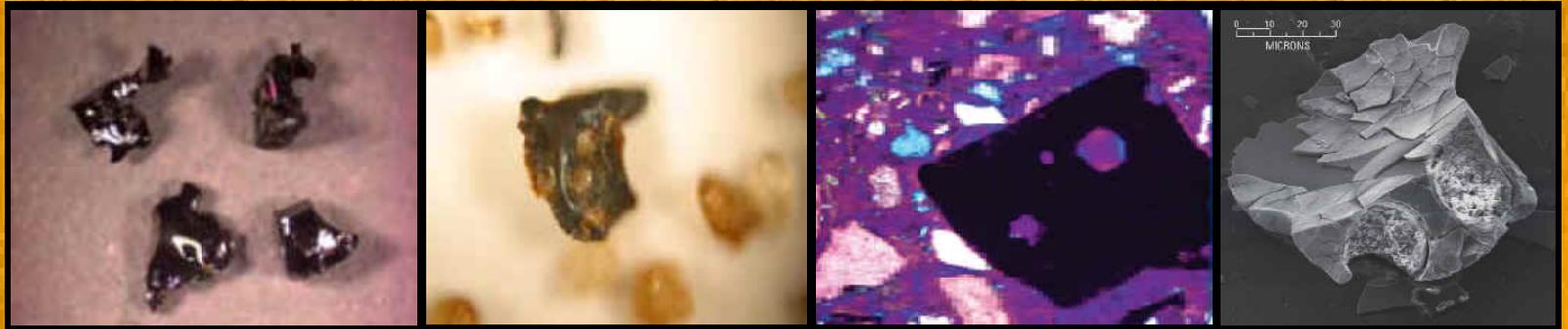


USGS Studies in the Lake Roosevelt Area

Year	Project Title	Project Chief	USGS Publication
2003	The effects of trace elements on water quality and biological health in the Lake Roosevelt National Recreational Area	Paulson	Pending (active project)
2002	Assessment of trace-element concentrations in accumulated sediment in Lake Roosevelt	Cox	SIR 2004-5090
2001	Occurrence and distribution of trace elements in air along Lake Roosevelt	Majewski	Pending (active project)
2001	Spatial distribution of trace elements in near-shore bed sediments of Lake Roosevelt and the Upper Columbia River	Kahle	WRIR 03-4170
1999	Development of a sediment-quality study program for the Upper Columbia River and Lake Roosevelt	Munn	None; Technical Assistance
1998	Organochlorine compounds and mercury in fish from Lake Roosevelt and the Upper Columbia River	Munn	WRIR 00-4024
1994	Relation between concentrations of trace elements in walleye, smallmouth bass, and rainbow trout in Lake Roosevelt	Munn	OFR 95-195 FS-102-97
1992	Sediment-quality assessment of Lake Roosevelt and upstream reaches of the Columbia River	Bortleson	OFR 94-315 WSP 2496
Pre-1992	Earliest work on geology and mineral deposits, followed by studies on landslides, reservoir hydrology, and fish behavior	Several	Several

Studies Results

- Elevated concentrations of arsenic, cadmium, copper, lead, mercury, and zinc in sediments throughout reservoir
- Concentrations for most metals decrease down-reservoir
- Slag found in sediment, especially in upper reservoir
 - Not chemically stable as originally reported by Teck
 - Geochemically weathers, releasing metals to water column



From left to right: Photographs of recently deposited and weathered slag particles, from figures 11a, b, and c, and figure 15, SIR 2004-5090, *Vertical Distribution of Trace-Element Concentrations and Occurrence of Metallurgical Slag Particles in Accumulated Bed Sediments in Lake Roosevelt, Washington, September 2002.*

Studies Results (cont'd)

