OSAGE RIVER BASIN OPERATIONS

WATER MANAGEMENT

An Overview of Basin Operations

Water Management Section
Hydrologic Engineering Branch
Kansas City District
Northwestern Division
US Army Corps of Engineers

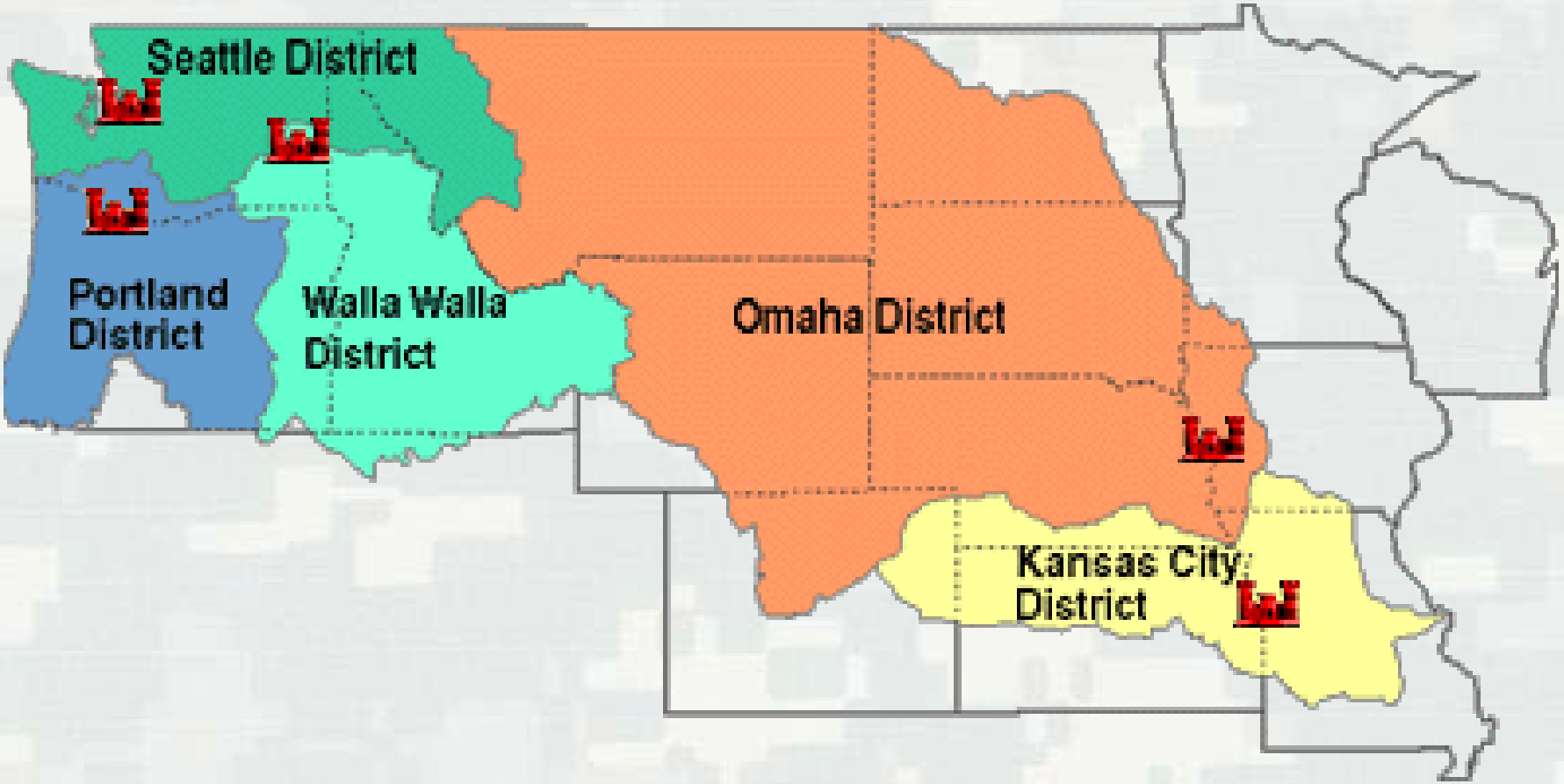
February 2013

US Army Corps of Engineers
BUILDING STRONG®

USACE Divisions

BUILDING STRONG®

Northwestern Division



Kansas City District

- Total of 18 USACE lakes
- Total of 11 Bureau of Reclamation lakes

Osage River Basin

Covers roughly 15,000 square miles over two states

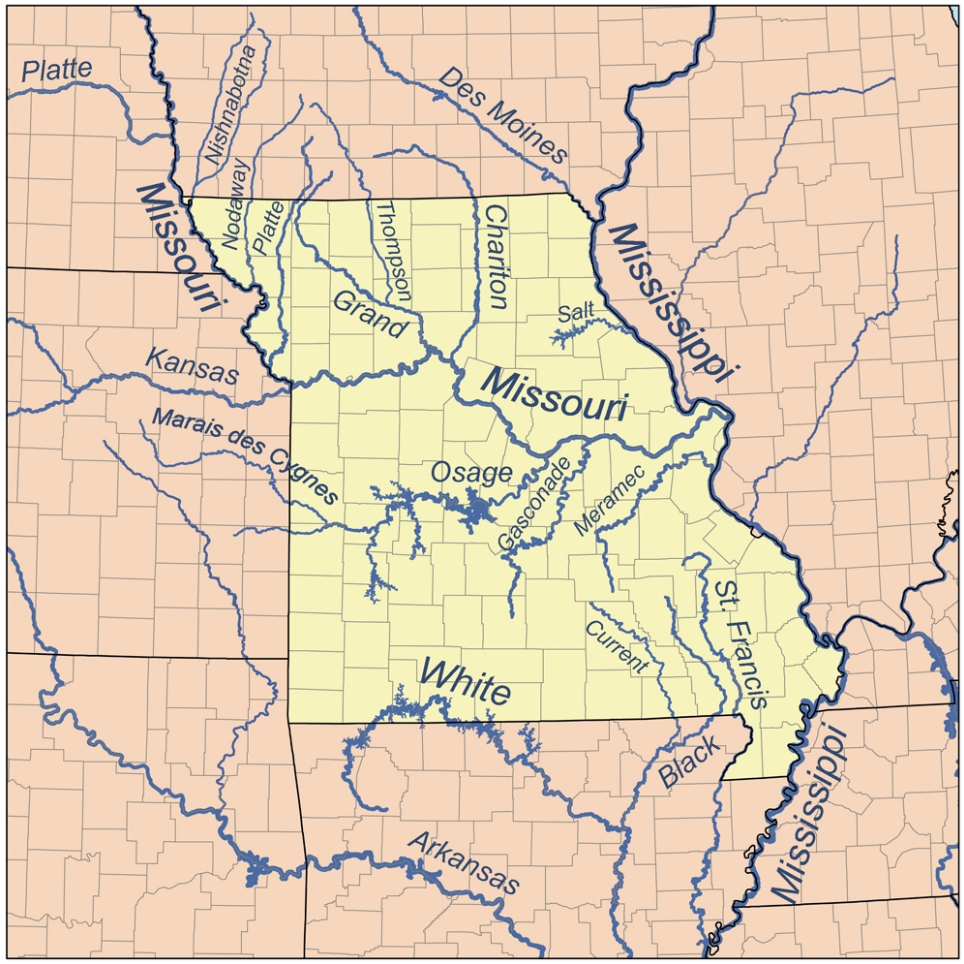
Lakes in Kansas:

- Melvern
- Pomona
- Hillsdale

