

M E M O R A N D U M

DATE: July 24, 2009
TO: Kansas Water Authority
FROM: Earl Lewis
SUBJECT: Reservoir Sustainability Initiative / Reservoir Roadmap

Following are the contents of Volume II of the Reservoir Roadmap. Volume II includes the statutory and budget considerations needed to address sustainable water supply. **Information in this volume is draft.** Financial needs are rough estimates, which in many cases will be further defined as the work for Volume III in the pilot basin of the Neosho is completed over the next few months. Volume II is organized into two chapters: recommended statutory changes and recommended financial resources.

Recommended Statutory Changes

This chapter contains recommended statutory changes to assure reservoir sustainability. The changes are presented as components of a comprehensive Kansas Reservoir Sustainability Act. The goal of this act would be to provide authority to the state of Kansas to secure, protect and restore reservoir storage to meet the needs of the citizens of Kansas. These components could also be considered “a la carte”, requiring changes to several existing and new statutes and regulations. While this approach could be considered, it would be labor intensive, requiring significant staff and legislative time, and may not completely address all aspects of needed change.

Recommended Financial Resources

This chapter contains a draft of estimated financial resources needed to secure storage in federal reservoirs; protect state and municipal owned storage from losses due to sedimentation and poor water quality impacts; and restore adequate storage to meet anticipated needs. Included with the narrative description of recommended financial resources is a table detailing the budget needs for the next 40 years. As shown in the table, about \$2 billion in additional revenue is needed to secure, protect, and restore Kansas reservoirs.

Based on input from the KWA and other state and federal agencies from the June 2009 KWA meeting in El Dorado, the full text of the chapters comprising Volume I: Quantification of the Issue – Statewide Perspective has been updated and reformatted. These updates, as well as draft versions of the chapters in Volume II, can be viewed on-line at www.kwo.org/ReservoirRoadmap.htm.

Volume III is currently being developed and will be presented to the KWA in November 2009. The Neosho basin has been selected as a pilot basin for Volume III. This Volume will contain a schedule for similar analyses of the remaining basins. The entire report will be presented to the Legislature during the 2010 session, after review of the final document by the KWA.

Recommended Action for the KWA

Staff recommends the Kansas Water Authority release the draft statutory changes for discussion with BAC’s and Stakeholders.

VOLUME II: RESERVOIR ROADMAP EXECUTIVE SUMMARY

Following is the second volume of the Reservoir Roadmap. Volume II includes the statutory and budget considerations needed to address sustainable water supply. Information in this volume is organized into two chapters: recommended statutory changes and recommended financial resources.

Recommended Statutory Changes. This chapter contains recommended statutory changes to provide authority to the state of Kansas to secure, protect and restore reservoir storage needed to meet the needs of the citizens of Kansas. A review of national and state water resource legislation was conducted as part of the Reservoir Sustainability Initiative. The primary recommendation resulting from this review is to establish a comprehensive Kansas Reservoir Sustainability Act. The components of that conceptual act, along with the recommended statutory changes, are included in this chapter.

Estimated Financial Resources. This chapter contains estimated financial resources needed to secure all available storage in federal reservoirs; protect state and municipal owned storage from losses due to sedimentation and poor water quality impacts; and restore adequate storage to meet anticipated needs. Key budget needs are organized in this chapter by their ability to Secure, Protect, and Restore Kansas water resources.

VOLUME II: RESERVOIR ROADMAP RECOMMENDED STATUTORY CHANGES

A review of state and national water resource policy was conducted as part of the Reservoir Sustainability Initiative. Several policies were focused on in the development of the Reservoir Roadmap. Following is a discussion of the statutory issues requiring resolution if the state of Kansas is to secure, protect, and restore the state's reservoirs to meet the needs of the citizens in the 21st century.

Addressing necessary statutory changes could be accomplished in a piecemeal fashion in which individual statutes or regulations are reviewed and modified. However, this process will be labor intensive, require significant staff and legislative time, and may not completely address all aspects of needed change. Therefore, the recommendation is to create a comprehensive Kansas Reservoir Sustainability Act (RSA) with the following goal:

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.

Many of the individual recommendations in the Protect and Restore categories were previously considered and approved in the *Enhanced Stream Corridor and Wetland Management to Address Sedimentation* policy section, the *Flood Damage Mitigation and Small Dam Safety* policy section and *Institutional Framework* management section of the *Kansas Water Plan*. Implementation of these recommendations would be included within the Kansas Reservoir Sustainability Act.