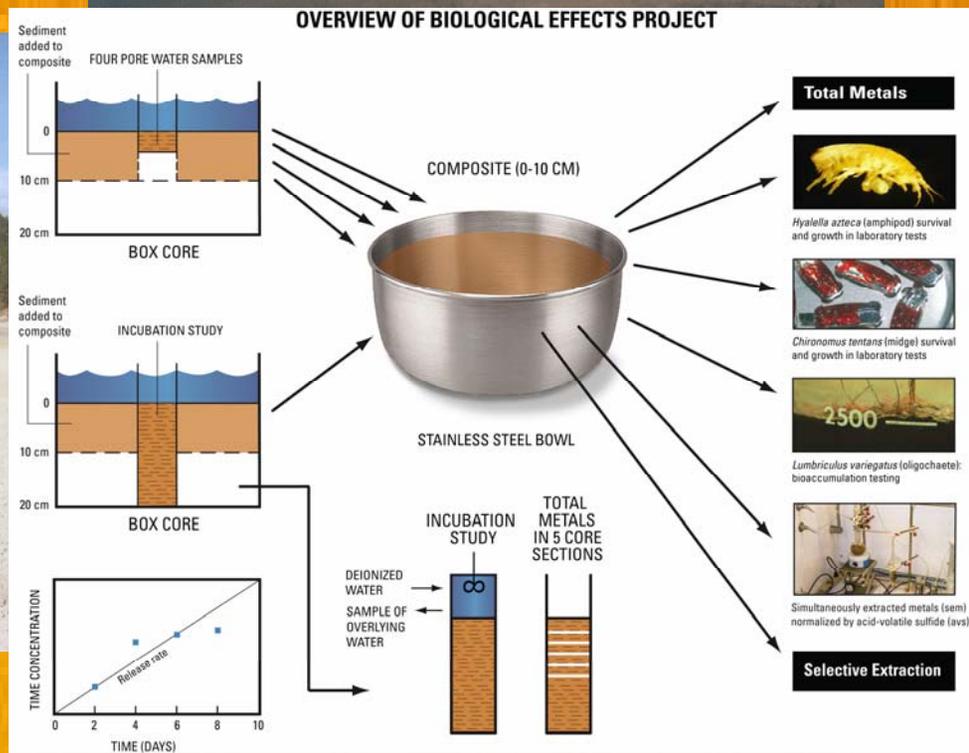
- **Copper, manganese, mercury, selenium, and zinc were found in walleye, trout, and smallmouth bass**
- **Only mercury found at concentrations of concern to human health**
- **Cadmium, copper, lead, and zinc found in fish liver tissues but no physiological effects were noted**
- **Followup studies found decreases in mercury, dioxins, and furans in fish fillets throughout the 1990's**



**USGS Coring boat in Lake Roosevelt near
Whitestone Mountain**

Current Status

- Present work is determining
 - Rates of release of metals from sediment to water column
 - Toxicity of sediment
 - Concentrations of metals in airborne dust



Current Status (cont'd)

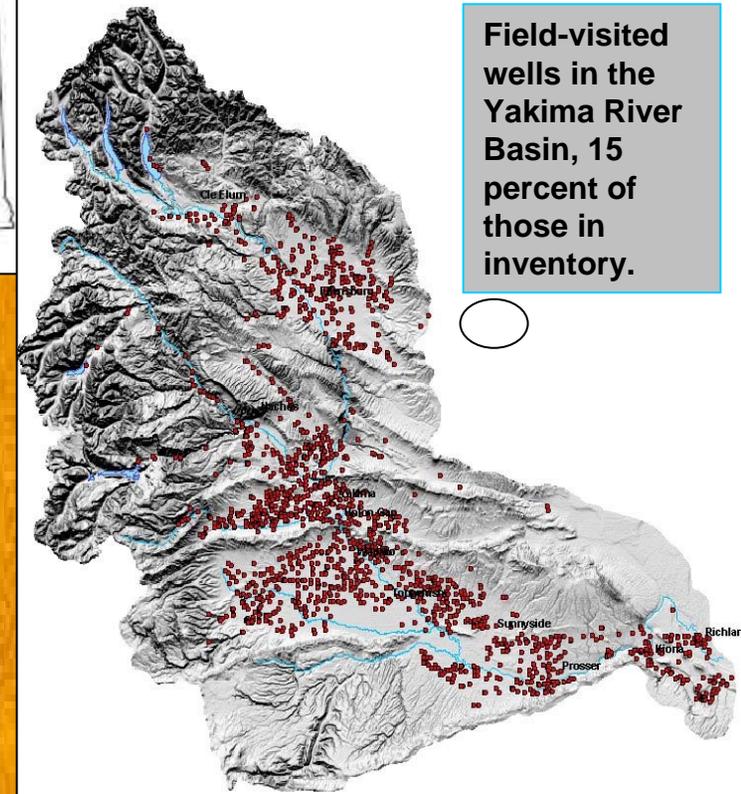
- **In 1999, the Colville's petitioned EPA to list the lake as a Superfund Site**
 - **EPA conducted a Site Investigation (2002) that scored high enough to list Lake on Superfund's NPL, but not done**
 - **Tribes, State of WA, DOI, EPA, and Departments of State and Justice negotiated with Teck Cominco**
 - **Teck committed to carrying out a RI/FS, with EPA oversight and technical review by the Colville and Spokane Tribes, the State, and six DOI agencies**



