

KANSAS WATER PLAN BASIN PRIORITY ISSUES UPDATE TABLE



When you open this pdf document you can click on any Table of Contents item and it will take you to that location in the document. You can also open the list of bookmarks and use them to maneuver through the document. To do this, look on the left side of your open document and click on the bookmark icon.



If you click on the Basin Priority Issue title within the body of this document it will open the complete BPI.

Table of Contents

Cimarron Basin Priority Issues	3
Arkansas River Shiner.....	3
Bioenergy and Water.....	5
Management of the Ogallala-High Plains Aquifer.....	6
Salt Cedar and other Non-Native Phreatophyte Control.....	9
Kansas-Lower Republican Basin Priority Issues	11
Kansas River Degradation	11
Lower Republican River System Management	13
Watershed Restoration and Protection.....	15
Water Supply Management and Conservation.....	16
Lower Arkansas Basin Priority Issues	17
Bioenergy and Water.....	17
Long Term Public Water Supply.....	19
Rattlesnake Creek Subbasin.....	20
Role of Reuse in Water Conservation	21
Watershed Restoration and Protection.....	22
Marais des Cygnes Basin Priority Issues	23
Comprehensive Flood Assessment.....	23
Watershed Restoration and Protection.....	25
Water Supply Management and Conservation.....	26
Missouri Basin Priority Issues	27
Missouri River Bed Degradation Impacts	27
Increased Water Recreation Use and Access.....	29
Watershed Restoration and Protection.....	31
Neosho Basin Priority Issues	32
Management of Ozark Plateau Aquifer and Spring River.....	32
Watershed Restoration and Protection.....	34
Water Supply Management and Conservation.....	36
Smoky Hill-Saline Basin Priority Issues	38
Lower Smoky Hill River Management	38
Ogallala-High Plains Aquifer Declines.....	40
Public Water Supply	42

Solomon Basin Priority Issues	44
Minimum Water Levels in Webster Lake	44
Ogallala-High Plains Aquifer Water Level Declines.....	45
Subbasin Water Management.....	47
Upper Arkansas Basin Priority Issues	48
Bioenergy and Water.....	48
Interstate Cooperation to Address Water Quality	50
Middle Arkansas Subbasin.....	52
Management of the Ogallala-High Plains Aquifer.....	53
Salt Cedar and Other Non-Native Phreatophyte Control.....	56
Watershed Restoration and Protection.....	59
Upper Republican Basin Priority Issues	61
Ogallala-High Plains Aquifer Water Level Declines.....	61
Republican River System Management: Compact Compliance & Damages	63
Verdigris Basin Priority Issues	66
Comprehensive Flood Assessment.....	66
Instream Flows.....	68
Watershed Restoration and Protection.....	69
Water Supply Management and Conservation.....	71
Walnut Basin Priority Issues	72
Comprehensive Flood Assessment.....	72
Planning for Urbanization	74
Recreational Use of the Walnut River	76
Watershed Restoration and Protection.....	78
Water Supply Management and Conservation	81

Cimarron Basin Priority Issues

- **Arkansas River Shiner (CIM)**

- **Description**

- Evaluate if fish is extirpated from Kansas and if recovery is possible; delist critical habitat if not recoverable. If recoverable, coordinate efforts to improve Arkansas Shiner critical habitat, promote and restore ecosystems, and maintain landowner rights.

- **General Update**

- KDWP is Kansas lead agency. No new data. USFWS continues to develop action plan to evaluate species recovery. USFWS Arkansas River Shiner draft action plan for critical habitat includes control of salt cedar in the Cimarron basin.

- **Recommended Actions**

1. Determine, monitor and document the status of Arkansas River shiner populations in Kansas.
2. Pursue opportunities with the U.S. Fish and Wildlife Service to delist the Kansas Cimarron River as critical habitat for the Arkansas River Shiner.
3. Evaluate the riparian and stream conditions of the Cimarron River within the critical habitat reach, and seek opportunities to protect and restore the ecosystem health.
4. Complete a hydrologic Modflow model of the GMD No. 3 and determine the groundwater – surface water conditions along the Cimarron River within the critical habitat reach.
5. Target state and privately-funded tamarisk control projects to the Cimarron River within the critical habitat reach to improve the riparian conditions.
6. Continue facilitating discussion and cooperation between local property owners, USFWS, Kansas natural resource agencies and organizations and other interested stakeholders.

Current Status of Action

Phased Implementation.

Phased Implementation.

Phased Implementation.

GMD3 ground water model in progress. On track to be completed spring 2009.

Pilot control projects have been completed in the Cimarron River valley. Ten-Year Tamarisk Strategy for the state is in place.

Phased Implementation.

Comments

USFWS has drafted work plan, includes portions of the Cimarron basin in KS.

The Safe Harbor Policy (USFWS) encourages voluntary management for listed species to promote recovery on non-Federal lands by providing assurances to property owners that no additional management activities will be required for the species.

Modeling work continues.

See phreatophyte priority issue. USFWS work plan includes tamarisk control in Cimarron basin, KS.

KWO will continue to coordinate and facilitate.

- **Bioenergy & Water (CIM)**

- **Description**

- The growing biofuel production provides economic opportunity, but we need to coordinate energy development with water resource management. Promote less water intensive fuel sources, and target programs to mitigate impacts to environmentally sensitive areas.

- **General Update**

- Traditional grain based ethanol plant construction halted due to economy. Current operation in basin includes one existing ethanol plant (110 MGY and one biodiesel plant (1.2 MGY). There are also one ethanol (44 MGY) and one 3 MGY biodiesel plant permitted in basin. The Abengoa plant permit is pending for 16 MGY. Coordination of facility permitting includes water agencies.

- **Recommended Actions**

1. Coordinate, where applicable, the development, implementation, and public input process between the Kansas Water Plan and Kansas energy policy.
2. Maintain regulatory oversight by state and local government on the siting of ethanol and biodiesel plants, with special emphasis on educating applicants on the water supply and availability.
3. Look for water recycling opportunities within the biofuel facilities.
4. Promote research for less water dependent corn varieties and improved irrigation scheduling that maintains or increases crop yield without increasing water use, and encourage more use of grain sorghum, sweet sorghum and other lower water use crops.

Current Status of Action

Interaction with KS Dept. of Commerce energy staff continues. Two BAC water and energy forums held with coordination with energy policy staff.

KS Dept. of Commerce continues to coordinate with siting of plants and required permits.

Delayed Implementation.

Consistent with Ogallala decline issue. Activities through state extension research and through Ogallala Aquifer Initiative (USDA ARS) as opportunities arise.

Comments

KWO involved in Biofuels Working Group and the Interagency Energy Coordination Team.

Water rights must be obtained as per water appropriation act and is based on availability. In closed or restricted areas existing water rights may be obtained and use changed. Water marketing contracts may also be obtained if available.

Many facilities reuse water as reuse increases efficiency.

KSU work on drip irrigation, transpiration efficiency, limited irrigation cropping systems, deficit irrigation at 2008 OAI meeting (<http://ogallala.tamu.edu/presentations.php>)

- **Management of the Ogallala-High Plains Aquifer (CIM)**

- **Description**

- Conserve and extend the life of the Ogallala through aquifer subunit management, targeting water conservation activities and implementing strategies to improve agricultural practices with limited water resources. Ground water modeling of GMD3 is in progress.

- **General Update**

- GMD3 model complete. Three scenarios have been defined for initial runs. Economic modeling contract is in place. Sub units have been defined for modeling purposes, and QRAs. An AWEP program proposed by GMD3 could address high priority areas if approved by NRCS. CIG proposed by GMD3 to test new irrigation scheduling system based on field specific weather data. Five QRA contracts in 2010. Preliminary evaluation of recharge opportunities reviewed in May 2010; no further action anticipated for formal recharge project.

- **Recommended Actions**

1. For priority aquifer subunits, develop specific goals and management strategies to extend and conserve the life of the aquifer.
2. Develop and maintain a ground water flow model of GMD3 area for evaluating management decisions and establishing conservation goals.
3. The KWO will continue coordination among GMD3, DWR, stakeholders and other agencies.
4. Provide opportunities to permanently and temporarily reduce water use through voluntary programs (state, federal and local).
5. Develop local ownership and leadership of aquifer issues to assist in local adoption of specific conservation goals and programs.

Current Status of Action

Aquifer characterization has continued with model building complete as are initial scenario runs. Model incorporates latest information. Coring project initialed fall 2010 in Haskell Co. in proximity to index well for more aquifer characterization.

Model is complete. Initial scenarios run. Final report expected soon.

The KWO coordinates the modeling effort, and works to keep agencies and the BAC informed and coordinated on Ogallala issues.

The federal EQIP QRAs is an option for targeted areas within the basin, as recommended by the GMD3 Board and approved by the State Conservationist, NRCS. Water right conservation program in place (DWR).

When the hydrologic computer model is completed and future management scenarios run, there are plans to have a public information outreach to discuss the results and management options with stakeholders.

Comments

GMD3 has developed an allocation tool based on individual well allocations and priorities, rather than aquifer subunits, to achieve overall goals. Aquifer subunits for targeting have been approved by the board. Areas updated in KWP.

Economic modeling to build on hydrologic model, now that it is complete.

Coordination continues.

The state funded program of Water Right Transition Assistance Program requires an area be targeted and approved by the Chief Engineer; high priority areas added in 2010 do include parts of the basin. Eligibility status may change soon.

GMD3 providing local input into model scenarios and conservation programs.

○ **Recommended Actions**

6. Educate water users, decision makers and the general public on the conditions of the aquifer and methods and opportunities to reduce water use.
7. Evaluate the long-term impact of climate change on supply and demand for water resources in the basin.
8. Seek crop insurance option for limited irrigation crops from USDA Risk Management Agency.
9. Consider interstate discussions on water conservation and planning where aquifer subunits cross state boundaries and are not directly impacting an existing surface water compact.
10. Explore opportunities to augment aquifer recharge through artificial recharge during flood events and other means as feasible.
11. Support research into high value, lower water use crops that would be suitable for the region.

Current Status of Action

The annual water level measurements of the High Plains aquifer network wells are available to the public on the KGS website. The annual Kansas Water Issues Forum and 3I booth presentation also educate the public.

Implementation delayed because more understanding is needed.

Immediate implementation is needed because crop response yield curves could be used by RMA to insure a limited irrigated crop.

Delayed Implementation.

Phased or Delayed implementation.

Phased or Delayed implementation.

Comments

BAC meetings, stakeholder meetings for EQIP, GMD annual meetings.

A study on climate change and the Ogallala has been discussed at the federal level. Water Issues Forum on Climate Dec. 2009. Model included runs incorporating reduced precipitation.

2010 is target to seek pilot program permission.

Hydrologic model in SW Kansas goes into OK and CO; model results may provide a discussion basis.

A recharge feasibility study for the Arkansas River corridor completed in 2008. Further research needed.

Research into drought tolerant crops underway at various companies.

- **Salt Cedar and Other Non-Native Phreatophyte Control (CIM)**

- **Description**

- Control of high water use nonnative plants such as salt cedar and Russian olive to reduce their impact on water resources.

- **General Update**

- Initial research has failed to find long term water savings through salt cedar control. Additional research for water quantity savings was recommended for additional hydrologic conditions. USDA has announced beetle releases for control will no longer be made. Related information continues to be gathered. Some indications restoring native habitat beneficial to landowner and native species.

- **Recommended Actions**

1. Continue to work with agencies and other groups on the water issue strategic plan and 10-Year Strategic Plan to coordinate and implement the variety of programs, research and educational efforts that are occurring or recommended.
2. Promote education and seek local input through the state's BACs.
3. Continue an evaluation of the most effective and cost efficient control measures for the basin.
4. An effective control measure is identified for the basin, implement a wide scale, watershed-based control effort, with plans to replant with beneficial vegetation that helps stabilize soil and provide other benefits the invasive species had provided.
5. Research and evaluate biological control of tamarisk using leaf beetles and/or other suitable organisms, but pilot it with extreme caution to avoid unintended consequences.

Current Status of Action

- State 10-year strategy in place. Participate in Tamarisk Coalition.
- Discussion with BAC to continue.
- Pilot projects completed in basin. State 10-year strategy in place.
- Projects in 2008 (KAWS) in Meade and Clark counties. National Grassland also testing two mechanical methods in Morton County.
- Pilot projects using leaf beetles under evaluation.

Comments

- Cooperation continues.
- On-going. Joint BAC meeting with UARK, 09/30/09
- The Cimarron National Grassland and Missoula Technology & Development Center recently completed the first phase of a tamarisk removal study. The overall goal of the study was to find the best way to remove tamarisk and minimize the use of chemical herbicides to treat re-growth. The study found that even though the extracting took more time to do, the end result may be there will be less re-growth and therefore less chemical needed.
- Through a cooperative grant with the USFWS, KAWS has awarded \$45,000 to landowners for tamarisk control 2005-2008. Long-term success will help restore the productivity of the native rangeland along the Cimarron River while also improving streamflow.

○ **Recommended Actions**

6. Deliver educational materials and technical information to legislators, property owners and the public within the basin related to non-native phreatophyte research and control through KSU-Ag Extension Service.
7. Quantify the actual non-beneficial use of water by tamarisk in the basin's different ecological settings. Existing research should be used and augmented with on-the-ground measurements of changes to both stream flow and groundwater before and after tamarisk control activities. This research will help to establish the difference in water consumption in Kansas between non-native phreatophytes and typical riparian plant communities.
8. Evaluate the recovery benefits after tamarisk control to provide valuable information on the specie's true impact to water quality, wildlife habitat, water quantity, grazing land, risk reduction from flood damages and other features that impact the basin's ecology and economy.
9. Determine the potential disposal of tamarisk biomass holds for various value-added products such as ethanol, bedding, fiberboard, and fuel pellets, and identify how to harvest and remove tamarisk without damaging the riparian area.

Current Status of Action

Newsletter. National award to Kansas will provide signage along highway 50. WRAPS coordination and targeting.

KGS study to quantify water use of tamarisk. Also, "An analytic solution for groundwater uptake by phreatophytes spanning spatial scales from plant to field to regional" by David R. Steward and Trevor S. Ahring (KSU). Published Oct 2008 with open access at Springerlink.com

Phased or Delayed Implementation.

