Health of Kansas Reservoirs

Milford Reservoir Health Water Issue Discussion Framework

APPROACH ONE: COLLECTIVE RESPONSIBILITY

Collectively we can we make the required changes, and voluntary approaches may not solve the problem. BUT, this approach adds constraints on individual choice in endeavors reliant on water.

Examples of actions we can take	Possible trade-offs to consider
D. Require farmers to use best management practices for water quality and quantity.	The costs of compliance to the sustainability of farming operations puts an undue burden on this sector.
G. Pass local ordinances restricting residential and business use of products containing phosphorous for lawn, garden, home and automotive.	Restrictions on products may economically disadvantage some individuals and businesses, and may not lead to a significant reduction in phosphorous.
Y. Limit development on most environmentally sensitive areas.	Doing so will impinge on individual landowner rights to develop property for their own benefit.
P. Increase public funding to clean and protect water.	This would require increasing taxes, increasing user fees, or diverting limited funds away from other priorities.

APPROACH TWO: RESPECTING NATURE

Our expectations for these reservoirs are not realistic and humans need to adapt to the limits of nature. BUT, personal losses (economic, cultural, comfort, etc.) are inevitable when adapting to natural constraints.

Examples of actions we can take	Possible trade-offs to consider
H. Expand & improve wetlands on the north end of the reservoir to enhance natural filtration of sediment and phosphorous.	This may take land out of agricultural production and interfere with property rights of landowners.
M. Launch a media campaign to educate recreational users about how and where they can safely use the lake during blue-green algal blooms.	Because algal blooms can devleop and move quickly, this could increase risk of exposure to toxins for lake users and associated liability for lake managers.
J. Manage reservoirs to serve only those priority functions that can be realistically sustained.	Some uses and practices relying on reservoirs must be abandoned, or alternate sources of water must be found to meet all needs.
L. Price water according to real cost (including ecological cost) as an incentive to conserve.	Higher rates would put additional economic pressure on those already facing hardship.

APPROACH THREE: HUMAN INGENUITY

Technology has or will be developed that will help meet our future water needs. BUT, new technologies not requiring human adaptation may have unintended consequences, and ignore the root causes of the problem.

Examples of actions we can take	Possible trade-offs to consider
R. Use a combination of mechanical interventions such as dredging or siphoning sediment, changing lake levels, aerating or circulating water, and building jetties to control algal growth & movement.	These are short term or localized solutions that will not address the long term health of the entire reservoir, and in some cases are experimental with unkown consequences.
I. Develop and implement technologies that harvest and reuse water on-site to reduce the demand for water from reservoirs.	Best Management Practices and specifications for reuse would require costly measures to guarantee safety.
E. Explore pilot studies using sonic, chemical or biological technologies that make the lake environment less favorable to growth of harmful algae.	Many emerging technologies developed for smaller ponds may not scale up to larger lakes, and impacts on the ecosystem and other living organisms are unknown.
O. Open dams following significant rain events, to send sediment through rather than letting it settle to the bottom of the reservoir.	This could violate historic priorities of supporting flood control and barge traffic, or flood ecosystems and communities downstream.

APPROACH FOUR: SELF DETERMINATION

Water can be managed at the local level to optimize growth. BUT, this process may result in a loss of equity in collective decision-making.

Examples of actions we can take	Possible trade-offs to consider
N. Trust and support agricultural producers to be stewards of the land without government interference.	Implementing best management practices without government funds might not make economic sense for many producers.
B. Allow citizens to form water management cooperatives that allocate water resources based on local needs.	Regional and statewide needs for water may not be met, resulting in inequitable distribution of water resources.
F. Privatize reservoir management to ensure priority local use.	Privatization can create a system of management that prioritizes company profitability over environmental and community needs.
K. Partner with corporations specializing in water quality technology to deploy equipment designed to reduce algal blooms.	Ongoing maintenence of these technologies may place an undue burden on already understaffed parks.

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Have you visited a Kansas Reservoir?

A reservoir is an enlarged natural or artificial lake, storage pond or impoundment created using a dam or lock to store water. Milford Lake near Wakefield is a reservoir, as are Tuttle Creek, Kanopolis, Perry, Clinton, Hillsdale, Pomona, Council Grove, Cheney, John Redmond and Wilson Lakes, among others. The major reservoirs in Kansas are managed by the federal and state governments for a variety of purposes, including drinking water, irrigation, navigation, flood control, recreation, wildlife, industry and energy needs.

Did you know?

- **HISTORICALLY**, Kansas had few permanent surface water bodies or lakes which, in part, limited both agricultural and human settlement. In the late 1940's-1960's, federal funding spurred the development of dams creating several large reservoirs in Kansas, primarily for the purpose of flood control but also to supply water to surrounding areas.
- The **US ARMY CORPS OF ENGINEERS** determines when to open the dams to release water from a reservoir according to historical priorities such as flood control and navigation for downstream barge traffic.
- Most Kansas reservoirs are now approximately half way through their **100 YEAR DESIGN LIFE**. Many reservoirs have lost capacity as they fill with sediment and face water quality problems from bacteria, nutrients, herbicides and pesticides.
- **SEDIMENTATION** is a natural process whereby soil that erodes from the land and from stream channels settles in the bottoms of lakes and ponds. In addition to reducing water quantity, sediment has a negative impact on water quality by transporting pollutants such as pesticides, herbicides, and nutrients attached to the soil particles.
- A **WATERSHED** is an area of land that water travels over or under to reach a water body. The Milford watershed includes portions of these counties: Clay, Cloud, Dickinson, Geary, Jewell, Mitchell, Phillips, Republic, Riley, Smith and Washington
- **RESERVOIR HEALTH** is greatly impacted by land use and human activities in the watershed above the reservoir. Practices that can increase sedimentation and it's effects include: straightening of streams, development of sensitive areas, livestock in and around streams, and conversion of grasslands to cropland.
- **BEST MANAGEMENT PRACTICES** (BMP's) that help decrease sedimentation and other contaminants include: cover crops, rain gardens, constructed wetlands, sediment basins, alternative livestock watering structures & fencing, terraces, waterways, buffers, subsurface fertilizer application, CRP grasslands and bioswales.
- **NUTRIENTS** (i.e. phosphorus and nitrogen) are essential for aquatic life and are the primary factor driving fish and aquatic plant growth rates and lake productivity. Excess nutrients from urban, agricultural or natural sources can alter natural cycles and cause algal blooms, create low dissolved oxygen affecting fish survival, and lead to taste and odor issues in drinking water. **PHOSPHORUS** (P) already in the lake and inflows from the watershed is a primary cause of toxic blue-green algal blooms and taste-and-odor problems in Milford Reservoir.
- Wind, invertebrates, bottom feeding fish and bacteria can release phosphorous from **LAKE-BOTTOM SEDIMENT** into the water.
- Record lake clarity, due in part to water being filtered by the invasive **ZEBRA MUSSEL** population, combined with high nutrients has created optimal conditions for blue-green algal growth in recent years.
- Milford Lake experienced sizeable **ALGAL BLOOM** events in 2011-2016, leading to significant recreational limitations ranging from health watch to lake closure. These algal blooms have had significant economic, recreational, and health impacts on surrounding communities.

"Too often we take for granted that the foundation of our lives and livelihoods will be there forever. Future demand for water supply from Kansas reservoirs is projected to increase. Increasing demands coupled with decreasing supplies will eventually result in water supply shortages during severe drought conditions."

- Tracy Streeter, Director, Kansas Water Office

In order to plan for the future we need to explore approaches that will balance our differing values with our shared need for clean and sufficient water.