Outfall of smelter in Trail, British Columbia

→ Yakima GW

- Yakima River flows miles, draining an of 6,155 square miles
- One of most irrigated areas in
- Basin population ~238,000 in 1990



Current Status

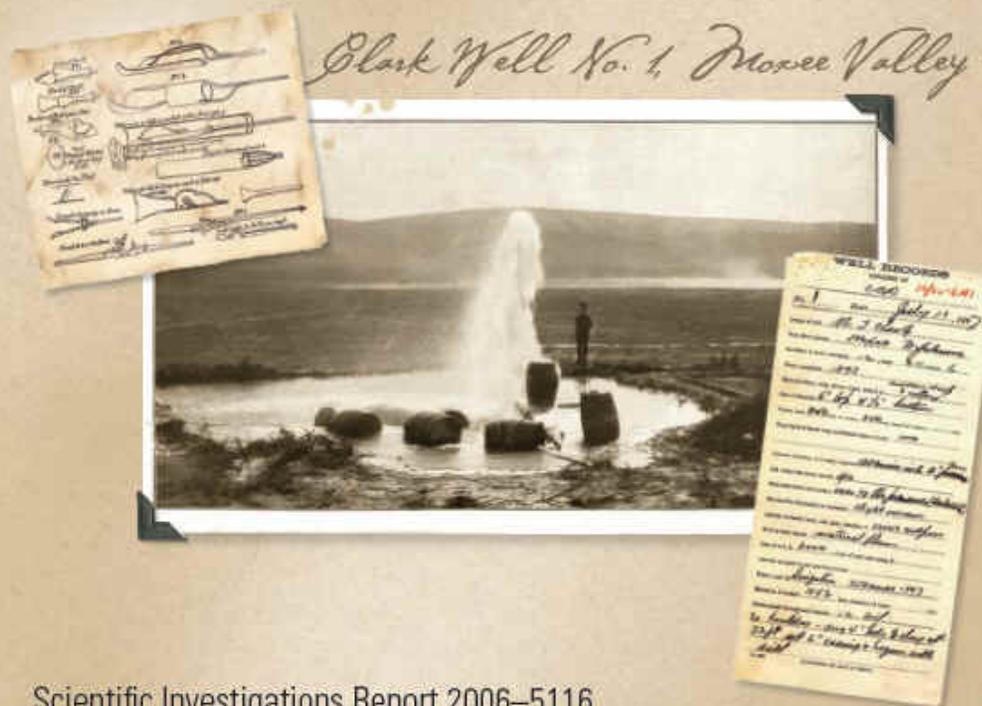
- Under Tri-Party Agreement, requested to
 - Describe GW/SW interactions
 - Integrate into numerical



Prepared in cooperation with the
Bureau of Reclamation,
Washington State Department of Ecology, and the
Yakama Nation



Hydrogeologic Framework of Sedimentary Deposits in Six Structural Basins, Yakima River Basin, Washington