Establishment of a comprehensive Kansas Reservoir Sustainability Act (RSA) involves each of the natural resource agencies. With assistance from these agencies, the Kansas Water Authority would maintain the overall responsibility of identifying reservoir sustainability needs through the public process of the *Kansas Water Plan*. Specific projects and activities resulting from the RSA would be identified in the *Kansas Water Plan*, Water Issue Strategic Plans, the Water Marketing/Assurance Programs Capital Development and Storage Maintenance Plan and the Water Resources Capital Development Plan, as appropriate.

SECURE

Debt Service on Storage in Federal Reservoirs

Kansas has contracts with the U.S. Army Corps of Engineers (Corps) for purchase of almost a million acre-feet of storage in 13 reservoirs; just over half of that storage is currently under a repayment agreement. The state makes annual principal and interest payments on that in-service storage. In addition, operation and maintenance costs for the in-service storage are paid annually. Currently, the customers of the Water Marketing program pay those costs. The ability to cover the increasing costs for principal and interest and operation and maintenance is limited because the majority of revenue in the Water Marketing program comes from fixed rate contracts. The rate for customers of the Marketing Program that have contracts signed since 1983 changes annually but represents only 20% of the revenue stream.

Efforts to provide additional funds to service this debt and to secure additional storage have been proposed and discussions are underway to determine the best method for doing this. The potential for the federal government to relieve part of the debt is part of the discussion and the state may need statutory authority to partner with the federal government if debt relief agreements can be negotiated.

Unfunded Liability

The storage under contract, but not yet in-service and committed to a customer, represents an unfunded liability in the program. The 2008 Legislature recognized this issue, and the concern that until a repayment agreement is in place, the state does not control use of that storage for the benefit of its citizens. In response, the Legislature created the Reservoir Storage Beneficial Use Fund to be used to buy additional

storage before the state has a customer to repay the cost to purchase, operate and maintain the storage. While this is a significant step toward securing storage, the appropriation is insufficient. While no statutory change is needed, there is a significant funding impact.

In addition, state statute requires a commitment on the part of a user to bring the water into service and begin paying for it before the state enters into repayment agreements to the federal government. To secure additional storage in existing reservoirs for future use, this requirement may need to be removed. (See Volume II, Chapter 2 – Funding Needs.)

Purchase of Additional Storage in Federal Reservoirs

There are a few situations in which additional storage could be obtained in existing federal reservoirs. Melvern, Wilson and Kanopolis, while all very different situations, each present an opportunity for providing additional storage. As mentioned above, to secure additional storage in existing reservoirs for future use, the requirement for the water to be in-service may need to be removed.

Expansion of Access to Storage

Though state planning statutes recognize multiple and broad public benefits of reservoirs, the right to use water supply that is stored in Corps reservoirs is currently limited to contracts under the Water Marketing Program, membership in a water assurance district, and in a very few instances, contracts directly with the federal government. In all cases, use of the water is designated either by statute or by contract, for municipal and industrial users only. There are times when a more flexible operation of the river/reservoir system could meet additional needs; however, legal access to storage released is limited. Approaches that will work with current and local conditions to allow the use of storage to meet contemporary needs, yet respecting current commitments under contract, ownership, and appropriation rights are needed.

Development of New Large Reservoirs

From the 1940's through the 1970's the federal government developed large reservoirs in the state of Kansas, constructed primarily for flood control purposes. Other purposes such as water supply, water quality, irrigation, recreation and fish and wildlife habitat were included based on the projected need, and in some cases, local interest.

The state recognized the value of these reservoirs as a public water supply resource and purchased available storage from the federal government. Likewise a number of cities purchased storage in federal reservoirs, notably Wichita and El Dorado. The water was then made available to municipal and industrial users under the Water Marketing and Water Assurance Programs. Two-thirds of the population of Kansas is now directly or indirectly dependent on storage in these reservoirs. As population grows and existing reservoirs fill with sediments, new surface water storage facilities may need to be developed (see Volume I, *Supply and Demand Projections* chapter).

Future water supply storage may also be achieved by off stream storage in some basins. Offstream refers to a [water body](#) or system that is not located in a [streambed](#) or does not receive significant natural flows from the surrounding [watershed](#). An example is a [reservoir](#) that is not located on a streambed, and is supplied by a [pipeline](#), [aqueduct](#) or an adjacent stream. Aquifer storage and recharge using excess river flows is also considered to be offstream storage.

