An Overview of Basin Operations

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

February 2013
Northwestern Division

- Seattle District
- Walla Walla District
- Portland District
- Omaha District
- Kansas City District
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

Harry S. Truman Reservoir

- Top of Surcharge Pool
- Top of Flood Control Pool
- Top of Multipurpose Pool
- Power Pool: 704.0 – 706.0
- Spillway Crest: 692.3
- Not to scale

Freeboard = 4.9 ft

Zone III: 735.5 – 739.6
Zone II: 717.1 – 735.5
Zone I: 706.0 – 717.1

Top of Dam: 756.0

Pre-Reservoir Bottom of Streambed
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/
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/
Flows Contributing to Hermann

Percent of flow at Hermann

- Missouri River at Waverly: 65%
- Harry S. Truman Release: 10%
- Grand River: 6%
- Gasconade River: 3%
- Blackwater River: 1%
- Misc: 15%

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

Flood Control Zones

III
II
I

Stage
III
II
I

Downstream

DownStream
Gage
“Control Point”

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

- Low flow release from Pomme De Terre Lake
- Flood control release from Pomme De Terre Lake
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

### 3-Day Reservoir Forecast Report

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

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.