Phased or Delayed Implementation.

Comments

KGS study to quantify water use of tamarisk. Ground-water Assessment in Association with Salt-cedar Control--Report on Phase Two Activities by James J. Butler, Jr., Gerard J. Kluitenberg, and Donald O. Whittemore KGS Open File Report 2008-13. Summer 2006 stable isotopic and plant physiological measurements from Plots 1 and 3 of the Ashland Research Site by Jesse B. Nippert, Scott E. Spal and Joy K. Ward, KGS Open File Report 2008-32.

Kansas-Lower Republican Basin Priority Issues

- **Kansas River Degradation (KLR)**

- **Description**

- Bed degradation threatens water intakes, bridges and other manmade “hard points”, aquatic habitats and impacts farm land and riparian habitats.

- **General Update**

- Through a Planning Assistance to States (PAS) agreement, the Corps has completed a hydrologic and geomorphic assessment of the Kansas River. The study included qualitative descriptions based on field reconnaissance, aerial photography, and various published resources, and quantitative analyses based on changes in stage-discharge relationships and measured cross-sections. The influence of dredging on current channel changes was also analyzed. Conclusions show that there is relative stability since about 2001.

- **Recommended Actions**

1. Complete installation of cross section survey points in the non-dredged portions of the Kansas River.

Current Status of Action

Completed.

Comments

Kansas River cross section survey work was completed in February 2010.

2. Analyze historic cross section data from dredged locations to determine the potential correlation between high and low flows, reservoir operations and climatic conditions and bed degradation trends.

Completed.

Corps study completed September 2010.

3. As cross section data from non-dredged areas is available, compare this information to dredged area as in action 2.

This is a continuous phased effort.

Cross section data is being processed and housed with the Corps. Next river survey will be conducted in 2011.

4. Compile an inventory of bridges constructed prior to 1970 which may be susceptible to bed degradation.

This is a continuous phased effort.

5. Monitor progress on study of Missouri River bed degradation for implications on the Lower Kansas River.

This is a continuous phased effort.

The KWO is participating in the Missouri River Degradation Feasibility study.

6. Compare cross section analysis information with data from the ongoing study of Kansas fish communities.

This is a continuous phased effort.

7. Develop a plan to stabilize the channel of the Kansas River.

This is a continuous phased effort.

See General Update and comments in action 2. Further research, such as effect of another large flood and downstream effects of upstream bank stabilization, is needed.

8. Evaluate the state’s regulatory framework as it applies to channel degradation.

This is a continuous phased effort.

- **Lower Republican River System Management (KLR)**

- **Description**

- The lower Republican River basin, subject to water received through the interstate compact, has many competing needs for limited water supplies. A report by stakeholders and agency personnel recommends a number of possible improvements to the system to increase water security in meeting needs. A feasibility study by the BOR to further evaluate option, including expanded storage at Lovewell Reservoir, has been authorized by Congress, but has not yet been initiated.

- **General Update**

- An option for Jamestown Wildlife Mngt. Area to receive water from Kansas Bostwick Irrigation Dist. or the Courtland Canal for winter storage is being evaluated through a U.S. Corps PAS contract. The concept is for the wildlife area to get water after the irrigation season, to improve aquatic habitat in the winter, and release it back to the Republican River in the spring or summer, when it can help flows meet MDS and downstream irrigators' needs. The study is expected to be completed June 2011. The KWO, the DWR, and USDA-NRCS met in July with irrigators above White Rock Creek that rely on the natural flows of the Republican River, to explore cost share options for more efficient irrigation systems or incentive grants for dryland cropping, through EQIP.

- **Recommended Actions**

1. Encourage State agencies to use the Lower Republican Basin Stakeholder Advisory Committee report recommendations as guidance for Lower Republican River System improvements.
2. Seek federal appropriation for a feasibility study on the Lower Republican River from Harlan County Reservoir to Milford Reservoir.
3. Develop hydrologic models of the Lower Republican River basin that cover the major surface water sources and ground water interactions.
4. Evaluate potential for system improvements, particularly those that provide more storage in the basin and use multi-user management. These may include additional storage at Lovewell reservoir, new storage at a downstream site, additional seasonal storage at Jamestown Wildlife Area, potential to provide more water and/or improve efficiencies for water users above Kansas Bostwick Irrigation District, and the potential for aquifer storage and recovery along the lower Republican River.
5. Update the bathymetric survey of Lovewell Reservoir.

Current Status of Action

This is a continuous phased effort.

This is a continuous phased effort.

An option for Jamestown Wildlife Management Area to receive water from Kansas Bostwick Irrigation District or the Courtland Canal for winter storage is being evaluated through a U.S. Corps Planning Assistance to States contract.

Comments

The concept is for the wildlife area to get water after the irrigation season, to improve aquatic habitat in the winter, and release it back to the Republican River in the spring or summer, when it can help flows meet Minimum Desirable Streamflow and downstream irrigators' needs. The study is expected to be completed June 2011.

- **Watershed Restoration and Protection (KLR)**

- **Description**

- Watershed Restoration and Protection efforts are needed to address a variety of water quality and water resource concerns such as achieving TMDLs, Nutrient Reduction goals, development of Source Water Protection Plans, reduction of sedimentation in reservoirs and lakes, and protection or restoration of wetland and riparian habitats. Approved August 2006.

- **General Update**

- TMDLs are being reviewed for the basin by KDHE. The BACs were asked for input on the suggested TMDLs. Most WRAPS groups in the basin continue to work on their 9 element plans. The Tuttle Creek WRAPS plan has been approved by the EPA. It is the first plan to do so. The Mission Lake Pilot Project has been completed. Dredge America removed 1 million cubic yards of sediment from the Lake. The sediment was removed and disposed of in the Confined Disposal Facility created to house the removed sediment. Dredge America and KBS conducted bathymetric surveys to ensure that the contracted amount of sediment had been removed from the Lake. The Glacial Hills RC&D received ARRA funds for streambank stabilization on the Delaware River. Gulf South and TWI completed the geomorphological analysis of rivers in the Delaware watershed. The Glacial Hills RC&D initiated a contract for the survey, design, and construction oversight of up to 15 streambank stabilization projects on the Delaware River. KDWP added Milford Lake to the state's list of water bodies infested by Zebra Mussels. The fish hatchery below Milford Reservoir could be threatened. The fish hatchery, and all public access to the hatchery, had to be shut down and \$300,000 in prevention money had to be spent. Perry Lake is currently the only other lake in the basin to be infested. KDWP has reported that Zebra mussels have infested some of the water treatment plants of municipalities and industries the pull water from the Kansas River. Asian carp have also been increasing in numbers and causing problems for boaters this past summer.

- **Recommended Actions**

- 1. Work with stakeholder groups to incorporate TMDL implementation, nutrient and sediment reduction, and urban stormwater management goals into applicable WRAPS projects.
 - 2. Target technical and financial assistance programs for water quality protection and restoration to implement TMDLs and WRAPS action plans.

Current Status of Action

This is a continuous phased effort.

This is a continuous phased effort.

Comments

WRAPS continue working on plans and implementing BMPs. KWO will assist KDHE in reviewing plans again in 2011.

KWO continues to assist KDWP in education efforts to inform the public about Zebra mussels and other ANS.

- **Water Supply Management and Conservation (KLR)**

- **Description**

- Increasing population and development and aging reservoirs and public water supply infrastructure, requires evaluation of the river/reservoir system capacity to meet future water supply needs in the basin.

- **General Update**

- The KWO contracted with Black & Veatch (B&V) to update the Kansas River OASIS model to analyze when they need to buy the remaining storage set aside for the KRWAD in Milford and Perry (it must be purchased by 2020). The analysis by B&V is complete. There is no immediate need to make additional purchases by the KRWAD. KWO has contracted with CDM to conduct a PAS study to analyze the affects of navigation on the reservoirs in the KLR basin and their beneficial uses, including water supply. CDM has complemented preliminary work on the study and will have a draft out by the end of the year.

- **Recommended Actions**

1. Work with stakeholders to identify options for supply and demand management including: reservoir pool raise, pool reallocation, dredging, new supplies, modification of reservoir operations, operation of Water Marketing and Water Assurance programs and conservation measures.
 - a. Test various options through the Kansas River basin model.
 - b. Share information with stakeholders from the basin model including supply and demand information for specific stream segments.
 - c. Implement the most beneficial and cost effective options.
2. Encourage incorporation of water demand management into utility operating plans. Demand management should include education and interaction with the development community and existing local authorities.

Current Status of Action

This is a continuous phased efforts.

Comments

Continue to work with CDM on the PAS. Preliminary information and results were presented to the KLR BAC in September.

This is a continuous phased efforts.

Lower Arkansas Basin Priority Issues

- **Bioenergy and Water (LARK)**

- **Description**

- The growing biofuel production provides economic opportunity, but we need to coordinate energy development with water resource management. Promote less water intensive fuel sources, and target programs to mitigate impacts to environmentally sensitive areas.

- **General Update**

- No progress has been made on this issue. It will likely be discussed at a proposed joint meeting with the UARK BAC.

- **Recommended Actions**

1. Coordinate, where applicable, the development, implementation and public input process between the Kansas Water Plan and Kansas energy policy.
2. Maintain regulatory oversight by state and local government on the siting of ethanol and biodiesel plants, with special emphasis on water supply availability.
3. Look for increased water recycling opportunities within the biofuel facilities.
4. Promote research for less water-dependent corn varieties and improved irrigation scheduling that maintains or increases crop yield without increasing water use.
5. Promote research and pilot projects for viable, commercial cellulosic ethanol production and other biofuels that are less dependent on water intensive crop production.
6. Increase corn water use efficiency (amount of grain produced per inch of water) through research and extension efforts. Educational emphasis should be placed on utilization of irrigation scheduling tools such as KanSched and the Mobile Irrigation Lab (MIL).

- **Current Status of Action**

- Interaction with KS Dept. of Commerce energy staff continues. Two BAC water and energy forums held with coordination with energy policy staff.
- KS Dept of Commerce continues to coordinate with siting of plants and required permits.
- Delayed implementation.
- Consistent with Ogallala decline issue. Activities through state extension research and through Ogallala aquifer Initiative (USDA ARS) as opportunities arise.
- Delayed implementation.
- Mobil Irrigation Lab has been targeting Ogallala-High Plains to provide for efficient water application and scheduling as well as cropping decision making. KSU tools available.

- **Comments**

- KWO involved with Biofuels Working Group and the Interagency Energy Coordination Team.
- Water rights must be obtained as per water appropriation act and is based on availability. In closed or restricted areas existing water rights may be obtained and use changed. Water marketing contracts may also be obtained if available.
- Many facilities reuse water as reuse increases efficiency.
- KSU work on drip irrigation, transpiration efficiency, limited irrigation cropping systems, deficit irrigation at 2008 OAI meeting. (<http://ogallala.tamu.edu/presentations.php>)
- Research through KSU and private companies ongoing.
- KSU work on drip irrigation, transpiration efficiency, limited irrigation cropping systems, deficit irrigation at 2008 OAI meeting. (<http://ogallala.tamu.edu/presentations.php>)

○ **Recommended Actions**

7. Evaluate the biofuel facility watershed and watersheds of input crops to identify potentially environmentally sensitive areas. Target programs such as stream buffers, grass filters, BMPs, etc., to mitigate environmental impacts.

8. Provide education and/or incentives to landowners of marginal lands that have expiring Conservation Reserve Program contracts that cannot be renewed to stay in a conservation planting with special consideration to acres that could return to irrigation. If coming out of CRP, encourage landowners to explore all options for conservation.

Current Status of Action

Delayed implementation.

Phased implementation - some opportunities available.

Comments

Watershed Restoration and Protection Strategies can evaluate watersheds. NPS programs target priority areas to reduce sedimentation and address TMDLs.

GMD3 and DWR can designate high priority areas to target efforts.

- **Long Term Public Water Supply (LARK)**

- **Description**

- Projected sources of water supply are insufficient to meet projected demands in some areas of the Lower Arkansas basin. Artificially recharging and conserving the existing supplies of the Equus Beds aquifer will help meet future demands for water for Wichita and other users in the area, and prevent degradation of the water quality of the aquifer by saltwater plumes. Another component of extending the future water supplies is ensuring the sustainability of Cheney Reservoir. Ground water modeling is in progress.

- **General Update**

- The City of Wichita is re-evaluating rate structures, the 2050 Water Supply Plan and the ASR project. A committee has been formed to provide recommendations to the City. Committee recommended that ASR project Phase II be completed.

- **Recommended Actions**

1. Conduct focused supply and demand analyses for areas of rapid growth and/or areas of projected shortage within the basin.

Current Status of Action

Coordinate with Planning for Urbanization Issue.

Comments

Bureau of Reclamation Basin Study letter of interest submitted. Basin Study not implemented. Cities of Wichita and El Dorado have initiated conversations about regional water supply issues.

2. Support the Equus Beds Aquifer Storage and Recovery (ASR) Project.

Ongoing.

Phase 2 has been initiated. Financial feasibility of phases 3 and 4 are being evaluated.

3. Coordinate with and support the efforts of the Regional Economic Area Partnership (REAP), Water Resources Committee, to identify and develop long-term water supplies in south central Kansas.

Coordinate with Planning for Urbanization Issue. Water resource planner under development.

See comment in Recommendation 1. When WRP is complete, efforts will be made to encourage its use by local agencies.

4. Implement the recommended actions as proposed in the Enhanced Stream Corridor and Wetland Management to Address Reservoir Sedimentation Policy Section of the Kansas Water Plan.

Phased implementation – some opportunities available.

Policy study implementation is ongoing.

5. Support the initiatives of the Cheney watershed Citizen’s Management Committee’s master plan for watershed pollution management, including the targeted voluntary implementation of conservation practices.

Ongoing.

Recent evaluations indicate that more targeting is needed to reach pollution reduction goals. Ground based LiDAR being used to evaluate ephemeral gullies.