The federal government has no plans or authority to develop additional water supply storage in Kansas. Therefore, it is recommended under the Kansas RSA to establish authority for the state to initiate the development of water supply reservoirs and other means of storage.

Secure Reservoir Sites for Future Development

During the time that the federal government was actively developing reservoirs, the Corps and the Bureau of Reclamation (Bureau) selected the most feasible reservoir sites from a cost benefit evaluation. A number of sites were identified, analyzed and eliminated from consideration on this basis. Reservoir sites not initially developed by the Corps are in some cases in close proximity to growing urban areas, enhancing their benefit. Such sites may be threatened by development of suburban growth, potentially precluding their development to meet future water supply needs.

In order to ensure the ability to provide adequate water supply for the future, the state should have the authority to protect reservoir and other storage sites for future water supply from development or other restrictive activities. The RSA should contain authority for the state to identify sites in the best locations for future water storage. A means should be developed to ensure that planned uses of the site do not preclude its suitability for future water storage,

Development of Small Reservoirs

In some areas, additional surface water storage may be needed for water supply. In addition, the value of a lake for local recreational purposes and the associated economic value to the region are recognized. Though the state can participate in public water supply and recreation storage under existing state law, flood control storage must be included as one of the purposes. Since enactment of this statute, the need for water supply reservoirs has emerged in locations where flood control was not a primary issue. This provision has prevented state participation in development of single purpose water supply reservoirs. Under a comprehensive Kansas RSA, authority could be provided to the State of Kansas to cooperate with local units of government or private entities for the development of small lakes for any purpose, whether single or multipurpose. Requirements that flood control be included should be removed.

Minimum Pool Agreements for Recreation

A stable reservoir water pool supports recreational uses for access to boat ramps and fisheries habitat, and increases support to the local economy. The State Water Plan Storage Act recognizes the value of recreation, therefore, no state statutory changes are recommended. However, greater coordination and evaluation efforts are needed to identify reservoirs that could provide greater opportunities for recreation. For example, discussions are underway to determine if irrigation storage can be leased to provide additional recreational benefits at Webster Reservoir. Changes to federal authority for the Bureau of Reclamation may be needed so that they may more freely participate in planning and evaluation of potential minimum pool agreements.

PROTECT

Protect Kansas Reservoirs through the Implementation of Best Management Practices (BMPs)

Water resources within Kansas are vital to the state for not only supplying a growing population but for the economic welfare of the state. The state has a vested interest in protecting the storage in the federal reservoirs in which two-thirds of the population depends on for its water supply. Land surface BMPs in target areas above reservoirs can help to reduce sediment loads. These practices can take the form of terraces, waterways, residue management, grade control structures, dams and other practices that reduce or eliminate sediment and nutrient loading to the reservoirs. There are well established cost share mechanisms for these traditional conservation practices. While no statutory change is needed, the recognition of the vital role these practices play is a component of a comprehensive reservoir sustainability initiative.

Riparian and Wetland Protection and Development

The protection of riparian and wetland areas, when systematically implemented and targeted above water supply reservoirs, may significantly reduce future sediment loads, extending storage capacity. The state currently provides cost-share assistance on wetland and riparian establishment and restoration. When matched with other state and federal programs, the total cost-share allowable to a participant is not to exceed 80% of the total cost of the practice, and in some cases cost share may be 90% of the total cost. In areas above federal reservoirs, the state's interest in the conservation practice may exceed the interest of the individual landowner, who may choose not to participate in the voluntary practice if financial input on his/her part is required. In those instances, the cost for project planning and implementation should be entirely the responsibility of the state. The RSA should give authority for the state to provide 100% funding for conservation project planning and implementation, when substantial state interest is demonstrated.

Protection of high value conservation resources often involves the purchase of a conservation easement. While the state does have the authority to accept donated easements, there is not a dedicated source of funding that could be drawn from to purchase targeted high value easements. The ability should be developed in the RSA to establish a dedicated conservation easement fund.