Lakes in Missouri:

- Stockton
- Pomme De Terre
- Harry S. Truman
- Lake of the Ozarks, Bagnell Dam (Ameren)

Water Management



- Job is to regulate KCD lake releases
- Releases contribute to Missouri River, Mississippi River
- Operation requires extensive analysis, communication

Operating Purposes

Osage River Basin Lakes

- Flood Control
- Hydroelectric Power Production
- Water Supply
- Water Quality
- Recreation
- Fish and Wildlife

Flood Control Operations

Lake Regulation Manual

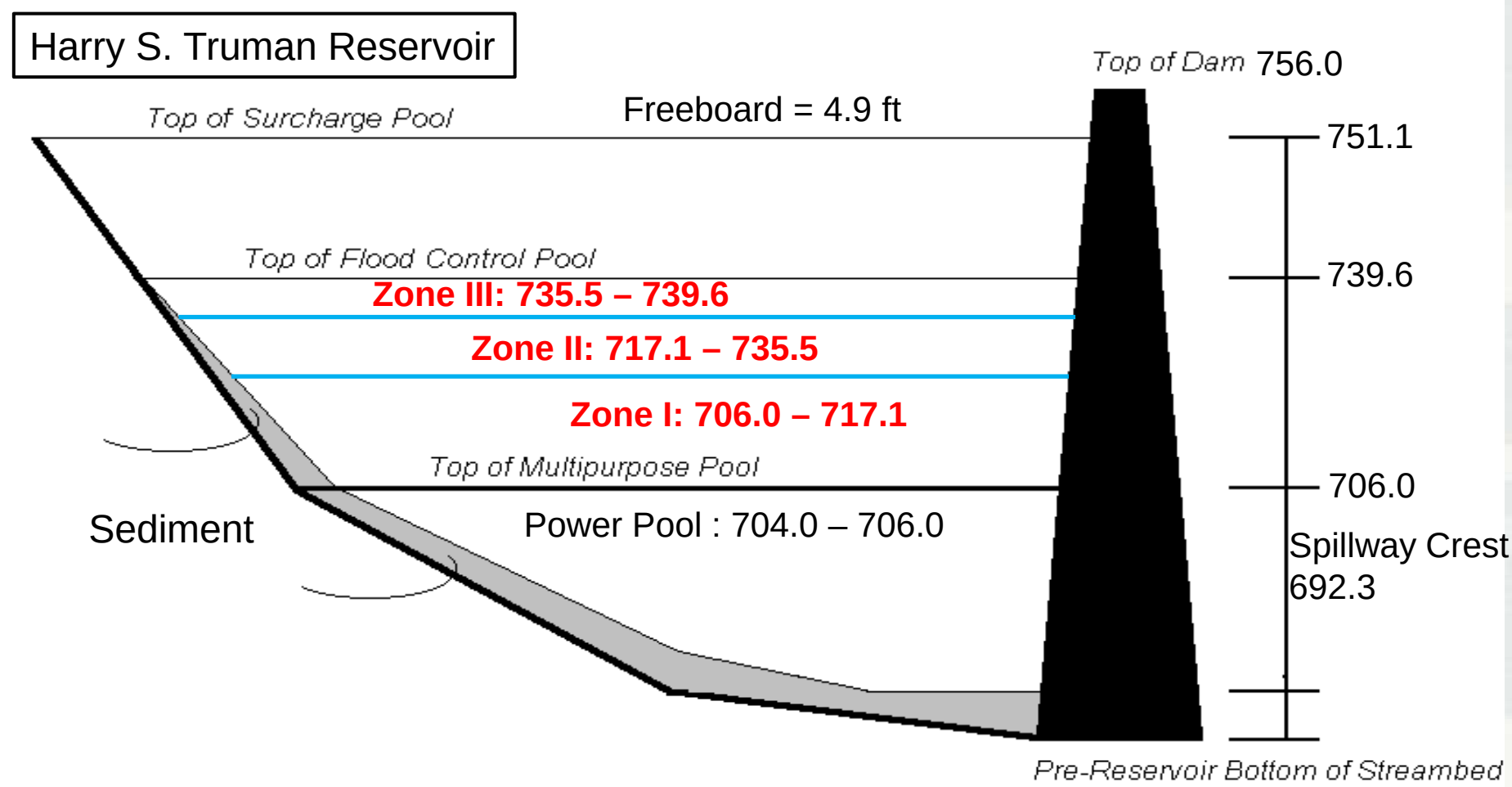
- Flood Control Zones
- Control Points
- System Balance
  - Upstream
  - Downstream

