



US Army Corps
of Engineers

U.S. Army Corps of Engineers Water Management



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-
- **38 District/Division Offices for Civil Works**
 - **36,000 Employees**
 - **\$5 Billion Annual Civil Works Budget**
 - **Military Design/Construction**
 - **Contract Administration (Billions)**
 - **Design/Construction for Other Agencies**

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Key Mission Elements

- Water management
 - Flood control - 383 Dams/Reservoirs (27 SWF)
 - Over \$20 Billion in Flood Damages Prevented Each Year, \$1 Billion+ SWF)
 - Navigation – 235 Locks/Dams
 - 12,000 Miles of Waterway
 - 300 Commercial Harbors
 - Water supply – 10 Million People In 115 Cites Plus Agriculture
 - Hydro Power – 75 Sites w/ 25% of Hydroelectric or 3% of Energy
- Recreation
 - Nation's Largest Outdoor Recreation Supplier
 - 2,500 COE Operated Plus 1,800 Leased Areas
 - 360 Million Visits
 - 600,000 Jobs Directly Related
- Environmental Restoration
- Emergency Response, Military Construction & Contracts, Iraq, Afghanistan

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Reservoir Control Branch





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Water Management for District Reservoirs

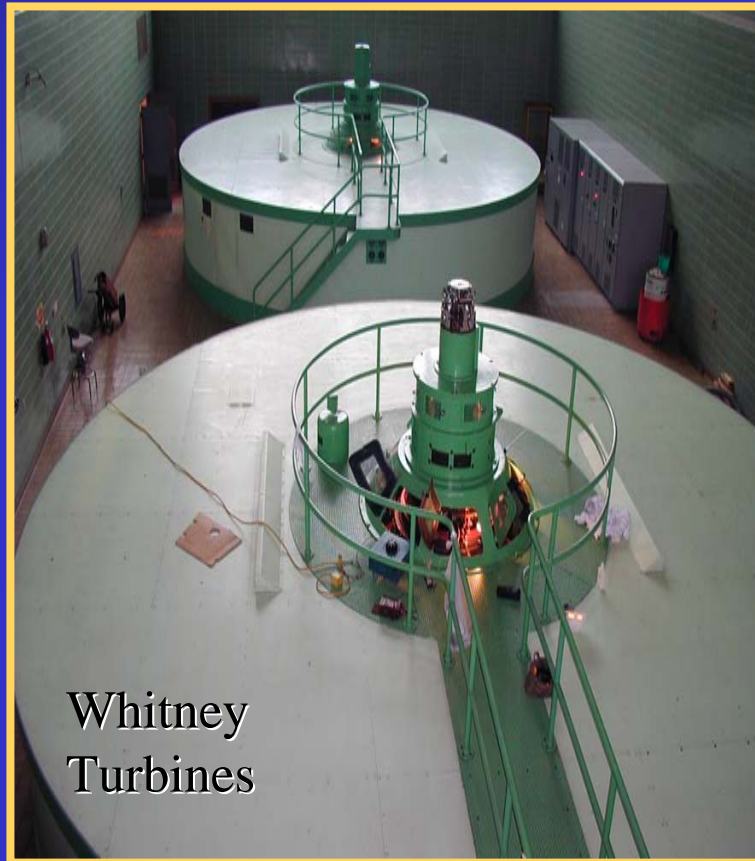


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Water Management for District Reservoirs



Whitney
Turbines

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Hydrologic Network



- System of 1000's of Remote Sensing Stations
- Cooperative Partnership With
 - USGS/COE/USBR/NWS
 - River Authorities
 - Cities/Others
- Transmitted - GOES/DOMSAT/Radio/Microwave
- Manual Observers (NWS)
- \$25 Million Plus Annual Budget for Stream Gages

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Manual Weather Station



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Elm Fork Jan 15, 1998



- Crandall rain gage

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Angelina River nr Alto



- Location: St Hwy 21
- 7.5 mile E of Alto
- Rain gage
- Stream gage



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Personnel



- **Engineers**
- **Hydrologists**
- **Scientist**
- **Technicians**
- **Support**

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Reservoir Control Branch





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Maintaining Perspective On Water Management



- Historical Disasters
 - S. Fork Dam, Pennsylvania (Operational Issues)
 - May 1889, 2209 dead, \$17 mil damages
 - St Francis Dam, California (Operational & Design)
 - March 1928, 450 dead, several towns destroyed
 - Buffalo Gap, Virginia Tailings Dams (Operational & Des.)
 - Feb 72, 125 dead (COE Involvement)
 - Banqiao & Shimantan Dams (Ru & Hong Rivers, China)(Design Issues)
 - August 75, 85k dead, 11 mil affected

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Water Management for District Reservoirs