Protect Streambanks through Stabilization Projects on a Stream Segment Approach

Increasing evidence exists that streambank erosion contributes to significant sedimentation in reservoirs. An approach that targets entire reaches for stabilization, instead of individual scattered sites, is more effective. State statute currently requires that federal funding be available before the state participates in a streambank stabilization project when a systematic approach is utilized. State statute emphasizes local responsibility for a streambank stabilization project. While coordination with local landowners and community members is essential to a successful project, requirement for local sponsorship and cost-sharing can be a significant limiting factor due to the high cost of stream stabilization projects. The recommended statutory approach is to allow for 100% state responsibility in the coordination, planning and implementation of systematic stream stabilization projects in targeted areas. In addition, the statutory requirement for federal funding should be removed.

In May 2009, the Kansas Water Office received funding through the American Reinvestment and Recovery Act to conduct a streambank stabilization and riparian restoration project on an eight-mile reach of the Neosho River above John Redmond Reservoir. Implementation of this project will serve as a pilot, illustrating the type of local coordination and funding needs required for this systematic approach.

RESTORE

Restoration of Water Supply Storage Capacity through Dredging of Municipal, State and Federal Reservoirs

In many reservoirs, especially those in which significant BMPs and streambank stabilization efforts have already been implemented in the contributing watershed, dredging may be a viable alternative for restoring water supply storage capacity. Through successful pilot projects such as at Mission Lake, the state is gaining the knowledge and expertise to facilitate similar projects at other reservoirs. Based on the experience of planning and implementing a pilot dredging project at Mission Lake, a successful dredging project requires coordination with many entities. These agencies include, but are not limited to, the State Conservation Commission, Kansas Water Office, Kansas Department of Health and Environment, Kansas Department of Wildlife and Parks, Kansas Department of Agriculture, Kansas Department of Transportation, the Corps and Bureau, local municipalities, legislators, and local citizens. Coordination among these entities is necessary to provide for complete collaboration and to expedite permitting and review processes. The RSA should 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.

Dam Safety and Rehabilitation

Nearly 6,000 small dams in Kansas are regulated by the Kansas Department of Agriculture, Division of Water Resources. Of these, 180 are classified as high hazard with an additional 247 classified as significant hazard. Most dams were constructed with a 50-year design life and the average age of these dams is 40 years. These dams have been constructed to provide flood control, public water supply, recreation and other benefits. Many were built by local watershed districts using federal or state cost-share assistance and local funds. Others have been constructed by municipalities, private organizations or individuals, and the state.

In November 2005, the Kansas Water Authority adopted a *Kansas Water Plan* policy section for small dam safety and rehabilitation. Recommendations were made for development of breach inundation maps and notification of downstream landowners. Inundation maps for new dams should be filed with the county registrar of deeds. Local downstream landowners should be notified by the registrar and information about the potential flooding if a breach occurs should be attached to the deed.

Where development downstream of an existing dam owned by a public entity such as a municipality or a watershed district results in a hazard class increase, notice should be given to property owners within the breach inundation area of the dam and the levying of a special assessment against these property owners for the purpose of making necessary modifications to the dam consistent with the design standards of the new hazard class should be authorized. The owner of a dam should not be held liable for damages caused by breach of the dam to real property developed after the landowner had been made aware of the location of possible flooding. This limitation should not affect liability for personal injury or death caused by breach of a dam.

Additional watershed and other dams require rehabilitation due to deferred maintenance, age or extreme floods or other natural phenomena. The cost for rehabilitation of existing dams is substantial. A cost benefit analysis for rehabilitation of these dams should be performed to determine if decommissioning of the dam is more cost effective than repair. When dam repair is the better option, and the dam owner can effectively demonstrate that the needed repairs are not due to negligence, state cost share could be provided to ensure the safety of the dam.

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

CONCLUSION

The Kansas Reservoir Sustainability Act would provide a comprehensive approach to secure, protect, and restore the state's water resources to meet the needs of the citizens. Equally important to the recommended statutory changes is funding. A discussion of the recommended financial resources to meet anticipated needs is provided in the following chapter.

VOLUME II: RESERVOIR ROADMAP FINANCIAL RESOURCES

This chapter presents estimated financial resources, based on current planning and subject to change, needed to secure all available storage in existing federal reservoirs; protect state and municipal owned storage from losses due to sedimentation and poor water quality impacts; protect future reservoir sites that may need to be developed; and restore adequate storage in existing reservoirs to meet anticipated needs. Included with the narrative description of recommended financial resources is a table detailing the budget needs for the next 10, 20 and 40 years. As shown in Table 1, about \$1.9 billion in additional revenue is needed in the next 40 years to secure, protect and restore Kansas reservoirs.