Flood Control Operations

Lake Regulation Manual

- **Flood Control Zones: Storage**
- Control Points
- System Balance
  - Upstream
  - Downstream

Flood Control Zones



Not to scale

Flood Control Operations

Lake Regulation Manual

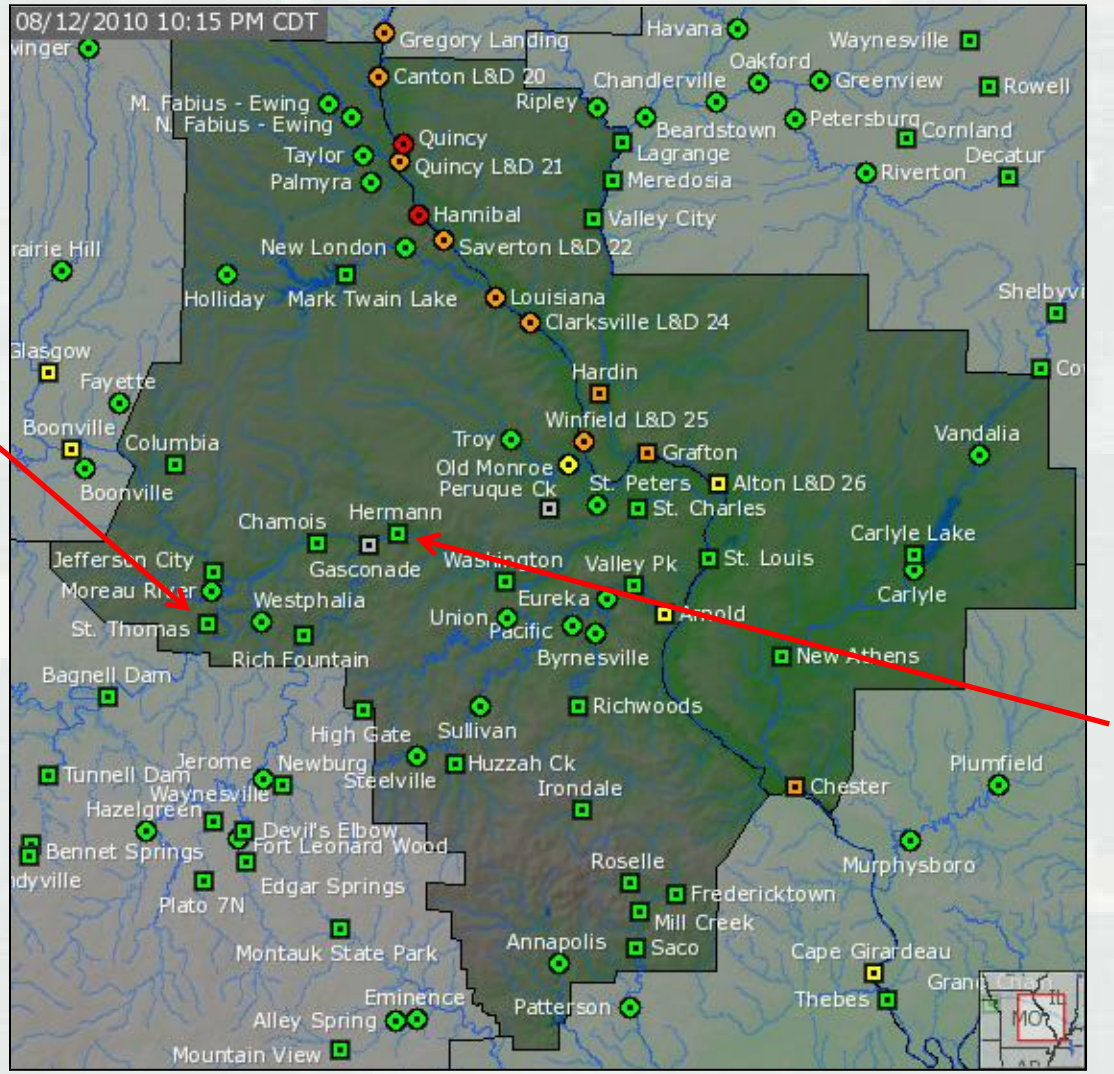
- Flood Control Zones
- **Control Points: Specific downstream locations with measured flow**
- System Balance
  - Upstream
  - Downstream

Control Points

- Osage River Basin
  - Ottawa
  - State Line/Trading Post
  - Hermitage
  - Caplinger Mills
  - St. Thomas
  - Hermann