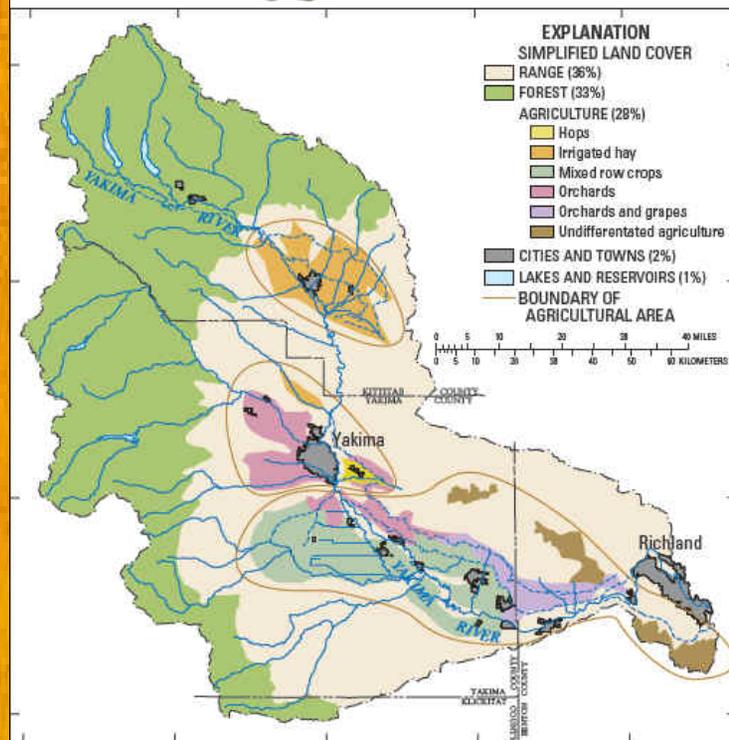
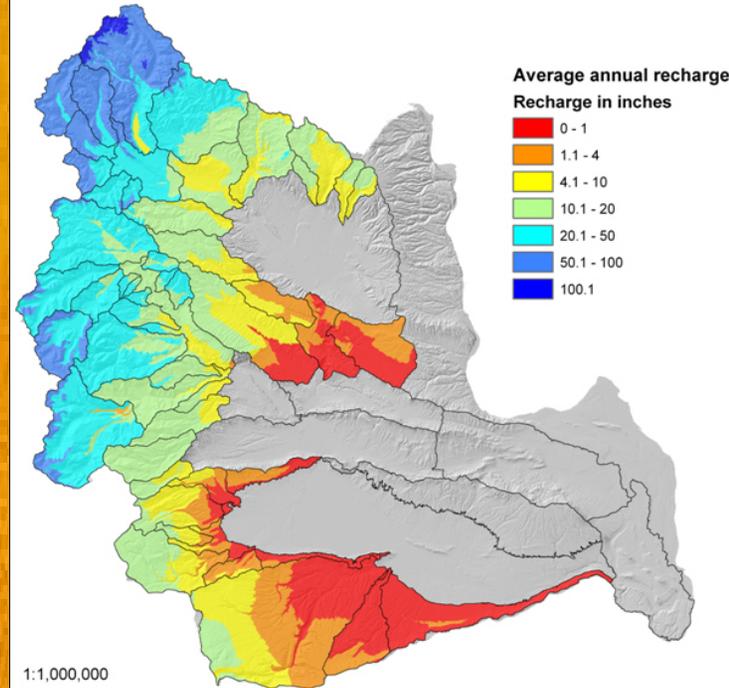
Scientific Investigations Report 2006-5116

