



U.S. Army Corps
of Engineers
Tulsa District

Tulsa District



Oklahoma 2007 A “Hurricane” of a Year

November 14, 2007



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Tulsa District

Overview

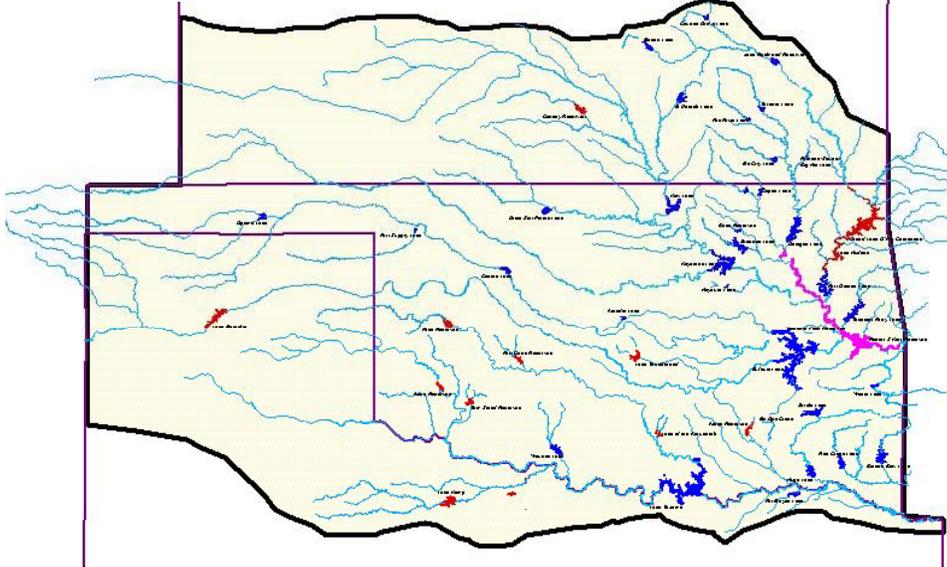


- Tulsa District
- Types of projects and storage zones
- Flood damage risk reduction operation.
- System water control plans
- Flood of June and July 2007

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Tulsa District:

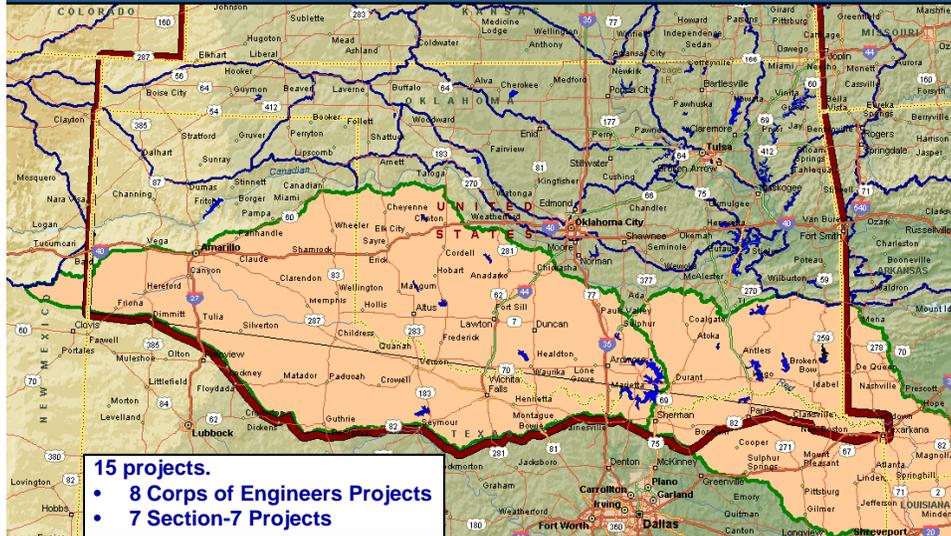
- 50 Projects
 - 15 in the Red River Basin
 - 35 in the Arkansas River Basin
- 12 Section-7 lakes (owned by others)
- 23 lakes with gated spillways
- 8 COE Hydropower
- 5 Navigation Locks
- 1 Chloride Control Project





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Red River Basin Watershed Map



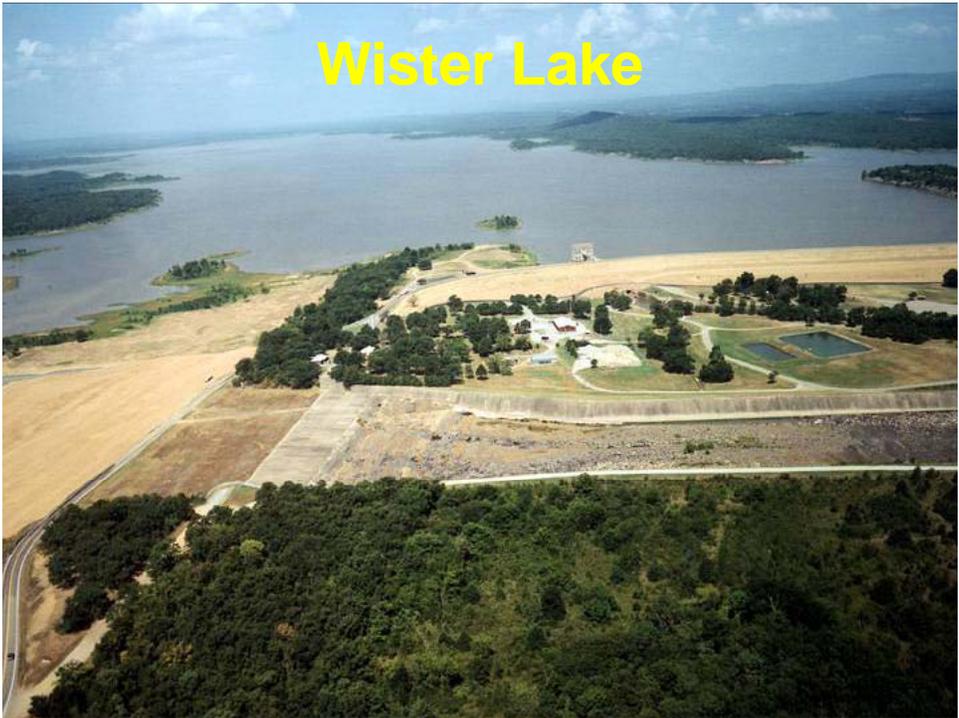
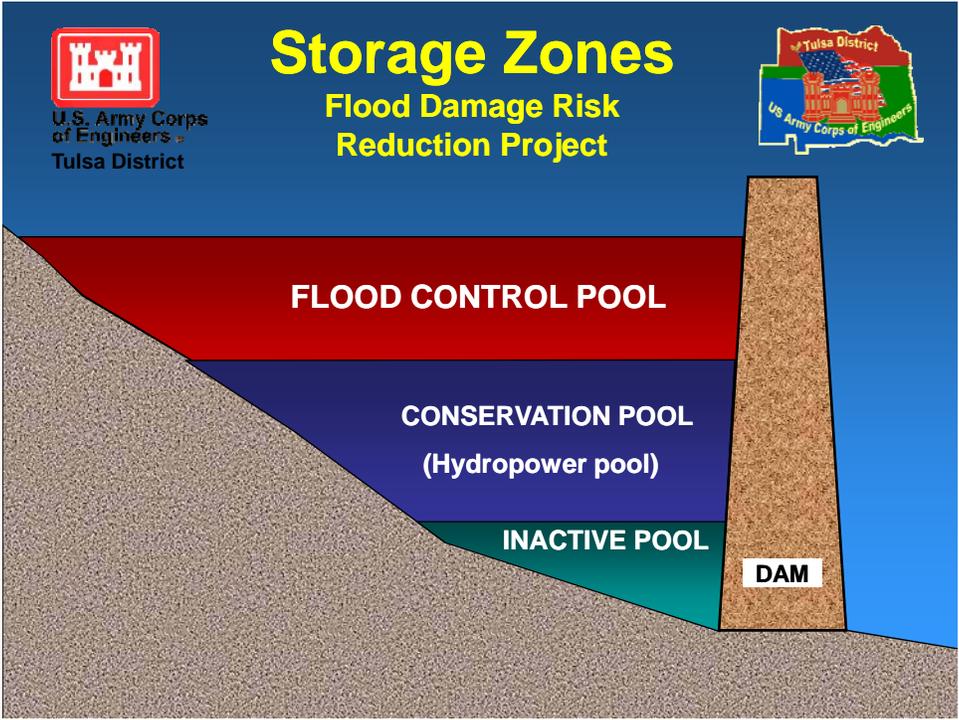
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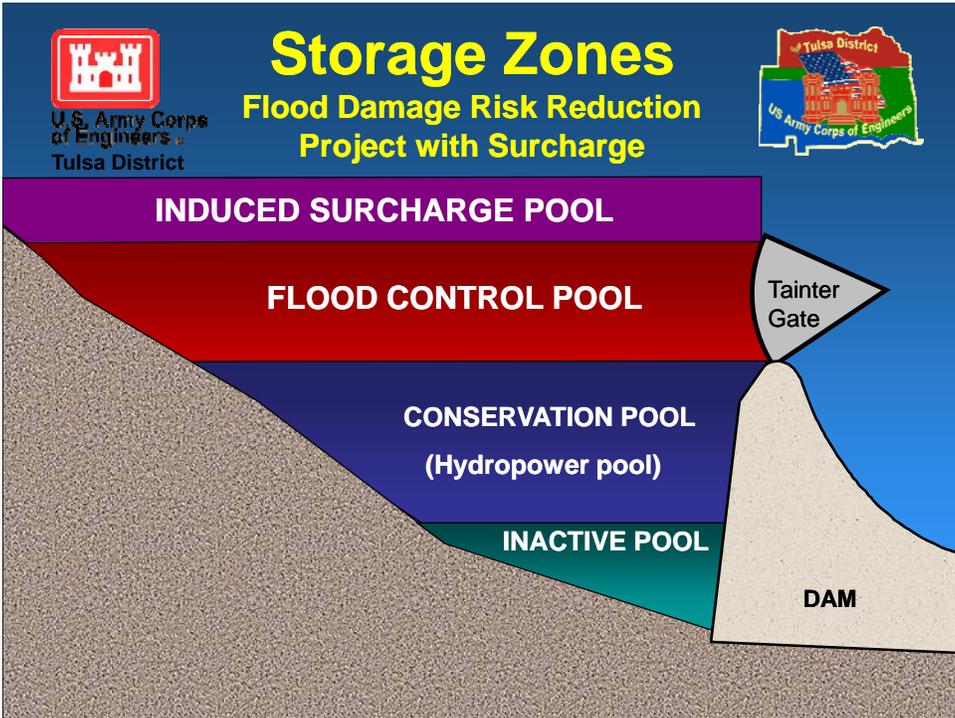
Types of Projects and Storage Zones

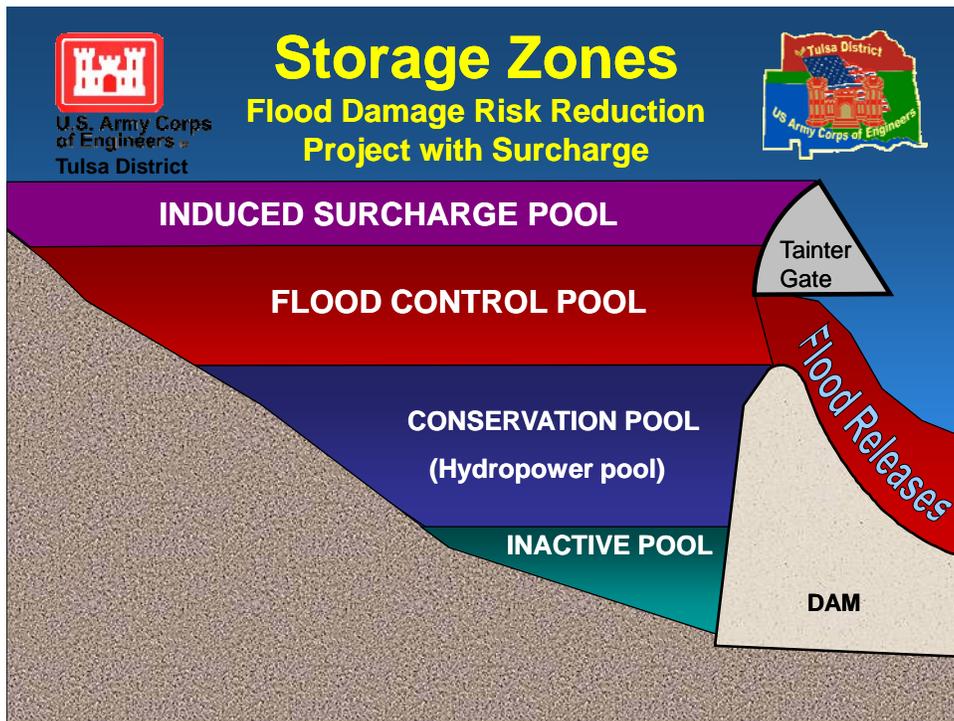


- Tulsa District has primarily four different types of water resources projects.
 - Flood damage risk reduction projects
 - Flood damage risk reduction projects with surcharge
 - Navigation lock and dams
 - Navigation lock and dams with hydropower