- **Rattlesnake Creek Subbasin (LARK)**

- **Description**

- Actions need adoption to reduce water level decline rates, achieve sustainable yield, and meet minimum desirable streamflows in the Rattlesnake Creek Sub-basin. Eighth year review indicates low participation, but higher precip conditions.

- **General Update**

- Hydrologic model under development for district. In GMD No. 5, a total of \$2.86 million will be available over a four-year period to convert to dryland the pivot corners that had been irrigated with sprinkler end guns in the Rattlesnake Creek subbasin through the AWEPP program.

- **Recommended Actions**

1. Implement the Rattlesnake Creek Subbasin Management Program Proposal and evaluate effects of voluntary implementation measures to restore streamflows and stabilize ground water declines.
2. State water resource agencies should continue to work with the Rattlesnake Creek Quivira partnership to implement the management plan.

Current Status of Action

Ongoing.

Ongoing.

Comments

Scheduled reviews of progress in meeting goals indicate that goals are not being met. However, Quivira Wildlife Refuge continues to receive full allocations of water rights.

A new groundwater model has been completed which will provide information for making management decisions, especially during times of drought.

- **Role of Reuse in Water Conservation (LARK)**

- **Description**

- Identify opportunities to better utilize reclaimed water as a valuable water resource. The potential for reuse for industrial, irrigation, municipal, domestic and public projects help meet future demand.

- **General Update**

- Due to issues discussed in the Public Water Supply issue, this issue is likely to receive increased attention in responding to the current budget and supply challenges.

- **Recommended Actions**

1. Provide public education on water reuse in irrigation, industry, municipal and domestic uses, and encourage communities to build in water reuse as part of their plans to meet future demand.
2. Where appropriate, establish the promotion and encouragement of water conservation and reuse as formal basin specific objectives for the Lower Arkansas basin.
3. Facilitate storage of seasonal reclaimed water from streamflow (including aquifer storage and recovery).
4. Facilitate interagency coordination between KDA-DWR and KDWP to ensure water reuse activities and permits remain in compliance with Kansas Water Appropriation rules and regulations and stream habitat issues are discussed. KDHE evaluate the potential impact of water reuse on downstream users and stream habitat.

Current Status of Action

Phased implementation - some opportunities available.

Ongoing.

Ongoing, needs more attention.

Ongoing, needs more attention.

Comments

Water & Energy Forum, December 2008, had session on this topic. KWO staff attended a water reuse conference this fall and information learned will be relayed to the LARK BAC.

Aquifer Storage and Recovery along Little Arkansas River major effort. Expand identification of opportunities.

Phase 2 has been initiated. Financial feasibility of phases 3 and 4 are being evaluated.

- **Watershed Restoration and Protection (LARK)**

- **Description**

- Three main issues drive development of plans: TMDLs, Source Water Protection and wetland and riparian protection, enhancement and restoration. Approved January 2007.

- **General Update**

- The Cheney watershed project continues to assess progress and success and target best management practices towards high priority areas. The City of Wichita, under a grant agreement with the KDHE, is developing a Watershed Restoration and Protection Strategy (WRAPS) program for the Lower Arkansas River watershed within the city limits. The project is titled “A Clear Tomorrow for Our River's Future”. The Little Arkansas WRAPS project continues to educate landowners and implement Best Management Practices to reduce atrazine and other pollutant loading into the Little Arkansas River.

- **Recommended Actions**

- 1. Work with stakeholder groups to incorporate TMDL implementation, nutrient and sediment reduction, and urban stormwater management goals into applicable WRAPS projects.
 - 2. Target technical and financial assistance programs for water quality protection and restoration to implement WRAPS action plans, including those high priority TMDLs and counties with high improvement potential index values for nutrient reduction.

- Current Status of Action**

- Ongoing.
 - Ongoing.

- Comments**

- The Cheney WRAPS, Little Arkansas WRAPS and River City (Wichita) WRAPS all incorporate these issues into their plans.
 - See comment in Recommendation 1.

Marais des Cygnes Basin Priority Issues

- **Comprehensive Flood Assessment (MDC)**

- **Description**

- Flooding damage in the Marais des Cygnes Basin indicates the need for a comprehensive evaluation of existing flood control infrastructure and storage to determine current status, mapping funding needs, and opportunities for flood management actions and flood damage reduction in the future. Coordination with DWR-Structures Unit has been ongoing and will need to continue.

- **General Update**

- A proposed plan to implement the Flooding BPI on a local basis was presented to the BAC in July, 2009. A No Adverse Impact (NAI) Plan could be implemented locally. DWR and KWO continue to work together to assess areas that the NAI could be implemented. DWR and KWO have put together a TAC to discuss dam regulations, hazard class changes, dam owner liability, inundation mapping, etc. The TAC has recommended to the KWA to reinstate the DWR Dam Safety Inspection Program. The group is also reviewing draft legislation proposed by SCC to create a Kansas Dam Rehabilitation Program. Flooding on HWY 400 was discussed at the KGS tour, including possible solutions to mitigate current problems and how to design better for the future. This is applicable because there is a similar situation on HWY 69 in the MdC basin.

- **Recommended Actions**

1. Assess the effectiveness of existing flood control infrastructure and develop plans to address necessary improvements.
2. Address repair of damaged flood control structures and deferred maintenance.
3. Determine the current floodplain status and promote model ordinances and BMPs to local units of government. Promote limiting development in the 100-year floodplain using FIRMs to delineate prohibited areas.
4. Engage basin WRAPS groups, watershed districts and federal agencies to integrate flood management with existing floodplain and riparian programs. Assess and inventory watersheds to identify potential locations for nonstructural flood control measures.
5. Examine basin application of nonstructural flood controls.
6. Purchase properties having repetitive flood damage and prevent redevelopment of these areas.

Current Status of Action

This is a continuous phased effort.

This is a continuous phased effort.

This is a continuous phased effort.

There have been some purchases in this basin.

Comments

This requires a significant data collection and planning effort to accomplish. DWR knows of no such comprehensive activity at this time.

DWR assessed some of the dams after the flood and sent requirement letters to owners of those dams that were thought to need attention.

DWR and KWO are working together through the TAC to develop maps and to send out information to educate the public to promote responsible downstream development.

DWR is unaware of any inventory or assessment effort.

This is a significant effort, and DWR is not aware of any systematic examination ongoing.

○ **Recommended Actions**

- 7. Develop emergency action plans for high hazard dams still needing them.

- 8. Complete breach inundation zone mapping.

- 9. Coordinate with DWR-Water Structures Program to determine if increased hydrologic and hydraulic evaluation of stream obstructions should be considered in the MdC basin in areas particularly prone to flooding. Identify and evaluate areas where flooding may be attributed to permitted stream obstructions. Consider the costs to repair flood damages against the costs to implement watershed based permitting.

- 10. Coordinate with county emergency management agencies on development of county-wide All Hazard Mitigation Plans.

Current Status of Action

Over the next 2 years DWR will require EAPs of all high hazard dams for which the owners do not have an EAP meeting current standards. Also, see item 8.

This is a continuous phased effort.

This is a continuous phased effort, but has recently come to a standstill but will most likely be resumed in the Fall.

Many of the counties in the basin are currently working on their mitigation plans.

Comments

Some dams within basin have inundation maps due to their hazard classification. SCC has funded mapping for a few watershed district dams through its inundation mapping program. The TAC is reviewing this.

DWR and KWO are working together to evaluate and implement the NAI plan. Part of this evaluation is to examine the cost of preventative measure vs. repairing flood damages.

KDEM would have a detailed report of plans.

- **Watershed Restoration and Protection (MDC)**

- **Description**

- Watershed Restoration and Protection efforts are needed to address a variety of water quality and water resource concerns such as achieving Total Maximum Daily Loads, Nutrient Reduction goals, development of Source Water Protection Plans, reduction of sedimentation in reservoirs and lakes, and protection or restoration of wetland and riparian habitats. Approved January 2008.

- **General Update**

- TMDLs are being reviewed for the basin by KDHE. The BACs were asked for input on the suggested TMDLs. Most WRAPS groups in the basin continue to work on their 9 element plans.

- **Recommended Actions**

1. Work with stakeholder groups to incorporate TMDL implementation, nutrient and sediment reduction and urban storm water management goals to applicable WRAPS projects.
2. Target technical and financial assistance programs for water quality protection and restoration to implement TMDLs and WRAPS action plans.

Current Status of Action

This is a continuous phased effort.

This is a continuous phased effort.

Comments

WRAPS continue working on plans and implementing BMPs. KWO will assist KDHE in reviewing plans again in 2011.

- **Water Supply Management & Conservation (MDC)**

- **Description**

- Evaluation of surface water supply, demand, management, and conservation, is needed to improve reservoir sustainability and provide adequate public water supply to meet long-term needs in the basin.

- **General Update**

- The yield analysis of lakes in the basin is in the process of being updated based on the KBS bathymetric survey. The KBS bathymetric survey showed more capacity in the lakes than was anticipated. The KWO is continuing to work with contract holders and applicants to form a local entity to use the supply from Hillsdale Reservoir efficiently. Interested cities and RWDs – the Hillsdale Water Users Group (HWUG) is finalizing an Interlocal agreement and has employed legal council to work out the details. They are expected to file an application for a Water Marketing Contract with the KWO for water out of Hillsdale in Spring 2011. The MDC was part of the COE PAS study to locate feasible reservoir sites for future use. The USACE PAS study was completed in September identifying possible reservoir sites.

- **Recommended Actions**

- 1. Work with stakeholders to identify options for supply and demand management including: reservoir pool raise, pool reallocation, dredging, new supplies, modification of reservoir operations, operation of Water Marketing and Water Assurance Programs and conservation measures.

Current Status of Action

This is a continuous phased effort.

Comments

- 2. Encourage incorporation of water demand management into utility operating plans. Demand management should include education and interaction with the development community and existing local authorities.

This is a continuous phased effort.

Some municipalities may already incorporate this.

- 3. Compare annual Corps visitation figures to pool conditions during primary recreation seasons. Determine when high and low pool levels create impacts on recreational use.

Coordination with the Corps will need to be made for determination.

Missouri Basin Priority Issues

- **Missouri River Bed Degradation Impacts (MO)**

- **Description**

- Lowering of the Missouri River bed in the reach bordering Kansas threatens water intakes, bridge abutments and other “hard points” as well as wildlife habitat.

- **General Update**

- Work continues on securing local funding for the study to be conducted by the Mid-America Regional Council. The agreement with the Corps is expected to be signed in August.

- **Recommended Actions**

1. Investigate the application in Kansas of infrastructure modifications from other states with similar conditions.

Current Status of Action

Delayed implementation

Comments

2. Monitor impacts to riparian habitats and species related to degradation.

Underway - Assessment of aquatic & riparian habitat along the MO River and tributaries experiencing head cut are components of the Corps Feasibility study. Task activities are planned for calendar year 2010.

See comments under item 4.

3. Conduct an inventory of bridges, pipelines and other channel infrastructure considered to be susceptible to bed degradation.

Underway - Component of Corps Feasibility study; task activities are planned to begin July 2010.

See comments under item 4. Some information has been assembled as a component of the dredging EIS (in development) and will be evaluated for data and findings.

4. Monitor and assist with the U.S. Army Corps of Engineers reconnaissance study of bed degradation on the Missouri.

Recon study is complete. The KWO is partnering with Mid America Regional Council (MARC) and stakeholders to serve as local sponsors of the COE MO River Degradation Feasibility Study. The Feasibility Study Project Management Plan has been developed. MARC and partners are working through funding details (cash and In-kind services).

Feasibility study will be conducted in three phases. The goal has been to begin work on Phase I in Feb. 2010 & end in Aug. of 2012. Phase I will include data assembly & inventory development for baseline conditions. Phase III is expected to conclude in Aug. of 2016. Note: Some delays have occurred and are expected due to the complexity of obtaining commitments and funding from more than 20 entities partnering as local stakeholders.

5. Track the cost of past and ongoing repair for retrofit of water intakes (power and water supply) required due to bed degradation.

Delayed implementation

See comments under item 4.

- **Increased Water Recreation Use and Access (MO)**

- **Description**

- Increasing access to water-based recreational resources in the Missouri basin to increase recreational activity and associated economic, educational opportunities and stewardship.

- **General Update**

- Excavation was scheduled to start on one of three chutes that will allow the Missouri River access to its flood plain. High water that topped the levee and seep water has delayed the start of work. Excavated soil will be used to build berms on which native grasses tolerant to wet soil will be planted. A dedication of Dalbey Bottoms was held in early June.

- **Recommended Actions**

1. Evaluate the placement of existing access points on the Missouri River in both Kansas and Missouri, to determine the need for additional access points in Kansas.

Current Status of Action

Delayed implementation.

Comments

The Dalbey site, acquired by the COE, is 1600 acres south of Atchison. KDWP has completed a Project Impl. Rpt which is still under review by COE. All permits have been obtained. This tract is contiguous as well as adjacent to the MO River. There will not be direct vehicle access to the river, this recovery project will create three new "chutes" along this river corridor that will be the first major project of this type on the KS side.

2. Encourage recreational use of private lands through access programs such as walk-in hunting and fishing and other programs administered by KDWP.

Ongoing.

3. Develop recreational opportunities on Missouri River Mitigation Program properties as consistent with the primary purpose of habitat restoration.

Benedictine Bottoms is open; permit system for hunters Oct.-Mar. Boat ramps are available near Elwood & Atchison.) Public comment period on the Dalbey Bend site, S of Atchison, has closed and the COE is responding to concerns regarding sediment. In addition, the COE has acquired another 120 ac NW of Troy (Burr Oak bottoms).

4. Emphasize the educational potential of existing water resources through interpretive signage and programs.

5. Investigate non-governmental support and funding to develop water-related recreation and educational opportunities in Kansas.

KDWP pursuing groups to cooperate with. All sites to date on the MO R. have been interagency/non-gov. agreements.

- **Watershed Restoration and Protection (MO)**

- **Description**

- Watershed Restoration and Protection efforts are needed to address a variety of water quality and water resource concerns such as achieving TMDLs, Nutrient Reduction goals, development of Source Water Protection Plans, reduction of sedimentation in reservoirs and lakes, and protection or restoration of wetland and riparian habitats.