Truman Control Points

St. Thomas on the Osage River

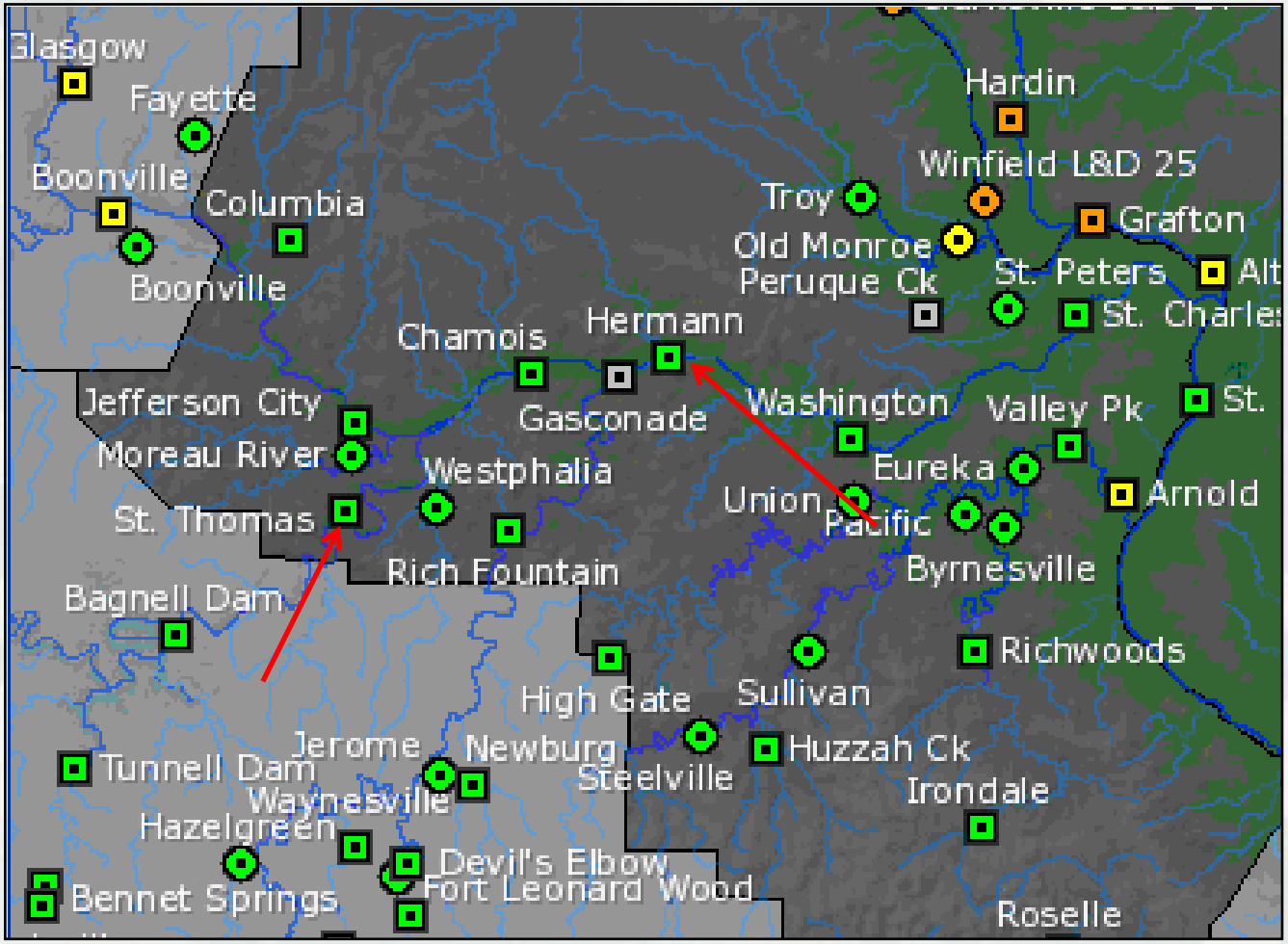


Hermann on the Missouri River

Base map from NWS A.H.P.S website: http://water.weather.gov/ahps/

BUILDING STRONG®

Truman Control Points



Maximum flows

St. Thomas:

Zone I: 34,000 cfs
Zone II: 54,000 cfs
Zone III: 80,000 cfs

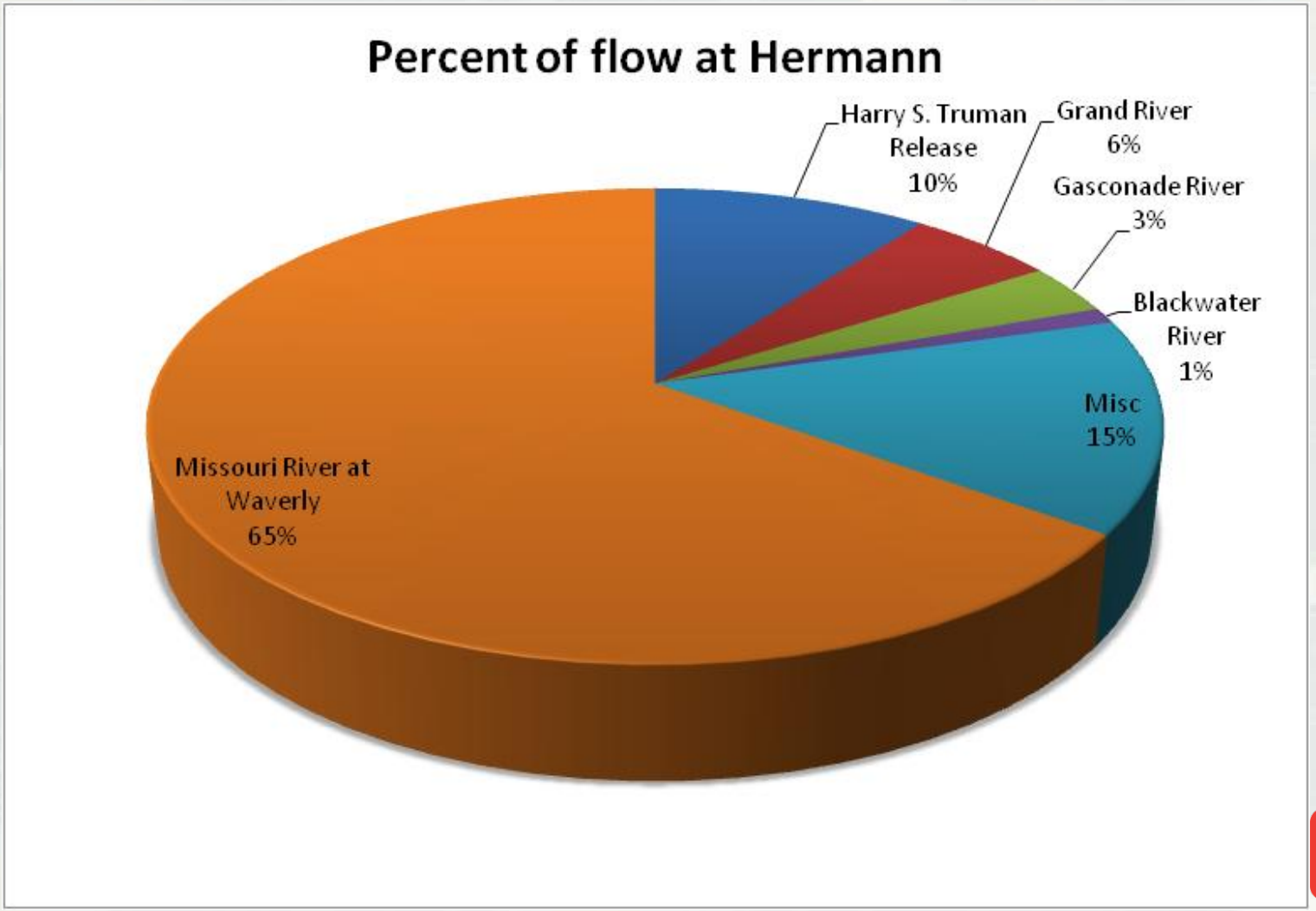
Hermann:

Rising: 260,000 cfs
Falling: 90% of crest

Base map from NWS A.H.P.S website: http://water.weather.gov/ahps/

BUILDING STRONG®

Flows Contributing to Hermann



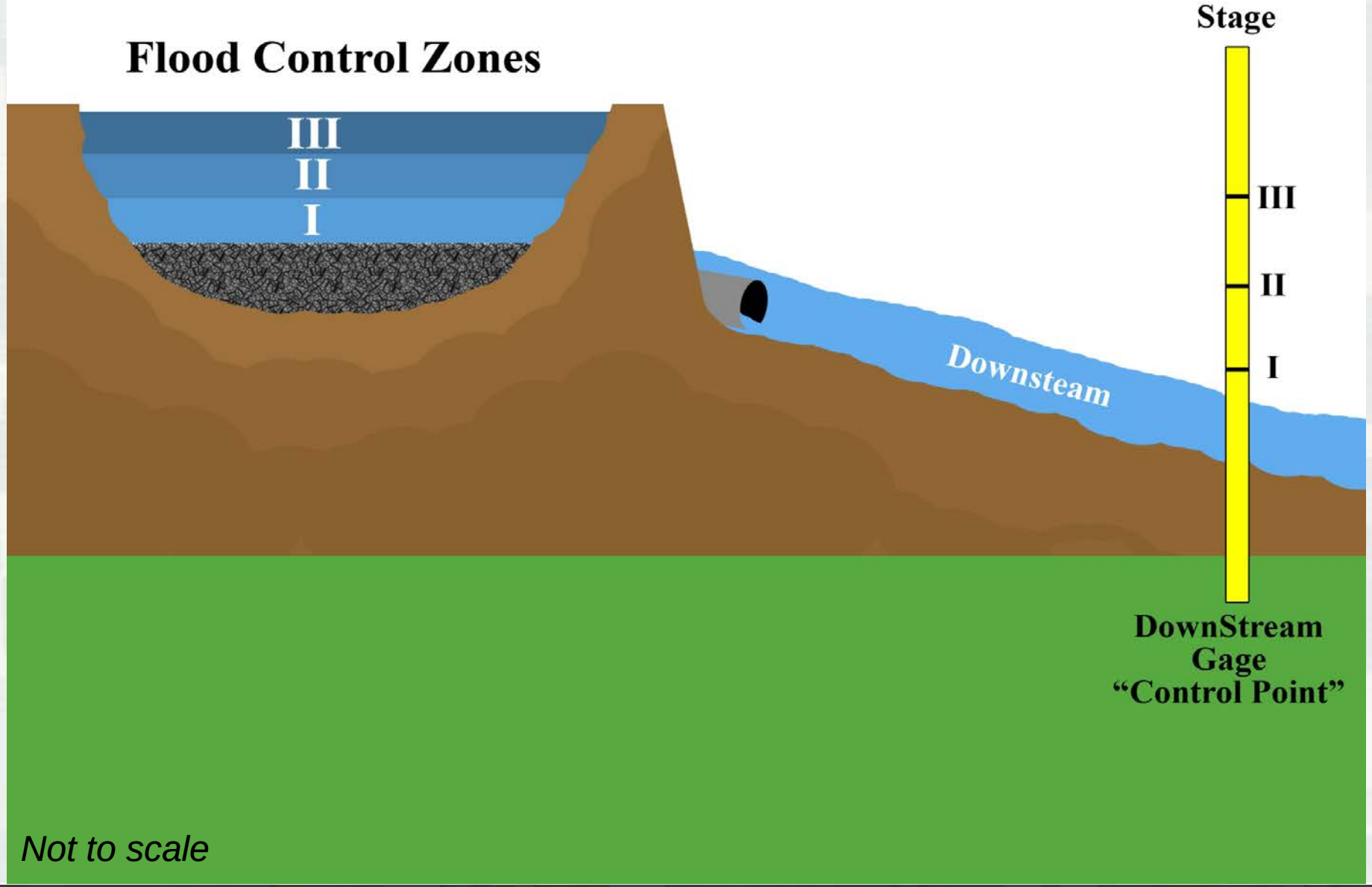
Flows from 01 Aug 1977
through 01 Feb 2011

Flood Control Operations

Lake Regulation Manual

- **Flood Control Zones**
- **Control Points**
- System Balance
  - Upstream
  - Downstream