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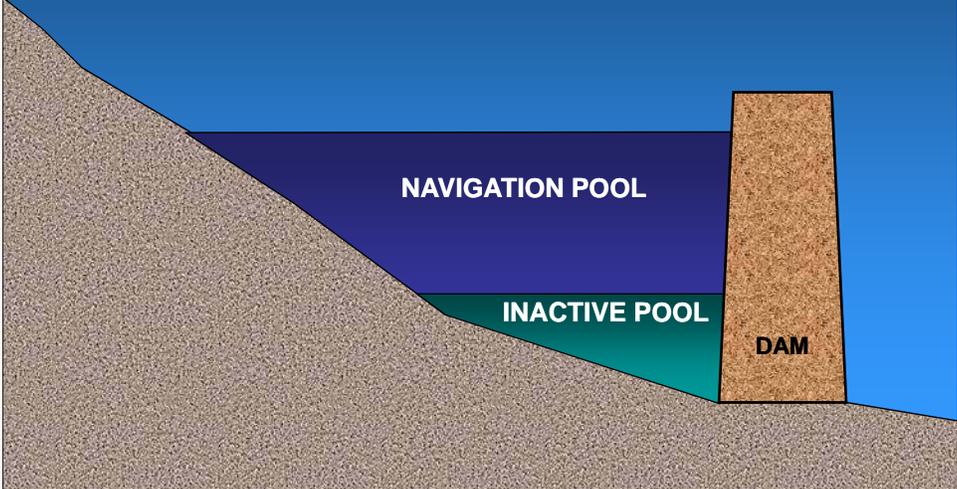


Keystone Lake

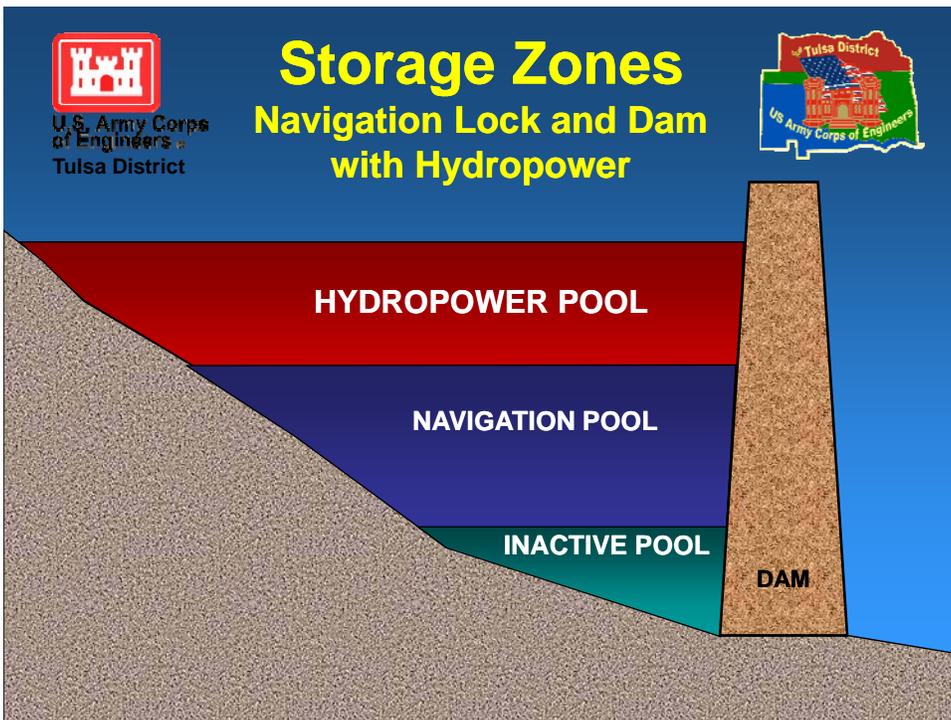
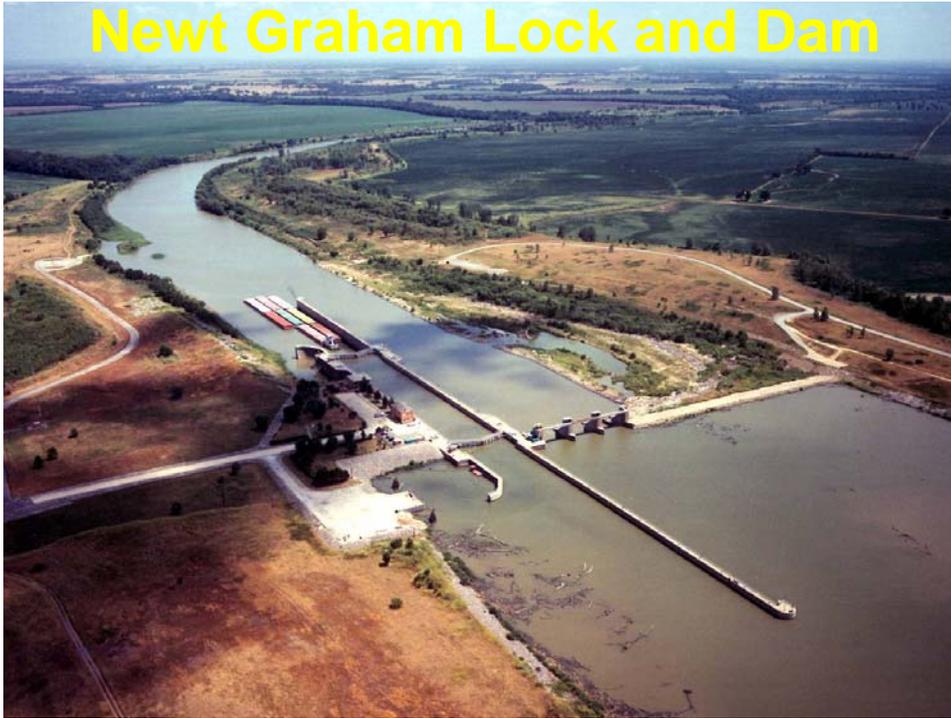


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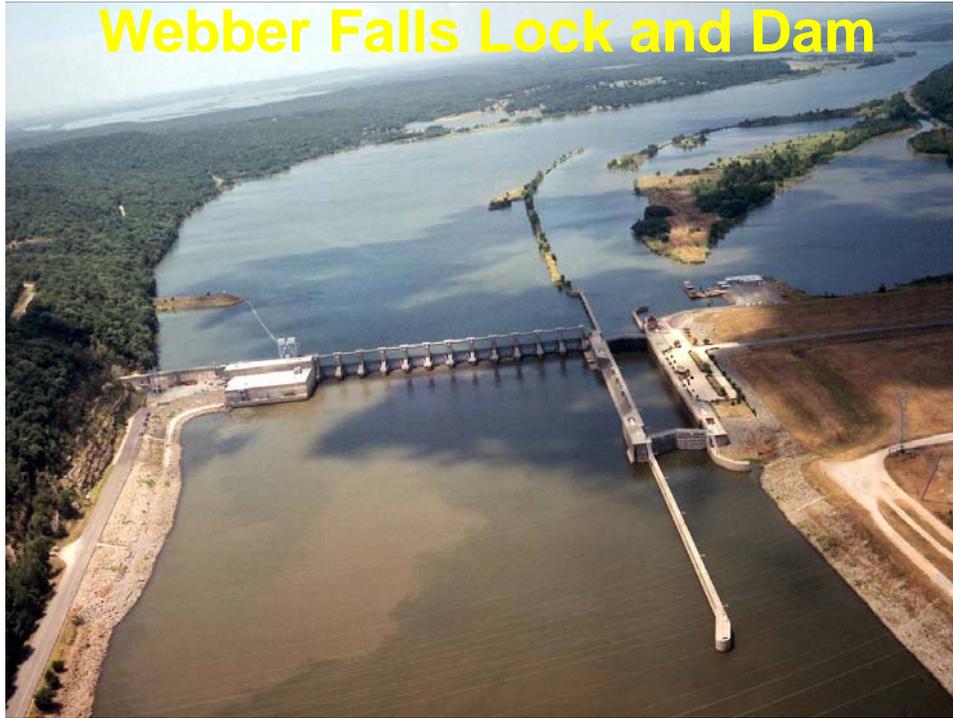
Storage Zones Navigation Lock and Dam



Newt Graham Lock and Dam



Webber Falls Lock and Dam



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Flood Operation Individual Project



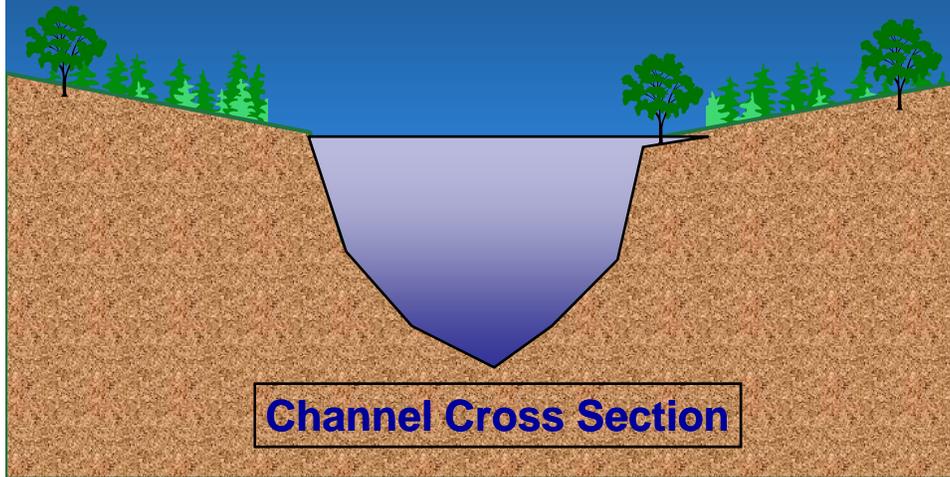
- The goal of any flood damage risk reduction operation is to not exceed the downstream bankfull capacity.
- Releases from the lake, when combined with downstream runoff will not cause the river to exceed bankfull capacity, if possible.
- Flood waters will be stored as long as possible in order to accomplish this goal.

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Bankfull Capacity



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System Water Control Plan



- Tulsa District has flood control projects in two river systems.
 - Arkansas River System
 - Red River System
- Each system water control plan attempts to balance the percent of storage contained in individual project flood pools.

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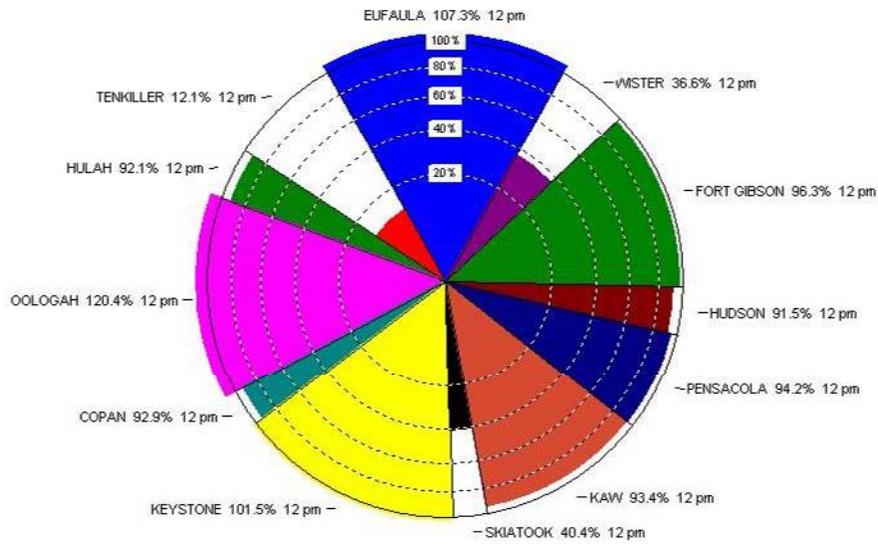
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Arkansas River Basin Watershed Map



LOWER ARKANSAS Flood Control Storage - 07JUL07

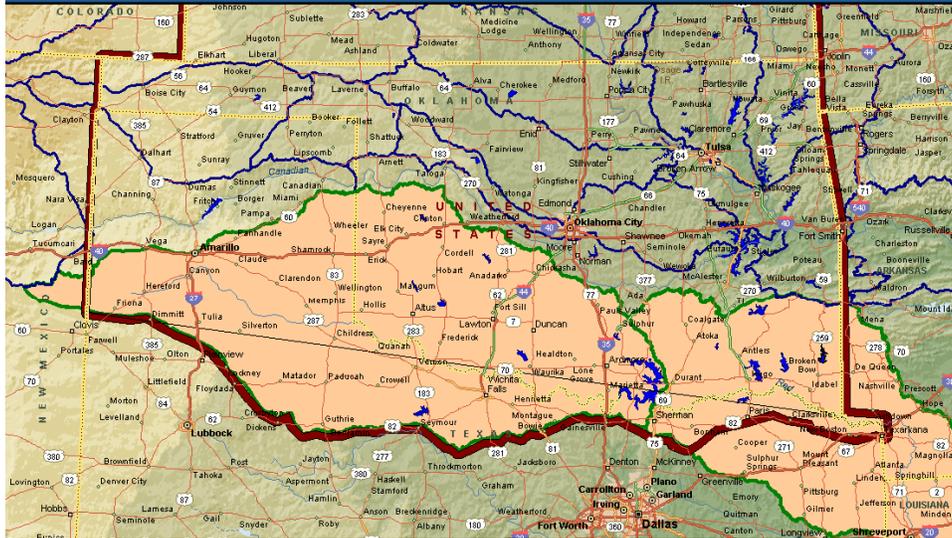
Total System Flood Storage Utilized = 90.55 %