U.S. Department of the Interior
U.S. Geological Survey



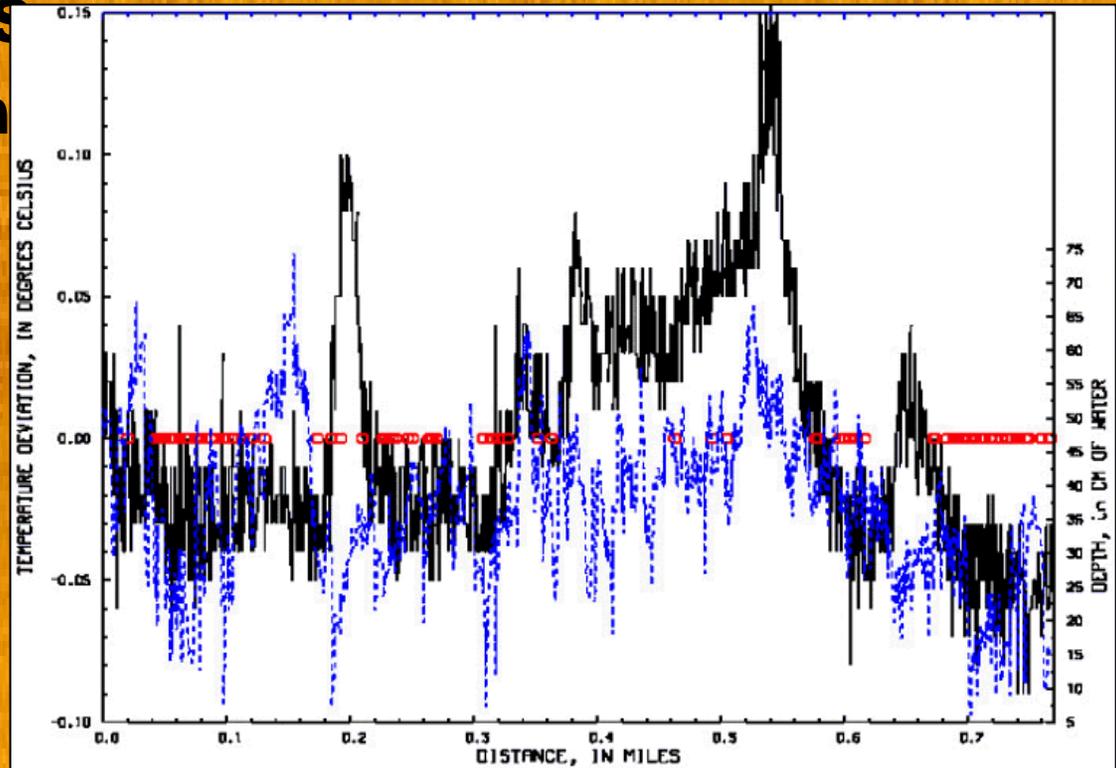
Components of Study

- Well information
- Mapping hydrogeologic units
- Estimating ground-water pumpage
- Estimating ground-water recharge
- Analysis of GW/SW interchanges
- Mapping/assessment GW levels
- Estimating hydraulic characteristics of hydrogeologic units
- GW flow modeling/assessment



Project Funding

- One-third split among USBR, Ecology &
- Direct Services
 - Yakama Nation
 - BIA
 - Municipalities
 - Irrigation Districts
 - Conservation Districts
 - State



Redds in relation to deviations from trend: Redds plotted along '0'-line.

→ NWIFC - Tribal Water Resources

- Twenty member tribes in Puget Sound region
- Assists in managing their natural resources
- No common approach in data collection and



USGS Partnership

- **MOU**
 - Collect, analyze, review, and compile hydrologic data
 - Assess hydrology and quality of water in western Washington
- **Science Framework**
- **Liaison**
- **Technical assistance and coordination**