- **General Update**

- The KWO is conducting an aerial map analysis of stream bank erosion areas and major gullies in the South Fork Big Nemaha Watershed. Twenty-one sites (stream bank and gullies) that merit field verification and data collection have been identified. The Missouri WRAPS, Marshall and Nemaha County Conservation Districts are helping to identify and landowners of the properties for permission to measure bank height. With that information, it will be possible to estimate the tons of soil loss. Anna Betzen with the KWO is the contact. She provided general information at the June 8 WRAPS meeting.

- **Recommended Actions**

1. Work with stakeholder groups to incorporate TMDL implementation, nutrient and sediment reduction, and urban stormwater management goals into applicable WRAPS projects.
2. Target technical and financial assistance programs for water quality protection and restoration to implement TMDLs and WRAPS action plans.

Current Status of Action

A basin wide WRAPs is in development. The mission of the MO River Basin WRAPS is to provide the framework for the implementation of water quality improvement practices through technical, informational, educational, and financial assistance. Current focus is on streambank stabilization demonstration projects.

Delayed Implementation.

Comments

RC&D is coordinating development. A Missouri River Basin Coordinator is focused on the project.

Neosho Basin Priority Issues

- **Management of Ozark Plateau aquifer and Spring River (NEO)**

- **Description**

- Increased understanding and adjustment of management of the Ozark Plateau aquifer system and the Spring River system is needed to ensure a sustainable water supply for southeast Kansas.

- **General Update**

- The Chief Engineer, DWR, presented to the BAC and members of the Ozark subcommittee the preliminary results from the modeling the DWR has conducted. The CE stated that, according to the model runs looking out 100 years, the area has enough water in the aquifer to sustain pumping, even with additional appropriations of water. New regulations will be drafted prior to December 31, 2010. PWWSD No.19 obtained funding from the USDA Rural Development to develop a water plant and intake on the Spring River. PWWSD No. 19 has signed a letter of intent and conditions with the USDA Rural Development. They will finalize plans in March 2011 and begin accepting bids in April 2011.

- **Recommended Actions**

1. Continue and complete the inter-agency strategy to address the complex water issues of multistate cooperative management, ground water declines and quality, surface water contamination, and public water supply concerns.

2. Use the USGS Regional Ozark Aquifer Study as a management decision support tool to assist DWR in determining the need for continuation or removal of the moratorium on new ground water rights in southeast Kansas, and develop appropriate management strategies.

3. Use the water quality monitoring network established by DWR as a decision support tool.

4. Continue interstate communications concerning the development of new water supplies or use of existing supplies adjoining states.

5. Support public water suppliers (PWS) efforts to work cooperatively and acquire funding for infrastructure needs for cooperative regional supply systems.

6. Coordinate with Spring River WRAPS and other groups to provide additional information to the public.

Current Status of Action

Waiting on CE's reports and draft regulations.

This is a continuous phased effort.

This is a continuous phased effort.

This is a continuous phased effort.

This is a continuous phased effort.

Comments

The regulations will determine if the moratorium term permits to be approved and allow for additional water appropriations based on the safe yield determination.

Kansas continues communication with GLWAF and monitors activities of the Tri-State group.

PWWSD 19 is working on plant design and acquiring easements to install pipes.

A member of the Spring River WRAPS is now a member of the Neosho BAC.

- **Watershed Restoration and Protection (NEO)**

- **Description**

- Watershed Restoration and Protection efforts are needed to address a variety of water quality and water resource concerns such as achieving Total Maximum Daily Loads, Nutrient Reduction goals, development of Source Water Protection Plans, reduction of sedimentation in reservoirs and lakes, and protection or restoration of wetland and riparian habitats. Implementation is a high priority because of reservoir sedimentation.

- **General Update**

- Most WRAPS groups in the basin continue to work on their 9 element plans. The Middle Neosho has a draft plan they are having KDHE and the SLT review. The Cottonwood WRAPS are looking into the sediment and flood savings that would result from the construction of watershed structures. The Grand Lakes of the Cherokee (GLWAF) continues its effort to get federal funding for the watershed. KDWP confirmed the presence of Zebra mussels John Redmond Reservoir in July 2010. To date, Coffey County Fishing Lake (Wolf Creek's Lake) is not infested, but is considered threatened.

- **Recommended Actions**

- 1. Continue development and support of local WRAPS groups, with technical assistance from state and federal agencies to develop management plans. Coordinate funding from among sources to address highest priority problems first. Focus resources towards high priority watersheds, particularly those that include high priority TMDLs, high biological priority, and source water protection.

Current Status of Action

This is a continuous phased effort.

Comments

WRAPS continue working on plans and implementing BMPs. KWO will assist KDHE in reviewing plans again in 2011.

- 2. Target resources to the improvement and management of riparian areas in priority watersheds.

This is a continuous phased effort.

This is part of the RSI and many WRAPS efforts. ARRA funding provided the means to initiate work to rehabilitate an 8 mile reach of stream on the Neosho.

- 3. Coordinate with KDWP & other organizations & agencies to prevent the spread of Zebra mussels in the basin.

This is a continuous phased effort.

BACs and water right holders' continue to be updated on status of infested water bodies in the basin. Coordination between KDWP and KWO continues.

- 4. Continue cooperative inter-state efforts to improve water resource conditions in the entire Neosho/Grand River Lake of the Cherokees watershed.

This is a continuous phased effort.

Need to work with Tri-State to be more Kansas orientated.

- 5. Complete Corps John Redmond Feasibility Study and incorporate results into WRAPS and other cooperative planning efforts.

The Feasibility Study has now expanded to a Watershed Study that will assess the effectiveness of streambank stabilization on sediment reduction.

Information on these studies has been shared with Upper Neosho, Cottonwood, Marion, and Council Grove WRAPS SLTs as appropriate for incorporation into their 9-Element Plans.

○ **Recommended Actions**

6. Work with local governments, including conservation districts, local environmental protection programs, and storm water utilities to develop and implement comprehensive urban storm water and source water management plans.

7. Continue public outreach efforts to educate the public and landowners about the benefits of best management practices.

8. Encourage other agencies and entities in partnerships and participation to support WRAPS initiatives, activities, and funding.

Current Status of Action

This is a continuous phased effort.

This is a continuous phased effort.

This is a continuous phased effort.

Comments

Attend WRAPS meetings where this occurs.

- **Water Supply Management and Conservation (NEO)**

- **Description**

- Evaluation of surface water supply, demand, management, and conservation, is needed to improve reservoir sustainability and provide adequate public water supply to meet long-term needs in the Neosho Basin. Supply and Demand evaluation indicates need for additional water in short term.

- **General Update**

- KBS has surveyed all 3 federal reservoirs in the Neosho basin plus Parsons City Lake, Council Grove City Lake, and Coffey County Fishing Lake (Wolf Creek's Lake). The report found that there was more capacity in the lakes than previously thought. This result is most likely due to the improved method of conducting the bathymetric surveys and is therefore more accurate than past surveys. A USACE PAS study for the Neosho has been initiated. As part of the Neosho PAS, 5 possible reservoir sites will be chosen by KWO based on KBS's depth to flooding analysis. These sites will be evaluated by CDM to determine which sites are feasible environmentally and economically. The next meeting concerning the PAS will be in late Fall with CDM, the Corps, and KWO. This ties into the RRM as a way to determine more specific alternatives and compare costs of dredging and building new reservoirs.

- **Recommended Actions**

1. Continue the calibration of the OASIS basin model with location specific supply and demand information.
2. Identify options for supply and demand management: reservoir pool raise, pool reallocation, dredging, off-channel storage, new supplies, modify reservoir operations, conservation measures, reserve levee operations.
3. Refine model to reflect possible outcomes of identified options and share results.
4. Implement the most beneficial and cost-effective options.
5. Begin incorporation of water demand management into utility operating plans. Demand management should also include education of and interaction with the development community and include existing local authorities.

Current Status of Action

- This is a continuous phased effort.
- This is a continuous phased effort.
- This is an ongoing process and the model is updated as new information comes in.
- Once an option or options have been selected based on benefits, costs, etc. the implementation process will begin as funding allows.
- This is a continuous phased effort.

Comments

- The model is operational and has located specific demand areas. KBS bathymetry completed. Now locating 5 reservoir sites to evaluate through PAS study.
- Waiting on Hartford Levee to initiate pool raise. Working with the Corps and CDM to initiate the Neosho PAS. Five reservoir sites will be located by KWO by using KBS's depth to flooding maps. These 5 sites will be evaluated by CDM.
- The PAS study will define options and possible implementation.

Smoky Hill-Saline Basin Priority Issues

- **Lower Smoky Hill River Management (SHS)**

- **Description**

- Develop understanding of hydrologic system to refine resource management of the system for efficient in-lake and downstream needs. Lake and river models completed in 2009.

- **General Update**

- Ground/surface water hydrologic model, river model and lake yields updated or complete. Based on information and stakeholder input policy developed. Draft policy to address access to storage in Kanopolis released for public comment in May. Request to Corps to complete evaluation for pool raise in Kanopolis submitted.

- **Recommended Actions**

1. Complete and maintain the hydrologic model of the Smoky Hill River valley.
2. Incorporate the updated Kanopolis Lake yield information in the aquifer model to better understand impacts on the reservoir and hydrologic system.
3. Determine the impact of full utilization of the Water Marketing Program supply on lake level and corresponding recreation and downstream uses.
4. Develop a basic supply and demand analysis using population and demand trends and reported water use. Compare to information developed in above models.
5. Identify options to meet water use needs in the area based on results of models and other pertinent data.
6. Develop an action plan to address preferred options for management needs based on hydrologic analysis/water budget and considering economic impacts.

Current Status of Action

- Model calibrated, scenarios run. Reservoir releases input to model.KGS OFR 2008-20.
- Yield analysis and release effects on reservoir levels looked at (report on www.kwo.org).
- Lake level impact looking at 20 cfs downstream had been analyzed. Analysis of marketing storage full releases needed.
- Implementation is needed for future basin wide needs and supply comparison.
- Gathering information to complete task. This may include Kanopolis Lake Regulation Manual/river system operation changes. May include Wilson as source of water supply.
- Phased or Delayed Implementation.

Comments

- Model completed December 2008. Additional model runs completed, groundwater impacts to stream minimal in most of area.
- Analysis completed September 2008. OASIS model under development.
- May be able to build on models (item 2).
- Basin supply and demand analysis is more complicated with major reservoirs and ground water providing majority of supply.
- This may include Kanopolis Lake Regulation Manual/river system operation changes. Reservoir Sustainability Vol. II includes 2 reservoir operational options. Access to reservoir storage policy presented for KWA approval Nov. 2010.
- Gathering information to complete task.

- **Ogallala-High Plains Aquifer Declines (SHS)**

- **Description**

- Conserve and extend the life of the Ogallala through aquifer subunit management, targeting water conservation activities and implementing strategies to improve agricultural practices with limited water resources.

- **General Update**

- GMD1 is developing PST+ in Wallace Co. An evaluation of PST and public water supply wells is also underway. Official closing of GMD1 to new appropriations under consideration by the Chief Engineer at GMD board request. GMD4 has designated high priority subunits, none in this basin.

- **Recommended Actions**

1. GMD1, GMD4 and DWR identify priority aquifer subunits and develop specific goals and management strategies.
2. GMD1, GMD4 and DWR manage water resources of aquifer subunits to maintain economic health and ensure water in future.
3. Support research for high value, low water use crops.
4. Provide opportunities to permanently or temporarily reduce water use through voluntary programs.
5. Education to public, water users and decision makers on the condition of the aquifer and opportunities and methods to reduce water use.
6. Seek crop insurance option for limited irrigation crops from USDA Risk Management Agency.

Current Status of Action

GMD4 identified 6 high priority subunits, GMD1 identified district. Development of goals/management in GMD4 underway.

Subunit management not implemented, but progress has been made.

Phased or Delayed implementation.

The federal EQIP QRAs is an option for targeted areas within the basin, as recommended by the GMDs1 and 4 and approved by the State Conservationist, NRCS. Water right conservation program in place (DWR).

The annual water level measurements of the High Plains aquifer network wells are available to the public on the KGS website. The annual Kansas Water Issues Forum and 3I booth presentation also educate the public.

Immediate implementation is needed because crop response yield curves could be used by RMA to insure a limited irrigated crop.

Comments

Research into drought tolerant crops underway at various companies.

The state funded program of Water Right Transition Assistance Program requires an area be targeted and approved by the Chief Engineer; no areas in the basin are designated eligible at this time.

BAC meetings, stakeholder meetings for EQIP, GMD annual meetings. GMD4 Stakeholder meetings for the 6 identified priority areas.

Contacts made with USDA. 2010 is target to seek pilot program permission.

- **Public Water Supply (SHS)**

- **Description**

- Efforts continue to identify supplies to meet expected demands needs.

- **General Update**

- Corps of Engineers' Planning Assistance to States draft report (Wilson) reviewed May 2010. Corps scoping Wilson reallocation study. Public meeting held Feb. 2010. Stakeholders meet May 2010, next meeting August 2010. Kanopolis pool raise request to Corps in May 2010.

- **Recommended Actions**

1. Evaluate (quantity) water resources in the basin and compare with appropriations.

Current Status of Action

Numerous future need estimations based on population growth completed (2003-present) as part of water supply related studies. Kanopolis bathymetric survey complete, report pending with updated sedimentation information.

Comments

Supply in basin is surface and ground water making supply demand analysis different than in eastern basins where surface supply in reservoirs is major source.

2. Evaluate management of resources in the basin that may provide opportunities for additional water uses.

On-going. Kanopolis Lake yield analysis, Wilson evaluation.

Kanopolis yield revised, lower Smoky Hill River model complete. Wilson PAS completed. Reallocation study underway, needs and region defined. Sources under evaluation. Economic impact scoping begun

3. Develop strategy for additional supplies.

To be developed with results of investigations into resources (items 1 and 2).

4. Negotiate water marketing contracts based on available water.

Six active water marketing applications totaling 23.4 MGD are on file for Kanopolis. Negotiations will consider results of the completed investigations into water resources of the basin.

Negotiations approved by KWA for 2 applicants. Comprehensive approach directed.