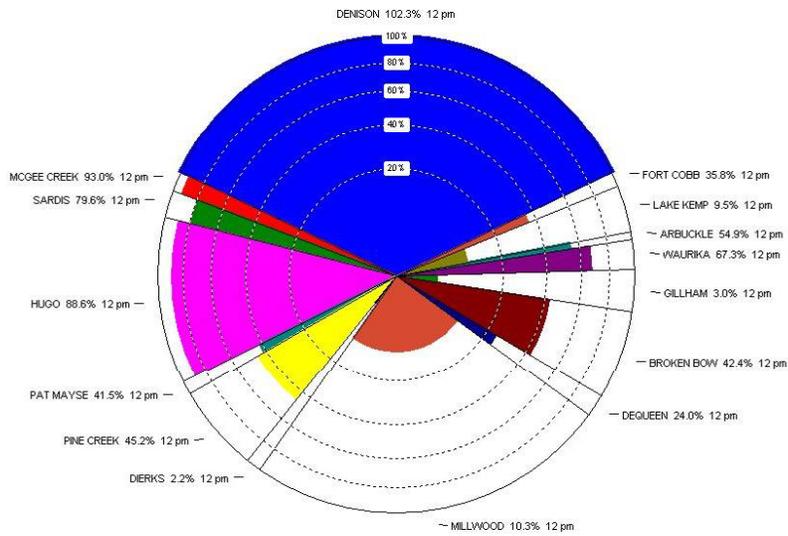
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Red River Basin Watershed Map



RED RIVER BASIN Flood Control Storage - 15JUL07

Total System Flood Storage Utilized = 60.33 %





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Flood of June and July 2007



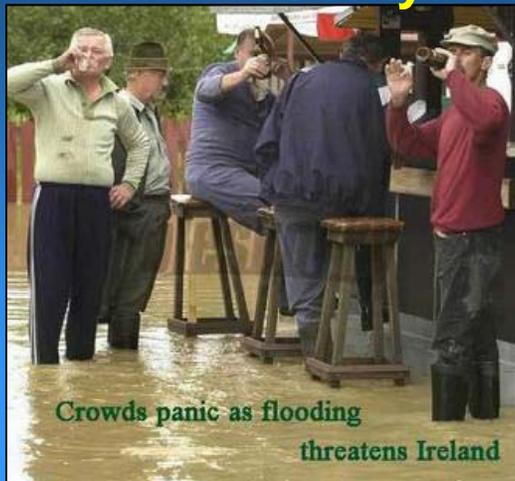
- The Corps can not control floods, we can only respond to the flood by managing the outflows from our projects.

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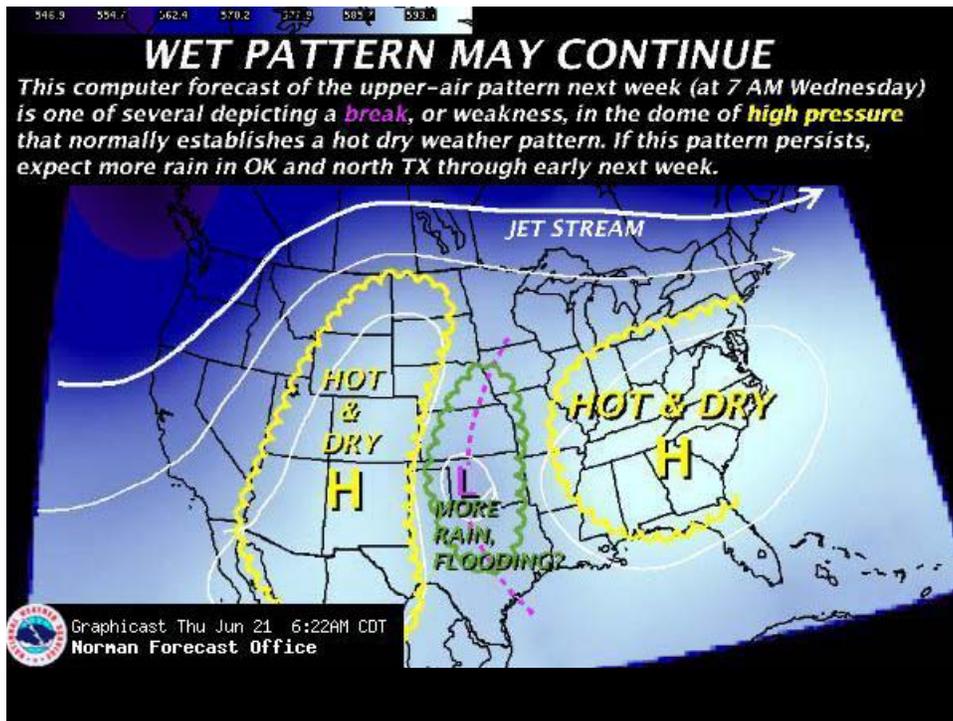
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People Respond to Floods in Different Ways



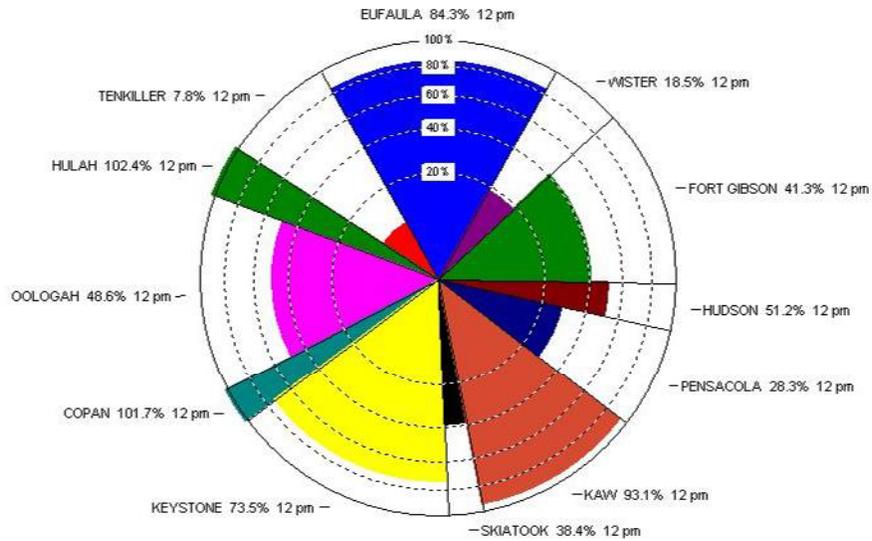
Crowds panic as flooding
threatens Ireland

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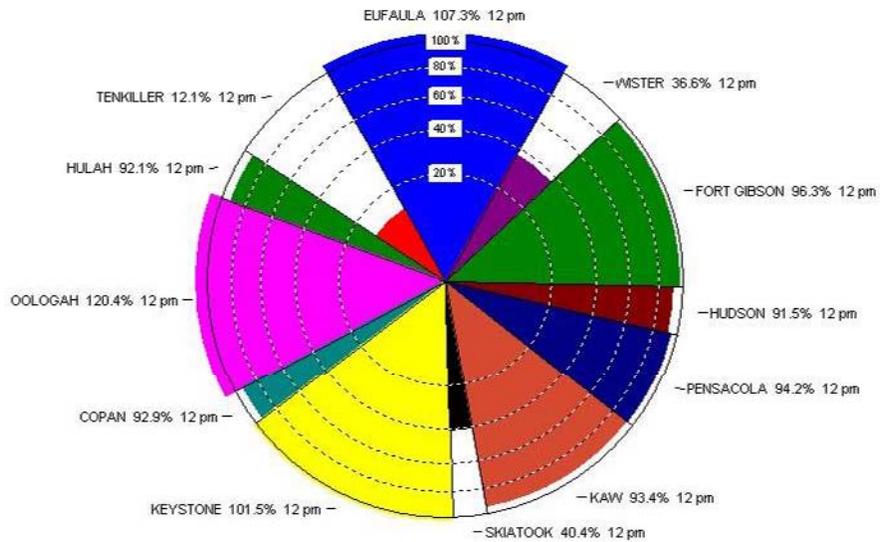
LOWER ARKANSAS
Flood Control Storage - 01JUL07

Total System Flood Storage Utilized = 59.57 %



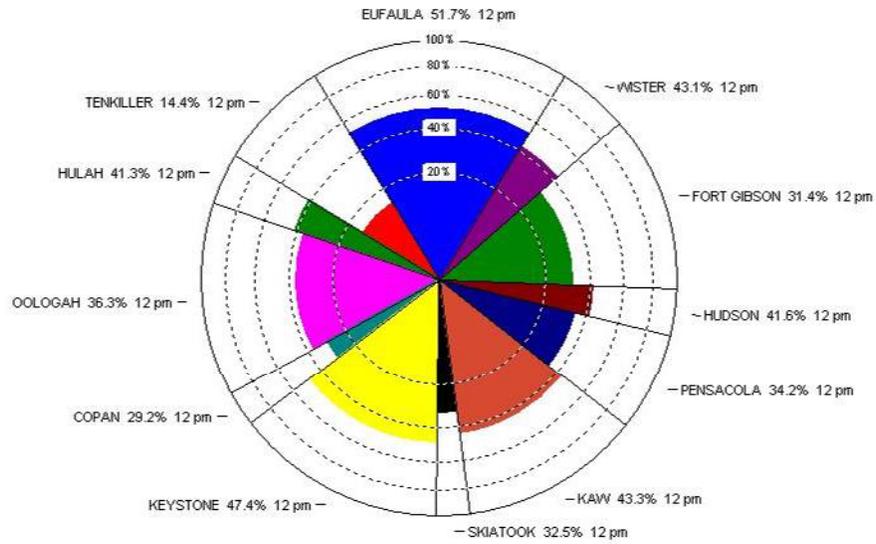
LOWER ARKANSAS
Flood Control Storage - 07JUL07

Total System Flood Storage Utilized = 90.55 %



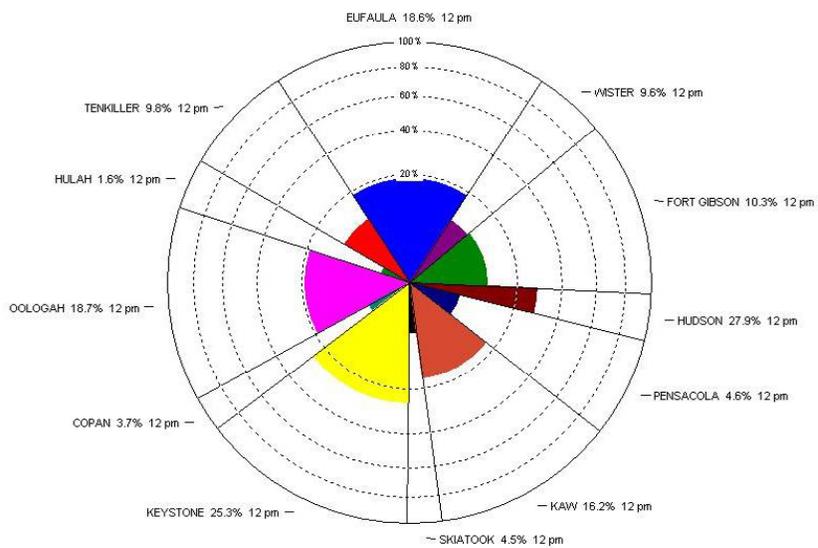
LOWER ARKANSAS
Flood Control Storage - 30JUL07

Total System Flood Storage Utilized = 39.48 %



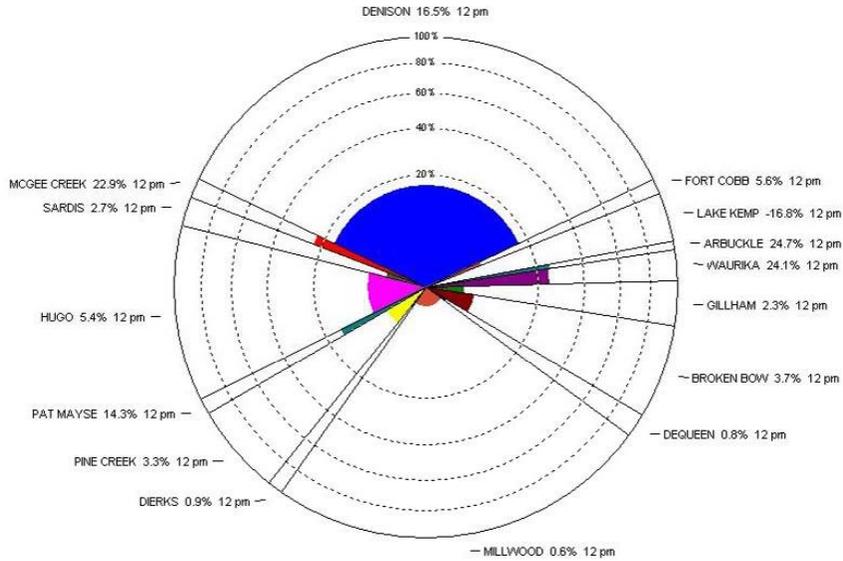
LOWER ARKANSAS
Flood Control Storage - 13AUG07

