

RECLAMATION

Managing Water in the West

Technical Service Center

Lab Facilities

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U.S. Department of the Interior
Bureau of Reclamation

“Denver Office” Organizations

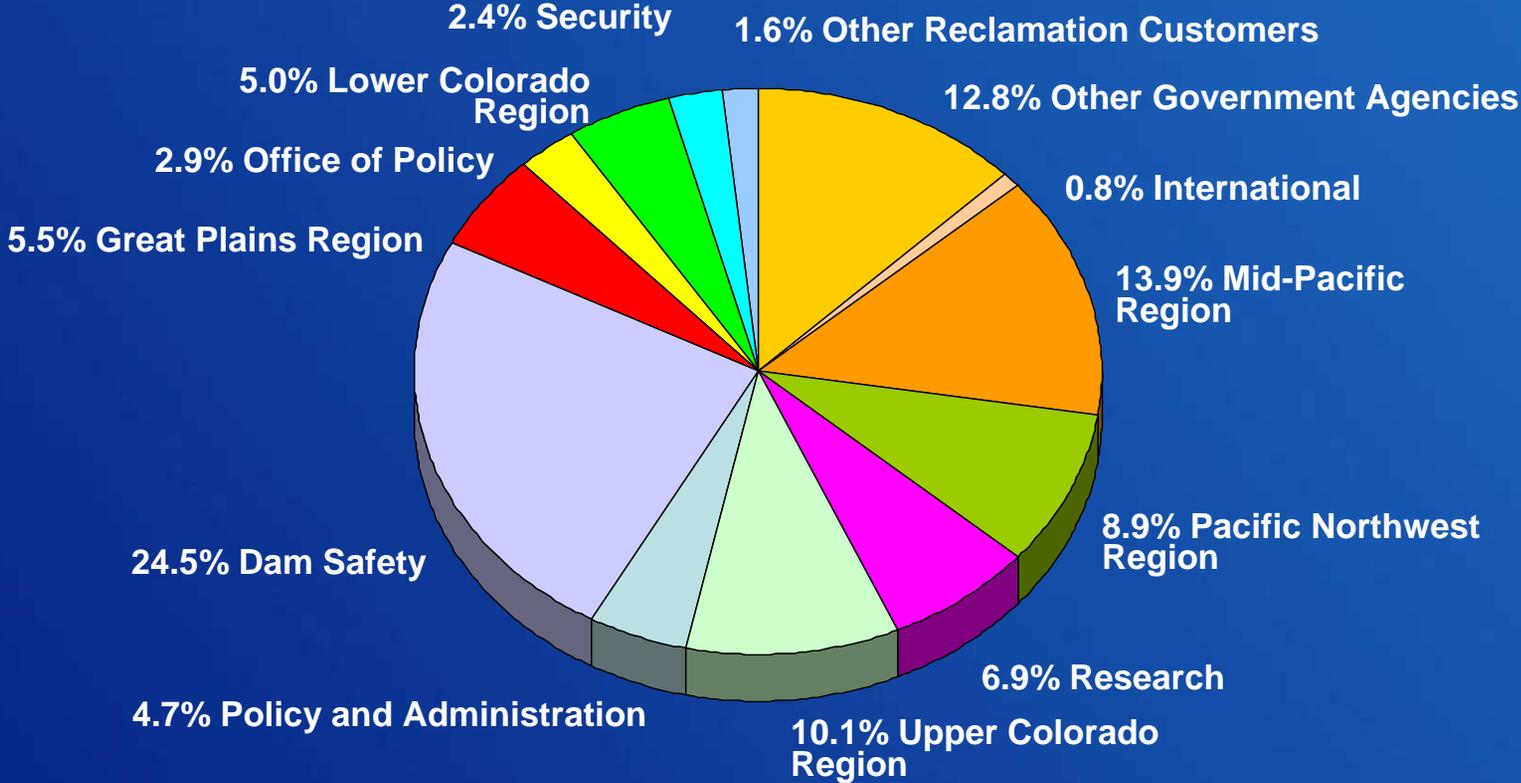


TSC Profile

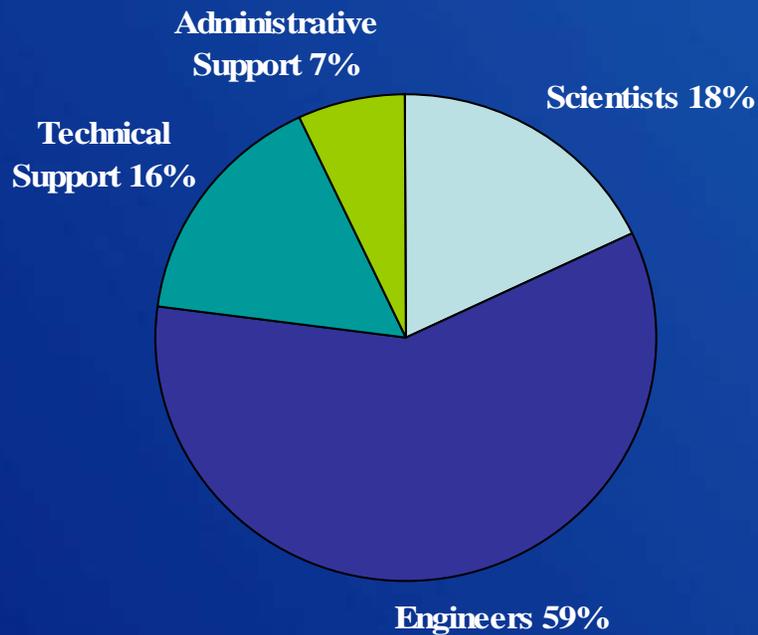
- **Unique expertise developed through 100 years of design, construction, operation and maintenance of water and power infrastructure**
- **Reclamation's in-house provider for specialized technical services to support**
 - **Design and construction activities**
 - **Operation and maintenance programs**
 - **Natural resources aspects of Reclamation's operations**
 - **Research and new technology development**
 - **Technical manuals, standards, and guidelines development**

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TSC Customer Profile (2007)