5. Explore methods to reduce need for additional water supplies such as water conservation and water reuse.

On-going practice. Reuse opportunities being considered by some in area.

Conservation efforts by the City of Hays have significantly reduced per capita water use. Salina initiating additional conservation efforts in 2009.

6. Continue to support local conservation efforts and programs.

On-going. GMD1 EQIP target areas. WRAPS projects reduce sedimentation into Kanopolis.

Hays conservation example. Salina conservation program.

7. Continue to promote water quality measures to protect sources of public water supply.

On-going. WRAPS projects on part of Big Creek and all of Smoky Hill River. Kanopolis is ranked 3rd in priority for WRAPS.

Solomon Basin Priority Issues

- **Minimum Water Levels in Webster Lake (SOL)**

- **Description**

- Increase water levels in Webster Reservoir for improved recreational opportunities. This pool would more consistently provide suitable habitat for fisheries production, safe access to the lake by anglers and boaters, and habitat for water fowl and other wildlife.

- **General Update**

- Late last year, discussions between the State of Kansas and the Webster Irrigation District have been mutually placed on hold due to current water level in Webster Reservoir and the state's fiscal condition. The KDWP had requested a budget allocation for a minimum pool level in the FY 2011 State Water Plan which was not funded.

- **Recommended Actions**

1. Establish a cooperative partnership between the Webster irrigation district No. 4 and the State of Kansas to achieve the highest possible conservation pool water level in the Webster Reservoir.

Current Status of Action

KDWP has a FY2012 budget request in for a possible water level lease.

Comments

The KDWP requested a budget allocation in FY2011, which was not funded.

2. Consider/negotiate water right acquisition in Webster Reservoir

Delayed implementation.

See comments under item 1.

3. Obtain rights to water by (in order of preference): a.) Purchase of Webster Irrigation District's water rights and convert storage in Webster Reservoir for fish, wildlife, and recreation purposes; b.) Negotiate a long-term lease c.) Negotiate a partial purchase of Webster irrigation District water rights and conversion to fish, wildlife and recreation storage.

Delayed implementation.

See comments under item 1.

4. Maintain consumptive use of the stream/aquifer/reservoir system at or below present historical levels.

Delayed implementation.

See comments under item 1.

- **Ogallala-High Plains Aquifer Water Level Declines (SOL)**

- **Description**

- Conserve and extend the life of the Ogallala through aquifer subunit management, and targeting of water conservation activities. Hydrologic and economic models are being used to support planning discussions underway between GMD4 and water users to address aquifer declines. Irrigators in GMD4 high priority areas recently declared eligible for the Water Transition Assistance Program have filed 38 of the 41 applications in the three pilot areas across the state. The new federal Agricultural Water Enhancement Program (AWEP) that offers an incentive for landowners to permanently retire their water rights, but allows dryland farming, is being considered.

- **General Update**

- A \$2.66 million FY 2010 AWEP proposal was approved by the NRCS. Northwest Kansas entities GMD 4, Conservation Districts in Sherman, Cheyenne, Thomas and Sheridan Counties, Sherman County Farm Bureau, the NW Kansas Groundwater Conservation Foundation, joined by the KWO, formed an AWEP Partnership. The partnership had requested \$9 million to permanently transition irrigated acres to dryland production in the six designated high priority areas of GMD 4. AWEP is a NRCS voluntary conservation initiative that provides financial and technical assistance to farmers to implement agricultural water enhancement activities on ag land to conserve surface and groundwater and improve water quality. It is part of the EQIP. GMD managers discussing local versus state authorities with Chief Engineer. Discussions on crop insurance for limited irrigated fields continue with USDA, KSU, KWO and DWR, with a recent meeting including Colorado and Nebraska.

- **Recommended Actions**

1. In their areas of responsibility, GMD4 and DWR should identify priority aquifer subunits or areas and develop specific goals and management strategies to extend and conserve the life of the aquifer.
2. GMD4 and DWR should manage aquifer subunits to maintain economic health while ensuring sufficient water resources for future generations of western Kansas communities and rural populations and chosen lifestyles.
3. Provide opportunities to permanently or temporarily reduce water use through voluntary programs (state, federal, and local).

Current Status of Action

GMD4 Board approved 6 high priority subunits. Development of goals/management in GMD4 underway. DWR not yet identified priority areas outside of district.

GMD met with stakeholders in all 6 priority areas. Local leadership in Sheridan County priority area exploring options for enforceable but not permanent water use reductions.

Irrigators in 6 priority areas were eligible for AWEP, federal payments for six years of dryland use. Out of 44 applications, 15 were approved (2,307 acres) for funding obligation of \$2.5 million. Over 6 years, about 13,500 acre-feet conserved.

Comments

Budget constraints and staff reductions have affected DWR's ability to fulfill the identified responsibilities.

Talks with Chief Engineer are ongoing.

WaterTAP is offered in same areas as AWEP, to seek permanent water right retirement.

○ **Recommended Actions**

4. Educate water users, decision makers and the general public on the condition of the aquifer and methods and opportunities to reduce water use.

5. Support research for high value, low water use crops.

6. Seek crop insurance option for limited irrigation crops from USDA Risk Management Agency

Current Status of Action

BAC meetings, stakeholder meetings for EQIP, GMD annual meetings.

K-State horticultural center in Olathe works with limited, supplemental irrigation. Work underway at Garden City and Tribune is focused on traditional field crops, growing with limited irrigation, reduced tillage.

Contacts made with USDA.

Comments

GMD4 also uses twitter, blogs, and newsletter to share information. KWO has online information, and a quarterly newsletter for BACs. DWR provides an online newsletter. KGS has online maps, reports, and current aquifer condition and well information.

- **Subbasin Water Management (SOL)**

- **Description**

- Solomon River water resources management by subbasins to stabilize hydrologic systems and improve reliability of water availability to water users. Modeling of the upper North and South Forks Solomon River nearly complete.

- **General Update**

- Due to DWR budget cuts, subbasin has phased out its role in convening stakeholders, but will provide modeling and data analysis support and collaborate with stakeholders.

- **Recommended Actions**

- 1. Complete the refinement of water balance of subbasins within the Solomon basin.
 - 2. Continue modeling of upper North and South forks of the Solomon River with scenarios of possible future water use patterns.
 - 3. Develop management operations to improve reliability of water available to water right holders
 - 4. Work with federal agencies to make appropriate reservoir storage and operation changes to meet sustainable yield management and other goals of Kansas Water Plan.

Current Status of Action

DWR has completed the model, met with stakeholders and the BAC.

DWR has completed the model, met with stakeholders and the BAC.

No work in this area.

Comments

DWR basin team will continue to provide technical support, but will no longer assemble stakeholders.

Upper Arkansas Basin Priority Issues

- **Bioenergy and Water (UARK)**

- **Description**

- The growing biofuel production provides economic opportunity, but we need to coordinate energy development with water resource management. Promote less water intensive fuel sources, and target programs to mitigate impacts to environmentally sensitive areas.

- **General Update**

- Traditional grain based ethanol plant construction slowed due to economy. Coordination of facility permitting includes water agencies. Three existing ethanol plants for 87.5 MGY production in basin. No new permits applied pending.

- **Recommended Actions**

1. Coordinate, where applicable, the development, implementation and public input process between the Kansas Water Plan and Kansas energy policy.

Current Status of Action

Interaction with KS Dept of Commerce energy staff continues. Two BAC water and energy forums held with coordination with energy policy staff.

Comments

Interaction with KS Dept of Commerce energy staff continues. Two BAC water and energy forums held with coordination with energy policy staff.

2. Maintain regulatory oversight by state and local government on the siting of ethanol and biodiesel plants, with special emphasis on the water supply and availability.

Kansas Dept of Commerce continues to coordinate with siting of plants and required permits.

Water rights must be obtained as per water appropriation act and is based on availability. In closed or restricted areas existing water right may be obtained and use changed. Water marketing contracts may also be obtained if available.

3. Look for water recycling opportunities within the biofuel facilities.

Delayed Implementation.

Many facilities reuse water as reuse increases efficiency.

4. Promote research for less water-dependent corn varieties and improved irrigation scheduling that maintains or increases crop yield without increasing water use.

Consistent with Ogallala decline issue. Activities through state extension research and through Ogallala Aquifer Initiative (USDA ARS) as opportunities arise.

KSU work on drip irrigation, transpiration efficiency, limited irrigation cropping systems, deficit irrigation at 2008 OAI meeting (<http://ogallala.tamu.edu/presentations.php>)

5. Promote research and pilot projects for viable, commercial cellulosic ethanol production and other biofuels that are less dependent on water intensive crop production.

Delayed Implementation.

Research through KSU and private companies ongoing.

6. Increase corn water use efficiency (amount of grain produced per inch of water) through research and extension efforts. Educational emphasis should be placed on utilization of irrigation scheduling tools such as KanSched and the Mobile Irrigation Lab.

Mobil Irrigation Lab has been targeting Ogallala-High Plains to provide for efficient water application and scheduling as well as cropping decision making. KSU tools available.

KSU work on drip irrigation, transpiration efficiency, limited irrigation cropping systems, deficit irrigation at 2008 OAI meeting (<http://ogallala.tamu.edu/presentations.php>)

○ **Recommended Actions**

7. Evaluate the biofuel facility watershed and watersheds of input crops, and identify potentially environmentally sensitive areas. Target programs to mitigate environmental impacts, such as stream buffers, grass filters, BMPs, etc.

8. Provide education and/or incentives for marginal lands that have expiring Conservation Reserve Program contracts that will not be renewed to stay in a conservation planting, with special consideration to acres that could return to irrigation.

Current Status of Action

Delayed Implementation.

Phased Implementation-some opportunities available.

Comments

Watershed Restoration and Protection Strategies evaluate watersheds. NPS programs target priority areas to reduce sedimentation and address TMDLs. Future WRAPS projects may include 3 of 4 ethanol plant locations in the Upper Ark.

GMD3 and DWR can designate high priority areas to target efforts.

- **Interstate Cooperation to Address Water Quality (UARK)**

- **Description**

- Seek coordination and management with Colorado to reduce salinity, selenium and uranium in Arkansas River corridor.

- **General Update**

- Anticipate 2010 meeting between states. 2010 CSU water quality model development expected. TMDL activities by both states in 2011, implementation actions to follow. KGS study on uranium and radionuclide's continues.

- **Recommended Actions**

1. Initiate meetings in 2008 and 2009 between Kansas and the Colorado water quality and water appropriation agencies to discuss proposals to improve water quality in the Arkansas River within the context of the Arkansas River Compact. Coordinate with water compact representatives. Identify pilot areas in the Arkansas River valley in 2009 to test remedial measures for lowering salinity in the river.
2. Cooperate with Colorado State University in the investigation of nitrate management as a means to reduce selenium loadings in irrigated areas below John Martin Reservoir.
3. Investigate, through the KGS, radionuclide loading from the Arkansas River into the aquifer sources of Kansas communities such as Deerfield and Lakin.
4. Collaborate between Colorado State University and KGS on the use of a model to identify salinity loading regions and the potential impact.
5. Initiate installation of Best Management Practices in pilot areas along the Arkansas River over 2010-2012 to determine the effect of those practices on water quality improvement and water management under the Compact.

Current Status of Action

KDHE met with Colorado in January 2009 and then again in December 2009, in conjunction with the Arkansas River Compact Annual Meeting, where a joint presentation on status of water quality issues was given to the Compact Administration.

Ongoing investigations of nitrate management by CSU; KGS introduces notion of Se volatilization as a potential sink (loss) of selenium in the river from Pueblo to stateline.

Study completed, initial results available.

KGS has been in contact with CSU.

Lower Arkansas watershed group awaiting additional CSU results to select appropriate BMPs

Comments

Awaiting a meeting between the water quality and water right agencies of the two states sometime in 2010.

KGS obtained EPA grant to examine fluctuating levels of uranium and other radiation-emitting elements in the Arkansas River in southwestern Kansas. Sampling and analysis completed.

Uranium exceeds MCL in many areas. Infiltration of saline river water is uranium source in alluvium and underlying High Plains aquifers.

Major development by CSU of a hydrologically driven, water quality model is likely to occur in 2010. This should be the subject of subsequent discussions between Kansas and Colorado.

Colorado believes some pilot projects might be identified in 2010, consistent with their current watershed plan.

○ **Recommended Actions**

- 6. Based on results from the pilot efforts, jointly obtain B45 funding with Colorado in 2012 to implement salinity reduction measures throughout the Arkansas River valley, including EPA Targeted Watershed Grants, Water Resource Development Act (WRDA) environmental restoration projects and state funded projects.

- 7. Cooperate with Colorado on joint tamarisk and other non-native phreatophyte control in the Arkansas River watershed.

Current Status of Action

Obtaining Federal funding delayed.

Pilot projects in boarder counties in CO and KS initiated in 2008. ARKWIPP

Comments

Deferred until 2012; Both Kansas and Colorado will initiate TMDL activities on their respective sides of the stateline on the Arkansas River during 2011; implementation actions should follow that phase of TMDL development.

See phreatophyte issue.

- **Middle Arkansas Subbasin (UARK)**

- **Description**

- Reduce ground water withdrawals to stabilize the hydrologic system. CREP is available.

- **General Update**

- GMD 5 modeling near completion.

- **Recommended Actions**

Current Status of Action

Comments

- **Management of the Ogallala-High Plains Aquifer (UARK)**

- **Description**

- Conserve and extend the life of the Ogallala through aquifer subunit management, targeting water conservation activities and implementing strategies to improve agricultural practices with limited water resources. Ground water modeling of GMD3 is in progress. CREP is active program.

- **General Update**

- GMD3 model development is complete. Three initial scenarios defined, to be run summer-fall 2010 with defined target areas. Economic modeling contracted. Subunits have been defined for modeling purposes, and QRAs. CREP area targets alluvial area along Arkansas River. State proposal to expand CREP acres and irrigated rental rate supported by state and Kansas FSA, under consideration by USDA. An AWEP program proposed by GMD3 could address high priority areas if approved by NRCS. Conservation Innovation Grant (CIG) application submitted by GMD3 to test new irrigation scheduling system based on field specific weather data. GMD 1 is developing PST+. An evaluation of PST and public water supply wells is also underway. Official closing of GMD1 to new appropriations under consideration by Chief Engineer at GMD board request.