Total System Flood Storage Utilized = 15.31 %



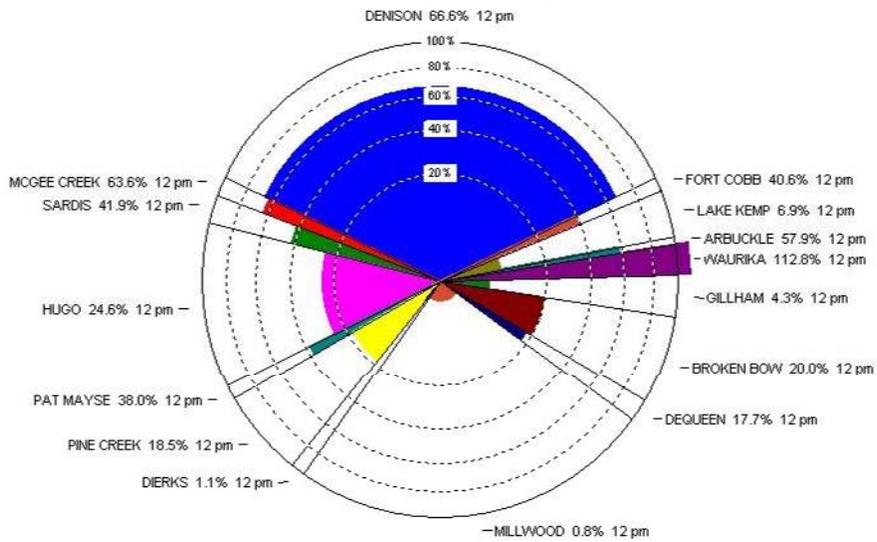
RED RIVER BASIN
Flood Control Storage - 01JUN07

Total System Flood Storage Utilized = 8.35 %



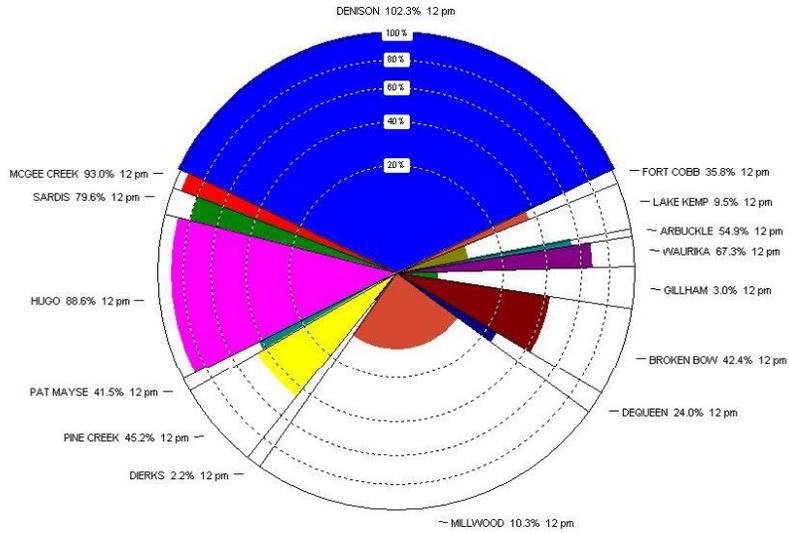
RED RIVER BASIN
Flood Control Storage - 1JUL07

Total System Flood Storage Utilized = 34.73 %



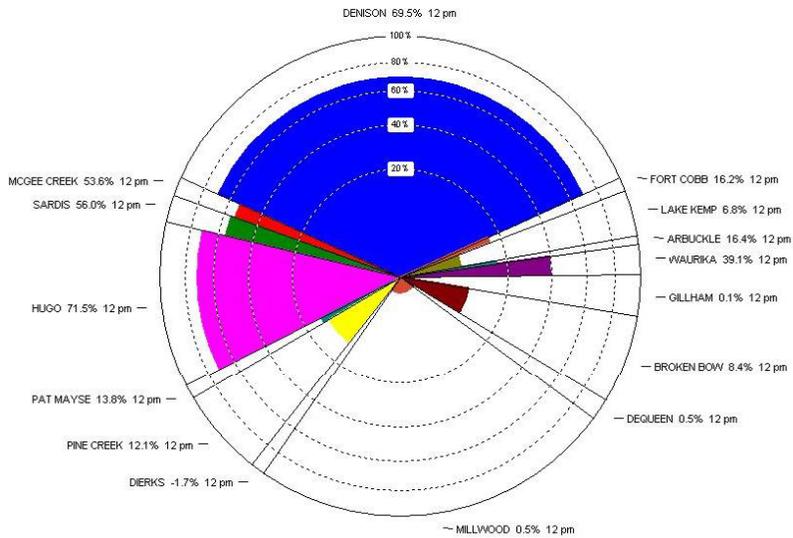
RED RIVER BASIN
Flood Control Storage - 15JUL07

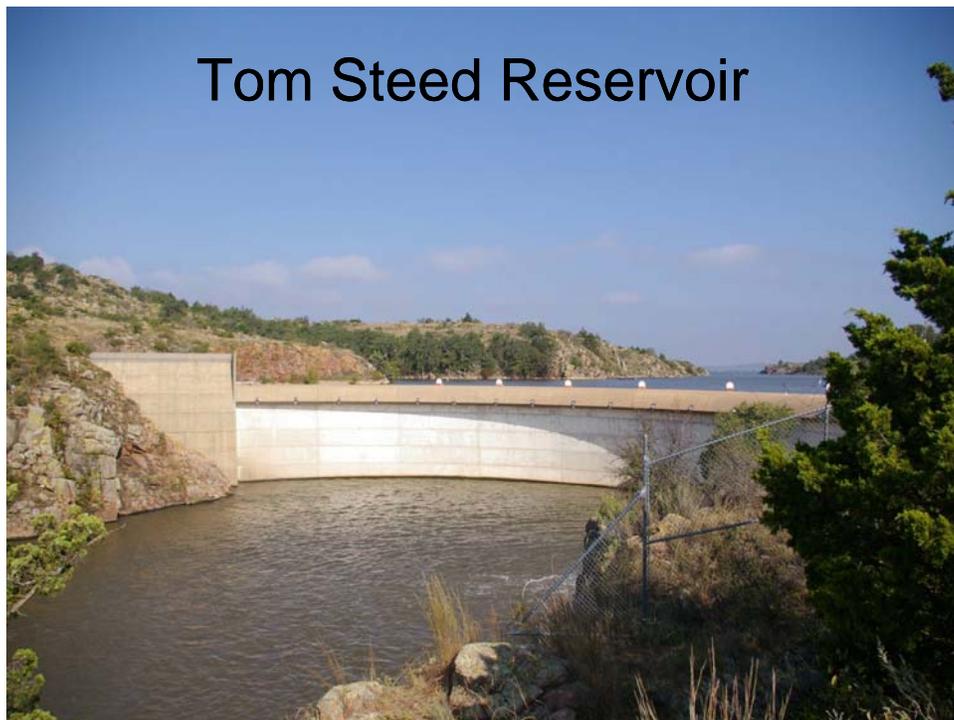
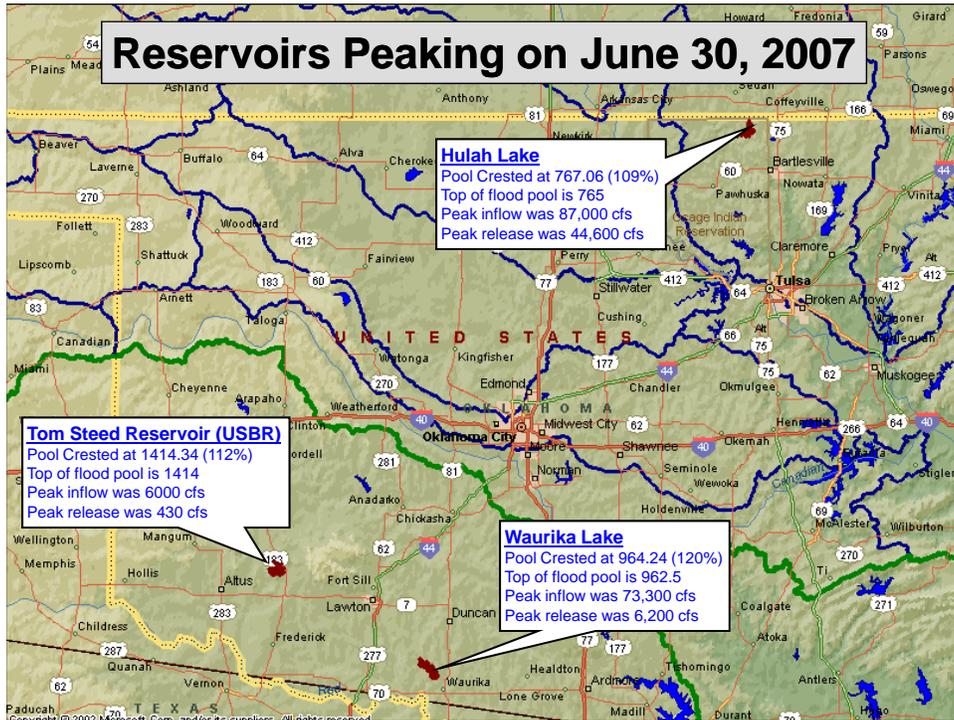
Total System Flood Storage Utilized = 60.33 %



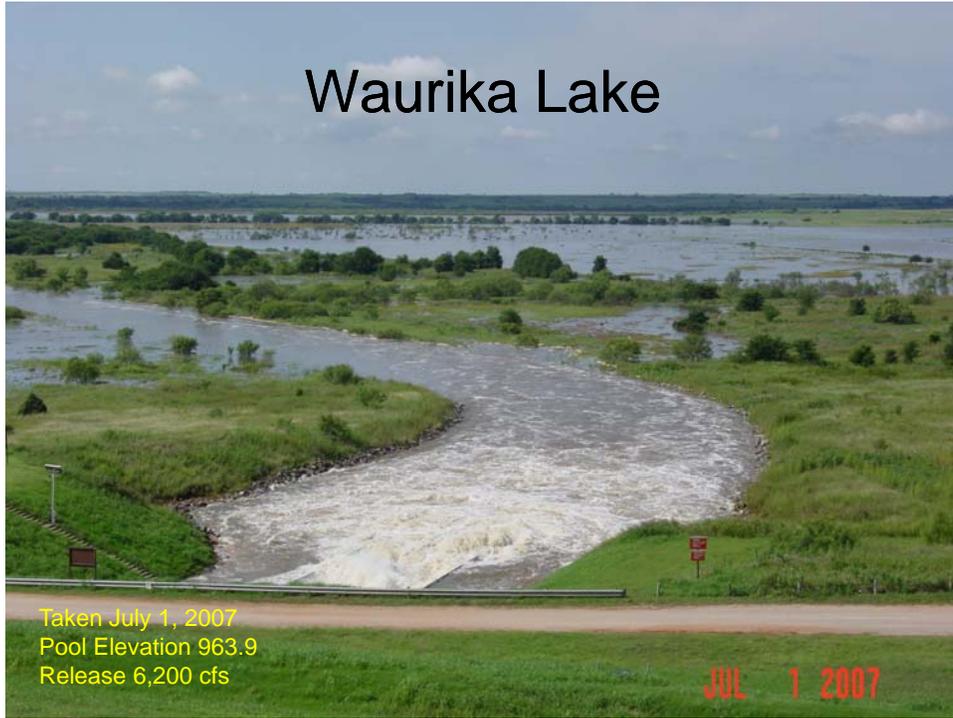
RED RIVER BASIN
Flood Control Storage - 30JUL07