TSC Staffing Profile (March 2008)



Biologists/Botanists/Soils	26
Chemists	4
Economists	11
Geologists	21
Geophysicists	4
Hydrologists	3
Physical Scientists	16
Meteorologists	3
Architects/Landscape Architects	3
Chemical Engineers	4
Civil Engineers	75
Electrical Engineers	46
Environmental Engineers	5
General Engineers	4
Geotechnical Engineers	48
Hydraulic Engineers	55
Materials Engineers	5
Mechanical Engineers	27
Structural Engineers	16
Estimator/Specifications	12
Engineering/Scientific Technicians	48
Technical Writers/Illustrators	14
Resource Managers/Planners	2
Sociologists/Historians	5
Laboratory Shops	4
Administrative Support	32

Total Positions 492

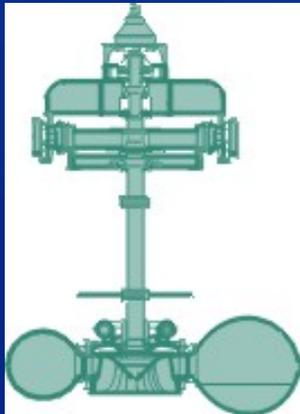
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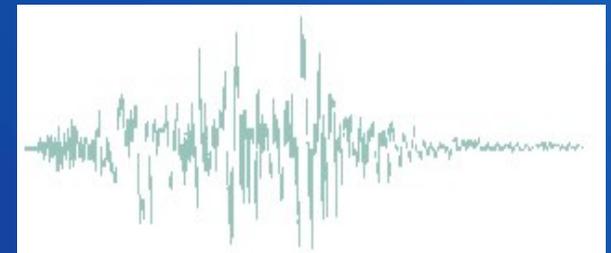
**Civil Engineering
Services**