- **Recommended Actions**

- 1. For priority aquifer subunits, develop specific goals and management strategies to extend and conserve the life of the aquifer.

- **Current Status of Action**

- Aquifer characterization has continued with model building complete as are initial scenario runs. Model incorporates latest information. Coring project initialed fall 2010 in Haskell Co. in proximity to index well for more aquifer characterization.

- **Comments**

- GMD3 has developed an allocation tool based on individual well allocations and priorities, rather than aquifer subunits, to achieve overall goals. Aquifer subunits for targeting have been approved by the board. Areas updated in KWP.

- 2. Develop and maintain a ground water flow model of GMD3 area for evaluating management decisions and establishing conservation goals.

- Model is complete. Initial scenarios run. Final report expected soon.

- Economic modeling to build on hydrologic model, now that it is complete.

- 3. The KWO will continue coordination among GMD3, DWR, stakeholders and other agencies

- The KWO coordinates the modeling effort, and works to keep agencies and the BAC informed and coordinated on Ogallala issues.

- Coordination continues though meetings.

- 4. Provide opportunities to permanently and temporarily reduce water use through voluntary programs (state, federal and local).

- The federal EQIP Quick Response Areas is an option for targeted areas within the basin, as recommended by the GMD3 Board and approved by the State Conservationist, NRCS. Water Right Conservation Program no longer available (DWR). CREP along Arkansas River.

- The state funded program of Water Right Transition Assistance Program requires an area be targeted and approved by the Chief Engineer; high priority areas added in 2010 do include parts of the basin. Eligibility status may change soon.

○ **Recommended Actions**

5. Educate water users, decision makers and the general public on the conditions of the aquifer and methods and opportunities to reduce water use.
6. Develop local ownership and leadership of aquifer issues to assist in local adoption of specific conservation goals and programs.
7. Evaluate the long-term impact of climate change on supply and demand for water resources in the basin.
8. Seek crop insurance option for limited irrigation crops from USDA Risk Management Agency.
9. Consider interstate discussions on water conservation and planning where aquifer subunits cross state boundaries and are not directly impacting an existing surface water compact.
10. Explore opportunities to augment aquifer recharge through artificial recharge during flood events and other means as feasible.
11. Support research into high value, lower water use crops that would be suitable for the region.

Current Status of Action

The annual water level measurements of the High Plains aquifer network wells are available to the public on the KGS website, with an annual report summarizing the water level trends. The annual Kansas Water Issues Forum and 3I booth presentation also educate the public.

When the hydrologic computer model is completed and future management scenarios run, there are plans to have a public information outreach to discuss the results and management options with stakeholders.

Implementation delayed because more understanding is needed.

Immediate implementation is needed because crop response yield curves being developed that could be used by RMA to insure a limited irrigated crop.

Delayed Implementation.

Phased or Delayed.

Phased or Delayed implementation.

Comments

Also BAC, CREP and WTAP meetings. New BAC newsletter.

GMD3 providing local input into model scenarios and conservation programs.

A study on climate change and the Ogallala has been discussed at the federal level. Water Issues Forum on Climate Dec. 2009. Model included runs incorporating reduced precipitation.

2010 is target to seek pilot program permission.

Hydrologic model in SW Kansas goes into OK and CO; model results may provide a discussion basis.

A recharge feasibility study for the Arkansas River corridor completed in 2008. Further research needed. WCPF project evaluated potential water for augmenting recharge.

Research into drought tolerant crops underway at various companies.

- **Salt Cedar and Other Non-Native Phreatophyte Control (UARK)**

- **Description**

- Control of high water use nonnative plants such as salt cedar and Russian olive to reduce their impact on water resources.

- **General Update**

- Visual evaluation of 2008 aerial spraying in June 2010. Initial research has failed to find long term water savings through salt cedar control. Additional research for water quantity savings was recommended for additional hydrologic conditions. USDA has announced beetle releases for control will no longer be made. Additional research for water quantity savings needed for additional hydrologic conditions. Related information continues to be gathered. Some indications restoring native habitat beneficial to landowner and native species.

- **Recommended Actions**

1. Continue to work with agencies and groups on the water issue strategic plan and 10-Year Strategic Plan to coordinate and implement the variety of programs, research and educational efforts that are occurring or recommended.
2. Cooperate with stakeholders in Colorado to implement tamarisk control projects that cross state lines.
3. Promote education on invasive plants and seek local input through the Basin Advisory Committees.
4. Continue an evaluation of the most effective and cost-efficient control measures for the Upper Arkansas River basin, and provide cost share on tamarisk control and shelter belt replacement.

Current Status of Action

State 10-year strategy in place. Participate in Tamarisk Coalition.

In progress with ARKWIPP and projects in Hamilton County KS and Bent County CO. At the December 9, 2008 Upper Arkansas River Compact Administration meeting, a resolution was signed by Randy Hayzlett, on behalf of the Arkansas River Compact Commissioners supporting the pursuit of federal funds to fund a joint Colorado and Kansas tamarisk control and restoration project in the Arkansas River basin.

Discussion with BAC to continue.

Pilot projects completed in basin. State 10-year strategy in place. Additional implementation delayed.

Comments

Invasive species removal is indentified in the Upper Arkansas WRAPS as part of a goal to protect riparian and buffer area.

In the fall 2008, 357 acres infested with tamarisk were treated with State funds in Hamilton County, Kansas. An additional 91.5 acres were treated with private and irrigation association funds. The treatment was aerial spraying by Skycopters, using Habitat. Re-treatment with a backpack sprayer may be needed this spring or in following seasons. This will be coordinated through the landowner, weed director, and Skycopters.

Ongoing.

A WRAPS developed for the Upper Arkansas Watershed focus on water quantity. Includes goals for Salt Cedar (Tamarisk).Aerial spraying in 2008 Hamilton County

○ **Recommended Actions**

5. As an effective control measure is identified for the basin, implement a wide-scale, watershed-based control effort, and combine with plans for successful beneficial vegetation that helps stabilize the soil, has potential for windbreaks and other benefits.
6. Research and evaluate biological control of tamarisk using leaf beetles and/or other suitable organisms, but pilot it with extreme caution to avoid unintended consequences.
7. Deliver educational materials and technical information to legislators, property owners and the public within the basin related to non-native phreatophyte research and control through KSU-Agricultural Experiment Station and Cooperative Extension Service.
8. Quantify the actual non-beneficial use of water by tamarisk in the basin's different ecological settings. Existing research should be used and augmented with on-the-ground measurements of changes to both streamflow and ground water before and after tamarisk control activities. This research will help to establish the difference in water consumption in Kansas between non-native phreatophytes and typical riparian plant communities.
9. Evaluate the recovery benefits after tamarisk control to provide valuable information on the specie's true impact to water quality, wildlife habitat, water quantity, grazing land, reduction of risk from flood damage and other features that impact the basin's ecology and economy.

Current Status of Action

- Phased Implementation.
- Pilot projects using leaf beetles under evaluation.
- Newsletter. National award to Kansas will provide signage along highway 50. WRAPS coordination and targeting.
- KGS study quantified water use of tamarisk. Ground-water Assessment in Association with Salt-cedar Control--Report on Phase Two Activities by James J. Butler, Jr., Gerard J. Kluitenberg, and Donald O. Whittemore KGS Open File Report 2008-13. Summer 2006 stable isotopic and plant physiological measurements from Plots 1 and 3 of the Ashland Research Site by Jesse B. Nippert, Scott E. Spal and Joy K. Ward, KGS Open File Report 2008-32.
- Delayed Implementation.

Comments

- To view a comparison of control methods, including costs and likelihood of success, visit: www.tamariskcoalition.org/tamariskcoalition/ControlMethods.php
- Joint BAC meeting topic fall 2009, ARKWHIP information disseminated.
- Research indicates water savings not long term when eliminate phreatophytes. A field investigation of phreatophyte-induced fluctuations in the water table by James J. Butler, et.al, Water Resour. Res., v. 43, W02404, doi: 10.1029/2005WR004627, 2007. Estimation of Groundwater Consumption by Phreatophytes Using Diurnal Water Table Fluctuations: A Saturated-Unsaturated Flow Assessment by S.P. Loheide, II, et. al., Water Resour. Res., v. 41, W07030, doi: 10.1029/2005WR003942, 2005. "An analytic solution for groundwater uptake by phreatophytes spanning spatial scales from plant to field to regional" by David R. Steward and Trevor S. Ahring (KSU). Published Oct 2008 with open access at Springerlink.com Other studies (NM) also indicate water savings short term. Future work in varying hydrologic situation suggested.

○ **Recommended Actions**

10. Determine the potential value of tamarisk biomass for various value-added products such as ethanol, bedding, fiberboard, and fuel pellets, or if not suitable for alternative uses, determine how to dispose of dead plant materials.

Current Status of Action

Delayed Implementation

Comments

- **Watershed Restoration and Protection (UARK)**

- **Description**

- The restoration of watersheds with impaired water quality and the protection of watersheds ground water sources used for drinking water supplies and irrigation are high priority in the Upper Arkansas basin. Approved January 2007.

- **General Update**

- WRAPS Implementations Plans complete for 3 subbasins. WRAPS implementation low funding priority (quantity based). Local entities in each of the 3 WRAPS areas replaced KSU as leaders in 2009. Presentation of preliminary TMDL status at BAC March 2010. TMDL development underway for submittal to EPA based on 2010 303(d) list. Five new listings anticipated. Gross alpha on the Arkansas River at Coolidge highest priority by BAC, and selenium and dissolved oxygen on Walnut Creek are also priority for development by April 2011.

- **Recommended Actions**

1. Work with stakeholder groups to incorporate TMDL implementation and nutrient and sediment reduction goals into applicable WRAPS projects.
2. Target technical and financial assistance programs for water quality protection and restoration to implement TMDLs and WRAPS action plans.
3. Continue coordination of agencies' programs and activities to achieve the high priority TMDLs, and show water quality improvements. Lead state agencies include KDHE, SCC, along with KDWP and KWO. Include others as appropriate.
4. Continue inter-agency cooperation and update the water issue strategic plan (WISP) to address the complex inter-state Upper Arkansas Water Quality concerns. Key state agencies include KDHE, SCC, KDA-DWR, and KWO. Include others as appropriate.
5. Encourage enrollment in the Conservation Reserve Enhancement Program (CREP) with emphasis on acres enrolling in the Conservation Practice (CP9) to develop or restore shallow water areas.

Current Status of Action

Three WRAPS along ARK River in Upper Ark basin with three stakeholder groups formed.

Delayed Implementation.

Phased Implementation.

See interstate water issue. KDHE lead.

CREP enrollment occurring but no CP9 requested.

Comments

Watershed specialist working in basin 1998-2009. Change to local leadership in 2009.

No federal reservoirs (high priority) supplying public water supply in basin. A WRAPS is being developed for the Upper Arkansas Watershed, including the river corridor from Coolidge to Raymond identifying critical concerns and also in developing goals Salt Cedar (Tamarisk).

On-going. KDHE lead. Third cycle TMDLs in the beginning analysis on impaired waters in the Upper and Lower Arkansas and Cimarron basins.

On-going.

CREP incentives may rise, still no CP9 interest.

Upper Republican Basin Priority Issues

- **Ogallala-High Plains Aquifer Water Level Declines (UREP)**

- **Description**

- Conserve and extend the life of the Ogallala through aquifer subunit management, and targeting of water conservation activities. Hydrologic and economic models are being used to support planning discussions underway between GMD4 and water users to address aquifer declines. Irrigators in GMD4 high priority areas recently declared eligible for the Water Transition Assistance Program have filed 38 of the 41 applications in the three pilot areas across the state. The new federal Agricultural Water Enhancement Program (AWEP) that offers an incentive for landowners to permanently retire their water rights, but allows dryland farming, is being considered.

- **General Update**

- A \$2.66 million FY 2010 AWEP proposal was approved by the NRCS. Northwest Kansas entities GMD 4, Conservation Districts in Sherman, Cheyenne, Thomas and Sheridan Counties, Sherman County Farm Bureau, the NW Kansas Groundwater Conservation Foundation, joined by the KWO, formed an AWEP Partnership. The partnership had requested \$9 million to permanently transition irrigated acres to dryland production in the six designated high priority areas of GMD 4. AWEP is a NRCS voluntary conservation initiative that provides financial and technical assistance to farmers to implement agricultural water enhancement activities on ag land to conserve surface and groundwater and improve water quality. It is part of the EQIP.GMD4 model scenarios have been run, with input from local stakeholders. Additional economic impact projections also underway. Development of crop insurance for limited irrigated fields continues with USDA, KSU, KWO and DWR, with a recent meeting including Colorado and Nebraska.

- **Recommended Actions**

1. DWR should identify priority aquifer subunits or areas, and GMD 4 and DWR should develop specific goals and management strategies to extend and conserve the life of the aquifer
2. GMD4 and DWR manage aquifer subunits to maintain economic health while ensuring sufficient water resources for future generations of western Kansas communities and rural populations and chosen lifestyles.
3. Provide opportunities to permanently and temporarily reduce water use through voluntary programs 9 state, federal, and local).

- **Current Status of Action**

- GMD 4 Board approved 6 high priority subunits. DWR has not yet designated priority areas outside of GMD district.
- GMD met with stakeholders in all six priority areas. Each priority area identifying different timeframes and possible solutions; options to implement are being considered.
- Irrigators in 6 priority areas were eligible for AWEP, federal payments for six years of dryland use. Out of 44 applications, 15 were approved (2,307 acres) for funding obligation of \$2.5 million. Over 6 years, about 13,500 acre-feet conserved.

- **Comments**

- Two of the high priority areas within the UREP basin have shown more interest in addressing water level declines. See SOL basin for info on Sheridan 6, where irrigators are working with GMD4 on self-initiated water use reductions with GMD regulations as oversight.
- WaterTAP is offered in same areas as AWEP, to seek permanent water right retirement.

○ **Recommended Actions**

4. Educate water users, decision makers and the general public on the condition of the aquifer and methods and opportunities to reduce water use.