FC Zones & Control Points



Not to scale

Flood Control Operations

Lake Regulation Manual

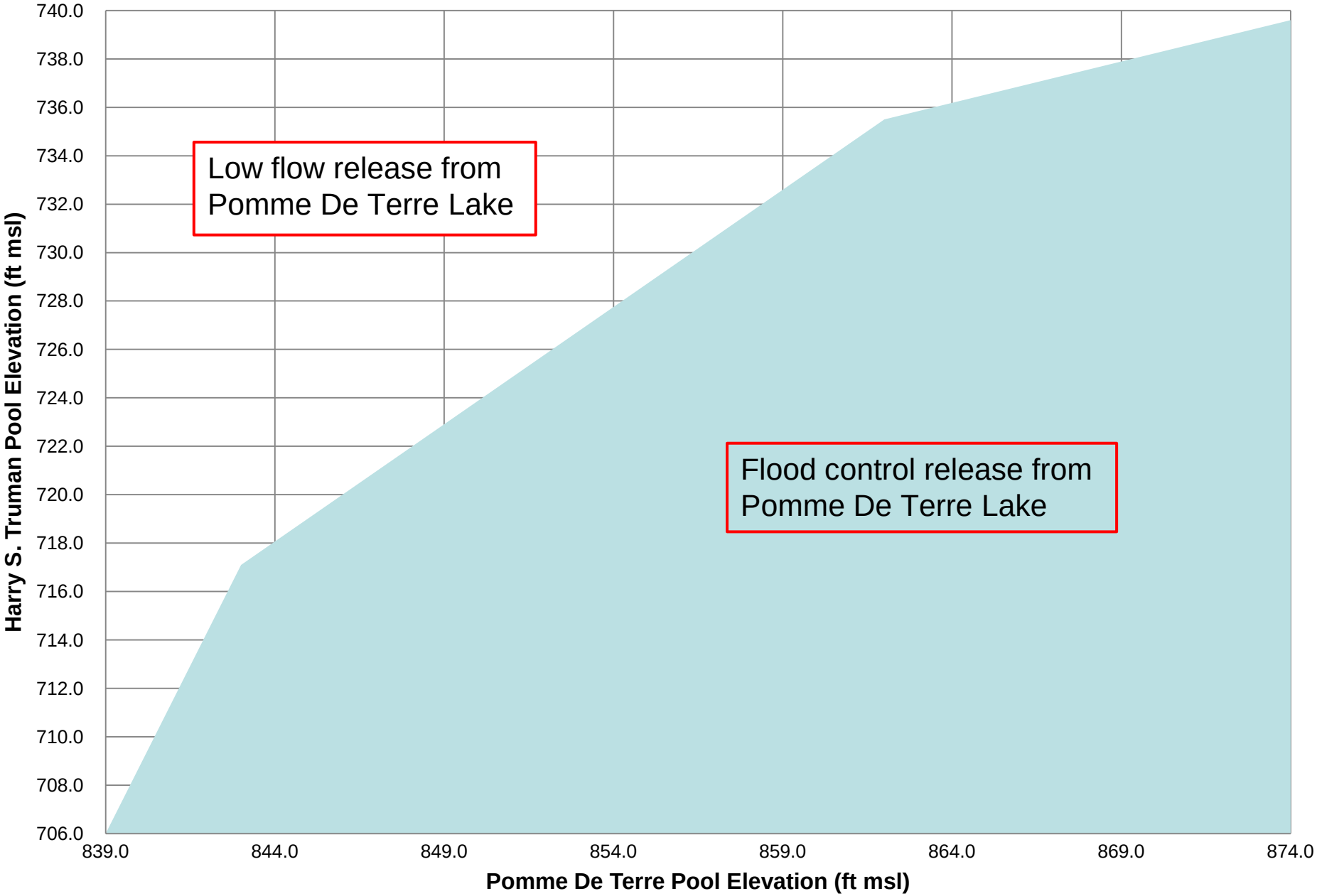
- Flood Control Zones
- Control Points
- **System Balance**
  - **Upstream**
  - **Downstream**

Tandem Balance

- Release from one reservoir becomes inflow to another
- Limits u/s* releases to keep flood control storage proportionate
- Five u/s* reservoirs operate in tandem with Truman