**Water & Environmental
Resources
Services**



**Infrastructure
Services**

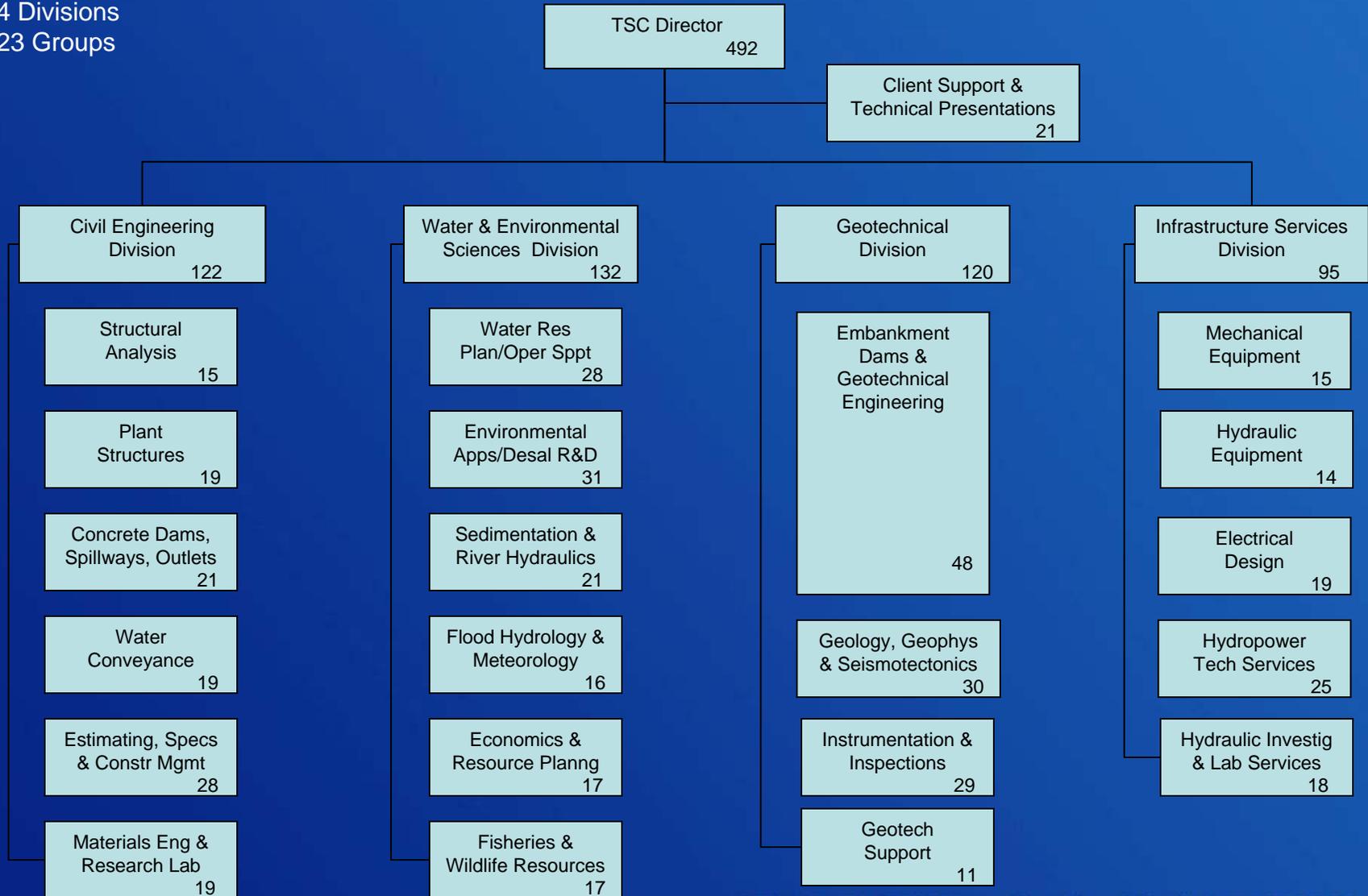
**Geotechnical
Services**



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Technical Service Center (March 2008)

4 Divisions
23 Groups



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Civil Engineering Services

Structural Analysis

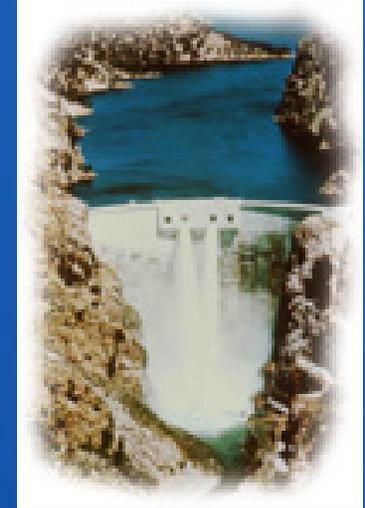
Plant Structures

Waterways and Concrete Dams

Water Conveyance

**Estimating, Specifications, and
Construction Management**

**Materials Engineering and Research
Laboratory**



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Water & Environmental Resources