Needs for and options to secure additional storage will vary by basin. Discussion of options presented in this chapter are intended to cover the array of solutions that are available and may be utilized. Volume III, Neosho Basin, represents a detailed plan based on in-depth analysis and modeling to refine and specify options. Each basin will undergo similar evaluation to refine costs.

Included as a subtopic under each of the Secure, Protect and Restore categories is planning and design. As described more fully below, each reservoir sustainability activity will require some level of advanced planning and design. Many items identified in this chapter as needing enhanced funding also require statutory changes to implement. A discussion of the recommended statutory changes can be found in *Volume II: Recommended Statutory Changes*.

SECURE

Debt Service on Storage in Federal Reservoirs

The Water Marketing and Water Assurance Programs are operated to fully pay the capital costs of water supply storage that has been called into service (in service storage) and projected storage that will be called into service (future use storage) by the end of the federal contract. When storage is called into service, the state begins payment on principal and interest. The contracts give the state 50 years from when the first quantity of water is called into service to purchase all the contracted storage or renegotiate for the storage. Over the next 40 years, the state will spend \$109 million on debt service and storage purchase. Discussion about purchase of additional storage and current unfunded liability is not included in the \$109 million and is presented as a separate subtopic below. The reservoirs included in the principal and interest total are Big Hill, Clinton, Council Grove, Elk City, Hillsdale, John Redmond, Kanopolis, Marion and Melvern reservoirs.

Reservoir Operation and Maintenance

In contracts with the federal government, the state pays annual operation, maintenance and repair costs incurred by the U.S. Army Corps of Engineers (Corps) for that portion of storage space the state has called into service. Costs vary from year to year and from reservoir to reservoir. As the reservoirs age and costs grow for personnel and maintenance activities, funding needed to meet operation and maintenance responsibility also grows. Over the life of the current contracts, the cost for operation and maintenance has averaged an increase of 8% per year to meet these growing needs. The funding needs assessment assumes that this percentage increase will continue throughout the 40 year period, amounting to \$436.5 million included in Table 1.

As additional storage is called into service, purchased from the federal government, or a large reservoir is built and owned by the state, additional operation and maintenance charges will be incurred. These are difficult to estimate, but are assumed to be generally within the totals provided in Table 1.

Unfunded Liability

Under agreements with the federal government, the state made a policy decision in 1986 to defer payments on storage not called into service (future use storage); this includes Big Hill, Clinton, Hillsdale, Milford and Perry reservoirs. As a result, the state does not pay the Corps for principal and interest on the capital cost or operation and maintenance for storage not committed to a user of the Water Marketing or Water Assurance programs, which represents an unfunded liability in the future. Future use storage accrues interest against the capital cost until such time as it is called into service or at the end of the contract term.

It is anticipated that the Water Marketing Program will fully utilize the future use storage in Clinton and Hillsdale reservoirs. The cost is included in the Water Marketing Program Capital Development and Storage Maintenance Plan adopted by the Kansas Water Authority. The principal and interest portion of these reservoirs is included above in the debt service financial needs.

The unfunded liabilities payments for future use storage are not decided on Big Hill, Milford and Perry. This debt can be paid by calling water into service and paying both capital and operation and maintenance expenses; waiting until the end of the contract period and paying a balloon payment; or setting money aside in an interest bearing escrow account to pay for storage when needed or at the end of the contract period. The financial needs shown in Table 1 represent the entire unfunded liability amounting to \$4,403,545 over the next 20 years and \$72,867,334 over the next 40 years

Purchase of Additional Storage in Federal Reservoirs

In addition to the storage already under contract with the federal government, additional storage may be available in some existing reservoirs. Additional water supply storage could be made available in Melvern Reservoir, but it is expected that a legislative change at the federal level would be needed for this to occur; therefore, no funding is identified for purchase of storage in Melvern Reservoir in Table I.

An ongoing reallocation study is evaluating the potential for water supply storage to be added in Wilson Reservoir. Table 1 assumes that a portion of the reservoir will be available for an estimated cost of \$5 million. Likewise, the evaluation of Kanopolis/Smoky Hill River system indicates a need for additional water supply storage in Kanopolis Reservoir to meet all of the proposed demands. The 2002 Corps Reallocation report for Kanopolis indicated that an additional 7,500 acre feet of storage could be available by permanently raising the level of the reservoir by two feet. Current cost of this pool rise is estimated to be \$5 million. The total of these costs is \$10 million as included in Table I.