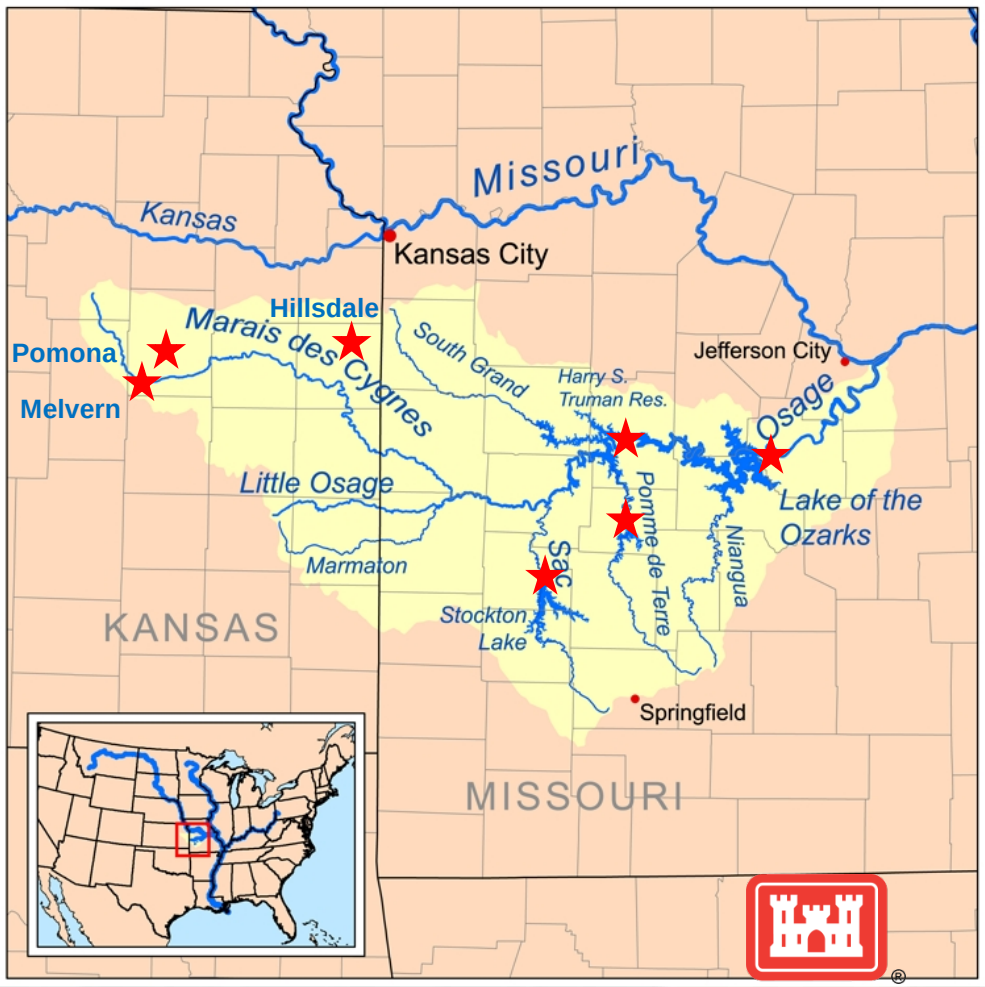
*u/s = upstream

Pomme De Terre & Harry S. Truman
Tandem Balance



Tandem Balance

- Five lakes operate in tandem with Truman
- Travel Time
- Rain
- Local Inflow
- Uncontrolled Inflow



Flood Control Operations

Lake Regulation Manual

- Flood Control Zones
- Control Points
- **System Balance**
  - **Upstream**
  - **Downstream**

Ameren

- Lake of the Ozarks, Bagnell Dam
- Hydroelectric Dam
- Daily communication
- Memorandum of Agreement (MOA)

Memorandum of Agreement

- Agreement between USACE and Ameren
  - Ameren may request low flow from Truman
  - USACE requests curtailment of Ameren's release due to downstream flooding
  - Ameren may pass local, uncontrolled inflows during flood events

Communication

- US Geological Survey
- National Weather Service
- Southwestern Power Administration
- Stakeholders

Communication

- **US Geological Survey**
- **National Weather Service**
- Southwestern Power Administration
- Stakeholders

Data Collection

- US Geological Survey
  - River and lake gages
- National Weather Service to USACE
  - Lake inflow forecast
  - River flow forecast
  - Precipitation records
  - Forecasted precipitation
- USACE to National Weather Service
  - Lake release changes
  - Lake forecasts

Communication

- US Geological Survey
- National Weather Service
- **Southwestern Power Administration**
- Stakeholders

Southwestern Power Administration

- Schedule power generation for parts of Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas from 24 USACE multipurpose dams
- Coordinate Stockton and Truman operations
- Memorandum of Understanding (MOU)

Memorandum of Understanding

- Understanding between USACE and SWPA
  - Information exchange
    - USACE: water available
    - SWPA: power needs
  - Current lake elevation
  - Daily lake inflow
  - Downstream flooding: USACE will shut down

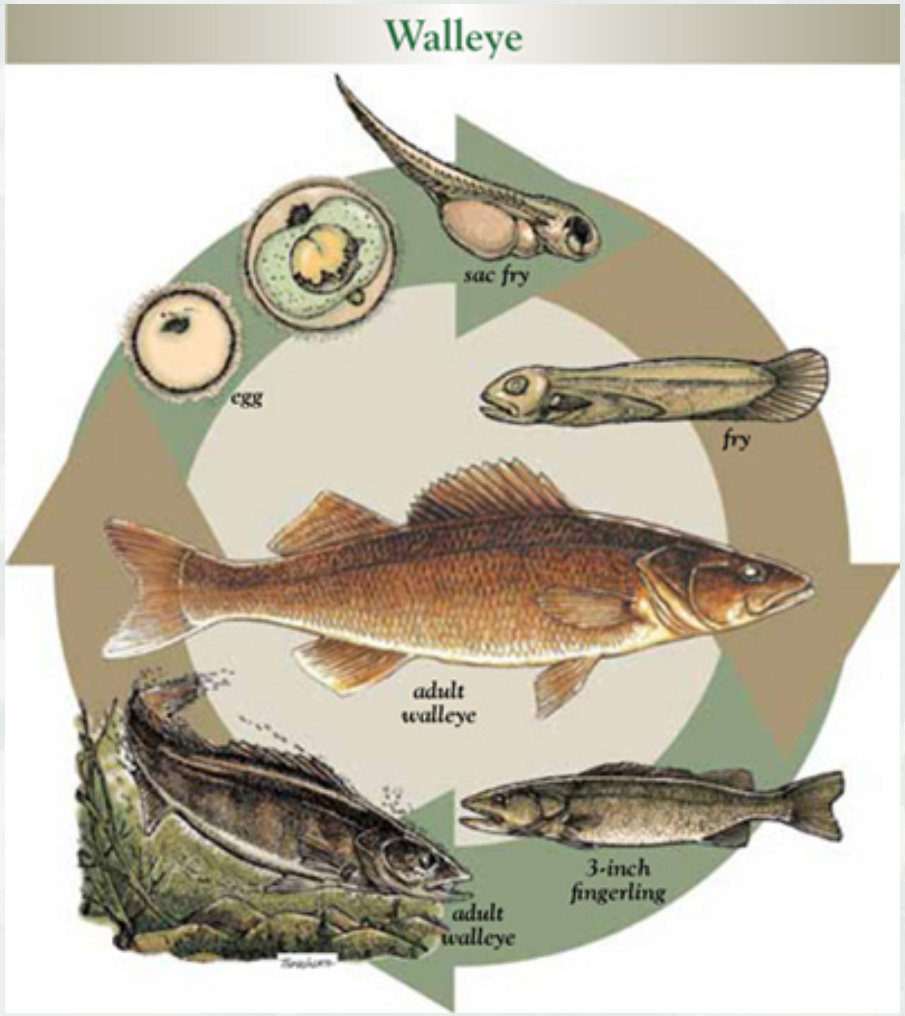
Communication

- US Geological Survey
- National Weather Service
- Southwestern Power Administration
- **Stakeholders**