Total System Flood Storage Utilized = 37.77 %





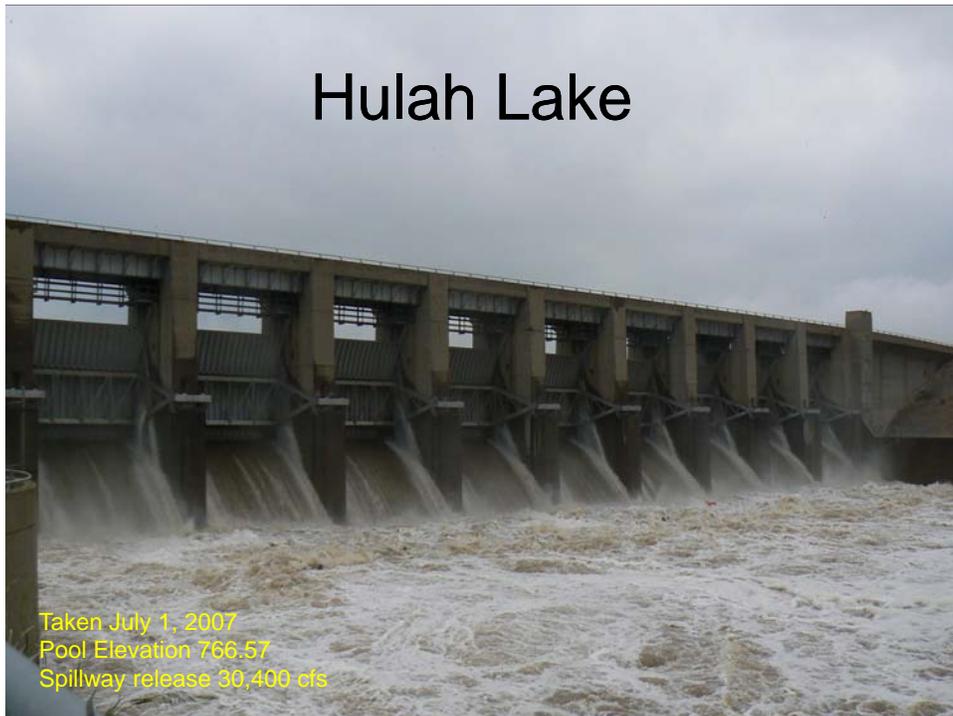
Waurika Lake



Taken July 1, 2007
Pool Elevation 963.9
Release 6,200 cfs

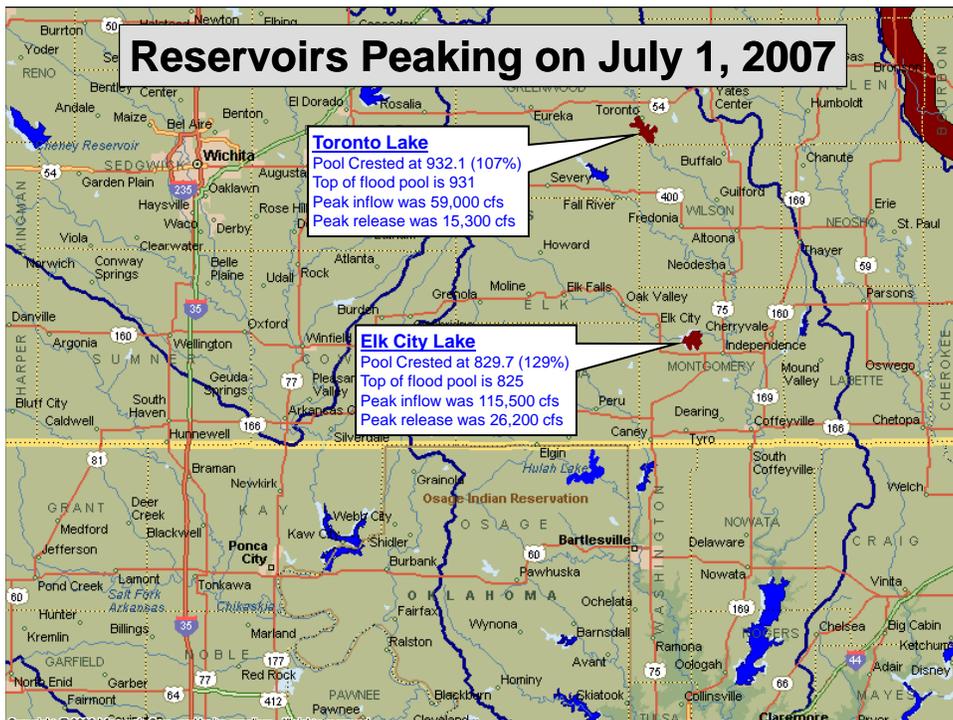
JUL 1 2007

Hulah Lake



Taken July 1, 2007
Pool Elevation 766.57
Spillway release 30,400 cfs

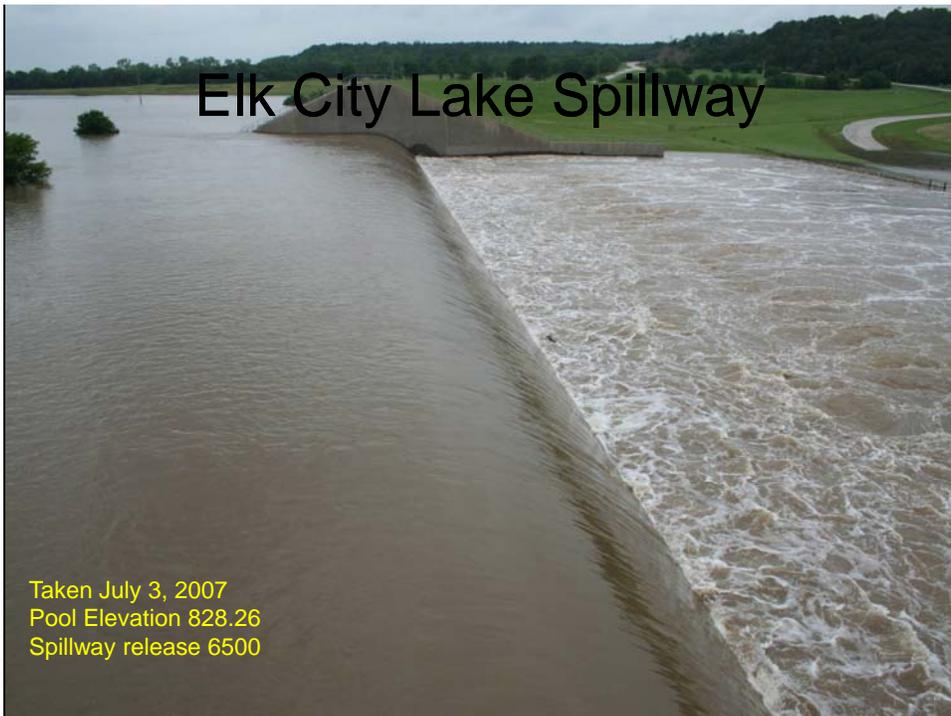
Hulah Lake Downstream