Development of New Large Reservoirs

Two-thirds of the population in Kansas is directly or indirectly dependent on storage in the state's largest reservoirs. As population grows and existing reservoirs become filled with sediments resulting in decreased storage capacity, more water supply storage may need to be developed where dredging or other alternatives are not feasible to meet the needs. (*See Volume I, Supply and Demand chapter.*)

Funding needs for the development of one new large reservoir in Kansas are projected to be as much as \$400 million per reservoir in the next 40 years. This cost estimate is based on information in a recent Corps study requested by the Kansas Water Office (KWO), as part of the John Redmond Feasibility study. In this study the Corps identified construction of a new reservoir at a previously federally authorized site as an alternative to dredging John Redmond Reservoir. New reservoir construction and associated stream mitigation costs are shown in Table 1 at an estimated \$400 million for the next 40 years.

The location of a new reservoir is yet to be determined. Likewise, other alternatives may prove to be less costly or more environmentally feasible. However, a comprehensive funding look at water supply needs for the future must include the possibility of one or more new large reservoirs.

Development of New Small Reservoirs

Under the proposed Reservoir Sustainability Act the state could cooperate with local units of government or private entities for the development of small lakes for any purpose, whether single or multipurpose. The cost estimates assume state participation to meet future water supply needs at more localized levels.

Cost for the development of a single small reservoir, about 5,000 ac ft of water supply storage, is estimated at a current cost of \$3 million based on 80% state cost share of a multipurpose small lake. The initial supply and demand analysis in Volume I provide an indication of the extent and timing of need for additional water storage. For planning purposes, an estimate of one single or multipurpose small lake every 3 years for the next 40 years, is used for approximating funding needs. These estimates are included in Table 1.

Minimum Pool Agreement

A stable reservoir water pool supports recreational uses for access to boat ramps and fisheries habitat and also increases support to the local economy. The State Water Plan Storage Act K.S.A. 82a-907 recognizes and supports recreational value of reservoirs. In FY 2007, the state entered into a ten year agreement with the Almena Irrigation District to protect the Keith Sebelius Reservoir recreational pool level. The minimum pool agreement protected roughly eight to ten vertical feet of water from withdrawal, so that fisheries and access to the reservoir could continue to be viable and serve the lake's recreational purposes. A similar agreement has been discussed with the Webster Irrigation District. Based on the Sebelius agreement, estimates of \$1 million per site for future minimum pool level agreements over the next 20 years are included in Table I as part of the effort to protect recreation value of reservoirs.

Secure Reservoir Sites for Future Development

The population of Kansas is projected to increase by 1 million people, approaching 3.5 million people, in the next 40 years. Regional increases in population and demand for water are expected to exceed water supply availability within the next 10 years in some areas. To protect the ability of the state to provide adequate water supply for a growing population and make up for lost storage from sediment deposition, the state should examine ways to identify and protect reservoir sites from future development.

The state recognizes that reservoirs may need to be constructed to replace lost storage capacity or to meet additional needs. In some cases, state or local partners may not be ready to develop the reservoir. However, the ability to be able to protect that site from other land use changes that could preclude its use as a reservoir in the future is needed. Funding needs for protection of reservoir sites for future development is not included in Table I.

Planning and Design

To make sound choices in selection of alternatives and locations to secure additional water supply, data collection, sharing and analysis will be needed. The state will be challenged based on actual need, financial constraints and environmental impacts. Success will be based on information and analysis available to address questions and concerns.

Significant efforts in data collection and analysis are already underway and funded primarily through the State Water Plan Fund. For the funding needs assessment, it is assumed that this level of data collection will continue for the next 10 years. Analysis and design costs will increase once large or complex projects are identified. These increases are incorporated in Table 1 and a 40 year estimate at \$12.3 million has been projected.