5. Support research for high value, low water use crops.

6. Seek crop insurance option for limited irrigation crops from USDA Risk Management Agency

Current Status of Action

GMD4 has taken the lead on this educational effort. Water resource information is posted by GMD4 via its web site, web logs and twitter tweets. The KDA-DWR has introduced a newsletter and a package of information of value to water right holders to better understand water resource rules and regulations. A Master Well Inventory is being developed by the KGS.

Conversations are on-going between State and USDA Risk management Agency for limited irrigated crop insurance.

Comments

GMD 4 also uses twitter, blogs, and newsletter to share information.

Information from KSU and Monsanto

- **Republican River System Management: Compact Compliance & Damages (UREP)**

- **Description**

- Planning and coordination are underway for the Republican River system in the Upper Republican basin for efficient water use, compliance with the Republican River Compact and the beneficial use of Republican River Compact settlement payments.

- **General Update**

- In anticipation of delivery of water or money from Colorado, the KWO contracted with Spronk Water Engineers of Denver to assess possible options. The options, takeoffs on ideas generated by the Upper Republican River Conservation Projects Alliance, include (1) a municipal pipeline generally following U.S. Highway 36 with any excess going to Keith Sebelius lake; (2) a centrally located, four-county multi-purpose water storage facility; (3) a groundwater recharge system for one or more of the identified High Priority Areas within GMD 4; and (4) alluvial recharge provided surface water diversions are of sufficient quantity to allow the recharge. The reconnaissance study is funded in part through the State Water Plan Fund, GMD 4, and the Bureau of Reclamation. Delivery of water from the Colorado source to a tributary of the South Fork of the Republican River (via pipe and surface water conduits) estimated to cost about \$14.5 million. Annual operation and maintenance cost estimated at \$380,000 for pumping and delivery of 3,000 acre feet of water annually.

- **Recommended Actions**

1. Review hydrologic system operation (some modeling may occur by federal agencies).
2. Review Keith Sebelius Lake management and operation.
3. Determine needs in the basin for continued compliance with Republican River Compact
4. Identify areas where Republican River Compact compliance has restricted water use.
5. Identify potential projects to meet requirements of Senate Substitute Bill 89. Consider the economic benefits to the basin in the use of any financial payments and/or water received.
6. Develop coordination of state-funded projects such as nonpoint source (NPS) cost share and WRAPS with projects funded by damage payments.

Current Status of Action

- Republican River Compact Administration model has been adapted and calibrated for GMD4's six high priority areas.
- KDA-DWR is monitoring relative to RRCA.
- KS has always been in compliance. Accounting is tracked by DWR.
- To date, water use has not been restricted.
- Upper Republican River Conservation Alliance formed to provide advice to the Director of the KWO. Recon study done in Upper Republican to consider options for use of water expected.

Comments

- Model has been useful to GMD4 Board in identifying priority areas, and stakeholders in determining how much benefit would accrue to their area through conservation.
- Less than 5 years left on lease agreement with Alma Irrigation District.
- Kansas has worked to balance water use and availability. GMD 4 uses a safe yield approach.
- Options to study further: 1) recharge in the priority areas; 2) regional pipeline for municipal use along Hwy 36; 3) water impoundment for recreational, wildlife and recharge benefits.
- A Watershed Restoration and Protection Strategy (WRAPS) is active in the Prairie Dog Watershed.

○ **Recommended Actions**

- 7. Consider benefits to area economy in determining priority uses for damage payments.
 - a. consider economic impacts when determining use of payments from CO
 - b. consider economic impacts when determining use of payments from Nebraska to maintain compact compliance.

Current Status of Action

Lawsuit dispute current before Supreme Court.

Comments

Verdigris Basin Priority Issues

- **Comprehensive Flood Assessment (VER)**

- **Description**

- Persistent flood damages in the Verdigris Basin indicate a need for a comprehensive evaluation of existing flood control infrastructure and storage to determine current status, mapping funding needs, and opportunities for flood management actions and flood damage reduction in the future.

- **General Update**

- A proposed plan to implement the Flooding BPI on a local basis was presented to the BAC in July, 2009. A NAI could be implemented locally & steps taken to accomplish this. DWR and KWO continue to work together to assess areas that the NAI could be implemented. DWR & KWO are also working together to form a TAC to meet about dam regulations, hazard class changes, dam owner liability, inundation mapping, etc. Flooding on HWY 400 was discussed at the KGS tour, including possible solutions to mitigate current problems and how to design better for the future. The Flood Policy Management Section of the KWP, adopted in 2009, was discussed at the May meeting of the KWA. The TAC will be reconvened with some potential new members to discuss additional implementation measures needed for the recommendations.

- **Recommended Actions**

1. Assess effectiveness of existing flood control infrastructure & develop plans to reduce flood damage. Ensure that stream obstructions are maintained & free of debris accumulation.
2. Complete repairs of damaged flood control structures and deferred maintenance needs.
3. Determine the current floodplain status and promote NFIP participation, model ordinances and BMPs to local units of government. Limit development in the 100 year floodplain using Flood Insurance Rate Maps to delineate prohibited areas.

Current Status of Action

BAC members have been notified of contact for debris accumulation problems & are expected to communicate this to basin residents if possible.

Emergency funds were secured to be used for damaged structure repair after the floods of 2007.

A proposed plan to implement the Flooding BPI on a local basis was presented to the BAC in July, 2009. A NAI could be implemented locally and steps taken to accomplish this. DWR & KWO continue to work together to assess areas that the NAI could be implemented. A joint BAC meeting focused on flood management was held in June 2009. The benefits of integrating WRAPS plans with flood management were discussed.

Comments

The Verdigris chapter of the Reservoir Roadmap contained an inventory of watershed structures above Fall River, Toronto and Elk City reservoirs. This information has been added to the basin plan.

○ **Recommended Actions**

4. Engage in WRAPS to integrate comprehensive watershed based flood management with exiting floodplain, wetland, and riparian programs. Assess and inventory watersheds to identify potential locations for non-structural flood control measures.

5. Develop emergency plans for high hazard dams still needing them.

6. Complete breach zone mapping.

7. Coordinate with the DWR Water Structures Program to determine if increased hydrologic and hydraulic evaluation of stream obstructions should be considered in the Verdigris basin or in parts of the basin particularly prone to flooding. Identify and evaluate flood prone areas that may be attributed to permitted stream obstructions. Consider costs to repair damages against costs to implement the program

Current Status of Action

A proposed plan to implement the Flooding BPI on a local basis was presented to the BAC in July, 2009. A No Adverse Impact Plan (NAI) could be implemented locally and steps to take to accomplish this. DWR and KWO continue to work together to assess areas that the NAI could be implemented. A joint BAC meeting focused on flood management was held in June 2009. The benefits of integrating WRAPS plans with flood management were discussed.

Ongoing.

Ongoing.

No progress.

Comments

DWR and KWO are also working together to put together a TAC to meet about dam regulations, hazard class changes, dam owner liability, inundation mapping, etc. The Flood Policy Management Section of the Kansas Water Plan, adopted in 2009, was discussed at the May meeting of the KWA. The TAC will be reconvened with some potential new members to discuss additional implementation measures needed for the recommendations. Flood issues, with a focus on dam safety, were discussed at the May KWA meeting. The TAC that developed the 2009 Flood Policy section of the Water Plan will be reconvened to follow through on recommendations in the policy. Policy recommendations will be discussed at the November 2010 KWA meeting.

- **Instream Flows (VER)**

- **Description**

- Streams in Kansas are to meet water quality standards, support a healthy aquatic and riparian habitat, and maintain access to diversions for beneficial uses. The Verdigris River and associated tributaries have been having increasingly frequent occurrences of low flow conditions. Low flows have caused aquatic life stress and impaired water quality. Threatened and endangered species, especially mussels, in the Verdigris River system are impacted by these conditions.

- **General Update**

- A work plan was presented to the subcabinet; DWR researched legal implications of proposed work plan. No additional progress has been made.

- **Recommended Actions**

- 1. Continue to work towards coordinated management of the reservoir system to ensure that instream needs are met.

Current Status of Action

Ongoing.

Comments

The ability of the river/reservoir system to meet downstream target flows was evaluated using the OASIS model in the Reservoir Roadmap. The Lake Level Management Plan for Elk City Reservoir may need to be revised based on this information.

- 2. Evaluate the potential for using abandoned surface water rights on tributaries to provide flow.

DWR has determined that surface water flows can be protected at specific points of diversion if a water right is authorized for recreational use.

- 3. Continue water issue strategic plan meetings to ensure intrastate coordination.

Ongoing.

- 4. Identify scenarios and create site specific criteria for improvement. Identify pilot reaches for implementing site specific projects.

A WISP Team has been formed to provide this information

- 5. Participate in interstate discussions to evaluate other states instream flow programs and their applicability to Kansas.

Ongoing.

- 6. Complete the scheduled bathymetry on reservoirs in the basin and use in conjunction with the OASIS model as a decision support tool.

Ongoing.

- **Watershed Restoration and Protection (VER)**

- **Description**

- The restoration and protection of watersheds, particularly those watersheds above public water supply reservoirs, is a priority in the Verdigris basin. The Verdigris and Caney rivers drain south into Oklahoma so inter-state water quality issues are also important to ensure high quality water crossing the state line.

- **General Update**

- The Verdigris BAC participated in a joint meeting of four BACs in the eastern part of the state in June. The purpose of the meeting was to provide members with detailed information on the processes, purposes and complexities of the WRAPS program. The Toronto WRAPS 9 Element Plan has been approved by KDHE. Other WRAPS groups in the basin are working on their plans to bring them into compliance with 9 element requirements. Discussions between KDHE and local stakeholders are underway to determine how best to organize landowners in the area below the confluence of the Fall and Verdigris rivers and in the Elk City and Big Hill reservoir areas. The WRAPS grant covering these areas has been revoked due to lack of progress.

- **Recommended Actions**

1. Work with stakeholder leadership groups to incorporate TMDL implementation, nutrient and sediment reduction and urban stormwater management goals into applicable WRAPS projects.

Current Status of Action

June 2010 Update. The VER BAC participated in a joint meeting of 4 BACs in the eastern part of the state in June. The purpose of the meeting was to provide members with detailed information on the processes, purposes and complexities of the WRAPS Program.

Discussions between KDHE and local stakeholders are underway to determine how best to organize landowners in the area below the confluence of the Fall and Verdigris Rivers & in the Elk City and Big Hill reservoir areas. The WRAPS grant covering these areas has been revoked due to lack of progress.

Comments

2. Target technical and financial assistance programs for water quality protection and restoration to implement TMDLs and WRAPS action plans. Coordinate with development of Source Water Protection Plans.

The Toronto WRAPS 9 Element Plan has been approved by KDHE. Other WRAPS groups in the basin are working on their plans to bring them into compliance with 9 element requirements.

Nine element plans require that targeting occur based on detailed assessments.

○ **Recommended Actions**

3. Continue coordination efforts with the City of Tulsa to ensure good water quality entering Oklahoma from the Verdigris River in Kansas.
4. Complete assessment projects with particular attention to riparian and wetland assessments to target resources. Encourage private landowner efforts to maintain riparian areas to prevent introduction of excess woody debris into the tributary and river system.
5. Continue public outreach efforts to educate the public and landowners about the benefits of best management practices. Encourage other agencies and entities in partnerships and participation to support WRAPS initiatives, activities and funding.
6. Continue efforts to prevent the spread of Zebra mussels from infected water bodies.

Current Status of Action

Coordination is ongoing.

A partial assessment of the mainstem Verdigris River has been completed. An aerial assessment comparing photos has been accomplished above all four federal reservoirs in the basin.

Ongoing.

KDWP continues to provide information about Zebra mussel prevention at all reservoirs and lakes in the state.

Comments

Streambank measurements are being made and will be used to estimate sediment volume originating from streambanks going into the reservoir. This in turn will help to target restoration activities. Gully erosion and brine scar erosion is also being evaluated.

Numerous workshops and presentations have occurred.

- **Water Supply Management and Conservation (VER)**

- **Description**

- Reservoirs, community lakes, and streams in the Verdigris basin provide water for municipal and industrial water supply, irrigation, recreation, and aquatic life. There is a need for a comprehensive management and conservation strategy by communities within the basin to make efficient use of the water resource.

- **General Update**

- KWO has begun work in the Verdigris basin to include it as the next chapter of the Reservoir Roadmap. An OASIS model is being developed to provide a better understanding of supply/demand characteristics of the basin.

- **Recommended Actions**

1. Develop a basin model of the hydrologic system with location specific supply and demand information.
2. Identify options for supply and demand management: reservoir pool raise, pool reallocation, dredging, new supplies, modification of reservoir operations and conservation measures.
3. Refine models to reflect possible outcomes of identified options.
4. Based on results from model scenarios, implement the most beneficial and cost-effective options.
5. Compare the benefits of development of a water assurance district or an improved river/reservoir water management system to ensure sufficient supplies for all water users served by Fall River, Toronto and Elk City reservoirs.
6. Begin incorporation of demand management into water utility plans. Demand management should also include education of and interaction with the development community and include existing local authorities.

Current Status of Action

As part of the Reservoir Roadmap, an OASIS model is being developed by KWO to provide this information.

These options will be evaluated with the OASIS model.

Ongoing.

Ongoing.

No progress.

No progress.

Comments

Information obtained from the model has been incorporated into this basin priority issue and new recommendations have been developed. The revisions will be considered for approval at the November KWA meeting.

Walnut Basin Priority Issues

- **Comprehensive Flood Assessment (WAL)**

- **Description**

- Persistent flood damages in the Walnut Basin indicate a need for a comprehensive evaluation of existing flood control infrastructure and storage to determine current status, mapping funding needs, and opportunities for flood management plans and flood damage reduction actions in the future.