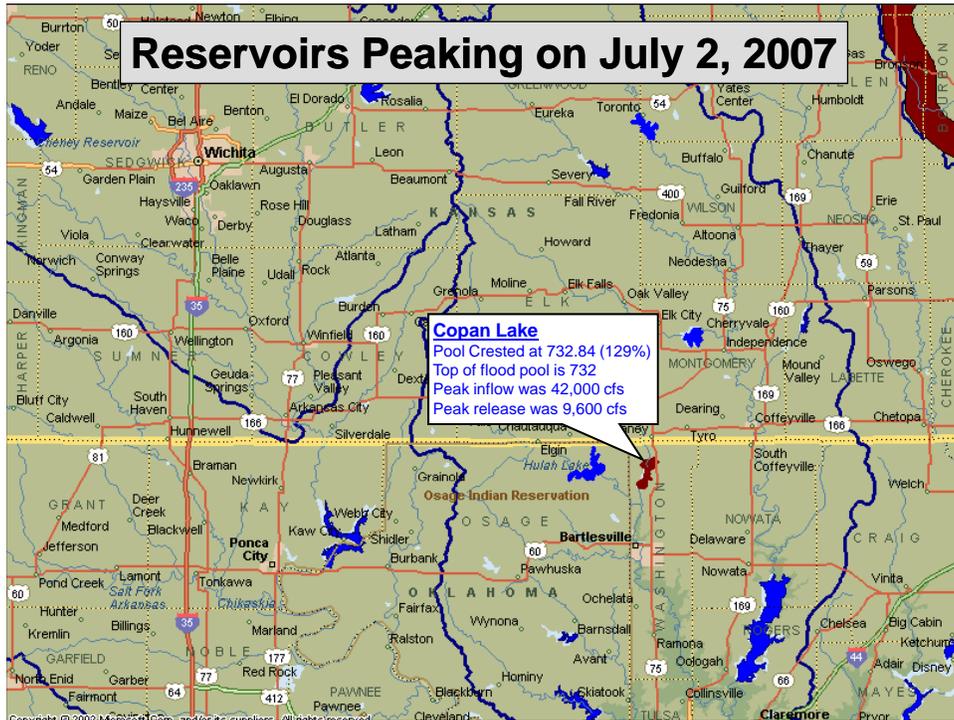
Toronto Lake

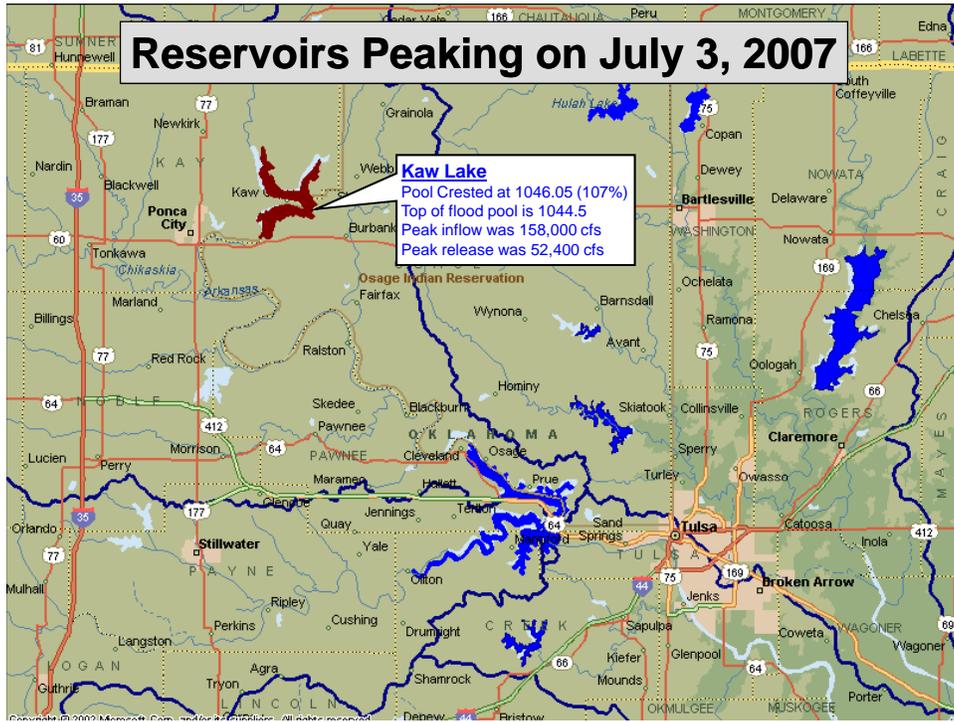


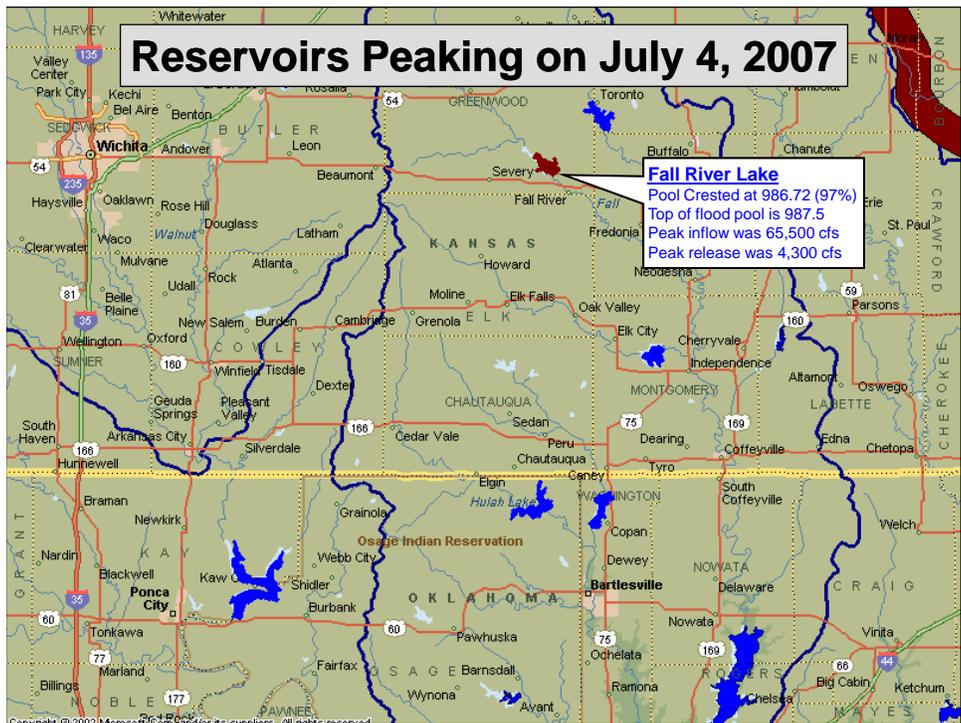
Elk City Lake Spillway

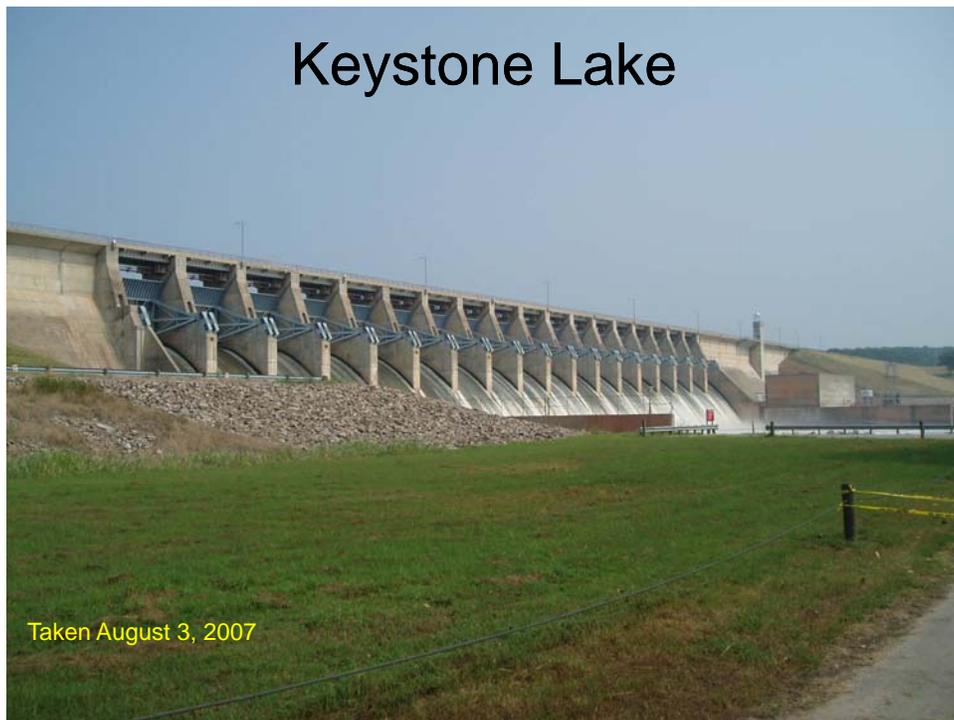
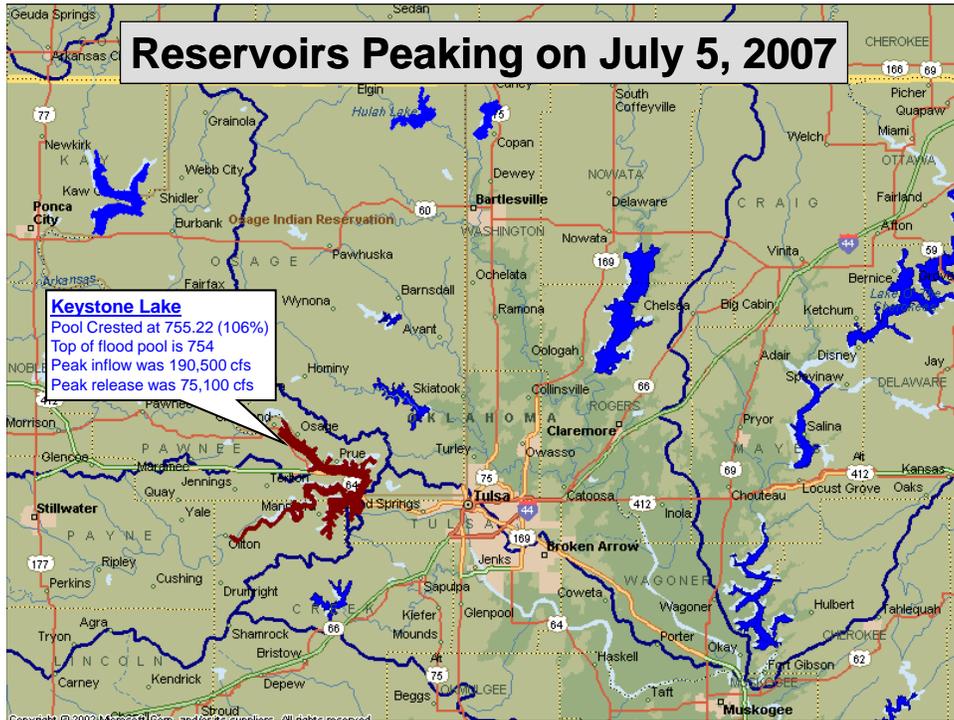


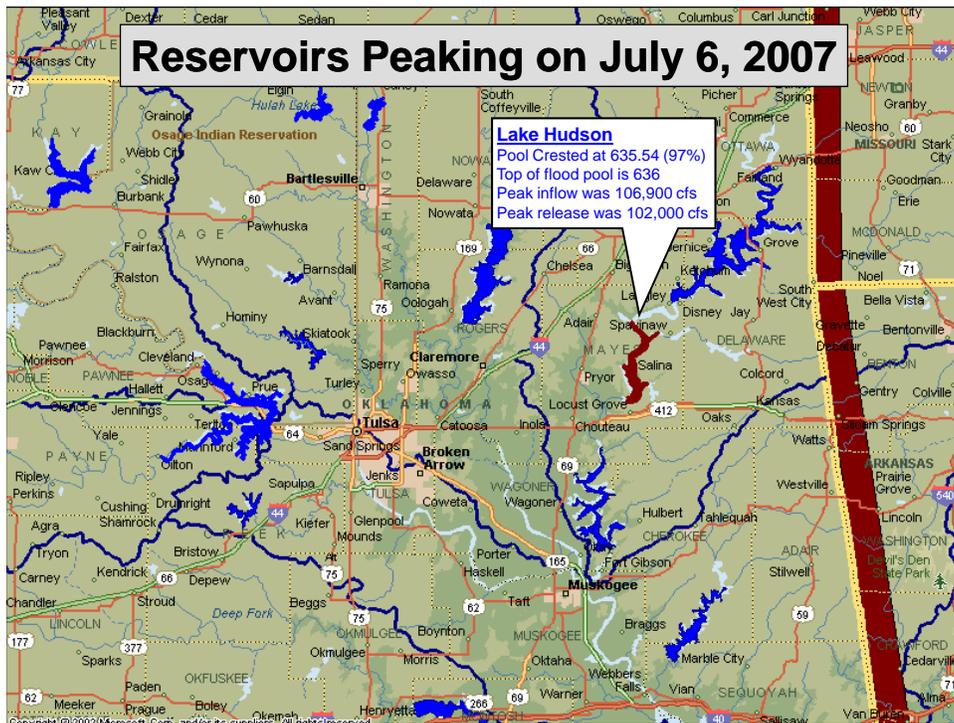
Taken July 3, 2007
Pool Elevation 828.26
Spillway release 6500