PROTECT

Protect Kansas Reservoirs through Implementation of Best Management Practices

Land surface best management practices (BMPs) in target areas above reservoirs can help to reduce sediment loads. BMPs can take the form of terraces, waterways, residue management, grade control structures, watershed dams and other practices that reduce or eliminate sediment and nutrient loading of the reservoirs. Funding estimates are based on cost in watersheds above federal reservoirs where there is landowner interest in voluntary BMPs. Current annual expenditures on land treatment in these watersheds is approximately \$750,000; this cost is projected to be an annual cost for the first 10 years. In Table 1 the annual cost is estimated to double for the second decade with a \$2 million annual cost projected for the remainder 40 year period.

Riparian and Wetland Protection and Development

In areas above federal reservoirs, the state's interest in wetland and riparian development and protection may exceed the interest of the individual landowner, who may choose not to participate in the voluntary practice if financial input on his/her part is required. In those instances, the cost for project planning and implementation should be entirely the responsibility of the state. Currently, the funding needs assessment estimates 10 riparian and wetland protection sites be developed per year for the next 20 years, at a rate of \$50,000 per site.

Protection of high value conservation resources often involves the purchase of a conservation easement. For planning purposes an annual need of \$300,000 in a dedicated easement funding source is estimated for the first year. It is projected that the easement needs will increase significantly by 10% per year for the next 20 years. Both easements funding needs and the riparian and wetland protection site development funding needs are included in Table 1.

Protect Streambanks through Stabilization Projects on a Stream Segment Approach

Numerous streambank stabilization projects have been implemented in recent years with state and federal assistance to address stream bank and channel erosion concerns. For maximum effectiveness it is recommended that the state coordinate, plan and implement systematic stream stabilization projects in targeted areas. This approach is being piloted in the Neosho basin. The KWO received funding from the 2009 American Recovery and Reinvestment Act (ARRA) to stabilize a roughly eight mile reach of the Neosho River above John Redmond Reservoir. The total cost of this streambank stabilization and restoration project is \$1.3 million.

In Table I, it is assumed that the cost per stream length in the Neosho project will be similar above other federal reservoirs with water supply storage. The total stream length above the federal reservoirs was determined and multiplied by the cost per mile of the Neosho ARRA project. A total protection need of just over \$36 million was determined using this approach. This work would be carried out over the next 15 years.

Planning and Design

The majority of planning and design work for the protection portion of the Reservoir Sustainability Initiative is being managed by the local Watershed Restoration and Protection Strategy (WRAPS) stakeholder leadership teams (SLTs). These locally led groups are providing valuable insight into the local needs and opportunities to improve the watersheds above the federal reservoirs. Statewide, \$2 million per year has been spent in each of the last three years on these efforts. This is a combination of federal Environmental Protection Agency (EPA)

funds and State Water Plan Funds. These funds are leveraged with other state, federal and local programs.

Solicitation of proposals for these limited funds has shown a large unmet demand. The funding needs assessment assumes that there is a need of \$5 million per year for the next five years. The funding for planning and design would then taper off to \$500,000 over the following seven years. Funding for protection strategies would then be more focused on implementation of identified projects for the duration of the planning period.

RESTORE

Restoration of Water Supply Storage through Dredging

Dredging involves the physical removal of accumulated sediment through mechanical, hydraulic, or pneumatic means. Funding is needed to develop and implement an operational program for reservoir dredging and disposal of dredged materials.

The 2007 Legislature amended K.S.A. 82a-2101 which authorizes the state to provide funding for the Water Supply Restoration Program. This program is a voluntary, incentive-based water program designed to assist eligible sponsors to restore reservoirs where appropriate watershed restoration and protection strategies are planned or are in place. The program budget is financed from the Clean Drinking Water Fee Fund through the State Water Plan Fund.

Upon announcement of this program in 2007, letters of interest from public water suppliers which had a small reservoir for primary or secondary water supply were solicited. Letters were received for 15 reservoirs. Mission Lake in Horton, Kansas was selected as a pilot project and dredging of the lake is currently underway. The City of Horton is contributing \$4 million and the state \$2.6 million, for a total project cost of \$6.6 million. This funding will provide for the removal and disposal of one million cubic yards of sediment from Mission Lake.

For purposes of this needs assessment, it is assumed that all of the 15 reservoirs that indicated interest in the dredging program would be dredged within the next 15 to 20 years. It is also assumed that average project costs for these reservoirs would be \$6 million; half of which would be paid for by the state and half by the local sponsor. Total estimated costs for this portion of the funding assessment are \$90 million.

A report to the Kansas Legislature in 2000 found at least 35 municipal lakes were being used as either a primary or secondary water supply. As the program grows and matures additional local sponsors may become interested in restoring storage in other lakes not on the original 15-lake list.