- **General Update**

- A proposed plan to implement the Flooding BPI on a local basis was presented to the BAC in July, 2009. A NAI could be implemented locally and steps to take to accomplish this. DWR and KWO continue to work together to assess areas that the NAI could be implemented. DWR and KWO are also working together to put together a TAC to meet about dam regulations, hazard class changes, dam owner liability, inundation mapping, etc. The Flood Policy Management Section of the Kansas Water Plan, adopted in 2009, was discussed at the May meeting of the KWA. The TAC will be reconvened with some potential new members to discuss additional implementation measures needed for the recommendations. Flood issues, with a focus on dam safety, were discussed at the May Kansas Water Authority meeting. The TAC that developed the 2009 Flood Policy section of the Water Plan will be reconvened to follow through on recommendations in the policy.

- **Recommended Actions**

1. Assess the effectiveness of existing flood control infrastructure and develop plans to reduce flood damage to this infrastructure. Ensure that infrastructure is maintained and free of debris accumulation.
2. Complete repairs of damaged flood control structures and deferred maintenance needs.
3. Determine the current floodplain status and promote NFIP participation, model ordinances and best management practices to local units of government. Limit development in the 100 year floodplain using Flood Insurance Rate Maps to delineate prohibited areas.
4. Engage in WRAPS to integrate comprehensive watershed based flood management with existing floodplain and riparian programs. Assess and inventory watersheds to identify potential locations for non-structural flood control measures.

Current Status of Action

BAC members have been notified of whom to contact with debris accumulation problems and are expected to communicate this to basin residents when possible.

Emergency funds were secured to be used for damaged structure repair after the floods of 2007.

DWR Flood Management Program works with local communities to promote NFIP participation.

A proposed plan to implement the Flooding BPI on a local basis was presented to the BAC in July, 2009. A NAI Plan could be implemented locally and steps to take to accomplish this. DWR and KWO continue to work together to assess areas that the NAI could be implemented. A joint BAC meeting focused on flood

Comments

DWR and KWO are also working together to put together a TAC to meet about dam regulations, hazard class changes, dam owner liability, inundation mapping, etc. The Flood Policy Management Section of the KWP, adopted in 2009, was discussed at the May meeting of the KWA. The TAC will be reconvened with some potential new members to discuss additional implementation measures needed for the recommendations. Flood issues, with a focus on

- **Recommended Actions**

Current Status of Action

management was held in June 2009. The benefits of integrating WRAPS plans with flood management were discussed.

Comments

dam safety, were discussed at the May KWA meeting. The TAC that developed the 2009 Flood Policy section of the KWP will be reconvened to follow through on recommendations in the policy. Policy recommendations will be discussed at the November KWA meeting.

- **Planning for Urbanization (WAL)**

- **Description**

- Demographic shifts in the WAL basin are influencing land use patterns, water supply and distribution infrastructure, wastewater treatment and disposal, flood damage management, and natural and biological resources. The WAL basin is strongly influenced by demographic changes in the eastern portion of the LARK basin which is experiencing similar impacts. Municipalities seek to guide development within their boundaries or designated growth areas to maximize efficiency of providing services. Unplanned rural subdivisions can challenge the provision of services when municipal boundaries reach rural water district boundaries.

- **General Update**

- A Natural Resource Inventory/Water Resource Planner has been initiated to provide a GIS based database of natural and community resources in the nine county REAP area. This was prepared by a graduate student at KU and funded jointly by REAP Water Resources Committee and the KWO. The Inventory/Planner was presented at the REAP WRC meeting in June. The intent is to continue to add layers and information as funds become available and to begin work with the local agencies to make them aware of the Inventory/Planner and encourage them to use the information in the planning process.

- **Recommended Actions**

1. The KWO, the KDHE, and other resource agencies should support local stakeholders in providing leadership in developing a comprehensive regional watershed based plan to manage urbanization and minimize impacts on water resources in the area.
2. Plan development should seek consensus among regional stakeholders, including RWDs, on needed changes to local authorities to implement a comprehensive regional watershed based plan.
3. Determine the feasibility of using the model of County Comprehensive Water and Wastewater plans as a template for plan development. Consider recommending modification of existing, or development of new state legislation to provide additional appropriate state oversight in plan development and or implementation.
4. Coordinate planning efforts with the LARK basin to assure that these issues are addressed in a comprehensive manner.

Current Status of Action

- Ongoing. KWO staff continues to encourage regional planning.
- REAP Water Resource Committee has assumed leadership in developing guidelines for use by cities and RWDs when annexation issues arise.
- Not initiated.
- A joint BAC meeting between the two basins was held in October 2009 to share issues.

Comments

- Discussions between the cities of El Dorado and Wichita have been initiated to determine what role El Dorado reservoir may have in a regional water supply plan.
- As members of the REAP WRC, cities in the basin will use the guidelines.

○ **Recommended Actions**

- 5. Include consideration of the impacts of urbanization on water quality, public water supply, inter-basin transfers, flooding, resource protection and related issues.

Current Status of Action

A Water Resource Planner is under development to provide information on water resources in the REAP area. A Natural Resource Inventory / Water Resource Planner has been initiated to provide a GIS based database of natural and community resources in the 9 county REAP area. This was prepared by a graduate student at KU and funded jointly by REAP Water Resources Committee and the KWO. The Inventory/Planner was presented at the REAP WRC meeting in June. The intent is to continue to add layers and information as funds become available and to begin work with the local agencies to make them aware of the Inventory/Planner and encourage them to use the information in the planning process.

Comments

The planner will continue to be added to and refined. Plans are to familiarize local agencies with its use.

- **Recreational Use of the Walnut River (WAL)**

- **Description**

- Increasing public access to the state’s lakes, rivers and streams, and recognizing the associated economic, social, and quality of life benefits to be derived from fishing, boating and other water-related recreational activities is an objective of the Kansas Water Plan. The Walnut River is not open for public access under Kansas law. However, the river and its tributaries do present numerous opportunities for recreation including boating, hunting, hiking, fishing, wildlife viewing, and camping. The entire extent of current opportunities and access areas is unknown and opportunities to consolidate areas with access have not been evaluated.

- **General Update**

- No progress has been made on this issue.

- **Recommended Actions**

1. Inventory existing access points along the Walnut River and tributaries outside of authorized public use areas that have access provided by KDOT, WIHA or F.I.S.H. programs. Determine the feasibility of developing additional access points that could be linked together to provide reasonably long float experiences.
2. Encourage the use of conservation easements by private landowners with stream frontage that would be willing to allow public recreation in target areas to link with access points identified above. Conservation easements on riparian lands have multiple benefits.
3. Continue to promote participation in the WIHA Program and target areas containing stream segments with potential access development.
4. Continue to promote the F.I.S.H. program especially on contiguous tracts of land with potential for access development.
5. Explore the possibility of establishing a stream access program with the KDWP that would provide payment to private landowners who allow boaters to float through their properties.

Current Status of Action

Comments

No activity.

No activity.

KDWP continues to promote WIHA participation.

KDWP continues to promote F.I.S.H participation.

No activity.

○ **Recommended Actions**

- 6. Explore the possibility of a sponsored licensed tour/float guide to raise confidence in landowners concerned with nuisance and liability issues. The license could have similar restrictions as the F.I.S.H. program to ensure responsible use of the streams.

Current Status of Action

No activity.

Comments

- **Watershed Restoration and Protection (WAL)**

- **Description**

- The restoration and protection of watersheds, particularly those watersheds above public water supply reservoirs and lakes, is a priority in the Walnut Basin. With growing populations in the northern portion of the basin and a corresponding increase in the demand for water, the restoration and protection of these watersheds and the reservoirs below them are of high importance.

- **General Update**

- El Dorado Reservoir Watershed Restoration and Protection Strategy. A WRAPS grant from KDHE was initiated in January 2010. Two very comprehensive newsletters have been distributed with a mailing list of almost 600 recipients. Information in this newsletter results in calls to the Conservation District from landowners wishing to take action to address resource concerns on their properties, many of which are discussed in the newsletters. As follow up to the Corps of Engineers assessment that significant amounts of sediment originate from stream banks above El Dorado Reservoir, Wildhorse Riverworks, with the assistance of eight graduate students participating in the WaterLink program, will begin a stream bank assessment project this summer. Private landowner participation is essential for this work. Many educational activities targeting school children, elected officials and others have taken place. A regional No Till on the Plains workshop is planned for this summer. The City of El Dorado is matching the Kansas Rural Center payment of \$250 for land owners to complete a River Friendly Farms Assessment. The El Dorado WRAPS project has requested demo funding for a new practice: Go Back Filters. KDWP is already using go back filters in areas around the reservoir which involves no farming of a strip of land 120 feet wide along some riparian areas and allowing them to go back naturally to whatever will grow there. The challenge is to determine effectiveness of a go back filter as compared with an established grass filter that has an existing NRCS code number. Funding for this demo practice has not yet been approved by EPA but KDHE is supportive and is negotiating with EPA. Grouse/Silver Creek WRAPS. This project continues to coordinate Watershed District activities with WRAPS related activities to maximize effectiveness of projects. Grouse-Silver Creek WSD #92 is finishing up their FFY 2007 grant to develop a stakeholder leadership team and do some assessment plus water quality protection demonstration projects, by completing and submitting reports to KDHE. They have started spending funds from FFY 2008. They are just now initiating another stream bank stabilization project. Grouse-Silver Creek is revising their 9 element watershed plan to make them eligible for future funding. Winfield City Lake Protection. The City of Winfield continues to provide cost share funding for landowners in the watershed to implement BMPS to protect water quality in the lake. Since 2006, a total of \$76,889.50 has been granted for projects. Landowners have contributed an additional \$17,933 to complement projects for which cost share was provided. An additional 59 acres of land around the lake have been purchased by the City of Winfield to be reverted back to a grass buffer around the lake. The City will continue to purchase buffer land as it becomes available. Upper Timber Creek WRAPS (above Winfield City Lake) Assessment and Planning has been approved by Sub Cabinet for funding. Will likely start in September. This is being sponsored by KSU. Hopefully any future grants will be locally sponsored.

- **Recommended Actions**

- 1. Begin formation of a WRAPS group above El Dorado Reservoir. Work with stakeholders to incorporate TMDL implementation, nutrient and sediment reduction, and urban stormwater management goals into the WRAPS project. Coordinate with development of source water protection plans.

- **Current Status of Action**

- A WRAPS group above El Dorado Reservoir has been formed. A WRAPS grant from KDHE was initiated in January 2010.

- **Comments**

○ **Recommended Actions**

2. Continue to provide cost-share funds through the City of Winfield to landowners in the Winfield City Lake watershed to install BMPs to protect water quality.

3. Continue efforts to prevent the spread of Zebra mussels from infected water bodies.

4. Complete assessment of riparian and wetland areas and target resources to restoration or installation of grass filter strips along streams.

5. Coordinate with surrounding counties on urban growth issues.

6. Continue public outreach efforts to educate the public and landowners about the benefits of BMPs. Encourage other agencies and entities in partnerships and participation to support WRAPS initiatives, activities and funding.

Current Status of Action

The City of Winfield continues to provide cost share funding for landowners in the watershed to implement BMPS to protect water quality in the lake. Since 2006, a total of \$76,889.50 has been granted for projects. Landowners have contributed an additional \$17,933 to complement projects for which cost share was provided.

KDWP continues to provide educational material to boaters at all reservoirs and lakes.

As follow up to the COE assessment that significant amounts of sediment originate from stream banks above El Dorado Reservoir, Wildhorse Riverworks, with the assistance of eight graduate students participating in the WaterLink program, will begin a stream bank assessment project this summer.

A Water Resource Planner is under development to provide information on water resources in the REAP area.

Two very comprehensive newsletters have been distributed with a mailing list of almost 600 recipients. Information in this newsletter results in calls to the Conservation District from landowners wishing to take action to address resource concerns on their properties, many of which are discussed in the newsletters.

Comments

An additional 59 acres of land around the lake have been purchased by the City of Winfield to be reverted back to a grass buffer around the lake. The City will continue to purchase buffer land as it becomes available. Upper Timber Creek WRAPS (above Winfield City Lake) Assessment and Planning has been approved by Sub Cabinet for funding. Will likely start in September. This is being sponsored by KSU.

Zebra mussel populations in El Dorado Reservoir are down considerably from peak levels. Winfield City Lake populations are still high.

Private landowner participation is essential for this work.

Butler and Cowley counties participate in REAP.

Many educational activities targeting school children, elected officials and others have taken place. A regional No Till on the Plains workshop is planned for this summer. The city of El Dorado is matching the Kansas Rural Center payment of \$250 for land owners to complete a River Friendly Farms Assessment.

- **Water Supply Management and Conservation (WAL)**

- **Description**

- The western part of the Walnut and the eastern part of the Lower Arkansas River basins have experienced population growth at an increasingly high rate over the last few years, resulting in increasing demands placed on existing water supplies. While surface water and ground water supplies are available to meet current and future (2050) demands in the area and are generally of good quality, supplies are not necessarily located in the immediate area of demand. A complete understanding of the capability of meeting future demand is needed.

- **General Update**

- As part of the Reservoir Roadmap, Walnut basin water supply will be assessed during 2013 using detailed models and simulations. Internal discussions are underway to evaluate water issues in the basin particularly related to the status of El Dorado Reservoir.

- **Recommended Actions**

1. Continue to support collaborative efforts of the REAP to provide leadership in regional planning for water including urban growth issues.
2. Develop inter-basin hydrologic models with location specific supply and demand information.
3. Identify options for supply and demand management including: interconnections between public water suppliers, better use of existing supplies, dredging, development of new supplies, modification of reservoir operations, conservation measures, and individual responsible use of water through residential activities. Refine plans to reflect outcomes of identified options. Implement the most beneficial and cost-effective options.
4. Begin incorporating demand management into utility operations. Demand management should also include education of and interaction with the development community and include existing local authorities

Current Status of Action

Walnut Basin members participate in REAP.

As part of the Reservoir Roadmap, Walnut basin water supply will be assessed during 2013 using detailed models and simulations. Internal discussions are underway to evaluate water issues in the basin particularly related to the status of El Dorado Reservoir.

These issues will part of discussions between Wichita and El Dorado and will involve their broader service areas.

Not initiated.

Comments

Conversations between the cities of Wichita and El Dorado have been initiated to explore the possibility of El Dorado selling water the Wichita

KWO is providing technical support for determining a firm yield for El Dorado Reservoir.

KWO will provide support.