

Reservoir Roadmap Vision 2020 Committee March 8, 2010

By January 2010, the Kansas Water Authority will deliver to the Kansas Legislature a report on actions necessary to insure an adequate future water supply for areas currently or potentially served by federal, state or municipal reservoirs.

www.kwo.org/ReservoirRoadmap.htm

Volume I:

Quantification of Issue – Statewide Perspective

Volume II: Statutory and Budget Considerations

Volume III: Basin Approach to Reservoir Sustainability

Volume I: Quantification of Issue - Statewide Perspective



- Data Collection, Analysis, Storage Sharing and Gaps
- Surface Water Supply and Demand Projections
- Water Quality and Recreational Impacts
- Flood Protection Impacts
- Irrigation Impacts

We need answers to fundamental questions concerning reservoir conditions

What is the current state of our reservoirs?
How fast is siltation occurring?
Where is the sediment coming from?
What is the supply and quality of drinking water?
How much time do we have left?

What is the status of our reservoirs? Current capacity? How much capacity has been lost?

Sedimentation rates can be measured by repeated reservoir depth mapping

Council Grove

0 - 5 6 - 10

Contour Interval = 5 fee

Date of Survey: May 8, 2008

> KANSAS BIOLOGICA



Many reservoirs in the state have not been mapped for years – and most have never been mapped.

Reservoirs mapped by KBS for KWO

BANNER CREEK LAKE CEDAR VALLEY LAKE CENTRALIA LAKE CLINTON RESERVOIR COUNCIL GROVE CITY LAKE COUNCIL GROVE RESERVOIR FT. SCOTT CITY LAKE HERINGTON LAKE HILLSDALE RESERVOIR JOHN REDMOND RESERVOIR KANOPOLIS RESERVOIR LAKE SHAWNEE LOUISBURG SFL MADISON CITY LAKE MELVERN LAKE MIOLA LAKE MISSION LAKE OSAGE CITY LAKE PARSONS LAKE POMONA LAKE PONY CREEK LAKE ROCK CREEK LAKE WABAUNSEE LAKE WELLINGTON CITY LAKE WILSON RESERVOIR WINFIELD CITY LAKE WOLF CREEK LAKE

Some reservoirs that are NOT yet mapped:

ALMA CITY LAKE ANTHONY CITY LAKE ATCHISON CO. SFL AUGUSTA LAKE AUGUSTA SF LAKE BARBER CO. SFL BLUE MOUND CITY LAKE BOURBON CO. SFL BROWN CO SFL BUTLER CO. SFL CEDAR BLUFF LAKE CEDAR CREEK LAKE CENTRALIA LAKE CHANUTE SF LAKE CHASE CO. SFL CHENEY LAKE CLARK CO. SFL COWLEY CO. SFL DOUGLAS CO SEL EL DORADO LAKE ELK CITY LAKE EUREKA LAKE FALL RIVER LAKE FORD CO. LAKE GARDNER CITY LAKE GEARY CO. SFL GOODMAN SFL HARVEY CO. EAST LAKE

HARVEY CO. WEST LAKE JEWELL CO. SFL KINGMAN CO SFL **KIRWIN LAKE** LAKE AFTON LAKE CRAWFORD LAKE KAHOLA LAKE MEADE LAKE SCOTT LAKE WEATHERBY LEAVENWORTH CO. SFL LONE STAR LAKE LOVEWELL LAKE LYNDON CITY LAKE LYON CO. SFL MARAIS DES CYGNES MARION CO. LAKE MCPHERSON CO. SFL MONTGOMERY CO SEL MIAMI CO SFL MOLINE CITY LAKE #2 MALLARD LAKE CIMARRON LAKE MOUND CITY LAKE NEOSHO CO. SFL NEOSHO WA NORTON LAKE OLPE CITY LAKE OSAGE CO. SFL