**Water Resources Planning & Operations
Support/Remote Sensing & GIS**

**Ecological Research and
Investigations/Water Treatment Research**

Sedimentation & River Hydraulics

Flood Hydrology and Meteorology

Economics & Resource Planning

Fisheries & Wildlife Resources



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Geotechnical Services

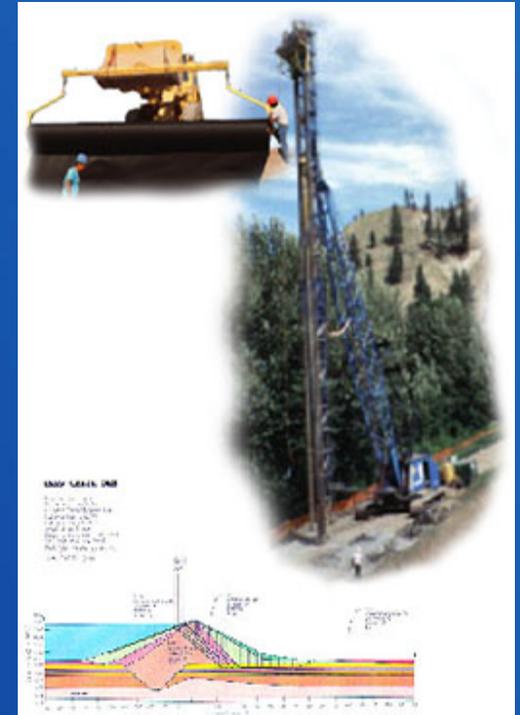
Embankment Dams & Geotechnical Engineering