Harry S. Truman Consensus Operating Plan

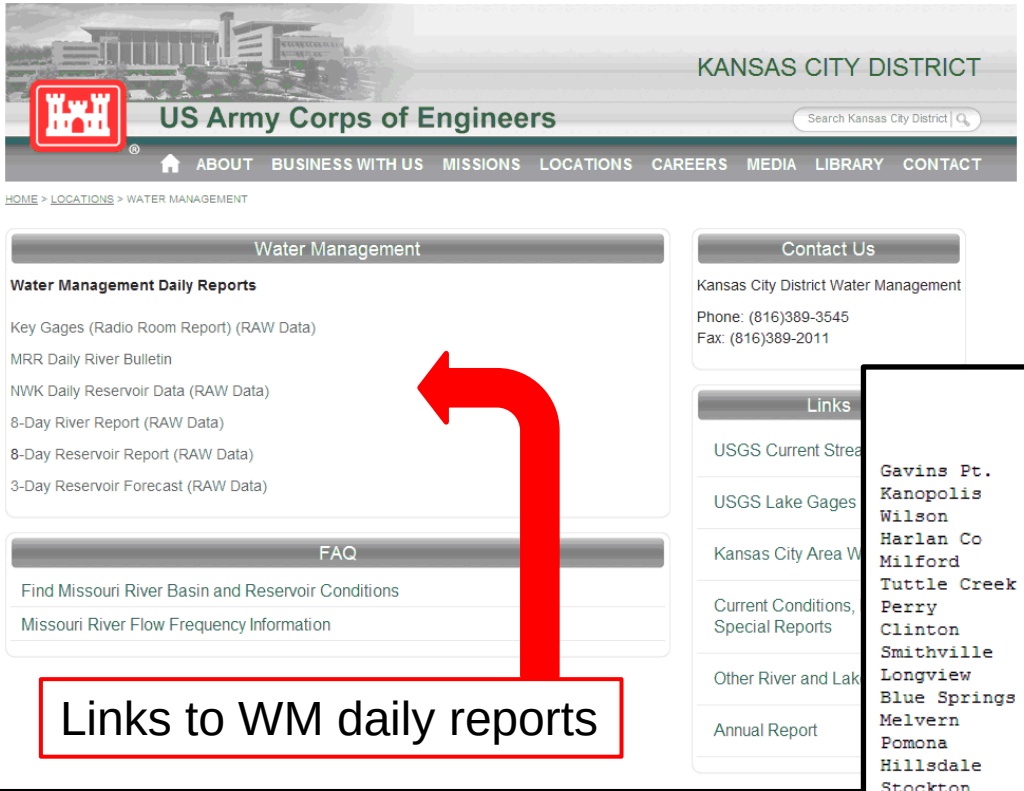
- Agreement among State of Missouri, Southwestern Power Administration, USACE
- Rules for power generation
- No impact on total volume of release
- Boating, recreation safety
- Fish spawn

Downstream Fish Spawn



- State of Missouri initiates coordination
- Usually begins in March, runs for 45 days
- Minimum flow:
  - If pool is 706.0+: Run 1 unit continuously at half load
  - If pool is below 706.0: Spill inflows
- In warm weather small spills to maintain D/S dissolved oxygen levels

Water Management Daily Reports



Water Management's Home Page

Links to WM daily reports

3-Day Reservoir Forecast Report

KANSAS CITY DISTRICT LAKE FORECAST (EC-HC)

		02-22-2013		DAY 1		DAY 2		DAY 3	
	MPP	Elev	Outfl	Elev	Outfl	Elev	Outfl	Elev	Outfl
Gavins Pt.			14000		14000		14000		14000
Kanopolis	1463.0	1457.16	10	1457.17	10	1457.17	10	1457.17	10
Wilson	1516.0	1512.38	5	1512.40	5	1512.41	5	1512.41	5
Harlan Co	1945.7	1935.49	0	1935.52	0	1935.53	0	1935.53	0
Milford	1144.4	1137.77	100	1137.78	100	1137.79	100	1137.80	100
Tuttle Creek	1075.0	1062.96	300	1062.98	300	1062.99	300	1062.99	300
Perry	891.5	885.80	25	885.83	25	885.84	25	885.84	25
Clinton	875.5	871.80	7	871.84	7	871.85	7	871.85	7
Smithville	864.2	861.75	8	861.78	8	861.79	8	861.79	8
Longview	891.0	888.97	8	889.01	8	889.03	8	889.05	8
Blue Springs	802.0	802.45	20	802.45	20	802.42	18	802.39	16
Melvern	1036.0	1031.82	20	1031.76	20	1031.66	20	1031.53	20
Pomona	974.0	969.98	15	969.99	15	969.98	15	969.96	15
Hillsdale	917.0	913.62	3	913.66	3	913.68	3	913.69	3
Stockton	867.0	860.10	40	860.17	40	860.19	40	860.19	40
Pomme D Terr	839.0	840.78	50	840.84	50	840.86	50	840.87	50
Harry Truman	706.0	707.44	2500	707.50	1000	707.52	1000	707.51	1500
Rathbun	904.0	903.11	17	903.12	17	903.12	17	903.12	17
Long Branch	791.0	790.04	7	790.03	7	790.00	7	789.95	7

The Lake of the Ozarks is owned and operated by Ameren UE of Saint Lo
For lake forecast information contact Ameren UE at (573) 365-9205.

http://www.nwk.usace.army.mil/Locations/WaterManagement.aspx

Osage River Basin

- Operating requires
  - Data collection
  - Analysis
  - Tandem balance
  - Control points
  - Communication
- Result: Balance of all operating purposes at each of the Osage River Basin reservoirs

Thank you for your interest

in the operation of the Osage River Basin.