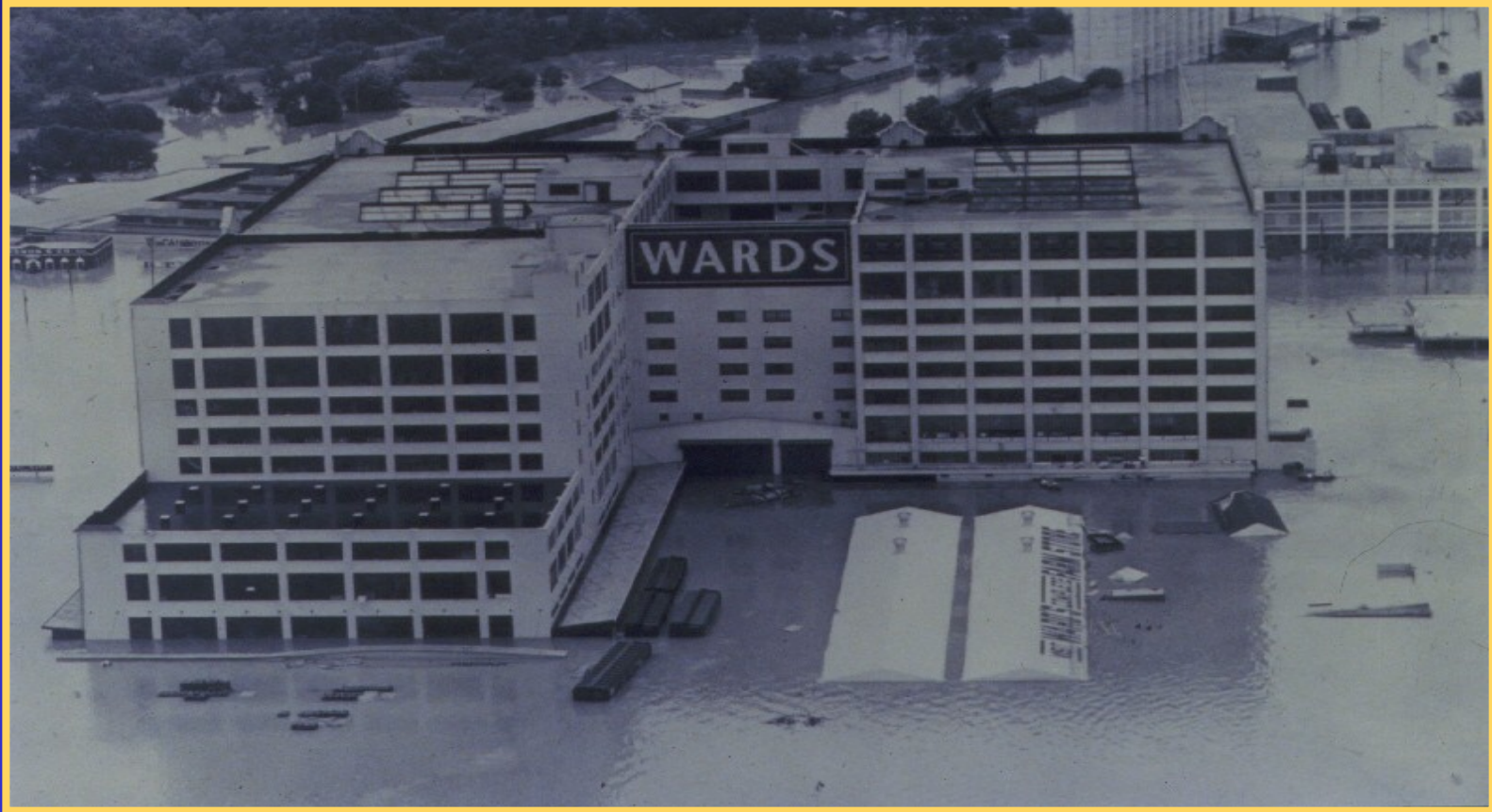


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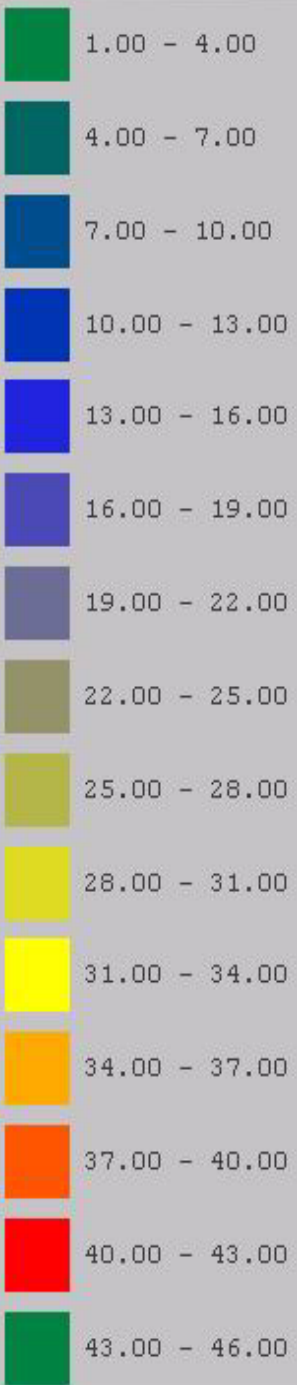


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Water Management for District Reservoirs