Engineering Geology

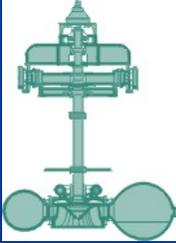
Geophysics and Seismotectonics

Instrumentation & Inspections

Geotechnical Computer Support



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Infrastructure Services

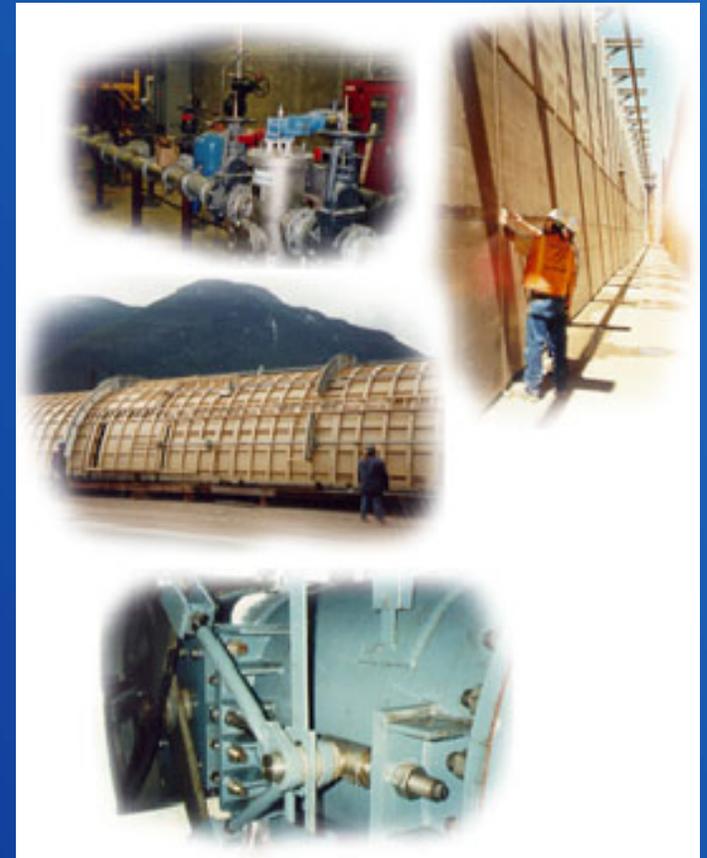
Mechanical Equipment

Hydraulic Equipment

Electrical Design

Hydropower Technical Services

**Hydraulic Investigations & Lab
Services**



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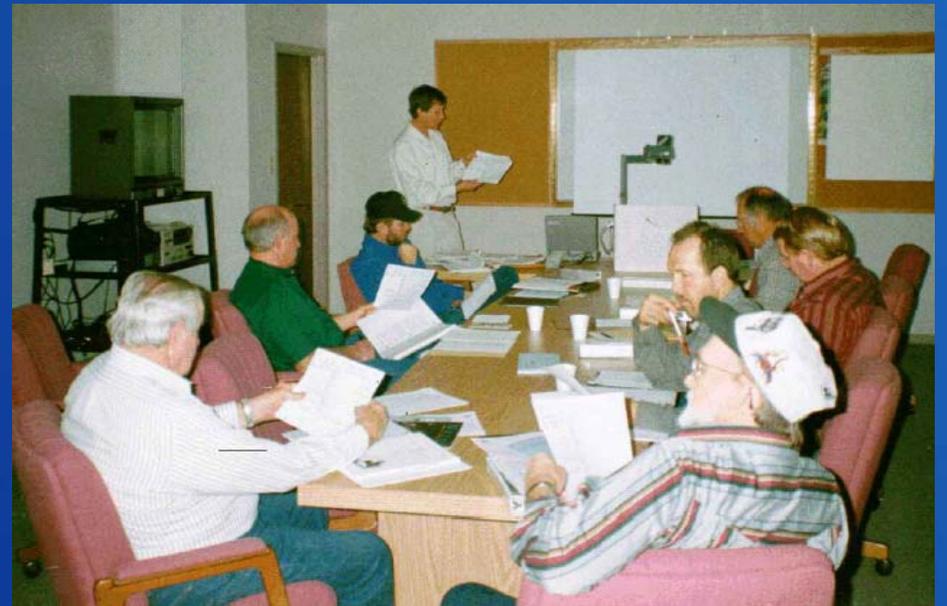


Client Support & Technical Presentations Office

Client Support

Client Liaisons

Technical Presentations



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Laboratory Facilities and Capabilities

- 54,000 square feet floor space
- 240,000-gallon storage reservoir
- Automated flow delivery and measurement systems

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Laboratory History

- Reclamation began using hydraulic models in 1930 in Fort Collins and Montrose, CO
- Unprecedented scale of Hoover, Shasta, and Grand Coulee Dams made the hydraulic lab necessary to evaluate new design aspects
- Reclamation obtained Lab Facility in 1946
- Consolidated hydraulic labs in one location
- Allowed for expansion of applied research
- Largest indoor hydraulic lab in the world

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River and Geomorphology Studies

River Restoration

River Resources Management

Fluvial Hydraulics & Geomorphology

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River and Geomorphology Studies



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Project Examples

- Upper Gila River Fluvial Geomorphology Study – New Mexico
- Little Colorado River Sedimentation Study – Arizona
- Trinity River Restoration and Adaptive Management Plan – California
- Rio Grande Environmental Studies: Cochiti Reach – New Mexico
- Klamath Project Environmental Studies - Oregon

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Hydraulic Investigations



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Water Measurement



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Water Measurement - Developments

- WinFlume computer program for calibration and design of long-throated flumes and broad-crested weirs
- Improved calibration methods for canal radial gate check structures, facilitate accurate flow measurement, and improved canal operations
- Low-cost flow meters and data recorders for on farm open-channel applications