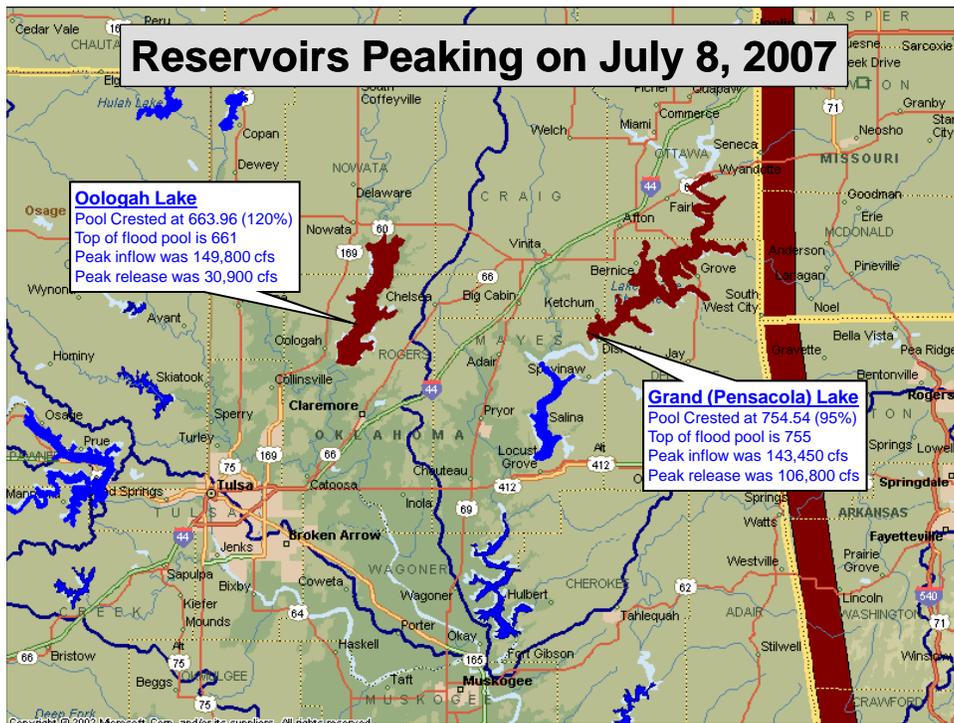












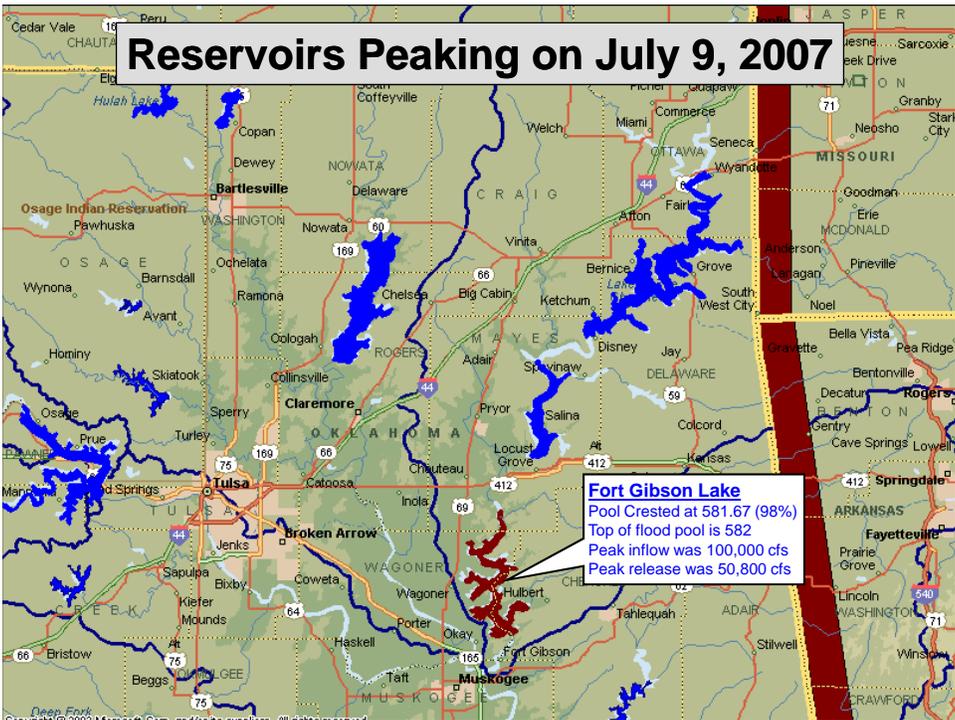
Oologah Lake



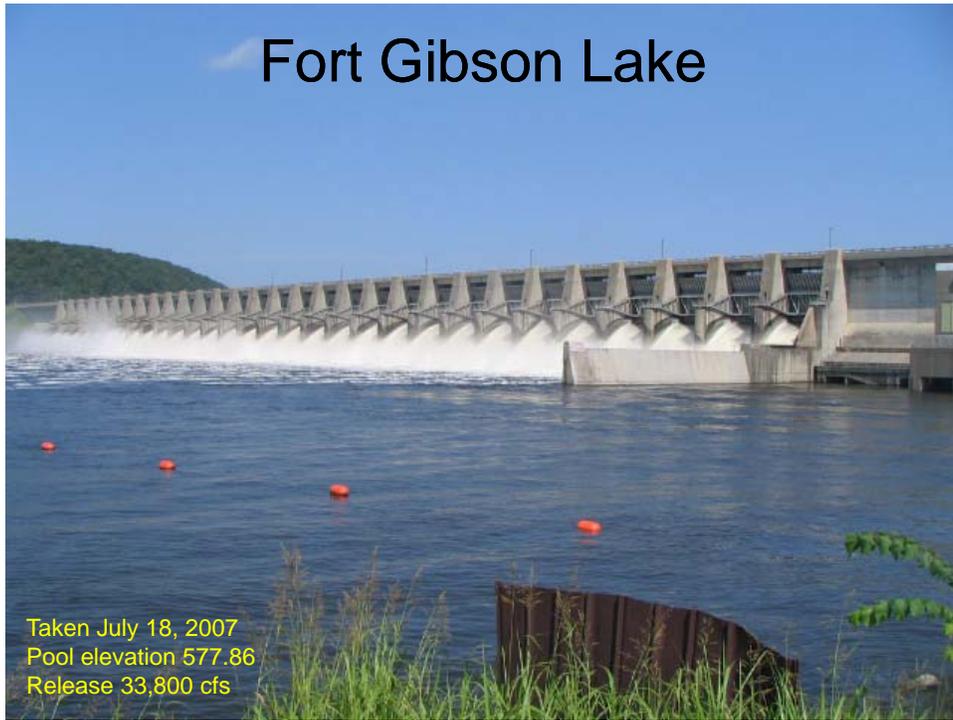
Grand Lake



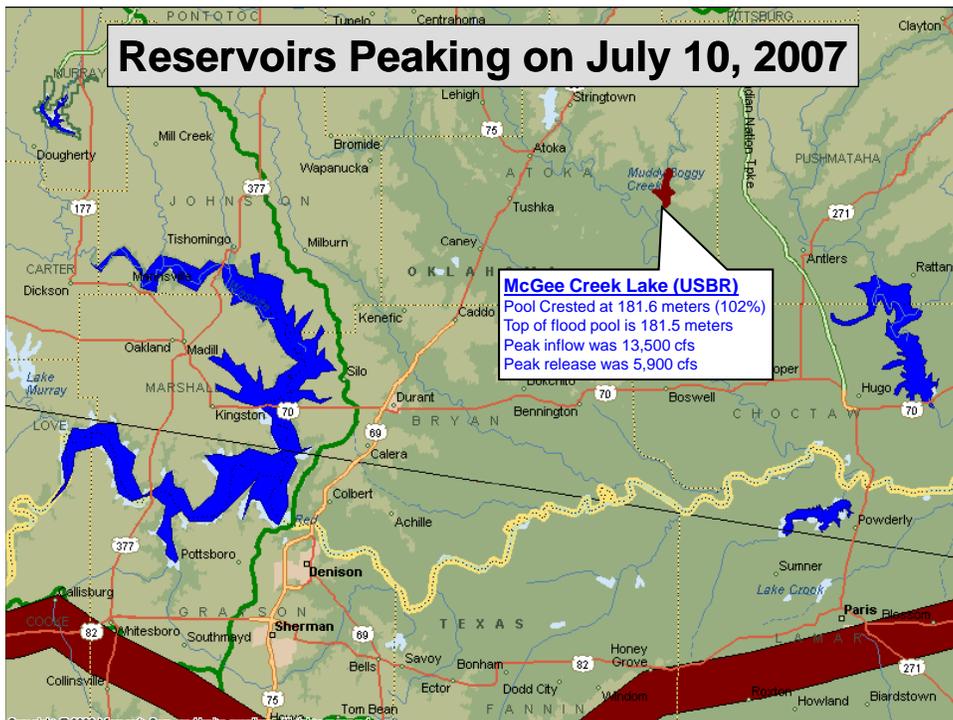
Grand Lake Spillway

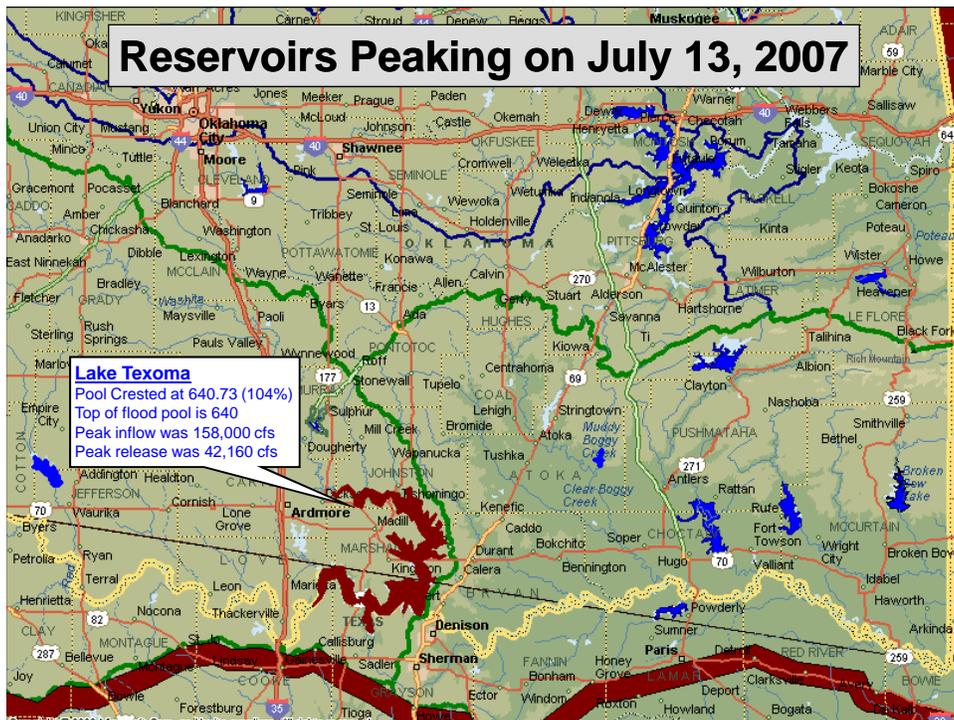
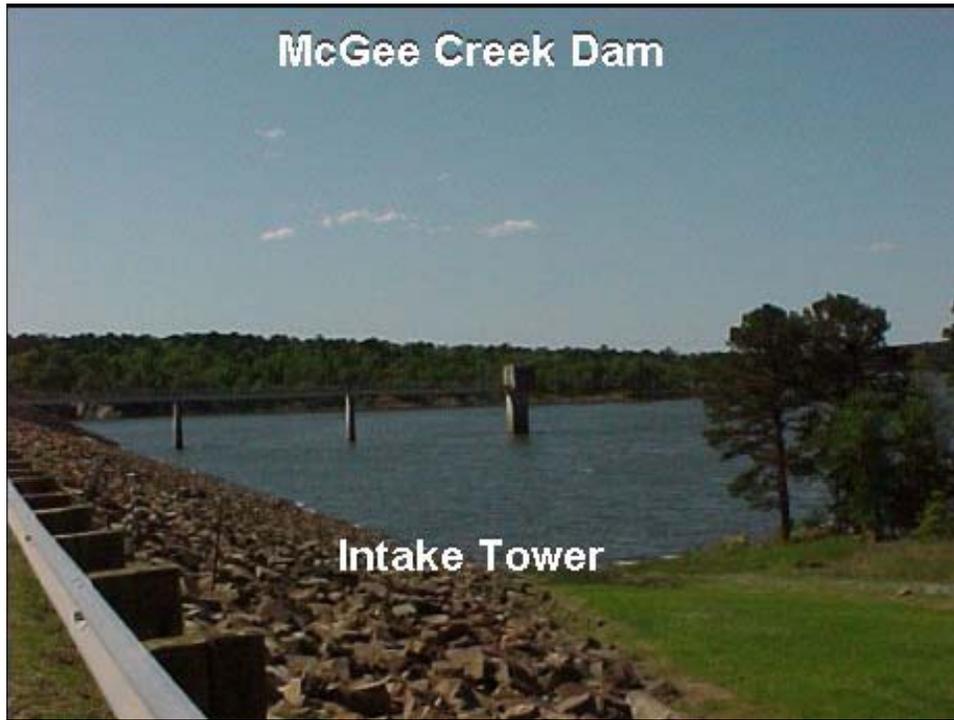