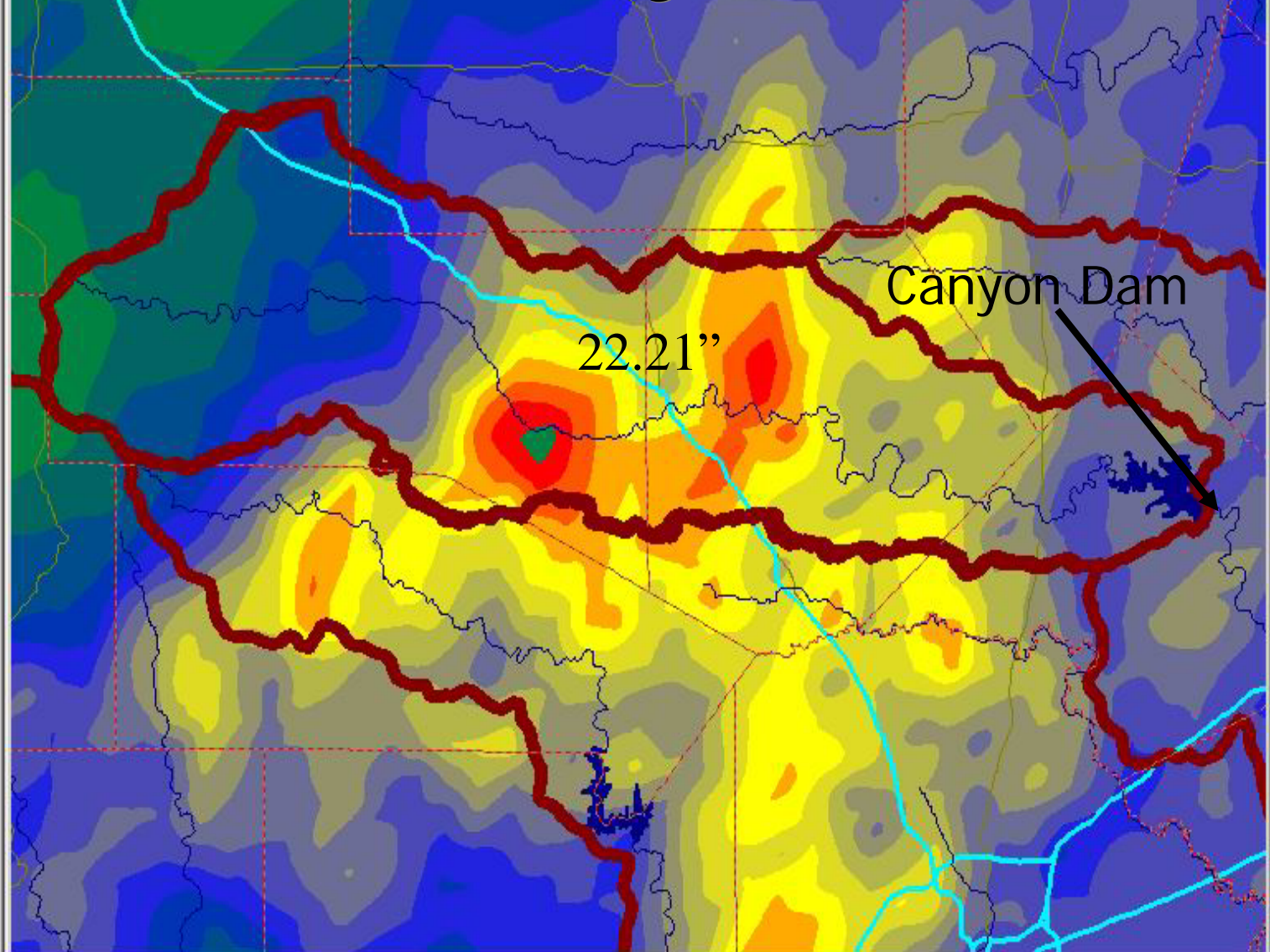


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Canyon Dam

28 June - 07 July 2002





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Canyon Dam Flooding Spillway on 6 July 2003 Pool Elevation 950.3' , Discharge = 66,800 cfs





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Modeling Requirements



- **Reallocation Studies**
- **Changes in Operation to Accommodate:**
 - **Flooding Issues**
 - **Recreation Interests**
 - **Users with Conflicting Needs**
 - **Environmental Needs**
- **What If Scenarios**
 - **Flooding**
 - **Drought**

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RiverWare



- **Why A New Tool**
 - **Obsolete Legacy Modeling Tools**
 - **Decreased Staffing (Modeling & Development)**
 - **Single Individual**
- **First Contract August 2001**
- **Success in Early 2004**

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Criteria



- Modern Computer Language
- Long Term Sustainability
- Substantial User Community
- Institutional Support/Maintenance
- Training

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Scope of Work



- Flood Control (John Daylor - SWT)
 - Objects
 - Methods
 - Testing
- Hydropower Operations
- Conservation Operations
- Post Processing
 - Statistical Analysis and Plotting
- Integration of RiverWare Into CWMS (Joan Klipsch – HEC, Bill Oakley – CADSWES)
 - Includes Integrated DSS DMI (CADSWES)

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Questions?

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