Basin Level Drought Monitoring: The Upper Trinity Case

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Center for Research in Water Resources
University of Texas at Austin

US Drought Monitor Forum
Austin, October 7, 2009
Questions being asked

• How can national level drought information be customized for application within a river basin?
• How can additional information be added from state and local sources to show drought impacts in greater detail?
• How can drought impacts on reservoir systems be measured and depicted?
• MS thesis study conducted by Virginia Smith in collaboration with NWS Fort Worth and TNRIS
Base Map of the Trinity River Basin using ArcGIS Server
Adding the Drought Monitor as a Web Mapping Service from NDMC
Drought Impact Reporter for the Trinity Basin
USGS Streamflow accessed through WaterML

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Approved for publication -- Processing and review completed. </value>
Reservoir water levels in the Trinity River Basin
Selecting Lake Grapevine
Grid of water depth in Lake Grapevine

Computed each day by subtracting reservoir bathymetry from water level
Adding NWS Gridded MPE Precipitation Data
Some unresolved questions

- How do we characterize the effect of drought on reservoir water supply systems and construct regional indices of this?
- How **severe** is the current drought compared with past droughts?
- How do we characterize effect of drought on groundwater storage?
WaterML data service for KawLake Reservoir

http://his.crwr.utexas.edu/Corps_Reservoirs/cuahsi_1_0.asmx?WSDL

Data from http://www.swt-wc.usace.army.mil/home.shtml

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<th>Variable Name</th>
<th>Units</th>
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Source Information

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Variable Information and Time Series

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**Variable Code**

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</tr>
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</table>

**Storage (acre-ft)**

![Storage Graph](image)
KawLake Water Balance, 1995-2008

- Precipitation (in/day)
- Inflow (cfs-day)
- Storage (acre-ft)
- Evaporation (in/day)
- Release (cfs-day)
The water data services below are meant to facilitate the sharing of water information. The WFS technology of the [CUAHSI Hydrologic Information System](http://data.crwr.utexas.edu). The Web Feature Service (WFS), WFS, are built using the standards and specifications of the Open Geospatial Consortium (OGC). They use a DSpace digital archive.

### Data Services

- [WaterML Data Services](http://data.crwr.utexas.edu)
- [Web feature service (WFS)](http://data.crwr.utexas.edu)
- [Web coverage service (WCS)](http://data.crwr.utexas.edu)
- [Web map service (WMS)](http://data.crwr.utexas.edu)
- [Digital document archive](http://data.crwr.utexas.edu)
- [HydroPortal](http://data.crwr.utexas.edu)
**Pan Evaporation Data from Lake Ray Hubbard**

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**Summary**

- **Arithmetic Mean**: 0.2417
- **75th Percentile**: 0.2408
- **90th Percentile**: 0.377
- **Number of Observations**: 178
- **Number Censored**: 0

**Select Data**

- **Pick a Site**: 414914: LAKE RAY HUBBARD Region:3
- **Begin Date**: 2/1/1976
- **End Date**: 1/1/1992
- **Pick a Variable**: Evap001: Evaporation in inches per day (0 hour Average)
HydroPortal to access Themes

We have shown that the contents of this portal can be registered within a similar portal at NCDC (Rich Baldwin)
International Standardization of WaterML

OGC/WMO Hydrology Domain Working Group

September '09 Technical and Planning Committee Meetings
Fraunhofer Institute for Computer Graphics Research (IGD)
Darmstadt, Germany
28 September - 2 October, 2009
We are at a tipping point...

- Web pages
- Web services

People interact with a remote information server

People interact with a network of Information services
Consortium of Universities for the Advancement of Hydrologic Science, Inc (CUAHSI)

118 Universities in North America (and 3 in Europe)

NSF supports building a Hydrologic Information System (HIS)
Conclusions

• We constructed a successful prototype linking national drought information with regional information about the Trinity Basin through web services.

• Reservoir information is crucial for water supply management in Texas.

• WaterML time series are useful for web services besides web map services.