OTTAWA CO. SFL PLEASANTON RESERVOIR POLK DANIELS LAKE POTTAWATOMIE CO SFL #1 POTTAWATOMIE CO SFL #2 PRATT CO. LAKE RICHMOND CITY LAKE ROOKS CO. SFL SABETHA CITY LAKE SEDAN CITY NORTH LAKE SEDAN CITY SOUTH LAKE SEVERY CITY LAKE SHAWNEE CO. SFL SHAWNEE MISSION LAKE SHERIDAN CO. SFL SOUTH OWL LAKE STROWBRIDGE RESERVOIR THAYER NEW CITY LAKE TORONTO LAKE WACONDA LAKE WASHINGTON CO SFL WEBSTER LAKE WILSON CO. SFL WOODSON CO. SFL WYANDOTTE CO. LAKE XENIA LAKE YATES CENTER RESERVOIR BONE CREEK LAKE MURRAY GILL LAKE

Answers to basic questions: Where is the sediment coming from?

Over-land erosion ?

Channel erosion ?

In fact, stream channel erosion is increasingly recognized as a significant source of reservoir sediment





Higher N¹⁵ : N¹⁴ ratios indicate channel sources and lower ratios indicate surface land sources.



Answers to basic questions: How much time do we have left?



Volume II: Statutory and Budget Considerations



Kansas Reservoir Sustainability Act

The State of Kansas will have the authority to secure, protect and restore reservoir storage needed to meet the water supply needs of the citizens of Kansas.

Volume II: Statutory and Budget Considerations



Secure



- Debt Service
- Unfunded Liability
- Purchase of Additional Storage
- Expansion of Access to Storage
- Development of New Reservoirs
- Secure Reservoir Sites for Future Development
- Minimum Pool Agreements

Current Water Supply Storage Summary (2004) 300,000 250.000 200,000 Storage (af) 150,000 100,000 50,000 **Big Hill** Clinton Council Elk City Hillsdale John Kanopolis Marion Melvern Milford Perry Pomona Tuttle Grove Redmond Creek Marketing Committed In-Service Marketing Uncommitted ■ Not In-Service □ Assurance Reserve Capacity

State of Kansas

Debt Service and Unfunded Liability

Remove requirement for a commitment by a customer to begin calling storage into service

\$623,000,000



Purchase Additional Storage

Requirement for customer before calling into service may limit our opportunities for growth

\$119,000,000



Development of New Reservoirs

Establish authority for the state to initiate the development of water supply reservoirs and other means of storage

\$1,293,000,000



Development of Small Reservoirs

Cooperate with local units of government or private entities for the development of small lakes for any purpose, whether single or multipurpose.



Built and De-authorized Federal Reservoirs



Secure Additional Storage

Authority to protect reservoir and other storage sites for future water supply development



Minimum Pool Agreements

No statutory changes, but enhanced coordination and evaluation is needed to identify reservoirs with greater recreation potential

\$5,000,000

Protect

- Best Management Practice (BMP) Implementation
- Riparian & Wetland
 Protection and
 Development
- Streambank Stabilization on a Reach/Segment Approach





Best Management Practices (BMPs)

While no statutory change is needed, the recognition of the vital role these practices play is a component of a comprehensive reservoir sustainability initiative

\$189,000,000



Riparian and Wetland Protection

Establish a dedicated conservation easement fund

\$178,000,000



Streambank Restoration

Allow for 100% state responsibility in the coordination, planning and implementation of systematic stream stabilization projects in targeted areas.