Dredging may also prove to be a viable alternative for water supply restoration at our larger federal reservoirs. Within the John Redmond Feasibility Study with the Corps, removal of roughly 50,000 acre-feet was evaluated as an alternative to providing future water supply for the Neosho Basin. Based on an estimated \$6.60 per cubic yard of sediment removal and using John Redmond Reservoir as an example, total cost for this project would be approximately \$500 million.

Dam Safety and Rehabilitation

Nearly 6,000 small dams in Kansas are regulated by the Kansas Department of Agriculture, Division of Water Resources. Of these, 180 are classified as high hazard with an additional 247 classified as significant hazard. Most dams in Kansas have a 50 year design life; the current average age of dams in Kansas is 40 years. These dams have been constructed to provide flood control, public water supply, recreation and other benefits. Many of these dams were built by local watershed districts using federal or state cost-share assistance. Others have been constructed by municipalities, by private organizations or individuals and by the state.

In a 1999 report, the Natural Resources Conservation Service (NRCS) estimated a cost of approximately \$20 million to repair or upgrade 97 watershed dams in Kansas. The KWO has estimated that within the next 40 years, 280 dams will need to be rehabilitated at a total cost of \$50 million. These numbers are based on the assumption that an average privately owned dam costs roughly \$150,000 to rehabilitate, while an average watershed dam cost around \$250,000. This amounts to roughly 7 dam rehabilitation project every year for the next 40 years.

Planning and Design

To make sound choices in the selection of alternatives and locations to restore reservoirs, increased data collection, sharing and analysis will be needed. The state will be challenged based on actual need, financial constraints and environmental impacts. Success will depend on information and analysis available to address the questions and concerns.

Significant efforts in data collection and analysis are already underway and funded primarily through the State Water Plan Fund. For this funding needs assessment, it is assumed that this level of data collection will continue for the next 10 years. Analysis and design cost will increase once large or complex projects are identified. Funding needs for the next 40 years amount to \$6.3 million, shown in Table 1.

Table 1: Reservoir Sustainability Funding Needs

| Reservoir Roadmap | 10 Yr Total | 20 Yr Total | 40 Yr Total |
|---------------------------------------------------|-----------------------|-------------------------|-------------------------|
| Secure | | | |
| Reservoir 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 | \$ 10,000,000 | \$ 10,000,000 | \$ 10,000,000 |
| Development of New Large Reservoir | \$ - | \$ 100,000,000 | \$ 400,000,000 |
| Development of New Small Reservoirs | \$ 9,000,000 | \$ 21,000,000 | \$ 39,000,000 |
| Minimum Pool Agreement | \$ 2,000,000 | \$ 3,000,000 | \$ 3,000,000 |
| Planning and Design | \$ 2,500,000 | \$ 7,250,000 | \$ 12,250,000 |
| Total Secure | \$ 66,921,798 | \$ 332,828,205 | \$ 1,082,756,433 |
| Protect | | | |
| Implementation of Best Management Practices | \$ 7,500,000 | \$ 22,500,000 | \$ 62,500,000 |
| Riparian and Wetland Protection and Development | \$ 9,350,000 | \$ 21,700,000 | \$ 21,700,000 |
| Streambank Stabilization | \$ 23,250,000 | \$ 36,250,000 | \$ 36,250,000 |
| Planning and Design | \$ 35,750,000 | \$ 40,750,000 | \$ 50,750,000 |
| Total Protect | \$ 75,850,000 | \$ 121,200,000 | \$ 171,200,000 |
| Restore | | | |
| Sediment Removal Small Reservoirs | \$ 60,000,000 | \$ 90,000,000 | \$ 90,000,000 |
| Sediment Removal Large Reservoirs | \$ 100,000,000 | \$ 500,000,000 | \$ 500,000,000 |
| Dam Safety/ Rehabilitation | \$ 27,500,000 | \$ 35,000,000 | \$ 50,000,000 |
| Planning and Design | \$ 5,000,000 | \$ 6,250,000 | \$ 6,250,000 |
| Total Restore | \$ 192,500,000 | \$ 631,250,000 | \$ 646,250,000 |
| Total Reservoir Sustainability | \$ 335,271,798 | \$ 1,085,278,205 | \$ 1,900,206,433 |