Fisheries Engineering



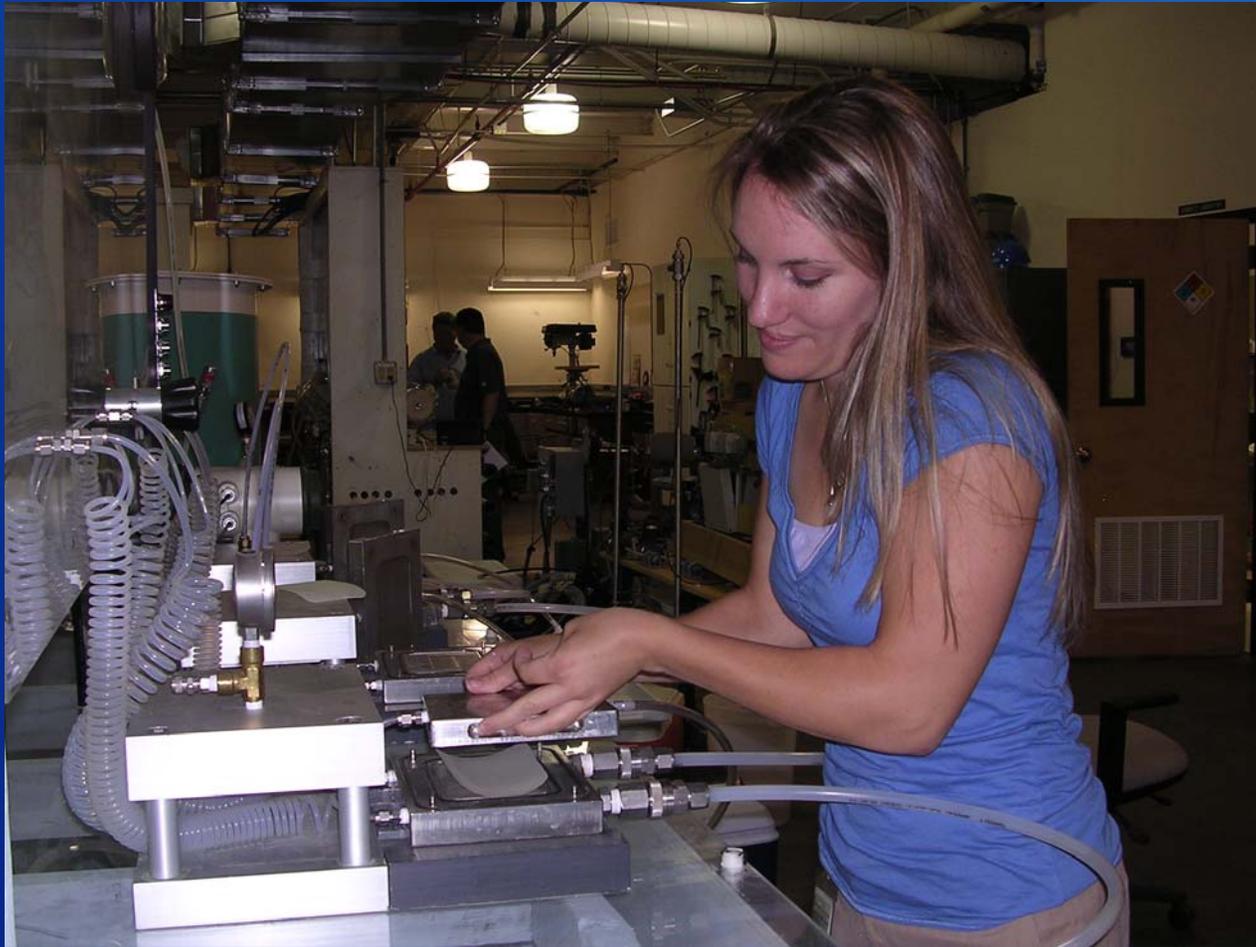
**Fish ladders for
western sucker and
minnow species**



**Fish locks for
swim- challenged species**

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New Technologies – Water Purification, Desalination



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Technology Transfer Workshops

- Modern Methods for Canal Operation and Control (twice per year)
- Water Measurement (once per year)
- Specialized workshops as requested (in Denver or on-the-road)



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Lab Tour

- Fishery Lab
- Robles Diversion Dam Model
- Canal Automation Model
- Folsom Dam Model
- Fish Stress Test – Tracy Facility
- Coatings Lab – Zebra/Quagga Mussels
- Materials Lab - 5 Million Pound Test Machine

Western United States – Early 1900's



Boise Project, Idaho

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