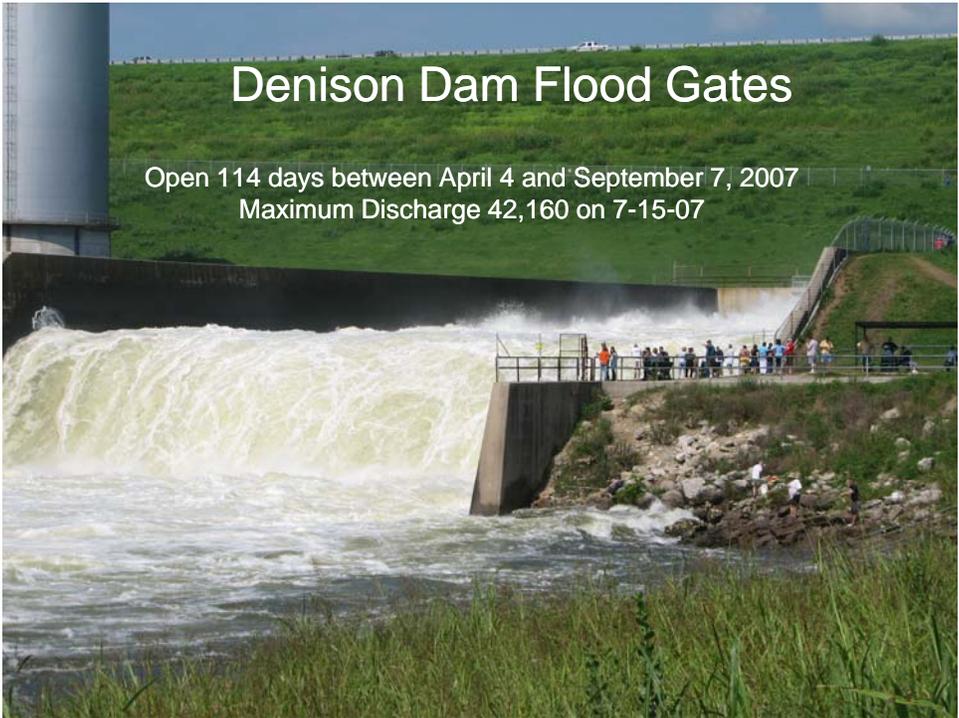
Fort Gibson Lake

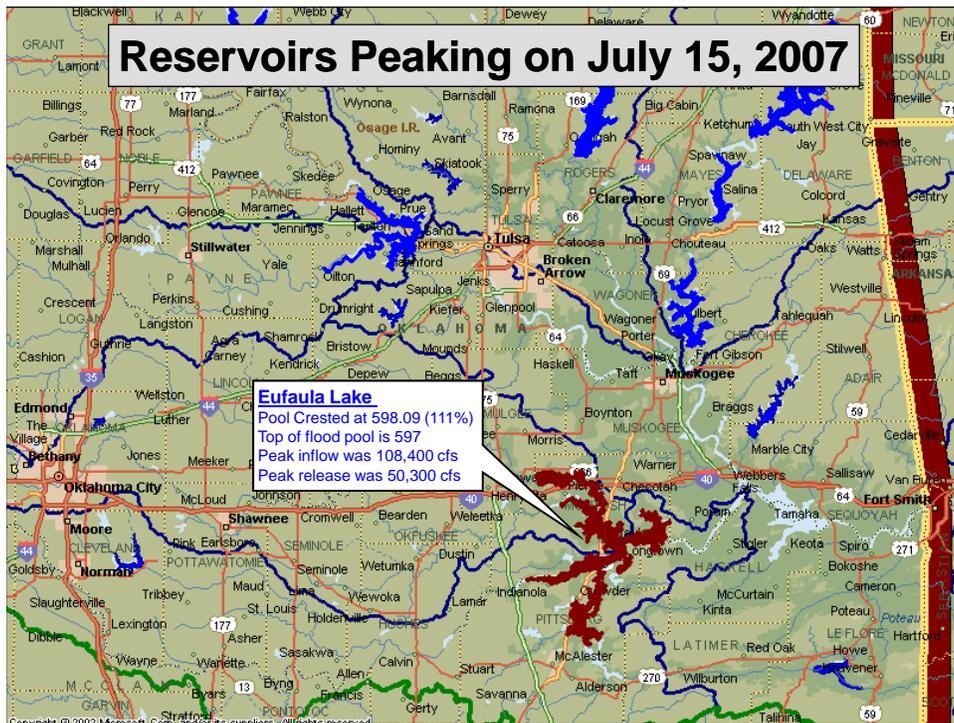


Taken July 18, 2007
Pool elevation 577.86
Release 33,800 cfs





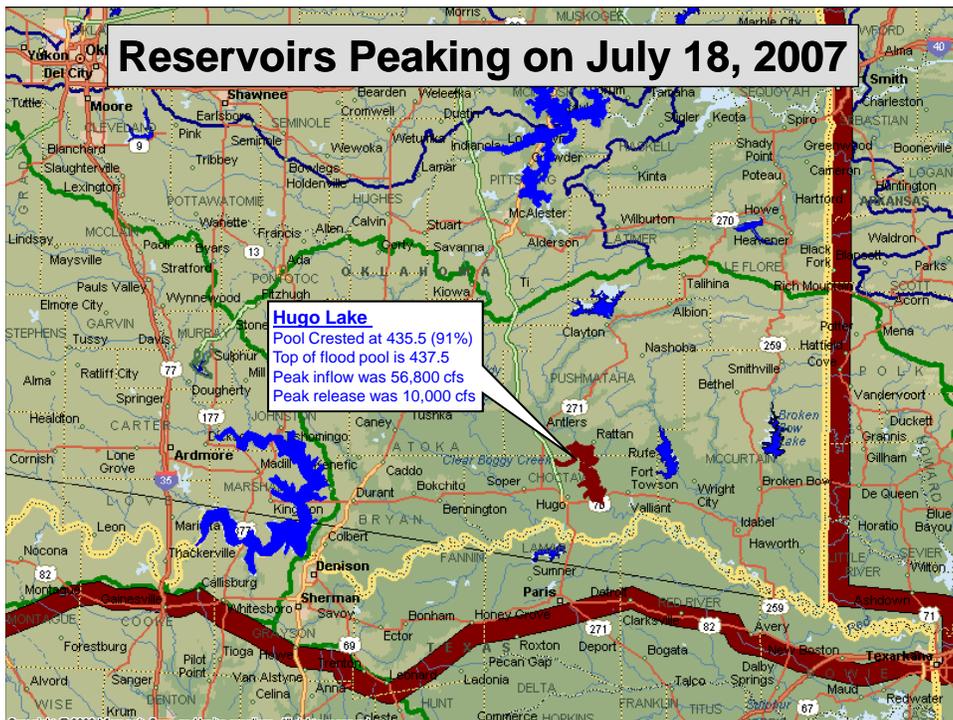


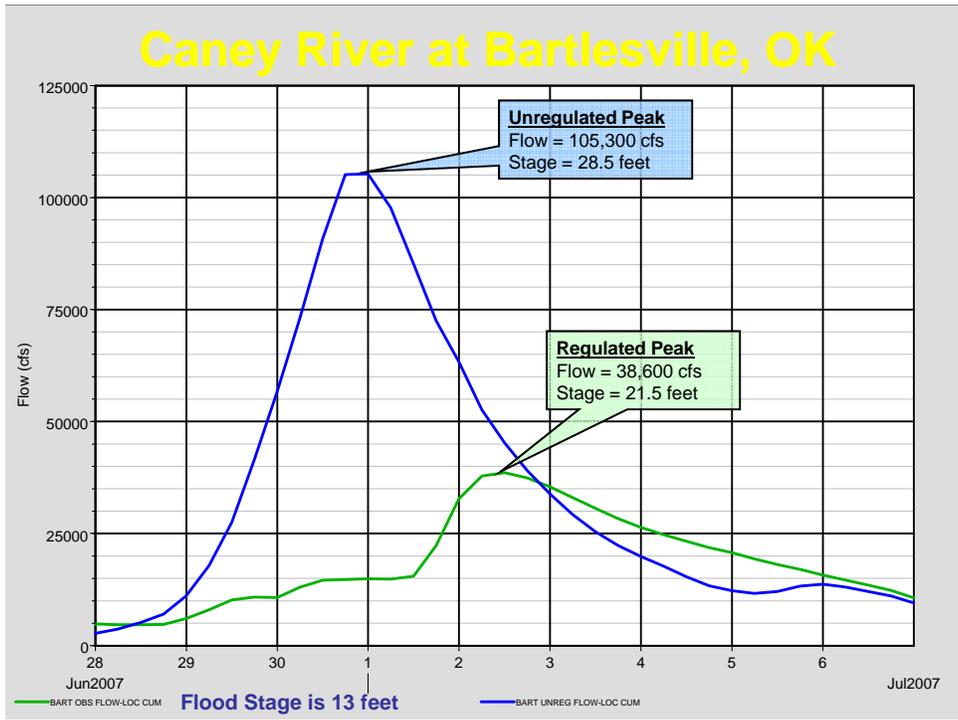


Eufaula Lake

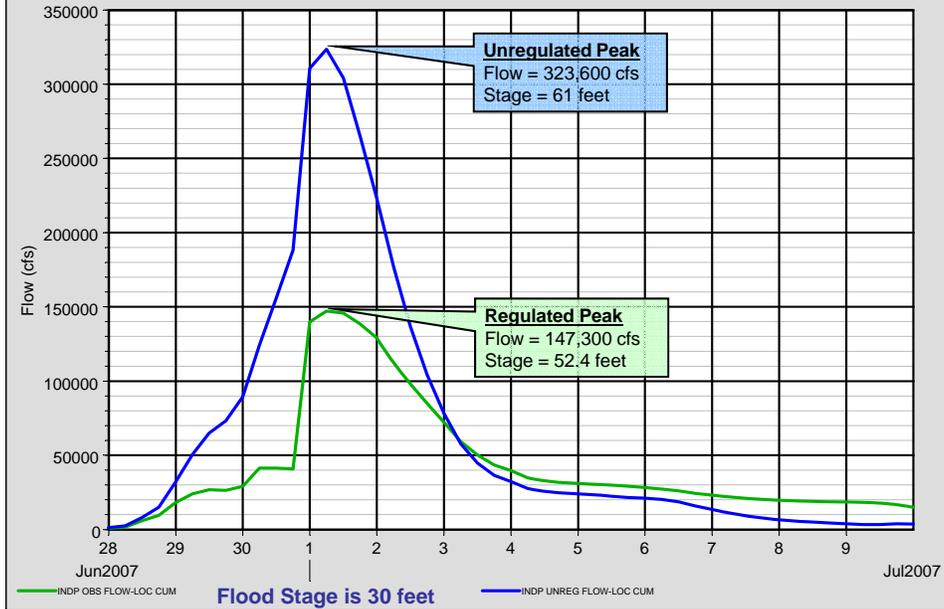


Taken July 12, 2007
Pool elevation 597.61
Release 50,300 cfs

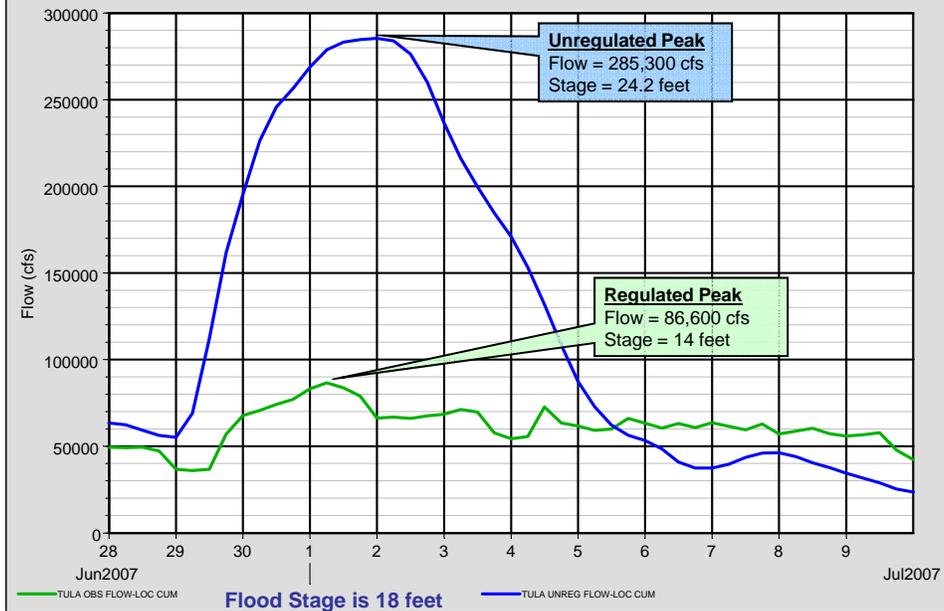




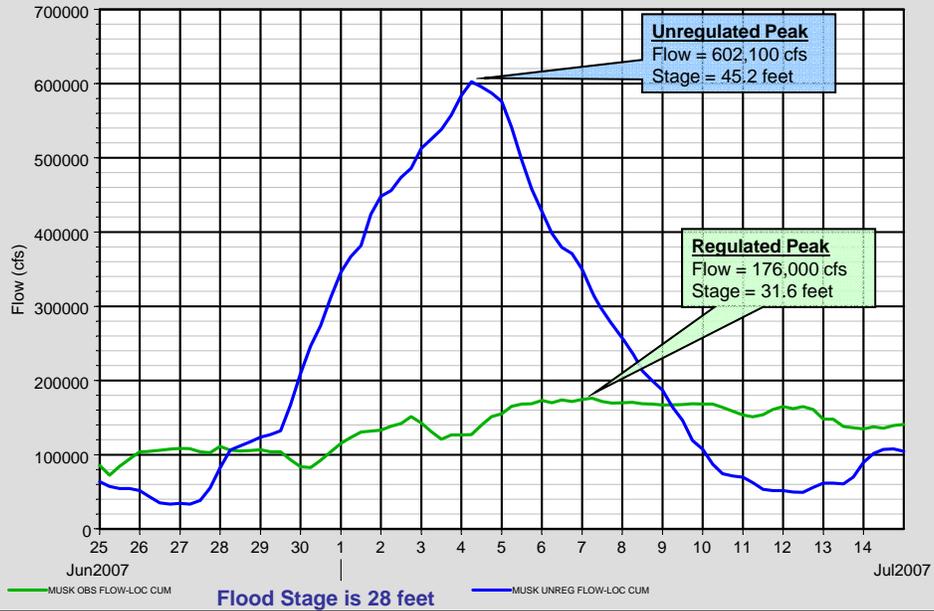
Verdigris River at Independence, KS



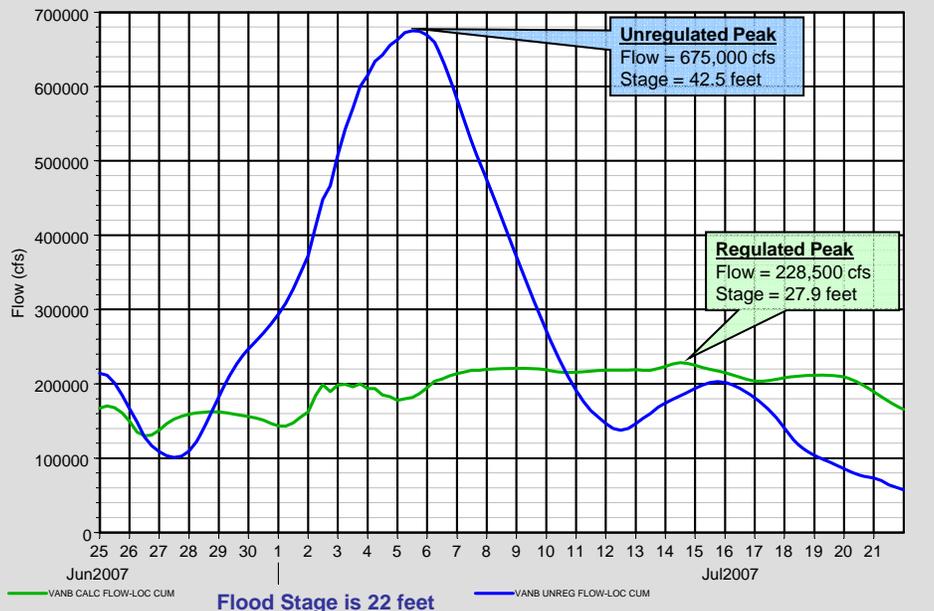
Arkansas River at Tulsa, OK



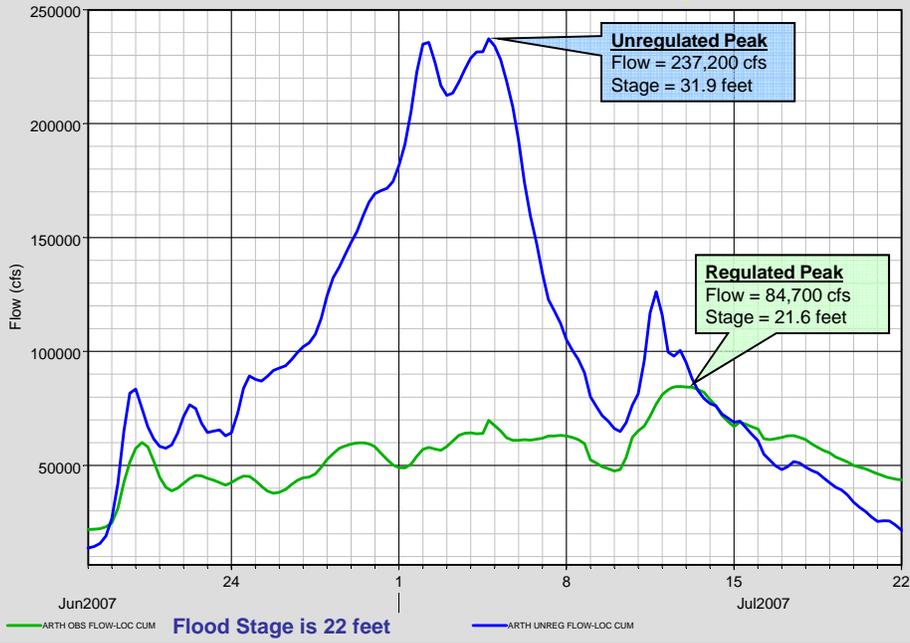
Arkansas River at Muskogee, OK



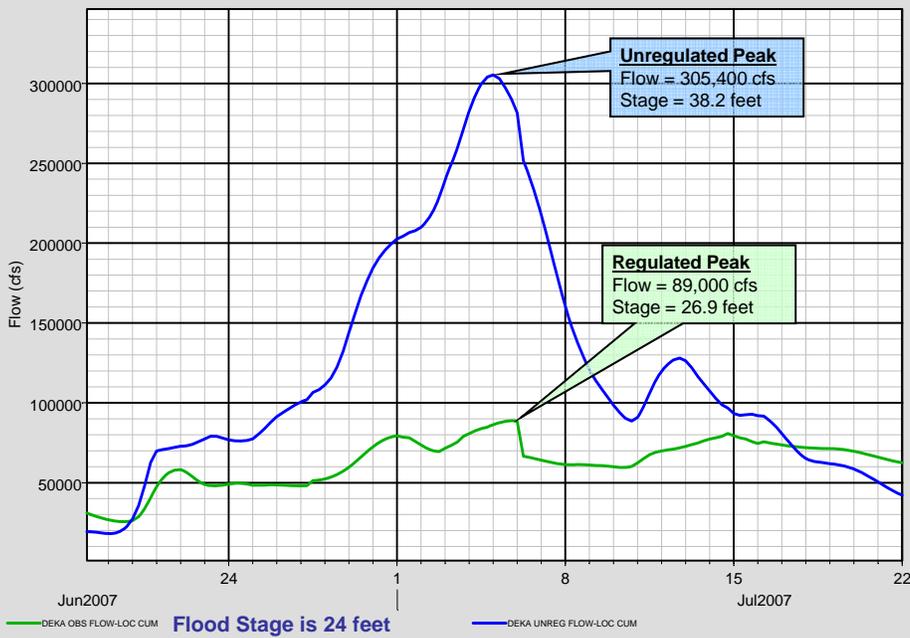
Arkansas River at Van Buren, AR



Red River at Arthur City, TX



Red River at Dekalb, TX





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Questions?

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