\$115,000,000

Restore

- Dredging of Municipal, State, and Federal Reservoirs
- Dam Safety and Rehabilitation





Dredging

Provide for clear and comprehensive state authority for coordination of all aspects of a systematic dredging program for the purposes of water supply storage capacity restoration

\$1,158,000,000



Dam Safety and Rehabilitation

The state should establish a cost-share program to assist eligible dam owners in paying for needed dam rehabilitation and upgrade measures

\$84,000,000

Value of Our Reservoirs

Reservoirs in Neosho Basin	Recreation	Recent Annual Flood Reduction	Cumulative Flood Reduction
John Redmond	\$2,320,000	\$18,753,400	\$362,095,670
Council Grove	\$8,000,000	\$1,105,740	\$95,044,320
Marion	\$8,050,000	\$6,769,370	\$186,860,510

Reservoir Roadmap		10 Yr Total		20 Yr Total		40 Yr Total	
Secure							
eservoir Debt Service & Storage Purchase (P & I)		17,420,743	\$	108,680,666	\$	109,149,449	
Reservoir Operation and Maintenance	\$	26,001,055	\$	78,493,994	\$	436,489,650	
Unfunded Liability	\$	-	\$	4,403,545	\$	72,867,334	
Purchase of Additional Federal Storage		13,500,000	\$	34,593,750	\$	119,051,147	
Development of New Large Reservoir	\$	-	\$	300,000,000	\$	1,293,037,500	
Development of New Small Reservoirs	\$	7,280,000	\$	25,831,808	\$	96,993,205	
Minimum Pool Agreement	\$	400,000	\$	1,800,000	\$	5,000,000	
Planning and Design	\$	2,500,000	\$	7,250,000	\$	12,250,000	
Total Secure	\$	67,101,798	\$	561,053,763	\$	2,144,838,286	
Protect							
Implementation of Best Management Practices	\$	18,866,839	\$	56,600,516	\$	188,864,333	
Riparian and Wetland Protection and Development		12,577,893	\$	33,065,954	\$	120,799,774	
Riparian and Wetland Easments		15,937,425	\$	57,274,999	\$	57,274,999	
Streambank Stabilization		31,874,849	\$	114,549,999	\$	114,549,999	
Planning and Design		35,750,000	\$	40,750,000	\$	50,750,000	
Total Protect	\$	115,007,005	\$	302,241,469	\$	532,239,106	
Restore							
Sediment Removal Small Reservoirs	\$	86,919,375	\$	162,912,684	\$	162,912,684	
Sediment Removal Large Reservoirs		180,000,000	\$	994,613,625	\$	994,613,625	
Dam Safety/ Rehabilitation		34,589,204	\$	44,022,624	\$	84,418,340	
Planning and Design		5,000,000	\$	6,250,000	\$	6,250,000	
Total Restore		306,508,579	\$	1,207,798,932	\$	1,248,194,649	
Total Reservoir 40 Year Sustainability	\$	488,617,383	\$	2,071,094,164	\$	3,925,272,040	

Volume III:

Basin Approach to Reservoir Sustainability (Neosho)

- Basin Description
- Water Supply and Demand
- Inventory of Restoration Approaches
- Water Conservation Opportunities
- Operation and Management Changes
- Mean Annual Sediment Yield
- Streambank and Riparian Restoration
- Watershed Structures
- Reservoirs Not Built
- Recommended Reservoir Sustainability Approach

Reservoir	Sediment Removal	Pool Rise	Reallocation	Structural Restoration
Marion	X	Х	Х	Х
Council Grove	X	Х	X	Х
John Redmond	X	X	X	Х
Council Grove City Lake	X			X
Parsons City Lake	X			Х
Wolf Creek Lake	Х			

Inventory of Restoration Approaches

Opportunities for Restoration were evaluated for each of the major water supply reservoirs in the basin



Inventory of Restoration Approaches

A pool rise at John Redmond reduces the percentage of time the reservoir may experience drought emergency conditions.

Volume III: Basin Approach to Reservoir Sustainability













What's Next?

- Continue/begin to implement the recommendations for the Neosho
- Schedule for next basins is based on initial supply and demand assessment, updated census information, and Kanopolis Analysis
- Recommend that the KWA conduct a similar analysis of reservoir sustainability for:
 - Verdigris basin (2010)
 - Marais des Cygnes (2011)
 - Smoky Hill-Saline (2012)
 - Walnut & Lower Arkansas (2013)
 - Kansas River (2014)

Questions

www.kwo.org/ReservoirRoadmap.htm