Prepared in cooperation with the Northwest Indian Fisheries Commission

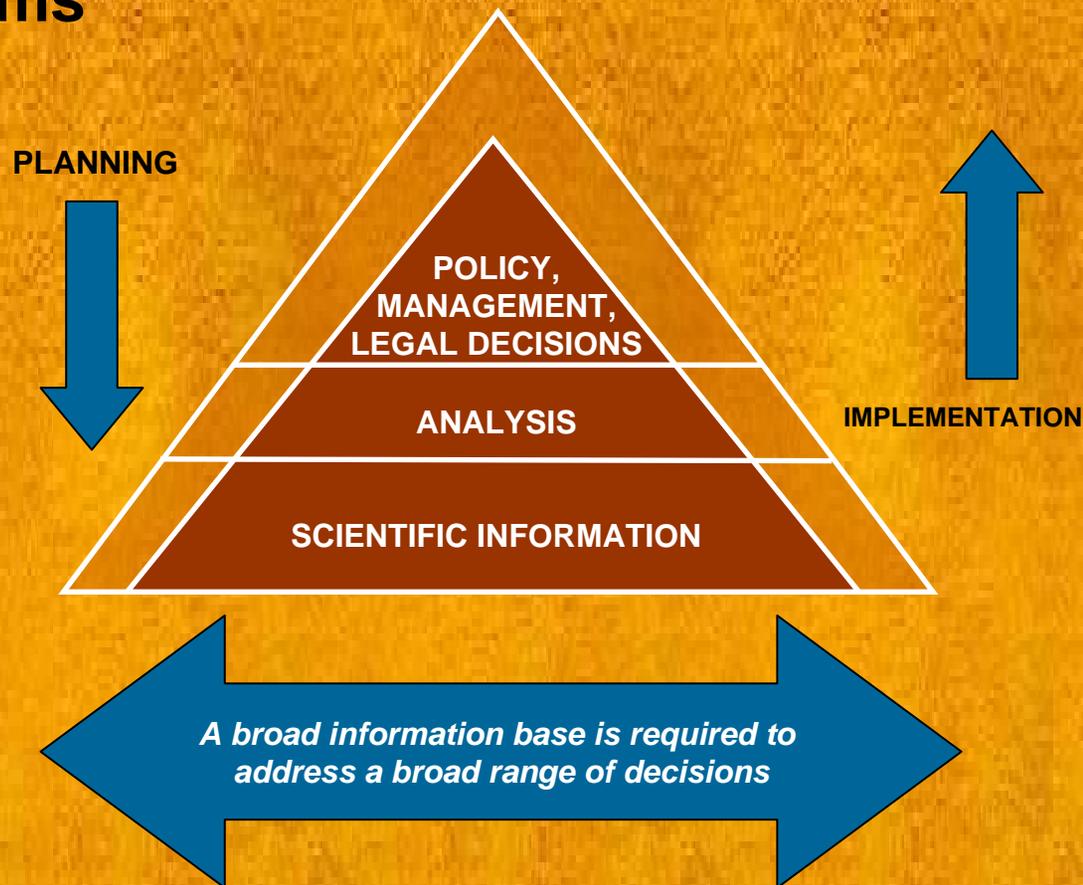


Scientific Framework for a Comprehensive Assessment of Tribal Water Resources in Western Washington

Open-File Report 2005–1390

Current Status

- **USGS tribal assessment activities in 2006**
 - **Identify tribal information resources and needs**
 - **Review options for tribal water-resources information systems**
 - **Develop approaches for assessing the water requirements of aquatic ecosystems**



Current Status (cont'd)

- Recently completed assessment of tribal water-resources information
- Identified significant information gaps and training needs
 - Developed workshop on streamflow data collection
 - Other technical workshops are being planned
- Summarizing tribal water-resources activities



STREAMFLOW DATA COLLECTION WORKSHOP	
Wading Measurements	Continuous Temperature
New Acoustic Technology	Quality Assurance
Installation and Site Operation	
September 19, 2006	September 21, 2006
Tulalip Casino Tulalip, WA	Shelton Civic Center Shelton, WA

Sponsored by
U.S. Geological Survey and **Northwest Indian Fisheries Commission**

Hosted by
Squaxin and **Tulalip Tribes**

USGS Water Science Activities

Data Collection	Investigations	Analytical Techniques
<ul style="list-style-type: none"> •Streamflow data •GW-level data •QW data •Stream-sediment transport data •Climate data 	<ul style="list-style-type: none"> •Water-quantity & –quality assessments •Toxic substances in natural waters & biota •Rural & urban nonpoint pollution •Seawater intrusion •SW/GW interactions •Sediment transport & chemistry •Effects of climate change •Wetland functions •Aquifer & streamflow characteristics •Floods/droughts magnitudes & frequency 	<ul style="list-style-type: none"> •Watershed, SW and GW modeling •Flood/low-flow frequency analysis •Sediment & chemical load determination •Aquifer testing •Aquatic ecosystem health indexing •GIS •Acoustic Doppler velocity measurements •GW age dating •Surface & borehole geophysics •Evapotranspiration analysis •GW recharge & GW-flow modeling •Solute-transport modeling •Geochemical modeling •Water, sediment, tissue analysis
<p>Data-Base Capabilities</p> <ul style="list-style-type: none"> •Streamflow, reservoir, & lake data •GW data •Continuous or discrete QW data •Water-use data •Geographic Information System (GIS) data 		

Please feel free to contact me at cbarton@usgs.gov, or by telephone at (253) 552-1602. Thank you.